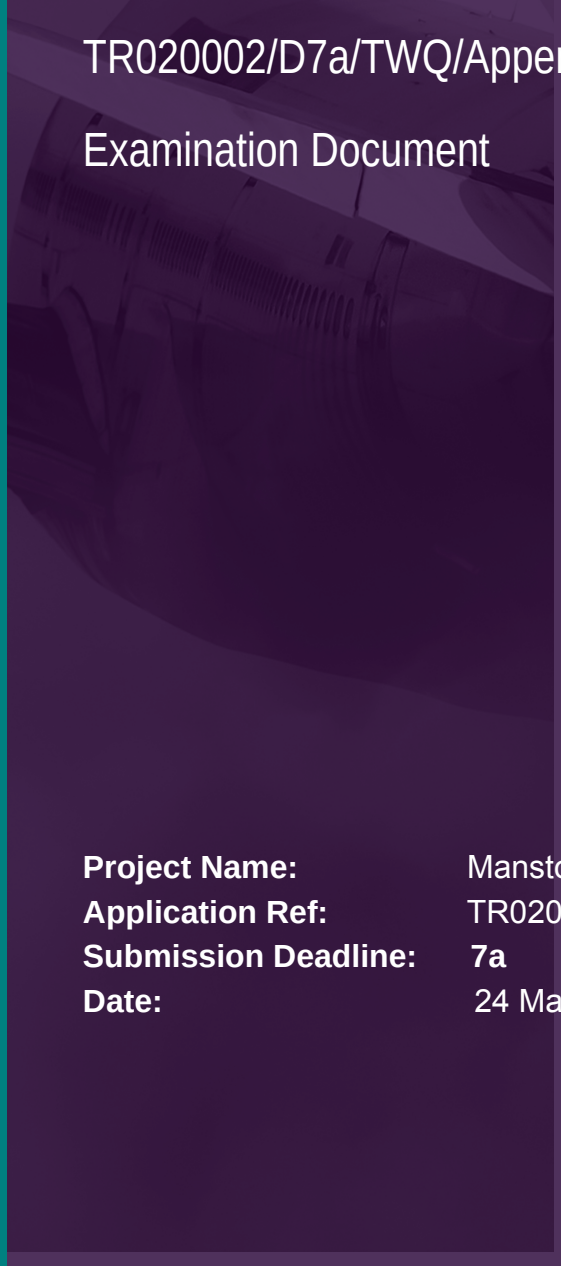
RiverOak Strategic Partners

Appendices to Answers to Third Written Questions

TR020002/D7a/TWQ/Appendices

Examination Document



Project Name:	Manston Airport Development Consent Order
Application Ref:	TR020002
Submission Deadline:	**7a**
Date:	24 May 2019

Manston Airport Development Consent Order

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Appendix EC3.4

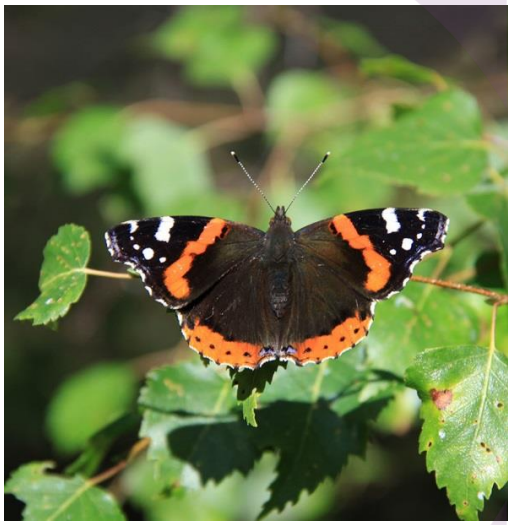
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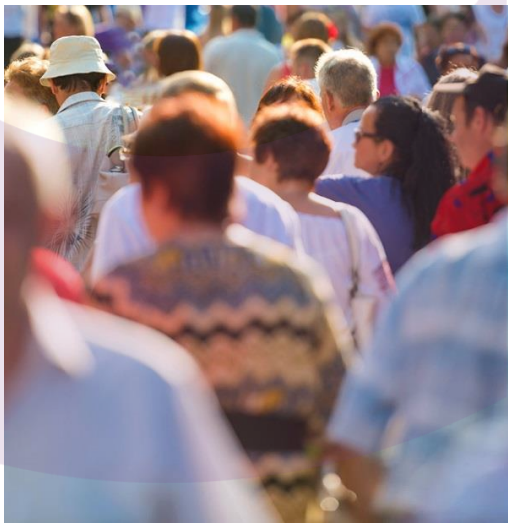
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Manston Airport Development Consent Order

Response to Natural England Deadline 6 Submission (Annex 3)







Wood Environment & Infrastructure Solutions UK Limited – May 2019

Appendix Ec.3.4

Report for

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Document revisions

No.	Details	Date
1	Final	22 May 2019

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1. Introduction

1.1.1 This report has been prepared in response to Natural England's Representation submitted at Deadline 6 (Annex 3), which is referenced in Ec. 3.3 (on air quality effects on designated sites) and Ec. 3.4 (regarding noise effects on waders of Special Sites of Scientific Interest (SSSI) sites) of the Examining Authority's (ExA) Third Written Questions (3WQs). It provides additional information with regard to the ecological effects of predicted changes in air quality resulting from the Proposed Development, in addition to the potential effects of aircraft noise on SSSI wading bird interest species. A summary of the conclusions of this report is provided as a direct response to Ec 3.3 and Ec 3.4.

1.2 Air Quality

1.2.1 Ec. 3.3 addresses Environmental Statement (ES) Chapter 6: Air quality effects on designated sites:

"Annex 3 of NE's Deadline 6 response states that the Applicant has incorrectly assessed the air quality impacts of future traffic growth because such growth is included in the predicted environmental concentration (PEC) and not in the process contribution (PC).

1.2.2 Ec 3.3 requests that the Applicant responds to the following:

i. Respond to NE's comments regarding the approach to in-combination assessment of the Process Contributions from the proposal and other plans or projects.

ii. Respond to NE's comments regarding the update to the Air Pollution Information System (APIS) background data.

iii. Provide contour plots to clearly show where the Process Contribution of NOx is more than 1% (or relevant proxy) where the background is at or over 100% of the Critical Level. This should be overlain with habitat data to clearly illustrate the potential effects on designated sites.

iv. Where relevant, provide an updated consideration of the impact of NOx from construction and operation phase effects for years 2, 6 and 20 on designated sites.

1.2.3 This report provides the Applicant's response with reference to designated sites, also termed major receptors including SSSI, Special Areas of Conservation (SACS), Special Protection Areas (SPAs) and Ramsar sites, and for local receptors (e.g. Priority habitats).

1.2.4 The ecological assessment has been informed by an air quality assessment which accounts for the use of the Thanet Strategic Transport Model (TSTM) and includes all developments included in the Local Plan. The assessment of ecological effects potentially resulting air quality effects are presented in **Section 2.**

1.3 SSSI waders and noise

1.3.1 Ec.3.4 requests the Applicant to respond to NE's comments regarding waders on SSSI sites. In their response to the Second Written Questions submitted at Deadline 6, they suggest that "*based on the noise contour mapping, Natural England's view is that significant effects on SSSI waders cannot be ruled out*"'

Appendix Ec.3.4

1.3.2 In responding to this view, there are two SSSIs of relevance: The Thanet Coast SSSI and the Sandwich Bay to Hacklinge Marshes SSSI. These are the constituent SSSIs of the Thanet Coast and Sandwich Bay SPA and Ramsar Site.

1.3.3 This report provides information to show that there are no significant effects from aircraft flights associated with the operation of Manston Airport on the three SSSI wader species.

1.3.4 It should be noted that EC 3.4 also refers in (ii) to NE's comments on the SPA and Pegwell Bay. These comments are addressed in the revised RIAA submitted at Deadline 7a.

Appendix Ec.3.4

2. Assessment of Effects on Designated Sites/Priority Habitats/Plant and Invertebrate Species through Air Quality Effects

2.1 Baseline Conditions

Sites and Habitats Included

2.1.1 The current baseline was discussed in Section 7.10 of the ES [APP-033] and is therefore only summarised here. The key sites and habitats identified for inclusion in the assessment are:

- Sandwich Bay SAC, which is designated for the presence of five Annex I habitats;
- Sandwich Bay to Hacklinge Marshes SSSI, which is the constituent SSSI of the SAC and covers the entirety of the SAC, plus areas of adjacent and nearby land. The SSSI is notified for a total of 31 separate features; and
- Priority habitats outside designated sites, specifically deciduous woodland as detailed in Appendix 7.3 of the ES [APP-033]. Locations of deciduous woodland priority habitats in the vicinity of the Proposed Development are shown on Figure 4.2, Appendix 7.2.

Air Quality

2.1.2 The overall air quality baseline is detailed in Chapter 6: Air Quality of the ES [APP-033], with a summary provided here.

2.1.3 Measured annual mean NOx concentrations from Thanet's monitoring programme between 2007 and 2016 and monitor locations are detailed in Appendix 6.2 in Chapter 6: Air Quality of the ES [APP-033].

2.1.4 The Department for Environment, Food and Rural Affairs (Defra) maintains a nationwide model (the Pollution Climate Mapping (PCM) model) of existing and future background air quality concentrations at a 1km grid square resolution. The datasets include annual average concentration estimates for NOx[1], NO_2, PM_{10} and $PM_{2.5}$[2], as well as other pollutants. The datasets were updated in 2016.

APIS background mapped deposition rates

2.1.5 The Air Pollution Information System (APIS) website[3] provides information on background deposition of nitrogen and sulphur at sensitive ecological sites in the UK. APIS is widely recognised as the appropriate source for this information and will be used for the air quality assessment.

[1] Nitrogen oxides were taken to be nitrogen dioxide (NO_2) + nitrogen/nitric oxide (NO). NO and NO_2 are collectively known as NOx
[2] PM_{10} is particulate matter 10 micrometres or less in diameter, $PM_{2.5}$ is particulate matter 2.5 micrometres or less in diameter. $PM_{2.5}$ is generally described as fine particles.
[3] www.apis.ac.uk

Future Baseline

2.1.6 There is a trend in the air quality monitoring data for concentrations to reduce slightly over the years. For example, Defra forecasts that NOx concentrations will fall by about 2% per year during the 2020s. This trend is expected to continue in response to strong political pressure to reduce emissions from roads vehicles. To ensure that a conservative scenario is adopted, this trend has been ignored in the modelling, with the future baseline assumed to be the same as the current baseline. For near-road locations, the Defra maps have been used for consistency across the roads methodology.

2.1.7 No quantitative information is available on future deposition rates, so these too will be assumed to be the same as the current baseline. However, it is worth noting that the current trend is for both nitrogen and acid deposition to fall. Emissions of nitrogen, especially from road vehicles, are declining and emissions of ammonia, which contributes to nitrogen deposition, have been static for many years, albeit that the UK Government's Clean Air Strategy 2019 has placed new focus on this pollutant and is introducing measures to control and reduce emissions. Additionally, emissions of sulphur, which contributes to acid deposition, have fallen substantially over the last two decades and are likely to fall further as coal use is eliminated.

2.1.8 Committed developments have been reviewed to identify additional sources of emissions that are likely to arise in future. The main new developments of relevance are residential, which may generate additional road traffic. These have been included in the traffic modelling, and subsequent air quality assessment.

2.2 Predicted Effects and their Significance

2.2.1 There is potential for direct effects resulting from a deterioration in air quality. Plant and equipment used during construction, as well as road traffic generated during the construction phase, will produce emissions. During operation, emissions will result from aircraft and airside plant and equipment; and road traffic generated during the operational phase.

2.2.2 The pollutant of concern associated with emissions that might affect sensitive habitats is nitrogen oxide[4] (NO_x). Road and air traffic emissions may increase the ambient NO_x concentrations in the air to which vegetation is exposed. The air quality standard measurement used for NO_x concentrations in air is the annual mean and the daily mean.

2.2.3 In addition to NO_x concentrations in air, NO_x may also result in deposition, following chemical conversion in the air from nitrogen dioxide emissions. This nitrogen deposition may affect plant communities (with the consequent potential to alter habitats) by causing:

- Nutrient enrichment of soils; and
- Acidification of soils.

2.2.4 The strongest effect of NO_x emissions is through their contribution to nitrogen deposition (either through nutrient enrichment or acidification) rather than through the NO_x concentrations in air. Furthermore, there is substantial evidence to suggest that the effects of ambient nitrogen are much more likely to be negative in the presence of equivalent concentrations of sulphur dioxide (SO_2), with the ratio of SO_2 to NO_2 having decreased greatly in the UK over the past 30 years[5]. Ozone (O_3)

[4] Assessment of sulphur oxides (SO_2) has been scoped out as such emissions are expected to be negligible (see **Chapter 6: Air Quality**, section 6.4, and Table 6.8).
[5] Air Pollution Information System webpage: http://www.apis.ac.uk/overview/pollutants/overview_NOx.htm [Accessed 21/03/18]

has a similar effect to SO_2. Ozone has also decreased and in 2016 for the UK "*all zones and agglomerations met the target values for health and for protection of vegetation*"[6]. There is also a long-term objective for the protection of vegetation from O_3. In 2016 the south-east of England was below this long-term objective for the protection of vegetation[7]. In terms of potential impacts upon ecological receptors this means that any elevated levels of NOx concentrations in air are unlikely to have negative impacts when levels of SO_2 and O_3 are also low.

2.2.5 The EA and Institute of Air Quality Management (IAQM) has specific guidance for ecological receptors.

2.2.6 The EA guidance[8] gives criteria for screening outsource contributions at designated nature conservation sites. For SSSIs, SPAs, SACs and Ramsar sites there is no need for further assessment if the screening calculation finds that:

- Both the following are met:
  - The short-term PC[9] is less than 10% of the short-term AQAL[10]; **and**
  - The long-term PC is less than 1% of the long-term AQAL;
- **or**:
  - The long-term PEC is less than 70% of the long-term AQAL.

2.2.7 The EA guidance states that for local nature sites, emissions are insignificant if:

- The short-term PC is less than 100% of the short-term AQAL; **and**
- The long-term PC is less than 100% of the long-term AQAL.

2.2.8 It further indicates that, following detailed dispersion modelling, no further action is required if:

- The proposed emissions comply with Best Available Technique (BAT) associated emission levels (AELs) or the equivalent requirements where there is no BAT AEL; and
- The resulting PECs won't exceed AQALs.

2.2.9 However, alternative approaches to the screening of annual mean NOx, nitrogen deposition and acid deposition have been adopted to respond to NE's concerns with reference to the In combination assessment.

- The updated approach to annual NOx assessment is detailed in the Manston Airport DCO: Environmental Statement Addendum- Potential Effects arising from the use of the Thanet Strategic Transport Model [REP6-016]. In summary however, the 1% screening criterion was **not** used. This is because the 1% criterion should only be applied after the contribution from other

[6] Defra, Air Pollution in the UK 2016. September 2017: https://uk-air.defra.gov.uk/assets/documents/annualreport/air_pollution_uk_2016_issue_1.pdf [Accessed 21/03/18]
[7] Five zones (Yorkshire and Humberside, the West Midlands, the North-East, South Wales and North Wales) were above the long-term objective for vegetation in 2016 (Defra, Air Pollution in the UK 2016. September 2017).
[8] Environment Agency (2016). 'Air emissions risk assessment for your environmental permit'. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit, dated 2 August 2016.
[9] The predicted concentrations resulting from the process (i.e. the process contribution (PC)) are used along with background concentrations and the percentage contribution that the predicted environmental concentrations (PEC) would make towards the relevant standard, objective or guideline value (see **Chapter 6: Air Quality**).
[10] AQAL = Air quality assessment level. A generic term to embrace air quality standards, air quality objectives, targets, limit values, critical levels, critical loads, etc. This term is promulgated by IAQM/Environmental Protection UK (see glossary and abbreviations, Table 6.1, **Chapter 6: Air Quality**).

plans and projects have been included in the PC (that is, the in-combination contribution). This is because the proposals contained in the Thanet Local Plan were insufficiently defined to isolate traffic contributions from individual projects. It is not therefore the case that 'other plans and proposals' have not been taken into account, rather that this assessment uses the relevant alternative screening criteria. In this regard, the guidance also states that impacts at major ecological sites can be considered negligible if the PEC is less than 70% of the AQAL. This criterion **has** been used to identify receptors requiring more detailed assessment in the updated RIAA and is considered robust

- The approach to assessment of nitrogen deposition and acid deposition is detailed in Manston DCO: Modelling and Assessment of Nitrogen and Acid Deposition presented in Appendix I to the updated RIAA. In summary, this does adopt the 1% screening criterion detailed in the EA guidance, but presents an In Combination Contribution i.e. there is no alone assessment.

2.2.10 The critical level for all vegetation types from the effects of NOx has been set to 30 µg/m^3 [11].

2.2.11 The full scope of the air quality assessment, the air quality baseline, assessment methodology and assessments (for ecological receptors) are detailed for NOx in the Manston Airport DCO: Environmental Statement Addendum- Potential Effects arising from the use of the Thanet Strategic Transport Model [REP5-021], and for nitrogen deposition and acid deposition in Manston DCO: Modelling and Assessment of Nitrogen and Acid Deposition (Appendix I to the updated RIAA). The criteria for the spatial identification of ecological receptors is set out in Section 6.4 of Chapter 6: Air Quality of the ES [APP-033], with the receptors detailed in Table 6 and their location shown in Figure 6.5 (those near the Proposed Development) and Figure 6.6 (those further away from the Order Limits).

2.2.12 The air quality assessment has been based upon three operational years, two of which also cover the construction phase, as follows:

- Year 2, representing the first year of aircraft operation;
- Year 6 (the point at which the airport exceeds 10,000 movements per year); and
- Year 20, representing the worst-case year in terms of likely emissions from aircraft and vehicular movements.

2.2.13 Construction activity will be spread over the first 18 years of the Proposed Development but is assumed to be at its most intense during Phases 1 and 2 This approach has ensured that the assessment has captured the peak construction years as well as the worst-case operational year.

2.2.14 Throughout the air quality modelling process, care has been taken not to risk under-predicting impacts. The assumptions made in this respect are detailed in the Manston Airport DCO: Environmental Statement Addendum- Potential Effects arising from the use of the Thanet Strategic Transport Model [REP5-021], and for nitrogen deposition and acid deposition in Manston DCO: Modelling and Assessment of Nitrogen and Acid Deposition (Appendix I to the updated RIAA).

2.2.15 Based on the updated assessment of annual mean NOx and daily mean NOx presented in Manston Airport DCO: Environmental Statement Addendum- Potential Effects arising from the use of the Thanet Strategic Transport Model it is concluded that air quality effects cannot be screened out for the following ecological receptors associated with designated sites and priority habitats:

[11] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. Transposed into UK law as the Air Quality Standards Regulations: Statutory Instrument 2010 No. 1001. Environmental Protection: The Air Quality Standards Regulations 2010.

- Annual mean NO_x on two receptors (ER012 and E41) in Year 2, Year 6 and Year 20 year; and
- Daily mean NO_x on eight receptors (E20, E21, E22, E23, E24, E39, E81 and E82) in Year 2, three receptors (E21, E22 and E23) in Year 6 and one receptor (E22) in Year 20.

2.2.16 Based on the updated assessment of nitrogen deposition and acid deposition presented in Manston DCO: Modelling and Assessment of Nitrogen and Acid Deposition (Appendix I to the updated RIAA) it is concluded that air quality effects cannot be screened out as insignificant on the following ecological receptors associated with designated sites and priority habitats:

- Nitrogen deposition on one receptor (ER012) in Year 6 and receptors E26, E28 and ER012 in Year 20; and
- Acid deposition on one receptor (E41) in Years 2 and 6 and three receptors (E40, E41 and ER012) in Year 20.

2.2.17 No receptors associated with the major or local receptors require assessment for nitrogen deposition in Year 2, and no local receptors require assessment for nitrogen deposition or acid deposition in any of the 3 assessment years as they all meet the screening criterion for insignificance.

Annual Mean NOx

2.2.18 Under EA guidance[8], where the PEC is greater than 21 µg m^{-3} (70% of the AQAL) at major ecological receptors, further assessment may be required. Two receptors exceed this criterion, namely Receptors E41 and ER012 which are both located along the A256 Margate Road.

2.2.19 The maximum annual mean NO_x PEC is predicted in Year 20 at Receptor E41 (49.28 µg m^{-3} or 164% of the AQAL), where the A256 Margate Road passes the Sandwich Bay to Hacklinge Marshes SSSI, which at this point is less than 5 m from the kerb. The modelled contribution from the Proposed Development here is 2.51 µg m^{-3}, indicating the contribution to NO_x concentrations at this receptor is dominated by non-airport road traffic.

2.2.20 At Receptor ER012 the AQAL is not exceeded, the PEC is 24.03 µg m^{-3} or 80.1 % of the AQAL (of which the PC is 0.97 µg m^{-3}, 3.2% of the AQAL.

2.2.21 Each of the two modelled locations has been related to the nearest unit of the Sandwich Bay to Hacklinge Marshes SSSI with the habitats present and condition status[12], detailed in **Table 2.1**.

Table 2.1 Modelled locations related to unit details for Sandwich Bay to Hacklinge Marshes SSSI

Receptor	SSSI Unit Number	Main Habitat/ Area (Ha)	Condition Assessment Status/ Latest Assessment Date
E41	11	Neutral grassland – lowland / 28.25	Unfavourable - recovering / 27.09.2012
ER012	08	Littoral sediment / 22.76	Favourable / 28.07.2009

2.2.22 However, the following factors are relevant in determining the potential for, and significance of, ecological effects at this location:

[12] Each unit of SSSI land is assessed (at least every six years) against six condition states: **Favourable; Unfavourable recovering; Unfavourable no change; Unfavourable declining; Part destroyed; Destroyed.**

Appendix Ec.3.4

- None of the habitats present within areas affected by the exceedance of the 70% (21 µg m^{-3}) threshold are considered to be particularly sensitive to NO_x deposition (i.e. they are considered very unlikely to support sensitive bryophyte species for example).
- Additionally, the Air Pollution Information System[13] (APIS) website states that NO_x are known to have greater adverse effects in the presence of SO_2 or O_3, and hence the critical level should apply where these pollutants are also close to their critical level. The levels of both these pollutants are well below their critical level (refer to paragraph 7.10.20 of Chapter 7 of the ES [APP-033]); hence these pollutants would not exacerbate any effects of NO_x in these locations.
- Habitats within the Sandwich Bay to Hacklinge Marshes SSSI Unit 08, approximately 5m from ER012, comprise littoral sediment. Where vegetated, this will be most likely with saltmarsh, the habitats present are regularly covered by eutrophic tidal waters. NO_x deposition in Year 20 at Receptor ER012 remains lower than the critical level, with no exceedance of the AQAL within the designated site. Therefore, no ecological effects are predicted and therefore no further consideration of these receptors has been undertaken.
- Additionally, Defra forecasts that NOx concentrations will fall by about 2% per year during the 2020s, and these trends are expected to continue in response to strong political pressure to reduce emissions from roads vehicles, both of air pollutants and CO_2, bearing in mind that concentrations at ER012 are dominated by road traffic. Whilst the Emission Factors Toolkit used in the modelling (version 8) only provides forecasts out to 2030, and does not include any electric vehicles on rural roads; in reality, by Year 20, a very large fraction of the vehicle fleet is expected to be zero-emission, given current behavioural trends, the Government's commitment to end sales of new petrol and diesel vehicles by 2040, and the increasing pressure to decarbonise the vehicle fleet as soon as possible. Therefore, the additional NOx deposition predicted to result from operation of the airport (including traffic generated in combination with other developments), is most likely to be off-set as time passes by reduced NOx emissions generally, ensuring that the development will not contribute to any undermining of achievement of the conservation objectives.

2.2.23 For the reasons described above, no further assessment of EC012 is required and as such, the remainder of the assessment of ecological effects of annual mean NOx, is focussed on Receptor E41, where the AQAL is exceeded.

2.2.24 Sandwich Bay to Hacklinge Marshes SSSI Unit 11 (Receptor E41) is adjacent to the A256 Ramsgate Road, with a solar farm and waste water treatment plant to the north and Richborough Energy Park to the south. Unit 11 does not form part of the European designated sites.

2.2.25 The main habitat of the unit is stated as neutral lowland grassland[14]. Based on the information available[15] , it is not clear which of the 31 notified features of the SSSI are present, as none of these clearly fall within a Lowland grassland definition. However, Magic[16] indicates priority habitats are

[13] Air Pollution Information System (2019) Nitrogen Oxides: Grasslands. Available at: [online] http://www.apis.ac.uk/nitrogen-oxides-grasslands [Accessed April 2019].
[14] Natural England (2019) Designated Sites View [online]. Available at: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001128&SiteName=Hack&countyCode=&responsiblePerson [Accessed May 2019].
[15] Natural England (2019) Designated Sites View [online]. Available at: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001128&SiteName=Hack&countyCode=&responsiblePerson [Accessed May 2019].
[16] Natural England (2019) MAGIC maps [online]. Available at: https://magic.defra.gov.uk/ [Accessed May 2019]

present, with much of the unit close to the road identified as 'coastal and floodplain grazing marsh' with a lesser extent of 'good quality semi-improved grassland'.

2.2.26 Based on review of aerial photography (accessed 26/03/2019), the unit appears significantly scrubbed over and the last condition assessment in 2012 noted:

"*Unit recovering following scrub clearance by Kentish Stour Countryside Project. Grazing arrangement in place appears to be keeping scrub re-growth under control. This is aided by Rabbit grazing, which has allowed some floral diversity to return to the site. Further scrub clearance may be needed to restore site to favourable condition*."

2.2.27 At Year 20, the worst-case year, the PEC at this receptor is 49.28 µg m^{-3}, well above the 30 µg m^{-3} critical level, with a PC of 2.51 µg m^{-3}. The APIS website indicates that increased NO_x can affect grasslands as follows:

- Effects are mainly on growth, photosynthesis and nitrogen assimilation / metabolism with few species showing visible injury;
- Visible decline symptoms for example, leaf discoloration can occur at very high concentrations (> 400 ug m^3);
- Direct damage to mosses, liverworts and lichens, which receive their nutrients from atmospheric deposition, often leads to reductions in species diversity, but also leads to an increase in nitrogen-loving species; and
- Species composition changes.

2.2.28 However, the following factors are relevant in determining the potential for, and significance of ecological effects at this location, as follows:

- In Year 20, without the Proposed Development, road traffic would contribute 40.18 µg m^{-3} NO_x. Thus, on its own existing traffic will already contribute significantly more NO_x than the critical level. This is an inherent characteristic reflecting the location of the site close to a busy road. This location already compromises achievement of the conservation objectives and for this reason any additional deposition arising from the proposed development in combination with others has some potential to affect delivery of the conservation objectives. In this regard, even the relatively small contribution of an additional 2.51 µg m^{-3} contributed by the Proposed Development may exacerbate any existing limitation on habitat quality in this location.
- For the reasons described above, one important moderating factor is that, levels of SO_2 and O_3, are well below their critical level and were scoped out of the assessment (as detailed in Section 6.4) in Chapter 6 of the ES [APP-033].
- A second factor that must be taken into account in determining whether a significant effect may occur is the extent of the affected area. In this regard, the area exposed to NO_x levels above the 30 µg m^{-3} is located only in the immediate vicinity of the roadside (refer to Figure 4.5 in the Manston Airport DCO: Environmental Statement Addendum- Potential Effects arising from the use of the Thanet Strategic Transport Model [REP6-016) and the entrance gate to this unit. It appears that the habitats in this area are not representative of the notified habitats, appearing to be scrubbed over. Even if restored to favourable condition (assumed to be grassland) the habitats in this location are likely to be disturbed and of lower quality than those positioned further away from the road in less disturbed areas.
- Additionally, as indicated above, Defra forecasts that NOx concentrations will fall by about 2% per year during the 2020s, and these trends are expected to continue in response to strong political pressure to reduce emissions from roads vehicles, both of air pollutants and CO_2,

bearing in mind that concentrations at E41 are dominated by road traffic. Whilst the Emission Factors Toolkit used in the modelling (version 8) only provides forecasts out to 2030, and does not include any electric vehicles on rural roads; in reality, by Year 20, a very large fraction of the vehicle fleet is expected to be zero-emission. Current behavioural trends together with the Government's commitment to end sales of new petrol and diesel vehicles by 2040, and the increasing pressure to decarbonise the vehicle fleet as soon as possible lend weight to this assertion albeit that it could not be included within the modelled scenario. In this, increasingly likely circumstance, the additional NOx deposition predicted to result from operation of the airport (including traffic generated in combination with other developments), is likely to be off-set as time passes by reduced NOx emissions.

2.2.29 Overall therefore, given the already degraded nature of the habitats in this location and taking the above factors into account, no ecological effects that would undermine the conservation objectives for the SSSI are predicted in relation to annual mean NOx emissions and therefore **no significant ecological effect is predicted**.

Maximum daily mean NO_x concentrations in air

2.2.30 Under EA guidance[8], where the short-term Process Contribution (PC) is greater than 10% of the short-term Air Quality Annual Limit (AQAL) (200 µg m^{-3}) at major ecological receptors, or greater than 100% of the AQAL at local ecological receptors, further assessment may be required.

2.2.31 The greatest PC at any of the 5 receptors where emissions exceed the criteria for insignificance occur in Year 2 (77 µg m^{-3}, or 38% of the AQAL at the Receptor E23 (see Table 4.3 in Manston Airport DCO: Environmental Statement Addendum- Potential Effects arising from the use of the Thanet Strategic Transport Model), representing Pegwell Bay, within Sandwich Bay SAC and the Sandwich Bay to Hacklinge Marshes SSSI). The PEC here is 120 µg m^{-3} or 60% of the AQAL. Under EA guidance[8], this impact cannot be screened out and requires further assessment.

2.2.32 The greatest PC at any of the modelled local nature receptors is 441 µg m^{-3} or 220% of the AQAL at Receptor E81, representing deciduous woodland in the Priority Habitat Inventory near the B2190 Spitfire Way, where the PEC is 493 µg m^{-3} or 246% of the AQAL. Under EA guidance[8], this impact cannot be screened out and requires further assessment.

2.2.33 Further assessment is also required at Receptor E82, representing deciduous woodland in the Priority Habitat Inventory near the B2050 Manston Road.

Major Receptors

2.2.34 Each of the modelled locations at which the guidance thresholds are exceeded have been related to the nearest unit of the Sandwich Bay to Hacklinge Marshes SSSI, with the habitats present and condition status[17] detailed in **Table 2.2**.

[17] Each unit of SSSI land is assessed (at least every six years) against six condition states: **Favourable; Unfavourable recovering; Unfavourable no change; Unfavourable declining; Part destroyed; Destroyed.**

Table 2.2 Modelled Locations Related to Unit Details for Sandwich Bay to Hacklinge Marshes SSSI

Receptor	SSSI Unit Number	Main Habitat / Area (Ha)	Condition Assessment Status / Latest Assessment Date
E20	1	Supralittoral rock / 19.06	Favourable / 21.10.2010
E21	1	Supralittoral rock / 19.06	Favourable / 21.10.2010
E22	2	Earth heritage / 1.08	Favourable / 20.07.2009
E23	5	Littoral sediment (saltmarsh)	Favourable / 21.11.2012
E24	5	Littoral sediment (saltmarsh)	Favourable / 21.11.2012
E39	11	Neutral grassland – lowland / 28.25	Unfavourable - recovering / 27.09.2012

2.2.35 As indicated above, air quality effects cannot be screened out as insignificant for daily mean NO_x on six major receptors (E20, E21, E22, E23, E24, E39) in Year 2, three major receptors (E21, E22 and E23) in Year 6 and one major receptor (E22) in Year 20. This is because the daily mean NO_x PC exceeds the EA 10% screening threshold[8]. However, the following factors are relevant in determining the potential for, and significance of, ecological effects at these locations:

- The maximum PEC at any of these sites occurs in Year 2 at Receptor E23, however this is 120.27 µg m^{-3} which is only 60% of the AQAL. The PEC at all other major sites are less than 60% of the AQAL, with the lowest exceedance being at Receptor E20, where the PEC is 70.36 µg m^{-3} in Year 2, around 35% of the AQAL. PECs at the receptors where contributions cannot be screened out as insignificant in Years 6 (E21, E22, E23) and 20 (E22) are all less than half the AQAL.
- The habitats within the designated areas in the immediate vicinity of Receptors E20, E21 and E22 would not be considered sensitive to changes in daily mean NO_x, as these are the cliffs, with the broad habitat categorisation on the designated sites view of the Natural England website of supralittoral rock in Unit 1 and earth heritage in Unit 2.
- Habitats at the remaining three receptors (E23, E24 and E39) would likely be sensitive to elevations in daily mean NO_x if sufficiently large over a long time period. However, it is noted that these receptors are all located to the south and south-east of the Proposed Development. Exposure to the maximum daily NO_x would therefore only occur when the wind is blowing from the north to north-west directions. Reference to wind rose data for the site (refer to Appendix 6.3 of the ES [APP-044], specifically Figures 6.10 to 6.14) indicates that this occurs infrequently. The habitats present at these sites will be exposed to the maximum daily mean NO_x values calculated infrequently.
- The daily mean NO_x contributions are dominated by construction inputs which are temporary and also not continuous during the construction period. Therefore, maximum construction-related NO_x emissions on site will not always coincide with the necessary wind directions for an effect to occur.
- Additionally, as indicated above, Defra forecasts that NOx concentrations will fall by about 2% per year during the 2020s, and these trends are expected to continue in response to strong political pressure to reduce emissions from roads vehicles, both of air pollutants and CO_2, bearing in mind that concentrations at ER012 are dominated by road traffic. Therefore, the additional daily mean NOx deposition predicted to result from operation of the airport (including traffic generated in combination with other developments), is most likely to be off-set

as time passes by reduced NOx emissions generally. Therefore, the additional NOx deposition predicted to result from operation of the airport (including traffic generated in combination with other developments), is most likely to be off-set as time passes by reduced NOx emissions generally, ensuring that the development will not contribute to any undermining of achievement of the conservation objectives.

2.2.36 Taking the above factors into account, it is considered very unlikely that the maximum daily NO_x would result in an ecological effect at any of the major receptors where exceedance of the screening threshold is predicted at Year 2, Year 6 or Year 20. There will therefore be **no significant** ecological effects on the nationally designated sites.

Local Receptors

2.2.37 The greatest PC at any of the modelled local nature receptors is 441 µg m^{-3}, or 220% of the AQAL at Receptor E81, representing deciduous woodland in the Priority Habitat Inventory in the immediate vicinity of the B2190 Spitfire Way, where the PEC is 493 µg m^{-3} or 246% of the AQAL. Receptor E82 is located adjacent to Receptor E81 and is also classified as deciduous woodland in the Priority Habitat Inventory.

2.2.38 These impacts cannot be screened out and require further assessment. However, the following factors are relevant in determining the potential for, and significance of ecological effects at these locations:

- Whilst deciduous woodland would potentially be sensitive to elevated nitrogen levels, effects would only be likely if elevations in daily mean NO_x are sufficiently large over a sufficiently long period. Whilst the maximum daily NO_x levels predicted are around 200% of the AQAL, it is noted that these receptors are both located to the west of Manston Airport. Exposure to the maximum daily NO_x would therefore only occur when the wind is blowing from an easterly direction. Reference to wind rose data for the site (refer to Appendix 6.3 of the ES [REF-044], Figures 6.10 to 6.14) indicates that this occurs infrequently. Therefore, the habitats present will be exposed to the maximum daily mean NO_x values calculated infrequently.
- Additionally, the daily mean NO_x contributions are dominated by construction inputs which are temporary and also not continuous during the construction period. Therefore, maximum construction-related NO_x emissions on site will not always coincide with the necessary wind direction.

2.2.39 Taking the above factors into account, it is considered very unlikely that the maximum daily NO_x would result in an ecological effect at Receptors E81 and E82 where exceedance of the screening threshold is predicted at Year 2. There will therefore be **no significant** ecological effects on these local receptors.

Nitrogen Deposition

2.2.40 Under EA guidance[8], where the short-term Process Contribution (PC) is greater than 1% of the short-term Air Quality Annual Limit (AQAL) at major ecological receptors, further assessment may be required.

2.2.41 The greatest In combination contribution at any of the receptors where emissions exceed the criteria for insignificance (ER012 in Year 6, and ER012, E26 and E28 in Year 20) occur in Year 20 at ER012 (0.31 kg N ha^{-1} y^{-1} In combination contribution, which is 3.9% of AQAL (see Table 4.3 in Manston Airport DCO: Environmental Statement Addendum- Potential Effects arising from the use of the Thanet Strategic Transport Model)).

2.2.42 These modelled locations have been related to the nearest unit of the Sandwich Bay to Hacklinge Marshes SSSI with the habitats present and condition status[18], detailed in **Table 2.3**.

Table 2.3 Modelled location related to unit details for Sandwich Bay to Hacklinge Marshes SSSI

Receptor	SSSI Unit Number	Main Habitat/ Area (Ha)	Condition Assessment Status/ Latest Assessment Date
ER012	08	Littoral sediment / 22.76	Favourable / 28.07.2009
E26	06	Neutral grassland – lowland / 7.98	Favourable / 21.11.2012
E28	07	Littoral sediment / 44.471	Favourable / 03.12.2012

2.2.43 As indicated above, air quality effects cannot be screened out as insignificant for nitrogen deposition at ER012 in Year 6 (where the In combination contribution is predicted to be 1.7% of the AQAL, albeit the PEC will already significantly exceed the AQAL (169%)) and ER012, E26 and E28 in Year 20 (where the ICCs will be 3.9%, 2.1% and 2.8% of the AQAL respectively, albeit the PEC for each will already significantly exceed the AQAL (approximately 170% for each), as the nitrogen deposition In combination contribution exceeds the Environment Agency 1% screening threshold[8]. However, the following factors are relevant in determining the potential for, and significance of, ecological effects at the ER012 and E28:

- Habitats within the Sandwich Bay to Hacklinge Marshes SSSI Units 07 and 08 (Sandwich Bay SAC), approximately 5m from ER012 and E28 comprise littoral sediment. Where vegetated, this will be most likely with saltmarsh, the habitats present are regularly covered by eutrophic tidal waters, which would be expected to limit the potential for the elevated to nitrogen deposition rates to adversely affect the littoral habitat areas.
- As there are no quantitative forecasts of background deposition rates the modelling assumes that current (2013–2015) levels of deposition continue into the future. However, current trends are for nitrogen deposition to fall in future years and as such the adopted approach is conservative. Emissions of nitrogen, especially from road vehicles, are declining, as explained above. Emissions of ammonia, which contributes to nitrogen deposition, have also been flat for many years. The UK Government's Clean Air Strategy 2019 has placed new focus on ammonia and is introducing measures to control and reduce emissions. Therefore, the additional nitrogen deposition predicted to result from operation of the airport (including traffic generated in combination with other developments), is most likely to be off-set as time passes by reduced Nitrogen emissions generally. This will ensure that the development will not contribute to any undermining of achievement of the conservation objectives.

2.2.44 In respect of E26, Unit 06, the main habitat of the unit is stated as neutral lowland grassland[19]. Based on the information available[20], it is not clear which of the 31 notified features of the SSSI are

[18] Each unit of SSSI land is assessed (at least every six years) against six condition states: **Favourable; Unfavourable recovering; Unfavourable no change; Unfavourable declining; Part destroyed; Destroyed.**
[19] Natural England (2019) Designated Sites View [online]. Available at: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001128&SiteName=Hack&countyCode=&responsiblePerson [Accessed May 2019].
[20] Natural England (2019) Designated Sites View [online]. Available at: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001128&SiteName=Hack&countyCode=&responsiblePerson [Accessed May 2019].

present, as none of these clearly fall within a Lowland grassland definition. However, Magic[21] indicates priority habitats are present, with much of the unit close to the road identified as 'deciduous woodland' 'coastal sand dunes' and 'coastal and floodplain grazing marsh'. Lowland fen is identified further from the road. The assessment below therefore provides commentary on the broad habitat, and also the likely most sensitive feature indicated present, coastal dune grassland. The screening presented in the air quality assessment in Appendix I, has used the AQAL for the most sensitive feature as the criterion, in this case 8 kg N ha^{-1} y^{-1}.

2.2.45 At Year 20 (the worst-case year) the PEC at this receptor is 13.66 kg N ha^{-1} y^{-1}, well above the 8 kg N ha^{-1} y^{-1} AQAL, with an ICC of 0.17 kg N ha^{-1} y^{-1}. The APIS website indicates that increased NO_x can affect grasslands as follows:

- Increase in canopy height, proportion of productive tall grasses;
- Reduction in proportion of fine leaved grasses;
- Loss of forb species;
- Loss of species with a preference for wetter conditions; and
- Decrease in soil pH and accumulation of NH_4^+.

2.2.46 For coastal due grassland, exceedance impacts presented on APIS can be summarised as follows:

- Increase in tall grasses;
- Decrease in prostrate plants;
- Increased N Leaching;
- Soil acidification; and
- Loss of typical lichen species.

2.2.47 However, the following factors are relevant in determining the potential for, and significance of ecological effects at this location, as follows:

- Based on analysis of the data provided in Appendix I of the RIAA, in Year 20, nitrogen deposition in the absence of the Proposed Development would already significantly exceed the nitrogen deposition AQAL In the absence of the Proposed Development, the elevated deposition may limit the quality of the vegetation in the immediate vicinity of the road.
- It is of course relevant that this assessment must be able to conclude that the additional contribution will not undermine the conservation objectives for the site. In this context, it is important to note that as there are no quantitative forecasts of background deposition rates the modelling assumes that current (2013–2015) levels of deposition continue into the future., Current trends are for nitrogen deposition to fall in future years. Emissions of nitrogen, especially from road vehicles, are declining, as explained above. Emissions of ammonia, which contributes to nitrogen deposition, have also been flat for many years, but the UK Government's Clean Air Strategy 2019 has placed new focus on this pollutant and is introducing measures to control and reduce emissions. Therefore, the additional nitrogen deposition predicted to result from operation of the airport (including traffic generated in combination with other developments), is most likely to be off-set by reduced N emissions

[21] Natural England (2019) MAGIC maps [online]. Available at: https://magic.defra.gov.uk/ [Accessed May 2019]

generally. This will ensure that the development will not contribute to any undermining of achievement of the conservation objectives.

2.2.48 Overall therefore, taking the above factors into account, ecological effects that would undermine the conservation objectives of the SSSI are not predicted at the receptors (ER012 in Year 6 and ER012, E26 and E28 in Year 20) where nitrogen deposition cannot be screened out as insignificant. There will therefore be **no significant** ecological effects on the nationally designated sites.

Acid Deposition

2.2.49 Under EA guidance[8], where the short-term Process Contribution (PC) is greater than 1% of the short-term Air Quality Annual Limit (AQAL) at major ecological receptors, further assessment may be required.

2.2.50 The In combination contribution to acid deposition at E41 is 2.6% of the AQAL in Year 2, 4.4% in Year 6 and 10.3% in Year 20. At E40 the contribution is 2.2% of the AQAL in Year 20, and at ER012 it is 2% (see Tables 4.4, .6, and 4.8 in Manston DCO: Modelling and Assessment of Nitrogen and Acid Deposition (**Appendix I** to the updated RIAA).

2.2.51 These modelled locations have been related to the nearest unit of the Sandwich Bay to Hacklinge Marshes SSSI with the habitats present and condition status[22], detailed in **Table 2.4**.

Table 2.4 Modelled location related to unit details for Sandwich Bay to Hacklinge Marshes SSSI

Receptor	SSSI Unit Number	Main Habitat/ Area (Ha)	Condition Assessment Status/ Latest Assessment Date
ER012	08	Littoral sediment / 22.76	Favourable / 28.07.2009
E41	11	Neutral grassland – lowland / 28.25	Unfavourable - recovering / 27.09.2012
E40	11	Neutral grassland – lowland / 28.25	Unfavourable - recovering / 27.09.2012

2.2.52 As indicated above, air quality effects cannot be screened out as insignificant for acid deposition n at E41 in each of the 3 assessment years, and at ER012 and E40 in Year 20. However, the factors indicated below are relevant in determining the potential for, and significance of, ecological effects.

2.2.53 At ER012:

- Habitats within the Sandwich Bay to Hacklinge Marshes SSSI Units 08 (Sandwich Bay SAC), approximately 5m from ER012 comprise littoral sediment, for which no sensitivity data are available. Where vegetated, this will be most likely with saltmarsh, and the habitats present are regularly covered by eutrophic tidal waters, which would be expected to limit the potential for the elevated to acid deposition rates to adversely affect the littoral habitat areas, as suggested by APIS.
- Additionally, as there are no quantitative forecasts of background deposition rates the modelling assumes that current (2013–2015) levels of deposition continue into the future. However, current trends are for acid deposition to fall in future years. Emissions of nitrogen, especially from road vehicles, are declining, as explained above. Emissions of ammonia, which

[22] Each unit of SSSI land is assessed (at least every six years) against six condition states: **Favourable; Unfavourable recovering; Unfavourable no change; Unfavourable declining; Part destroyed; Destroyed.**

contributes to nitrogen deposition, have also been flat for many years, but the UK Government's Clean Air Strategy 2019 has placed new focus on this pollutant and is introducing measures to control and reduce emissions. Therefore, the additional acid deposition predicted to result from operation of the airport (including traffic generated in combination with other developments), is most likely to be off-set as time passes by reduced emissions generally, ensuring that the development will not contribute to any undermining of achievement of the conservation objectives.

2.2.54 At E40 and E41:

2.2.55 Sandwich Bay to Hacklinge Marshes SSSI Unit 11 (Receptors E40 and E41) is adjacent to the A256 Ramsgate Road, with a solar farm and waste water treatment plant to the north and Richborough Energy Park to the south. Unit 11 does not form part of the European designated sites.

2.2.56 The main habitat of the unit is stated as neutral lowland grassland[23]. Based on the information available[24] , it is not clear which of the 31 notified features of the SSSI are present, as none of these clearly fall within a Lowland grassland definition. However, Magic[25] indicates priority habitats are present, with much of the unit close to the road identified as 'coastal and floodplain grazing marsh' with a lesser extent of 'good quality semi-improved grassland'.

2.2.57 Based on review of aerial photography (accessed 26/03/2019), the unit appears significantly scrubbed over and the last condition assessment in 2012 noted:

"*Unit recovering following scrub clearance by Kentish Stour Countryside Project. Grazing arrangement in place appears to be keeping scrub re-growth under control. This is aided by Rabbit grazing, which has allowed some floral diversity to return to the site. Further scrub clearance may be needed to restore site to favourable condition*."

2.2.58 An important factor that must be taken into account in determining whether a significant effect may occur is the extent of the affected area. In this regard, the area exposed to elevated acid deposition arising from the project in combination with other plans and project will, in common with the annual mean NOx described earlier, be restricted to the immediate vicinity of the roadside and the entrance gate to this unit. It appears that the habitats in this area are not representative of the notified habitats, appearing to be scrubbed over. Even if restored to favourable condition (assumed to be grassland) the habitats in this location are likely to be disturbed and of lower quality than those positioned further away from the road in less disturbed areas.

2.2.59 In combination contributions to acid deposition peak in Year 20, at 10.3% of the AQAL. Clearly this is a significant contribution at Year 20, although contributions in the nearer term at this receptor, and at E40 in Year 20, are much lower (albeit still over the screening threshold). However, it is important to note that as there are no quantitative forecasts of background deposition rates the modelling assumes that current (2013–2015) levels of deposition continue into the future. This ignores current trends that are for acid deposition to fall in future years. Emissions of nitrogen, especially from road vehicles, are declining, as explained above. Emissions of ammonia, which contributes to nitrogen deposition, have also been flat for many years, but the UK Government's Clean Air Strategy 2019 has placed new focus on this pollutant and is introducing measures to

[23] Natural England (2019) Designated Sites View [online]. Available at: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001128&SiteName=Hack&countyCode=&responsiblePerson [Accessed May 2019].
[24] Natural England (2019) Designated Sites View [online]. Available at: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001128&SiteName=Hack&countyCode=&responsiblePerson [Accessed May 2019].
[25] Natural England (2019) MAGIC maps [online]. Available at: https://magic.defra.gov.uk/ [Accessed May 2019]

control and reduce emissions. Therefore, the additional acid deposition predicted to result from operation of the airport (including traffic generated in combination with other developments), is most likely to be off-set as time passes by reduced emissions generally, ensuring that the development will not contribute to any undermining of achievement of the conservation objectives.

2.2.60 Overall therefore, taking the above factors into account, no ecological effects that would undermine the conservation objectives for the SSSI are predicted at the assessed receptors in relation to acid deposition. There will therefore be **no significant** ecological effects on the nationally designated sites.

Conclusion

2.2.61 The assessment has concluded there will be **no significant ecological effects on major or local receptors** resulting from changes to the air quality environment caused by the Proposed Development alone, in combination, during construction or operation.

3. SSSI Waders

3.1 Updated Baseline Information

Sources of information

3.1.1 Baseline information for the three wader species (grey plover, sanderling and ringed plover) for Pegwell Bay was presented in Chapter 7 of the Environmental Statement (ES) [APP-033], in the Winter Bird Survey 2016-17 Report (Appendix 7.5 of the ES) [Ref: APP-045] and in the Ecological Desk Study (Appendix 7.2 of the ES) [APP-045).

3.1.2 This report also relies upon the following new information also submitted at Deadline 7a:

- A Bird Survey Report 2018-19 (Appendix F of the updated Report to Inform Appropriate Assessment), which reports on a second winter of waterbird count and distribution surveys in Pegwell Bay undertaken from December 2018 to March 2019, and continued through April and May 2019 to include spring passage;
- Pegwell Bay & Thanet North Coast: Bird Disturbance Survey Report 2019 (Appendix G of the RIAA). For Pegwell Bay this reports on a bird disturbance survey (January – May) and noise monitoring from two locations (February – May). The report also includes figures showing the noise contours for the plane type predicted to generate the highest noise levels used at the Proposed Development (the Boeing 747-400) and that for a mid-level noise plane (a Boeing 737-800) overlain onto maps showing the results of the Pegwell Bay Waterbird Distribution surveys undertaken in 2016/17 and 2018/19 respectively. For the North Thanet Coast, the report also provides Wetland Bird Survey (WeBS) data and Kent Ornithological Society (KOS) data for the relevant wader species and a bird disturbance survey and noise monitoring both undertaken in May.
- An updated RIAA that is supported by the new information from the preceding sources and noise contour maps overlain with the areas of designated sites and the locations of SPA qualification bird species distributions.

3.1.3 These reports should be referenced for detail on methodology employed e.g. for surveys etc. All scheduled aircraft flights from the Proposed Development are to take place between the hours of 07:00 and 23:00 (a 16-hour period). As a result of a night time ban introduced at Deadline 5, no flights will now take place between the hours of 23:00 to 06:00, and any flights originally scheduled to take place during this period (as per the ES), would now take place during 06:00-07:00 hours. In view of this, it was considered necessary to collect additional noise level data (and the accompanying disturbance event and bird distribution data) during a 06:00-07:00 period at both Pegwell Bay and the Thanet north coast, in addition to that collected during the six-hour survey periods. The results of this work are provided in Bird Disturbance Report 2019, Appendix G of the updated RIAA.

Current baselines

Pegwell Bay

Grey plover

3.1.4 In Pegwell Bay during the 2016-17 surveys, low numbers of grey plover (with a range of 3 to 35) were recorded on three (October, November and January) of the six survey dates (October to March inclusive). They were located in the northern and central sections of the Bay. Flocks of roosting grey plover (with a peak count of 13 birds on 13 October) were recorded near the high-water mark in the west of the bay. Loose flocks of up to 19 foraging birds were seen more widely across the bay. The distribution is shown in Figure 3.5 of the Winter Bird Survey 2016-17 Report.

3.1.5 In Pegwell Bay during the 2018-19 surveys, a single survey was undertaken in December 2018 followed by twice-monthly survey visits completed from January to May 2019 inclusive. The details of the surveys are provided in Appendices C and D of the Appendix F of the RIAA.

3.1.6 **Table 3.1** presents the peak number of grey plover within the survey area recorded on each survey visit in 2018-19. The peak number of grey plover in each 200m grid square during the winter period (December-March) is shown in Figure 3.4d, and during the spring passage period (April-May) in Figure 3.4g in Appendix F of the RIAA.

Table 3.1 Peak number of grey plover in the survey area during each survey visit 2018-19

Species	6 Dec	21 Jan	30 Jan	7 Feb	25 Feb	5 Mar	25 Mar	3 Apr	25 Apr	3 May	15 May
Grey plover	184	173	164	72	24	1	11	4	1	9	18

3.1.7 Higher numbers of grey plover were recorded during the Pegwell Bay surveys undertaken in winter 2018/19 than in 2016/17. During the 2016/17 survey, grey plover was recorded in low numbers and only in October, November and January, with peak counts in those months of 22, 13 and 35 birds respectively. In 2018/19, grey plover was recorded on each survey visit from December to March inclusive, with peak counts in December and January of 184 and 164 respectively. Thereafter, numbers reduced with a peak count of 72 birds on 7 February dropping to one and then 11 birds on 5 and 25 March respectively. Further birds were seen during the spring passage period, with a peak count of 18 birds noted on 15 May, with the birds primarily foraging on the mudflats in the south-west of the Bay.

3.1.8 To conclude, results from the surveys indicate that grey plover are found across much of Pegwell Bay where they forage on the mudflats, particularly along the shoreline and in the south. Numbers vary greatly between winters.

Sanderling

3.1.9 In Pegwell Bay in 2016-17, low numbers of sanderling were recorded at scattered locations across Pegwell Bay, on three of the six survey dates with peak counts of 4 in December, 16 in January and 2 in February. Sanderling were recorded foraging along the shoreline (all during the mid, rising tide period) in the central part of the bay (see Figure 3.6 in the Winter Bird Survey 2016-17 Report). No roosting birds were observed.

3.1.10 **Table 3.2** presents the peak number of sanderling recorded within the Pegwell Bay survey area on each survey visit during the 2018-19 surveys. The peak number in each 200m grid square during

the winter period (December-March) is shown in Figure 3.4c, and during the spring passage period (April-May) in Figure 3.4i, located in the Appendix F of the RIAA.

Table 3.2 Peak number of target species in the survey area during each survey visit

Species	6 Dec	21 Jan	30 Jan	7 Feb	25 Feb	5 Mar	25 Mar	3 Apr	25 Apr	3 May	15 May
Sanderling	50	41	20	2	0	45	0	0	0	40	0

3.1.11 Numbers recorded were higher in the 2018-19 surveys although the distribution was broadly similar with birds using the central part of the bay during winter although with more use of the southern section and limited use of the north. During the passage period in 2019, sanderling were only recorded in the south of the bay, south of the mouth of the River Stour.

3.1.12 To conclude, results from the surveys indicate that sanderling forage along the shoreline of Pegwell Bay in variable numbers each winter. The birds constantly move with the changing tide (see **Table 3.2**) and are often concentrated along the south-west edge of the Bay. Use of the mudflats in the north of the Bay is very low and for short periods of time.

Ringed Plover

3.1.13 Ringed plover was not recorded in the Pegwell Bay winter surveys (October–March inclusive) in 2016-17. The species was also not recorded in the 2018-19 winter surveys (December-March inclusive).

3.1.14 Ringed plover was however, recorded during the passage surveys in 2019 (on three of the four survey visits undertaken in April-May), with eight birds recorded on 3 April, 4 on 3 May and 5 on 15 May. Birds were recorded just above or below the high-water line in the south of the survey area near the mouth of the River Stour (shown in Figure 3.4h in Appendix F of the RIAA).

To conclude, low number of ringed plover (peak count of eight birds on 3 April) were recorded during the spring passage period (none during winter in either 2016/17 or 2018/19) and were restricted to foraging on the mudflats in the south-west of the Bay.

Tide effects on counts and distribution in Pegwell Bay

3.1.15 **Table 3.3** shows the sum of counts for each interest species during each one-hour period in relation to high tide during the 11 survey visits in 2018-19. For grey plover and sanderling, the highest numbers were recorded on a falling tide (i.e. after the high tide).

Table 3.3 Total number of each SSSI interest species during each 1-hour tidal period in 2018-19

Tidal period	Sanderling	Grey plover	Ringed plover
-6 to -5		2	
-5 to -4		28	
-4 to -3		21	
-3 to -2	6	10	6
-2 to -1		36	7

Tidal period	Sanderling	Grey plover	Ringed plover
-1 to 0	21	145	5
0 to +1	21	183	
+1 to +2	89	187	
+2 to +3	128	618	8
+3 to +4	14	248	
+4 to +5	7	8	
+5 to +6	2		

North Thanet Coast

3.1.16 Data on use by the interest species of the coastal area between Herne Bay and Westgate (along the Thanet north coast, including within the Thanet Coast and Sandwich Bay SPA/Ramsar, and constituent Thanet Coast SSSI) has been presented in Appendix G of the RIAA. Data on the numbers of birds using this area has been obtained from the British Trust for Ornithology's Wetland Bird Survey (WeBS) and Kent Ornithological Society (KOS) data. Further survey data was collected during the Thanet North Coast disturbance survey visits in May 2019.

Wetland Bird Survey (WeBS) data

3.1.17 The WeBS data for 2010-2017 (no data is available for 2015) indicates the following:

- Grey plover are present from September to March, with peak numbers recorded from November to March. Numbers are variable between winters though there is no evidence to indicate any decline;
- Ringed plover are generally present from August to March, with the highest numbers occurring during autumn passage and early winter, from September to November. Numbers of ringed at Count Sector 22431 have varied greatly between years (2010-17) and have shown a decline in numbers since 2012; and
- Sanderling are generally present from September to April, with the highest numbers occurring from November to March. Numbers are variable between winters though there is no evidence to indicate any decline.

3.1.18 In Appendix G of the RIAA, **Table C.1** in **Appendix C** shows the peak annual count for each interest species during 2010-17 for the years for which data is available for Core Count Sector 22431 (see **Figure 2.3**). **Table C.2** in **Appendix C** shows the peak and mean (in parenthesis) monthly counts for each interest species in Count Sector 22431.

Kent Ornithological Society (KOS) data

The KOS data for 2010-1019 shows:

- **Grey plover** generally occur in the area from October to March, though much lower numbers of autumn passage birds have been recorded in August-September and less frequently during spring passage in May. Minnis Bay holds the highest numbers of grey plover (generally 20-80 birds), with a peak count of 150 there on 2 January 2018. Reculver holds much lower numbers of grey plover (generally 1-5 birds) with a peak count of 30 birds on 28 November 2011.

- **Ringed plover** occur in their highest numbers from October-February, though there are frequent records during autumn passage (July-September) and spring passage (in May). Numbers of ringed plover are usually in the region of 10-40 birds at Reculver and 30-60 birds at Minnis Bay, with peaks counts of 57 birds (on 2 November 2018) and 83 birds (on 6 October 2010) respectively.
- **Sanderling** have been recorded in all months of the year in the Study Area apart from June. The numbers are highly variable, but with counts generally in the region of 10-100 birds at Minnis Bay and 10-30 at Reculver. Much higher numbers occur infrequently, including peaks counts of 300 birds at Minnis bay on 6 November 2018 and 500 at Reculver on 6 November 2014.

3.1.19 In Appendix G of the RIAA, **Table C.3 in Appendix C** shows the peak and mean (in parenthesis) counts (from 2010-19) for each interest species at Reculver beach area and Minnis Bay which include the western and eastern parts of the Study Area (the area along the Thanet North Coast in which noise levels from aircraft from the Proposed Development are predicted to exceed 70db$_{LAmax}$) respectively, as well as additional areas outside the Study Area.

Thanet North Coast: Bird Disturbance Survey (May)

3.1.20 Data on the abundance and distribution of the interest species was collected during the disturbance surveys on two survey visits (9 and 14 May 2019), **Table 3.4** shows the total number of each species recorded on each visit within the Study Area for Thanet North Coast surveys, within approximately 500m of each vantage point or VP (the approximate halfway distance between each VP).

3.1.21 Details of all the records of interest species are shown in Table E.2 in Appendix E of Appendix G of the RIAA.

Table 3.4 Thanet North Coast: Total number of Interest Species on each Visit in 2019

Species	7 May (West VP)	7 May (East VP)	14 May (West VP)	14 May (East VP)
Grey plover	0	0	0	0
Sanderling	42	10	4	0
Ringed plover	2	2	4	2

Noise levels

3.1.22 To characterise the baseline noise environment in the wider area (dominated by noise from road traffic), measurements and observations were undertaken at 14 locations during both daytime and night-time periods as described in Table 12.3 in Chapter 12 of the ES [APP-033] and shown in Figure 12.1 of the ES [APP-033]. An ambient noise level has also been identified to represent each location observed, based on the following:

- Site observation;
- Short-term measurements; and

- Sound propagation modelling of the major sources of sound, namely road traffic movements for locations where the short-term noise level is uncertain; and *Directive 2002/49/EC*[26] Round 2 noise mapping data where road traffic modelling is not possible or rail is the dominant noise source.

3.1.23 The baseline noise levels measured from Observation Point 13 (OBS13) located near the clifftop on the northern fringe of Pegwell Bay (the most relevant measurement point in terms of the SPA), showed daytime noise levels of 40-45 dB $L_{Aeq,5min}$[27] and night time noise levels of 40 dB $L_{Aeq,5min}$, primarily due to road traffic. The ambient day and night noise level for OBS13 is 42 dB $L_{Aeq,\ 16hr}$: see paragraphs 12.4.45-47 and Table A12.4.8 in Appendix 12.4, ES Chapter 12 (RSP 2019).

3.1.24 Results from the noise monitoring at two locations on the western fringes of Pegwell Bay from February-May 2019 (northern and southern vantage points [VPs] respectively) revealed higher noise levels than at OBS13, likely due to being in areas heavily used by dog walkers and other recreational uses. These two locations more closely replicate the areas used by target species as both were on the high-water mark, and within 100m of mudflats used by foraging and roosting waders. Average noise levels over the six-hour survey periods ranged from 44 to 61 $dB_{LAeq,6hr}$, and noise events exceeding 70 dB_{LAmax} occurred on average, 10 and 21 times per hour at each of the northern and southern VPs respectively (see Table 2.3 in Appendix G of the RIAA).

3.1.25 Results from the noise monitoring at two locations along the coastline between Herne Bay and Westgate, within the 70 dB_{LAmax} noise contours for the noisiest plane type (the Boeing 747-400), showed that this area was quieter than at Pegwell Bay. However, average noise levels still ranged from 46-56 $dB_{LAeq,6hr}$, and peak noise levels exceeded 65 and 70 dB_{LAmax} on average, 17 and 2 times per hour from the East VP (see Table 3.4 in Appendix G of the RIAA).

Levels of human disturbance

3.1.26 Results from the disturbance survey at Pegwell Bay in 2019, indicated that levels of recreational activity were high along its western fringes, with the frequent walkers and their dogs leading to disturbance to target species present in the Bay. Human-related events (walkers, cyclists etc) with the potential to cause disturbance to the birds were recorded on average, 14 and 9 times per hour from the southern and northern VPs respectively (see Table 2.1 in Appendix G of the RIAA). The most frequently recorded cause of disturbance was by walkers with their dogs off-lead, though moderate-major disturbance responses (resulting in birds to take flight) were also caused by kite-surfers, a microlight and helicopters (see Table 2.2 in Appendix G of the RIAA).

3.1.27 The disturbance survey of the Thanet north coast in May 2019 revealed a high level of use of the footpath adjacent to the beach by cyclists (12-13 events per hour), and regular over-flights by commercial jets (usually above 1,000m) and occasional lower altitude flights (some as low as 150m) by light aircraft and helicopters. No disturbance responses were recorded from the target species present (including sanderling and ringed plover) due to the over-flights by aircraft (of all types, including helicopters) but disturbance responses were noted due to the presence of humans and their dogs (see Tables 3.2 and 3.3 in Appendix G of the RIAA).

[26] *Directive 2002/49/EC* of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise [online] Available at http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32002L0049 [Accessed 14/02/2018]

[27] L_{Aeq} indicates average exposure noise level over a measured period, in this case 5 minutes (BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures' BS7445-1:2003). BS 7445 provides guidance for describing and measuring noise from all sources. The standard recommends equivalent continuous A-weighted sound pressure level (L_{Aeq}) as the most appropriate basic noise indicator.

3.2 Assessment of effects on SSSI wader interest from aircraft flights at Manston Airport

Introduction

3.2.1 This section provides an assessment of the effects of aircraft landing and taking off from the Proposed Development on three species of wader - grey plover, sanderling and ringed plover – that are interest features of the SBHM SSSI and Thanet Coast SSSI. It considers both Pegwell Bay and the Thanet North Coast and flights departing to the west and the east.

3.2.2 As NE has agreed that noise generated from the quieter plane types are unlikely to result in any disturbance to the birds, these have been scoped out[28]. Therefore, the assessment is based upon the noise contours for the plane type predicted to generate the highest noise levels used at the Proposed Development (the Boeing 747-400) and that for a mid-level noise plane (a Boeing 737-800). Noise contours from these types of aircraft have been overlain onto maps showing the results of the Pegwell Bay Waterbird Distribution surveys undertaken in 2016/17 and 2018/19 respectively, as well as showing the nature conservation site designations. These figures are provided in Appendix G of the RIAA, with Figures 3.1c through to 3.8c covering grey plover and Figures 3.1d through to 3.8d for sanderling. In each case, the first four figures represent the 2016-17 survey distributions and the latter four the 2018-19 survey distributions. No figures were prepared for ringed plover due to the paucity of survey records. For the Thanet North Coast, Figure 2.2 of the same report provides noise contours in relation to the designated site in this area.

3.2.3 An indicative figure of locations overflown by aircraft below 500m is shown in Figure 4.4 of the updated RIAA. It should be noted that no aircraft (other than helicopters) are currently operating from the Order Limits and therefore the figure is based on indicative vertical climb profiles, operating procedures and flight paths. The actual procedures and flight paths will be consulted on post-DCO via the CAA's Airspace Change Process (ACP); the ACP will provide opportunities for engagement with local communities and other stakeholders. The ACP will likely follow the process outlined in the draft ACP guidance CAP1520 (CAA, 2017). However, given the relatively close proximity of Pegwell Bay to the dis-used airfield at Manston, the options for the flight routes to the east of the airfield, just north of Pegwell Bay are very limited. In view of this, the proposed routes of the flights are very unlikely to deviate from those shown in Figure 4.4**,** once agreed with the CAA.

Operational displacement – habitat loss due to aircraft flights

Pegwell Bay

3.2.4 Once the Proposed Development is operational, there is potential for foraging and roosting grey plover to be displaced from intertidal habitats below or near to the flight paths of planes. The altitude, lateral distance and noise of the aircraft are all factors involved in potential disturbance, although separating the effect of aircraft noise from that of visual disturbance is difficult.

3.2.5 There is limited documented evidence on the visual and auditory disturbance effects of aircraft on birds and much of this comes from studies that have focussed on geese, ducks, swans and seabirds. Those studies involving waders have looked at the effects of microlights and jets. Also, these

[28] Natural England's submission for Deadline 6: Answers to the Examining Authority's second written questions (ExQ2). Comments on the Applicant's responses to Written Representations [REP4-025] (letter dated 3 May 2019, ref. 279225)

studies have mainly been based upon effects associated with aircraft altitude rather than lateral distance.

3.2.6 A literature review was undertaken by Amec Foster Wheeler[29] on bird disturbance by aircraft (Appendix 7.4 in Chapter 7: Biodiversity of the ES [APP-033]). Results from this literature review and other studies indicate that beyond distances of 500m in altitude and 1km ground-level, lateral distance, the three wader species are unlikely to be disturbed by the visual presence of flying aircraft.

3.2.7 The foraging and/or roosting areas for the three species in Pegwell Bay (as identified by the Pegwell Bay Waterbird Distribution Surveys undertaken in 2016/17 and 2018/19) are located outside the area where aircraft are predicted to fly at distances beyond the 1km lateral distance (see Figures 4.4 in the RIAA, and Figure 3.5 in Appendix 7.5, ES Chapter 7, and Figures 3.4d Figure f in Appendix F of the RIAA), and therefore are unlikely to disturbed by the visual stimulus of aircraft.

3.2.8 A series of figures showing the noise contours at 5dB intervals from 55 to 80dB_{LAmax} (in relation to the statutory designated sites), for three plane types (noisiest, mid-range and less noisy) together with an accompanying technical note has been produced and provided in Examination document ref. TR020002/D4/ENCM. The note details the proposed peak number of flights per day for each plane type along each flight path.

3.2.9 The noise contours for the plane type predicted to generate the highest noise levels used at the Proposed Development (the Boeing 747-400) and that for a mid-level noise plane (a Boeing 737-800) have been overlain onto maps showing the results of the Pegwell Bay Waterbird Distribution surveys undertaken in 2016/17 and 2018/19 respectively, and are shown on Figures 3.1c to 3.8c inclusive in Appendix G in the RIAA.

3.2.10 The highest predicted levels of noise would be generated by aircraft departing to the east: on average, 29 times per day on 110 days per year, for higher and mid noise level planes such as the Boeing 747-400 and 737-800 respectively. Similar noise levels would be generated by aircraft departing to the west: on average, 28 times per day on 255 days per year, for mid-higher noise level planes, though the highest noise levels would be more restricted to the northwest corner of the Bay than that for easterly departing aircraft.

3.2.11 Figures 3.1c through to 3.8c (Appendix G of the RIAA) show that grey plover will experience noise levels from aircraft from between 55 to 75 dB_{LAmax}. Grey plover primarily occur within Pegwell Bay within the 60-70dB_{LAmax} noise contours for Boeing 747-400 flights departing to the west. During the flights of Boeing 747-400 and 737-800 departing to the east (8 and 21 flights per day respectively on 110 days per year), some birds will be exposed to noise levels of between 70 and 75 dB_{LAmax}, as shown in Figures 3.1c, 3.3c, 3.5c and 3.7c.

3.2.12 The noise contour maps for sanderling (Figure 3.1d through to 3.8d of Appendix G of the RIAA) show that this species will be exposed to noise levels from 55dB_{LAmax} to 75dB_{LAmax}. The majority of the population will be exposed to lower levels of up 65dB_{LAmax} with only two aircraft flight types exposing comparatively low numbers to levels above 70dBLAmax. However, it should be noted that sanderling constantly move with the changing tide (see **Table 3.2**) and use of the northern part of the bay is low and only for short periods of time. The surveys have also shown that most of their use is along the south-west edge of the bay exposed to the lower (55dB_{LAmax}) levels.

[29] Now known as Wood.

3.2.13 No noise contour maps were produced for ringed plover as the species was not recorded during either of the winter surveys. Low numbers were recorded on passage (April and May) 2019 in the south-west of the bay an area located largely between the 55-60dB$_{LAmax}$ contours.

1.1.1.1 During the noise monitoring undertaken at Pegwell Bay in February-May 2019, peak noise levels exceeded 70 dB$_{LAmax}$ on average 10 and 21 times per hour from the north and south VPs respectively, and exceeded 60 dB$_{LAmax}$, 121 and 89 times per hour. This compares to 29 flights per day on 110 days per year (1.8 times per hour over the scheduled 16 hours period when flights will take place), for higher and mid noise level planes (Boeing 747-400 and 737-800 respectively) heading east, and 28 times per day (1.75/hour) on 255 days per year heading west. Overall therefore, operation of the airport will result in a small number of additional noise events of a similar magnitude to those already occurring in the Bay. Importantly however, the Bird Disturbance Study (Appendix G of the RIAA) identified no occurrences where noise alone (i.e. arising from a disturbing source further than 500m from birds present) elicited a response in the birds present.

1.1.1.2 It is also important in this context that any case studies into effects on birds at currently operation airports in the UK are also considered in this assessment.

1.1.1.3 There are a number of operational airports in the UK that are located adjacent or close to SPAs designated for their congregations of non-breeding waterfowl and waders, including internationally important numbers of waders utilising mudflats for foraging. These include the civil airports at Belfast, Liverpool, Southampton, Bournemouth, Lydd (London Ashford Airport) and Blackpool (amongst others), and military aviation activities/ operations.

1.1.1.4 Table 1.2 in Appendix 7.2 of Chapter 7 of the ES [APP-033] presents a summary of results of a review of case studies related to the effects of aircraft flights from military and civil airports in the UK on nearby SPAs. This study was undertaken to inform the now consented expansion of London Ashford Airport, south of Lydd in Kent (Parsons Brinckerhoff, 2007). The case studies highlighted, show that despite the visual and noise disturbance from civil and military aircraft flights over the SPAs, there have been no recorded adverse effects on their qualifying populations of waders and wildfowl, including non-breeding populations of grey plover on the Ribble Estuary, Wash, North Norfolk Coast, Dungeness to Pett Levels and Lough Foyle SPAs.

1.1.1.5 Liverpool John Lennon Airport is located adjacent to the Mersey Estuary SPA/ Ramsar site. This SPA qualifies under Article 4.1 of the Birds Directive (79/409/EEC) by supporting populations of European importance of the golden plover, a species which is very closely related to (in the same genus) as grey plover. The SSSI Condition Statements for Units 1, 2 and 3 of the Mersey Estuary SSSI (which are located adjacent or within 100m of the Airport, and which form a constituent part of the SPA) make no mention of disturbance from aircraft. Though there has been a long-term decline in the numbers of golden plover in the Mersey Estuary SPA (more than 50% between site designation and 2010 when the condition statements were written) and very limited use of these SSSI Units by the species, the condition statement for Unit 3 states that the declines are unlikely to be due to site specific factors. This indicates that non-breeding wader populations can utilise areas adjacent operational airports without detriment.

1.1.1.6 Blackpool International Airport is located less than 300m from the Ribble & Alt Estuaries SPA for which non-breeding grey plover form a qualifying feature. Unit 10 of the Ribble Estuary SSSI (a constituent part of the SPA) comprising an extensive (1,288ha) area of mudflats, adjacent to the Airport site and within 640m of the runway also make no reference to disturbance from aircraft.

1.1.1.7 Additionally, a recent study (Jacobs 2018) on disturbance to seabirds at Cemlyn Lagoon, found that during the study period in 2018, birds were disturbed resulting in 'fly-ups' on average 26.5 times per day. Where the cause of the fly-ups was detected, they were almost always in response to visual disturbances, mainly the presence of predatory species. The birds only reacted to a noise alone

event on one occasion, in response to a jet passing, at 82.2dB. However, it was also noted that other jet flybys that were noisier (up to 84.5dB) did not elicit a response.

1.1.1.8 Therefore, although the noise contour maps indicate that the northern part of Pegwell Bay will be affected by noise levels up to around 70dB (depending on the plane type and flight-path e.g. 70dB would be experienced on 29 occasions per day on 110 days per year), for 8 months of the year, noise levels from Manston-derived aircraft flights will not reach 70dB.

1.1.1.9 Interpretation of the available evidence suggests that aircraft landing and leaving Manston are not predicted to cause additional significant disturbance to the three wader species because:

- The majority of the populations of these species using the Bay will typically be exposed to aircraft noise at the lower end of the noise range, of which many events of similar magnitude already occur each hour in the Bay.
- Research suggests that birds react to the presence of aircraft in flight if they are perceived to represent a threat (for example, their appearance and flight profile of the aircraft appears to be similar to that of an avian predator such as a peregrine). This may explain why low-flying helicopters, light aircraft and military jets often elicit a much more severe response in birds than higher flying commercial jets.
- Aircraft noise results in gradual increase and decrease in noise over a longer period than a sudden loud noise to which birds are far more sensitive;
- Flights will be infrequent with the predictability of flight paths again reducing the potential for disturbance, and the loudest planes make up a relatively small proportion of the forecast fleet and that only certain flight directions will occur on any one day;
- Results from the Pegwell Bay Waterbird Disturbance Survey in 2018/19 (Appendix F of the RIAA) provide no evidence to indicate that the birds using Pegwell Bay respond to the overflights of commercial jets, with only low flying helicopters and micro-lights eliciting a response from the combined visual and noise stimulus. It is however, acknowledged that the flight paths and altitudes of the commercial jets currently flying over or close to Pegwell Bay are different and higher respectively to those for the Proposed Development;
- During the disturbance study undertaken over a 24-month period at Pegwell Bay in 2010-11 (Swandale et al. 2012), the most frequently recorded ca\use of disturbance to birds was by walkers with dogs off lead. Though 21 instances of disturbance were attributed to aircraft flights, these were primarily due to low flying helicopter with no mention made of commercial jets during a period when Manston Airport was still operational. No disturbance responses were recorded by birds in the northern section of Pegwell Bay that were attributed to any type of aircraft during the study.
- In the last ten years of operation, there were approximately 1,000 freight and 1,000 passenger Air Traffic Movements annually to/from Manston. It is understood that the freight fleet comprised almost entirely of Douglas DC8-62, Boeing 747-200 and Boeing 747-400. Of these, the DC8-62 and Boeing 747-200 are noisier aircraft than any of the fleet proposed to be used when the airport re-opens. Despite the noisier aircraft used along similar flights paths to those proposed for the re-opening of Manston Airport (including over the Thanet north coast), there is no publicly available evidence to suggest that the conservation objectives of the SPA were impacted by aircraft noise whilst Manston Airport was operational. To the contrary, WeBS core count data indicates that numbers of waders at Pegwell Bay have declined since the airport ceased to be in operation.

1.1.1.10 Taking these factors into account, it is concluded that the three SSSI interest species using Pegwell Bay for foraging/roosting will very likely habituate to the visual presence and the noise arising from

regular aircraft flights from Manston, as they are contributing to the background noise environment, rather than adding significantly to it. Existing levels of noise in these areas are relatively high, primarily due to road traffic but also due to visitors (and their dogs) using the western fringes of Pegwell Bay. The predicted peak noise levels (due to aircraft flights) that would be experienced by the three wader species using Pegwell Bay are unlikely to result in high levels of disturbance to these birds. In view of this it is predicted that there will no significant effects from aircraft flights in and out of Manston Airport on the three SSSI wader species using Pegwell Bay.

North Thanet Coast

3.2.14 Results from the desk study in Appendix G of the RIAA (see Tables C.1-C.3) indicate that the Thanet north coast (including the area to be overflown by planes from the Proposed Development) is used by an important proportion of the Thanet Coast SSSI population of all three species with peaks counts for:

- Grey plover of 203 (March 2013);
- Sanderling of 277 (November 2016); and
- Ringed plover of 249 (September 2011.

3.2.15 Results from the disturbance survey also indicate that this stretch of coastline receives relatively high levels of human recreational use and other human-related events with the potential to cause disturbance to each of the three species. The area is also subject to regular overflights by aircraft, including commercial jets, light aircraft and helicopters.

3.2.16 The disturbance survey recorded no disturbance responses (Categories 2-5) from sanderling or ringed plover (grey plover were not recorded) foraging on the beach/ shoreline, due to the frequent low altitude over-flights by helicopters and light aircraft and the higher altitude flights by commercial jets (33 flights over a 12-hour period, involving 21 commercial jets, 7 light aircraft and 5 helicopters – 2.75 flights per hour). This compares to a total of 14 flights per day (0.88 per hour) of the loudest and mid-range planes (10 and 4 respectively) from the Proposed Development.

3.2.17 The highest noise levels would be created by Boeing 747-400 planes flying north over the coast between Herne Bay and Westgate, where at this point they would be at an altitude in excess of 1,000m, well above the 500m threshold under which visual disturbance would potentially be caused to each of the three species. Studies on the effects of disturbance due to aircraft (see Appendix 7.4 of the ES [APP-033]) indicate that due to their more highly-developed eye-sight (rather than hearing), birds are more likely to respond to visual rather than auditory cues.

3.2.18 There are a number of factors that indicate that the three wader species utilising the Thanet north coast will not be disturbed due to the noise generated from the aircraft flights, as follows:

- Aircraft are of sufficient altitude (well above 500m) so as not to provide a visual stimuli for disturbance;
- Aircraft noise results in gradual increase and decrease in noise over a longer period than a sudden loud noise to which birds are far more sensitive;
- The species show tolerance of existing high levels of disturbance on this stretch of coast. Disturbance studies in May 2019 show high existing levels of potential disturbance including from aircraft (both light and commercial) to which birds showed no disturbance response; and
- Flights will be infrequent with the predictability of flight paths again reducing the potential for disturbance.

3.2.19 To conclude, there is no evidence to suggest that the three wader species foraging and resting along the stretch of the Thanet north coast overflown by planes will be disturbed by noise or the visual presence of aircraft in flight from the Proposed Development; the effects of displacement on this species are considered negligible. In view of this, it is predicted that aircraft flights to and from Manston will have no significant effect on the grey plover, sanderling and ringed plover.

4. References

Jacobs (2018). Wylfa Newydd Project. Addendum to Seabird Baseline Report: Disturbance Monitoring at Cemlyn Lagoon. PINS Ref. EN01007, December 2018

RSP (2019f). Manston Airport Development Consent Order: Environmental Statement, Updated 5.2.12, Volume 12: Appendices 10.1, Appendix B - 12.14 (Examination Document ref. TR020002/D1/5.2-12).

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Appendix A
Details of qualifying ornithological features

Table A.1 Statutory designated sites of ornithological importance

Site name and designation	Site interest/qualification features	Distance and (direction) from Order Limits
Sandwich Bay to Hacklinge Marshes SSSI	The SSSI (covering 1,790ha) contains the most important sand dune system and sandy coastal grassland in South East England. Notified features include: non-breeding populations of golden plover, grey plover, ringed plover and sanderling, and the assemblage of breeding birds within areas of lowland open waters and their margins.	0m (South-east)
Thanet Coast SSSI	The SSSI (covering 817ha) is notified for its coastal habitats and the plant and invertebrate communities they support; geological features and breeding and non-breeding bird populations. Non-breeding populations of golden plover, grey plover, ringed plover and sanderling; breeding little tern; and the variety of passage bird species all form notified features of the SSSI.	~4,300m (East)

Appendix B
Species names and survey codes

Species code	Species English name	Species scientific name
PE	Peregrine	*Falco peregrinus*
RP	Ringed plover	*Charadrius hiaticula*
GP	Golden plover	*Pluvialis apricaria*
GV	Grey plover	*Pluvialis squatarola*
L.	Lapwing	*Vanellus*
SS	Sanderling	*Calidris alba*
RK	Redshank	*Tringa totanus*
TT	Turnstone	*Arenaria interpres*
TE	Sandwich tern	*Thalasseus sandvicensis*
AF	Little tern	*Sternula albifrons*
RN	Raven	*Corvus corax*

May 2019

Appendix Ec.3.4

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ES comments 07/02/19- subject to further instructions and comments from NR

Dated: 2019

(1) Riveroak Strategic Partners Limited

(2) Network Rail Infrastructure Limited

Framework Agreement

SUBJECT TO CONTRACT

An agreement relating to the proposed Development Consent Order to redevelop Manston Airport, Kent

DRAFT

DRAFT: 01
Ref: 292050.000099
Date: 24 May 2019
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Appendix CA.3.12

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THIS AGREEMENT is made on 2019

BETWEEN

(1) **Riveroak Strategic Partners Limited** (registered number 10269461) whose registered office is at 16 Charles II Street, London SW1Y 4NW, (**"RO"**); and

(2) **Network Rail Infrastructure Limited** registered in England and Wales (registered number 2904587) whose registered office is at 1 Eversholt Street, London, NW1 2DN (**"Network Rail"**).

BACKGROUND

(A) RO submitted an application for a Development Consent Order (the **"Order"**) on 17 July 2018 for the purpose of authorising works to redevelop Manston Airport in Thanet, Kent and carry out all associated works (the **"Application"**).

(B) Network Rail is the owner and operator of the national rail network, which will be affected by the design, construction, maintenance and operation of the works to be authorised by the Order.

(C) Network Rail is the freeholder of certain property affected by the Order, which forms part of the land required for the railway network and in connection with its railway operations enjoys rights over other land affected by the Application.

(D) Network Rail submitted representations in relation to the Application on the grounds that the Order would, if confirmed, authorise the permanent acquisition of subsoil in the Order Land and the permanent acquisition of rights over the Order Land, which would adversely affect Network Rail's ability to carry out its Licence obligations.

(E) RO and Network Rail are entering into this Agreement for the purposes of regulating certain aspects of their relationship so far as concerns the Application and the implementation of the powers proposed to be conferred by the Order and (without indicating any change in Network Rail's overriding policy position) to make provision as regards the Related Agreements needed to deal with the acquisition by RO of the Property, or interests in, or rights over the Order Land and, separately, to facilitate carrying out of any works which will impact upon the Network Rail Land and any infrastructure thereon.

(F) RO and Network Rail wish to enter into this Agreement to ensure that Network Rail's interests as operator of the Network are properly protected and that Network Rail's ability to carry out its obligations are not adversely affected by the Order, and to allow Network Rail to withdraw its Representation.

OPERATIVE PROVISIONS

1. **DEFINITIONS AND INTERPRETATION**

1.1 In this Agreement the following words and expressions have the following meanings:

"Affiliate"	in respect of a company (a) a holding company of such company as defined in section 1159 of the Companies Act 2006; or (b) a subsidiary of such company as defined in section 1159 of the Companies Act 2006; or (c) a company which is a subsidiary of a holding company of which such company is also a subsidiary

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"Asset Protection Agreement"	an asset protection agreement relating to the parts of the Authorised Development that affect the Network Rail Retained Land, which governs the responsibilities of RO to Network Rail in designing, constructing and maintaining the Authorised Development and secures: (a) the discharge of obligations in relation to the safety of persons on or near the Network; (b) the protection of the operational integrity of train operations and other work being undertaken on the network; (c) the achievement of good working practices in order to protect the condition and integrity of the assets and systems that make up the rail Network; and (d) the prevention of any adverse impact or detrimental effect upon railway operational matters; substantially in the form to be provided by Network Rail.
"Authorised Development"	has the same meaning as in the Order
"Clearance Conditions"	the conditions which Network Rail determines are necessary to allow it to dispose of land or any interest in land in accordance with Network Rail's obligations, in particular the Land Disposal Condition
"Compensation Code"	the code of statute and case law determining the compensation (including costs, fees, interest as prescribed by the Acquisition of Land (Rate of Interest after Entry) Regulations 1995 or any regulations replacing those regulations, stamp duty and VAT) to be paid to landowners and occupiers whose land or interests in or rights over land are authorised, by or under any statute to be compulsorily acquired or over which new rights may be compulsorily acquired, or whose land may be temporarily occupied, as modified by the Order
"Conduits"	any conducting media and associated equipment for the passing of substances, operational and utility services, energy and/or data
"Confidential Information"	information that ought to be considered as confidential (however it is conveyed or on whatever media it is stored) and may include information whose disclosure would, or would be likely to, prejudice the commercial interests of any person, trade secrets, intellectual property rights and know-how of either party and all personal data and sensitive personal data within the meaning of the Data Protection Act 1998
"Current Clearance Conditions"	the Clearance Conditions with issued by Network Rail on [DATE] with references [REFERENCES]

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"Deed of Grant Agreement"	means the transfer of rights agreement to be entered into between Riveroak Strategic Partners Limited and Network Rail in the form at **Appendix 3**
"Draft Order"	the draft of the Order which accompanies the Application
"Engineer"	has the same meaning as in the Protective Provisions
"Existing Rights Request"	a written notice from RO to Network Rail requesting release and/or modification of one or more Existing Right(s) in order to facilitate the Authorised Development of the Order Land
"Existing Rights"	(whether created by deed or otherwise): (a) any rights of way (including but not limited to rights of access); (b) any covenants; (c) any rights of support; and/or (d) any other property rights whatsoever over and in respect of the Order Land that at the date of this Agreement over which Network Rail enjoys rights of access including but not limited to those contained or referred to in the documents listed in **Appendix 4** (except for those so listed therein which are stated to be released)
"Future Agreement"	means an agreement, or a commitment to agree, proposed to be entered into by RO in favour of any third party on or after the date of this Agreement in respect of any matter connected with the promotion of the Order
"Land Disposal Condition"	condition 7 of the Licence
"Licence"	the licence or licences, as amended from time to time, to operate the Network and to operate managed stations granted to Network Rail by the Office of Rail and Road pursuant to section 8 of the Railways Act 1993
"Network"	the railway network of which Network Rail is the facility owner (as defined in section 17(6) of the Railways Act 1993)
"Network Rail"	(a) Network Rail Infrastructure Limited; (b) any Affiliate of Network Rail Infrastructure Limited; and the successors and assignees of any legal person within paragraph (a) or (b) above
"Network Rail Land"	all plots of land (including but not limited to the Property (until the completion of the Transfer) which Network Rail owns or occupies

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"Network Rail Property"	means: (a) the Network; (b) stations (as defined in the Railways Act 1993) owned by Network Rail; and (c) any land in which Network Rail has real property interest, right or entitlement to use or occupy and for the avoidance of doubt, following completion of any Network Rail Property Works, such Network Rail Property Works
"Network Rail Property Works"	means the works specified in the Asset Protection Agreement to be supplied by Network Rail
"Order Land"	the land within the Order Limits in respect of which RO seeks to exercise powers under the Order and which is shown edged red on the Order Map and which for the avoidance of doubt includes the Property
"Order Limits"	the limits shown on the works plans submitted with the Application
"Order"	the Manston Airport Order 201[x] in the form in which it is made by the Secretary of State
"Property"	interest in land at plots 113, 115-119 and 123 shown on the Property Plan as shown shaded blue, shaded orange and hatched blue and orange on the plan attached this this Agreement at **Appendix 2**
"Property Plan"	sheet number (Inset C to Sheet 5 of 5) of the land plans submitted with the Application a copy of which is attached to this Agreement at **Appendix 2**
"Protective Provisions"	the protective provisions set out in **Appendix 1** or any further iteration of the Protective Provisions as may be agreed in writing between the Parties after the date of this Agreement to apply for the purposes of the Authorised Development
"Railway Operational Procedures"	has the same meaning as in paragraph 2 of the Protective Provisions
"Regulatory Consent"	any consent or approval required under: (a) the Railways Act 1993; (b) the Licence; and /or (c) any other statutory or regulatory provisions by either the Office of Rail and Road or the Secretary of State or any other competent body including change procedures and any other consents, approvals of any access or beneficiary that may be required for any disposition involving Network Rail contemplated by this Agreement and/or any works to be carried out in accordance with this Agreement

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"Related Agreements"	together the Deed of Grant of Rights Agreement, the Asset Protection Agreement to be entered into between the Parties pursuant to clause 2 of this Agreement
"Representation"	together the relevant representation submitted to the Secretary of State by Network Rail on 8 October 2018 in relation to the Application, and the written representations made by Network Rail to the Planning Inspectorate thereafter
"Secretary of State"	the Secretary of State for Transport
"Transfer"	the transfer of rights at the Property from Network Rail to RO in the form appended to this Agreement at **Appendix 3** or in such form as may be agreed between the Parties
"Working Day"	any day from Monday to Friday which is not Christmas Day, Good Friday or a statutory bank holiday.

1.2 The headings in this Agreement are for convenience only and are not to be taken into consideration in the interpretation of this Agreement.

1.3 References in this Agreement to numbered clauses are references to the clauses of this Agreement and references in this Agreement to numbered articles and Schedules are references to the articles of and Schedules to the Draft Order.

1.4 Words importing the singular include the plural and vice versa; words importing either gender include the other gender and words importing persons include firms, companies and corporations and vice versa.

1.5 A reference in this Agreement to a "Party" or the "Parties" is a reference to the parties who are signatories to this Agreement, or their successors in title and commitments made in this Agreement are binding on those successors.

1.6 A reference to an enactment includes a reference to it as amended (whether before or after the date of this Agreement) and to any other enactments which may, after the date of this Agreement, directly or indirectly replace it, with or without amendment.

1.7 A reference in the Agreement to a plot is a reference to plots listed in the book of reference and on the land plans submitted with the Application.

2. **RELATED AGREEMENTS**

2.1 RO and Network Rail agree to negotiate with each other in good faith and use reasonable endeavours to enter into the Related Agreements. The Parties agree their common aim is to enter into the Related Agreements as soon as possible after the date of this Agreement subject to the making of the Order.

2.2 It is agreed that RO may propose changes to the form of the Transfer (at any time prior to its completion) to reflect any changes between the Draft Order and the Order and Network Rail shall act reasonably in approving such changes save for in the case of any matter relating to the safety or operation of the railway where Network Rail's decision shall be final. RO acknowledge that any change to the form of the Transfer may require Network Rail to update or renew the Current Clearance Conditions and Network Rail's approval will be subject to such revised Clearance Conditions.

2.3 Provided that the Order is made before the expiry of the Current Clearance Conditions and is not substantially different to the Draft Order as at the date of the Agreement, the Current Clearance Conditions will not need to be updated or renewed. For the avoidance of doubt,

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if the Order is not made by the expiry of the Current Clearance Conditions, new Clearance Conditions will be required.

3. **FUTURE AGREEMENTS AND UNDERTAKINGS**

3.1 RO shall not without the consent of Network Rail enter into a Future Agreement that imposes any obligation or restriction on Network Rail in respect of any rights enjoyed by, or otherwise exercisable by Network Rail over that Network Rail Property.

4. **NETWORK RAIL'S OBLIGATIONS**

4.1 Subject to the provisions of this Agreement, Network Rail shall:

4.1.1 comply with any relevant Railway Operational Procedures it is made aware of that are necessary to facilitate the Authorised Development by RO; and

4.1.2 withdraw its Representation to the Application within five Working Days of the date of this Agreement.

5. **RIVEROAK STRATEGIC PARTNERSHIP LIMITED'S OBLIGATIONS**

5.1 RO will, in the carrying out and the operation of the Authorised Development and in the exercise of any powers under the Order:

5.1.1 comply with the provisions of this Agreement and any provision in the Related Agreements (as applicable);

5.1.2 comply with the Protective Provisions whether or not the same are included in the Order;

5.1.3 agree and pay compensation to Network Rail in accordance with clause [14] of this Agreement and indemnify Network Rail in accordance with clause [12] of this Agreement; and

5.2 RO will not in constructing the Authorised Development:

5.2.1 ;

5.2.2 ;

5.2.3 place the Network Rail Land in a position where it cannot be used, or is placed at risk of not being capable of use, to run trains safely;

5.2.4 commence the part(s) of the Authorised Development which affect the Network Rail Land or maintain the same unless and until the Related Agreements have been entered into, unless otherwise agreed by the Parties in writing.

6. **PROTECTION OF NETWORK RAIL STATIONS, LEVEL CROSSINGS AND EQUIPMENT**

6.1 The Promoter must:-

6.1.1 not carry out any works within a 15 metre radius of the Cliffsend Level Crossing, including but not limited to construction, operational or maintenance works as a result of the Order being made;

6.1.2 not compromise or put at risk Network Rail's track, equipment and operational railway at Cliffsend Level Crossing during the construction or operation of the powers authorised by the Order nor affect Network Rail's ability to maintain the same;

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6.1.3 notify Network Rail of any proposed works within a 15 metre radius of the Cliffsend Level Crossing which may affect the safety, structure or operation of Network Rail's operational undertaking or the Cliffs End Level Crossing;

6.1.4 for the purposes of clause 6.1.3, the Promoter will provide Network Rail documentary evidence as Network Rail (acting reasonably) requires to satisfy itself that adequate safety and security is in place prior to commencement of any works specified in this clause 6;

6.1.5 if Network Rail (acting reasonably) so requires, enter into an asset protection agreement with Network Rail in respect of such works at the Cliffsend Level Crossing, such agreement to be in substantially the same for as the Asset Protection Agreement; and

6.1.6 pay Network Rail the reasonable and proper costs, charges and expenses incurred by Network Rail, if Network Rail (acting reasonably) identifies any necessary upgrade works as result of the Order being made to:

6.1.6.1 the Cliffsend Level Crossing;

6.1.6.2 Minster and Ramsgate Stations; and

6.1.6.3 Network Rail equipment and apparatus.

7. **EXISTING RIGHTS: ASCERTAINED RIGHTS**

7.1 Subject to clause [7.2 and7.3], the Existing Rights at **Appendix 4** as being accepted shall be retained and shall remain enforceable.

7.2 In respect of the rights and benefits specified at **Appendix 4**, the Parties acknowledge and declare that any approval given under the Asset Protection Agreement for works constitutes approval for the purposes of those rights and benefits.

7.3 The Parties acknowledge that RO may make an Existing Rights Request under clause [9] in relation to a right to which clause [7.1] applies.

7.4 The Existing Rights at **Appendix 4** as being released shall be treated by the Parties and their successors in title as if they had been released by a deed of extinguishment as at the date of this Agreement.

8. **UNKNOWN EXISTING RIGHTS**

8.1 An Existing Right which is not specified in **Appendix 4**, but which Network Rail subsequently establishes exists (an **"Unknown Existing Right"**) does not take effect and must not be applied except with RO's express agreement.

8.2 If Network Rail becomes aware of the existence of an Unknown Existing Right it must as soon as reasonably practicable inform RO of its existence and advise RO of what steps Network Rail wishes RO to take in relation to it.

8.3 On receiving a request from Network Rail to which clause [8.2] applies RO shall inform Network Rail as soon as reasonably practicable of its decision, taking into account with due consideration Network Rail's view as communicated pursuant to clause [8.2], as to whether the Unknown Existing Right is to be:

8.3.1 treated as if it were specified as accepted in **Appendix 4**;

8.3.2 re-granted in a modified form so as to take into account the Authorised Development; or

8.3.3 treated as released by the parties to this Agreement and their successors in title as if the Unknown Existing Right had been released by a deed of extinguishment.

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8.4 In reaching its decision under clause [8.3], where Network Rail has not indicated pursuant to clause [8.2] that the Unknown Existing Right should be released:

8.4.1 RO will only decide in accordance with clauses [8.3.2] and [8.3.3] if the retention of the Unknown Existing Right would materially compromise the efficient, economic and timely construction and operation of the Authorised Development; and

8.4.2 RO will favour a decision in accordance with clause [8.3.2] over a decision in accordance with clause [8.3.3] unless the Unknown Specified Right cannot be re-granted in a modified form without materially compromising the efficient, economic and timely construction and operation of the Authorised Development.

9. MODIFICATION OF AN EXISTING RIGHT

9.1 In relation to any Existing Right which is specified as accepted in **Appendix 4**, RO may seek to secure its release or modification by submitting an Existing Rights Request to Network Rail for Network Rail's consent which shall not be unreasonably withheld or delayed.

9.2 If Network Rail agrees to implement a request made under an Existing Rights Request it shall apply for any necessary Clearance Conditions further to which RO and Network Rail shall as soon as reasonably practicable following clearance having been obtained (if applicable) procure that such Existing Rights for which clearance is obtained (if required) shall be released and/or modified (as requested by RO) by way of a deed of extinguishment and re-grant or such other assurance as may be requisite for that purpose (**"Existing Rights Agreement"**) following confirmation of the Order and which the parties hereby shall use reasonable endeavours to agree and which shall include (inter alia):

9.2.1 such provisions as may be requisite to give effect to the Protective Provisions (so far as the same may be applicable thereto) and any provisions which are required for the safety and/or operation of the railway;

9.2.2 such other requirements of any applicable Regulatory Consent and/or Clearance Conditions; and

9.2.3 provisions providing the ability for RO to relocate (at RO's sole cost) the Existing Right(s) which are the subject of the Existing Rights Agreement unless the Clearance Conditions expressly prohibit any such relocation.

9.3 Network Rail reserves the right to request RO to group various Existing Rights Requests under one application for clearance, but RO is not obliged so to do if to do so would put its construction timetable at risk.

9.4 The compensation payable for the release or modification of an Existing Right pursuant to any Existing Rights Agreement(s) shall be in accordance with the Compensation Code, but no compensation shall be payable in respect of an Existing Right which is not specified in **Appendix 4**.

10. AMENDING THE ORDER

10.1 RO must not seek any modification of the Order from the Secretary of State in any way which would impact the terms of this Agreement without first obtaining Network Rail's written consent and for the avoidance of doubt if any modifications are made by the Secretary of State to the Order which impact on this Agreement and which have not been approved by Network Rail the terms of this Agreement shall remain in force as if the Order had not been modified, unless otherwise agreed with Network Rail in writing provided that if compliance with any provision of this Agreement would as a result of modifications to the Order which have not first been approved in writing by Network Rail result in RO being guilty of a criminal offence then RO shall not be required to comply with such provision but all other provisions of this agreement shall remain in full force and effect.

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11. **THE APPLICATION AND THE DRAFT ORDER**

11.1 To the extent that the Secretary of State does not incorporate any provision of the Protective Provisions in the Order the Parties agree that the Protective Provisions appended to this Agreement are deemed to be incorporated within the Order and, as between RO and Network Rail, apply and have effect accordingly.

12. **COSTS AND INDEMNITY**

12.1 RO shall:

12.1.1 indemnify Network Rail in the terms of the indemnity contained at paragraph [15] of the Protective Provisions; and

12.1.2 indemnify Network Rail in respect of all costs and expenses incurred (including legal, surveying and engineering costs and disbursements) or losses suffered to the extent that the same are reasonably incurred in connection with:

12.1.2.1 the preparation and negotiation of this Agreement;

12.1.2.2 the preparation, negotiation and completion of the Related Agreements;

12.1.2.3 any act or omission by RO that is in breach of this Agreement;

12.1.2.4 any act or omission by RO that is in breach of any Related Agreement; or

12.1.2.5 any claim by Network Rail or a third party relating to any act or omission by RO related to this Agreement, any Related Agreement, the Order or the Authorised Development.

12.2 RO must reimburse Network Rail's:

12.2.1 costs for entering into this Agreement on completion of this Agreement and all other costs within 28 days of receipt of an invoice together with appropriate and detailed evidence of the cost or expenses incurred; and

12.2.2 costs, charges and expenses of legal, surveying and engineering costs, internal administrative overheads and disbursements properly and reasonably incurred by Network Rail in connection with the preparation and negotiation of this Agreement and Related Agreement.

13. **CONSULTATION AND CO-OPERATION**

13.1 RO must continue on a regular basis to:

13.1.1 provide information to Network Rail; and

13.1.2 consult, co-operate and work with Network Rail

in connection with the implementation of the Order, including the design, development, construction and maintenance of the Authorised Development and the acquisition and use of the Property.

13.2 RO will provide such information and assistance as Network Rail may reasonably require to facilitate the obtaining of any Regulatory Consent which may be required in relation to any matters arising under this Agreement.

13.3 Network Rail must act expeditiously in determining any Existing Rights Request and, in accordance with clause [2.2], in responding to any request made by RO for an amendment to the form of the Transfer.

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13.4 No Party may issue any press release or make any public announcement in relation to the matters in this Agreement without the prior written consent of the other parties (such consent not to be unreasonably delayed or withheld) as to both content and timing of the issue of the press release.

14. COMPENSATION

14.1 Any compensation due to Network Rail in consequence of the acquisition and use of the Property by RO for the purpose of the Authorised Development must be assessed and determined in accordance with the Compensation Code.

14.2 If requested by Network Rail, RO shall make an advance payment of compensation to Network Rail, and such payment shall be made in accordance with sections 52 and 52A of the Land Compensation Act 1973.

15. DISPUTE RESOLUTION

15.1 Without prejudice to any other provision of this Agreement RO and Network Rail must attempt to resolve any lack of agreement, dispute or difference between them arising out of this Agreement (**"Dispute"**) by discussion and agreement in accordance with this clause.

15.2 If any Dispute has not been resolved within 21 days of the Dispute arising, RO must call a meeting for the purpose of resolving the Dispute by serving not less than five Working Days' written notice on Network Rail.

15.3 Each Party agrees to procure that a senior representative with sufficient knowledge and authority in respect of the matter in dispute is to attend any meeting called in accordance with clause [15.2] above and must co-operate in good faith with the others to resolve the Dispute as amicably as possible and within ten Working Days of the meeting called for that purpose.

15.4 If the senior representatives fail to resolve the Dispute within the time allotted by clause [15.2]:

15.4.1 a Dispute as to the meaning or construction of this Agreement is to be referred to and determined by an independent solicitor or barrister of at least ten years' standing, acting as an expert and who is experienced in drafting, negotiating and advising upon agreements similar to this Agreement, such independent person to be agreed between the Parties or failing such agreement to be nominated by the President or the Vice President or other duly authorised officer of the Law Society on the application of any Party, having given written notice to the others, and the costs associated with the expert and determination of the Parties must be borne as the expert directs;

15.4.2 and a Dispute as to matters of compensation must be determined by the Upper Tribunal; and

15.4.3 any other Dispute arising must be referred to and settled by arbitration in accordance with article [43] (Arbitration) of the Order on referral by either RO or Network Rail provided that, where relevant the arbitrator must settle the dispute or difference in accordance with the terms of this Agreement and the Parties must bear the costs associated with the arbitration in such manner as the arbitrator may determine, and in so doing the arbitrator must take into account the reasonableness of the Parties' respective positions leading to the difference arising between them and thereafter before its determination.

16. CONFIDENTIALITY

16.1 RO acknowledges that Network Rail may be required, under the Freedom of Information Act 2000 and/or the Environmental Information Regulations 2004 (collectively, the Information Acts) to respond to requests for information relating to the subject matter of this Agreement.

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16.2 RO shall and shall procure that its sub-contractors shall:

16.2.1 provide all necessary assistance and cooperation as reasonably requested by Network Rail to enable it to comply with its obligations under the Information Acts;

16.2.2 notify Network Rail of all requests for information relating to this Agreement that it receives as soon as reasonably practicable and in any event within five Working Days of receipt;

16.2.3 provide Network Rail with a copy of all information belonging to Network Rail requested in the request for information which is in its possession or control in the form that Network Rail requires within five Working Days (or such other period as Network Rail may reasonably specify) of Network Rail requesting such information; and

16.2.4 not respond directly to a request for information unless authorised in writing to do so by Network Rail.

16.3 RO acknowledges that Network Rail may be required under the Information Acts to disclose information (including Confidential Information) without consulting or obtaining consent from RO.

16.4 Network Rail shall take reasonable steps to notify RO of a request for Confidential Information (in accordance with the Secretary of State's section 45 Code of Practice on the Discharge of the Functions of Public Authorities under Part 1 of the Freedom of Information Act 2000) to the extent that it is permissible and reasonably practical for it to do so and shall consider any reasonable and timely representations made by the other Party/ RO within seven Working Days of notification regarding the application of exemptions to the requested information.

16.5 Notwithstanding any other provision in this Agreement, Network Rail shall be responsible for determining in its absolute discretion whether any Confidential Information and/or any other information is exempt from disclosure in accordance with the Information Acts.

16.6 Save as required by policies addressing freedom of information and requests for information under environmental information regulations, policies from time to time applied by the Parties (which shall not be in anyway restricted or limited by this Agreement), the Parties must not disclose any Confidential Information to any other person (save where such person is bound by a requirement not to keep such information confidential) except with the other Party's prior consent, which may not be unreasonably withheld or delayed but which may be made subject to reasonable conditions.

17. **SURVIVORSHIP**

17.1 The Parties acknowledge that this Agreement continues to have effect after the Related Agreements have been entered into.

18. **NOTICES**

18.1 Any notice served or given or plans, drawings or documents supplied under or in relation to this Agreement must (in the case of a notice) be in writing, must refer to the relevant provision of this Agreement, and will in all cases be deemed to be sufficiently given, served or supplied if addressed or supplied to RO or Network Rail as the case may be, and sent by first class post, courier services or registered post:

18.1.1 in the case of Riveroak Strategic Partners Limited, to:

16 Charles II Street
London SW1Y 4NW
For the attention of the Company Secretary

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18.1.2 in the case of Network Rail, to:

Network Rail Infrastructure Limited
1 Eversholt Street,
London NW1 2DN

For the attention of Stephen Sprei, Surveyor.

or to such other address as RO or Network Rail may from time to time designate by written notice to the other.

18.2 Any notice, plan, drawing or document given, served or supplied in accordance with this clause is determined, in the absence of earlier receipt, to have been given, served or supplied two Working Days after posting or despatch, exclusive of the day of posting.

19. **RIGHTS OF THIRD PARTIES**

19.1 Unless specifically provided otherwise nothing in this Agreement confers or purports to confer on any third party any benefit or any rights to enforce any term of this Agreement for the purposes of the Contracts (Rights of Third Parties) Act 1999.

20. **VARIATIONS**

20.1 No variation of this Agreement is effective unless it is in writing and is signed by or on behalf of a duly authorised representative of each of the Parties.

21. **NEGLIGENCE**

21.1 Nothing in this Agreement imposes any liability on RO or Network Rail with respect to any damage, cost, expense or loss which is attributable to the negligence of the other party or of any person in its employment or of its contractors or agents, and any liability of RO or Network Rail under this Agreement must be reduced proportionately to the extent to which any damage, cost expense or loss its attributable to the negligence of the other party or of any person in its employment, or of its contractors or agents.

22. **TERMINATION**

22.1 This Agreement shall cease to have effect (save in respect of any antecedent breach and any obligation to be discharged by RO arising from steps taken to implement the Authorised Development) and the parties shall be released from any further liability under it on the occurrence of any of the following events:

22.1.1 the rejection of the Application by the Secretary of State and upholding of such rejection in judicial review proceedings;

22.1.2 the rejection of the Application by Parliament following implementation of Special Parliamentary Procedure;

22.1.3 a decision by the Court in judicial review proceedings to overturn the grant of the Application by the Secretary of State; or

22.1.4 a decision by the Court in proceedings initiated under Section 118 of the Planning Act 2008.

IN WITNESS of which, this Agreement is executed as a Deed and is delivered and takes effect on the date stated at the beginning of the Deed.

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EXECUTED as a deed by)
RIVEROAK STRATEGIC PARTNERS LIMITED)
in the presence of:)

_____

Signature of director

_____

Signature of director/secretary

EXECUTED as a deed by affixing)
the common seal of)
NETWORK RAIL INFRASTRUCTURE LIMITED)
in the presence of:)

_____

Authorised Signatory

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Appendix CA.3.12

1 APPENDIX 1

Protective Provisions

SCHEDULE 9

Article [31 and 39]

PROTECTIVE PROVISIONS

PART 3

FOR PROTECTION OF NETWORK RAIL

1.The following provisions of this Part of this Schedule shall have effect, unless otherwise agreed in writing between the undertaker and Network Rail and, in the case of paragraph 14, any other person on whom rights or obligations are conferred by that paragraph.

2. In this Schedule—

"construction" includes execution, placing, alteration and reconstruction and "construct" and "constructed" have corresponding meanings;

"the engineer" means an engineer appointed by Network Rail for the purposes of this Order;

"network licence" means the network licence, as the same is amended from time to time, granted to Network Rail Infrastructure Limited by the Secretary of State in exercise of his or her powers under section 8 of the Railways Act l993;

"Network Rail" means Network Rail Infrastructure Limited and any associated company of Network Rail Infrastructure Limited which holds property for railway purposes, and for the purpose of this definition "associated company" means any company which is (within the meaning of section 1159 of the Companies Act 2006[1] the holding company of Network Rail Infrastructure Limited, a subsidiary of Network Rail Infrastructure Limited or another subsidiary of the holding company of Network Rail Infrastructure Limited;

"railway operational procedures" means procedures specified under any access agreement (as defined in the Railways Act 1993) or station lease;

"railway property" means any railway belonging to Network Rail Infrastructure Limited and-

(a) any station, land, works, apparatus and equipment belonging to Network Rail or connected with any such railway; and

(b) any easement or other property interest held or used by Network Rail for the purposes of such railway or works, apparatus or equipment; and

3.—(1) Where under this Part Network Rail is required to give its consent or approval in respect of any matter, that consent or approval is subject to the condition that Network Rail complies with any relevant railway operational procedures and any obligations under its network licence or under statute.

(1) In so far as the acquisition or use of railway property is or may be subject to railway operational procedures, Network Rail shall—

(a) co-operate with the undertaker with a view to avoiding undue delay and securing conformity as between any plans approved by the engineer and requirements emanating from those procedures; and

(b) use their reasonable endeavours to avoid any conflict arising between the application of those procedures and the proper implementation of the authorised project pursuant to this Order.

4.—(1) The undertaker shall not exercise the powers conferred by article 17 (*protective works to buildings*), 18 (*authority to survey and investigate the land*) article 19 (*compulsory acquisition of land*), article 22

[1] 2006 c.46

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(*compulsory acquisition of rights and restrictive covenants*), article 23 (*subsoil or new rights only to be acquired in certain land*), article 29 (*temporary use of land for carrying out the authorized development*), article 30 (*temporary use of land for maintain the authorized development*) and article 34 (*felling or lopping trees and removal of hedgerows)* or the powers conferred by section 11(3) of the 1965 Act in respect of any railway property unless the exercise of such powers is with the consent of Network Rail.

(2) The undertaker shall not in the exercise of the powers conferred by this Order prevent pedestrian or vehicular access to any railway property, unless preventing such access is with the consent of Network Rail.

(3) The undertaker shall not exercise the powers conferred by article 31 (statutory undertakers) or sections 271 or 274 of the 1990 Act, as applied by article 31 to this Order, in relation to railway property.

(4) The undertaker shall not under the powers of this Order enter upon, acquire or use, extinguish or acquire new rights over any railway property except with the consent of Network Rail.

(5) Where Network Rail is asked to give its consent pursuant to this paragraph, such consent shall not be unreasonably withheld but may be given subject to reasonable conditions.

(6) The undertaker shall enter into an asset protection agreement prior to the commencement of the construction of any part of the authorised project.

5.—(1) In this paragraph-

"EMI" means, subject to sub-paragraph (2), electromagnetic interference with Network Rail apparatus generated by the operation of the authorised works where such interference is of a level which adversely affects the safe operation of Network Rail's apparatus; and

"Network Rail's apparatus" means any lines, circuits, wires, apparatus or equipment (whether or not modified or installed as part of the authorised works) which are owned or used by Network Rail for the purpose of transmitting or receiving electrical energy or of radio, telegraphic, telephonic, electric, electronic or other like means of signalling or other communications.

(2) This paragraph applies to EMI only to the extend that such EMI is not attributable to any change to Network Rail's apparatus carried out after approval of plans under paragraph 5(1) for the relevant part of the authorised works giving rise to EMI (unless the undertaker has been given notice in writing before the approval of those plans of the intention to make such change).

(3) Subject to sub-paragraph (5), the undertaker must in the design and construction of the authorised works take all measures necessary to prevent EMI and must establish with Network Rail (both parties acting reasonably) appropriate arrangements to verify their effectiveness.

(4) In order to facilitate the undertaker's compliance with sub-paragraph (3)-

(a) the undertaker must consult with Network Rail as early as reasonably practicable to identify all Network Rail's apparatus which may be at risk of EMI, and thereafter must continue to consult with Network Rail (both before and after formal submission of plans under paragraph 5(1)) in order to identify all potential causes of EMI and the measures required to eliminate them;

(b) Network Rail must make available to the undertaker all information in the possession of Network Rail reasonably requested by the undertaker in respect of Network Rail's apparatus identified pursuant to sub-paragraph (a); and

(c) Network Rail must allow the undertaker reasonable facilities for the inspection of Network Rail's apparatus identified pursuant to sub-paragraph (a).

(5) In any case where it is established that EMI can only reasonably be prevented by modifications to Network Rail's apparatus, Network Rail must not withhold its consent unreasonably to modifications of Network Rail's apparatus, but the means of prevention and the method of their execution must be selected in the reasonable discretion of Network Rail, and in relation to such modifications paragraph 5(1) have effect subject to the sub-paragraph.

(6) If at any time prior to the commencement of regular revenue-earning operations comprised in the authorised works and notwithstanding any measures adopted pursuant to sub-paragraph (3), the testing or commissioning of the authorised works causes EMI then the undertaker must immediately upon receipt of notification by Network Rail of such EMI either in writing or communicated orally (such oral communication to be confirmed in writing as soon as reasonably practicable after it has been issued) forthwith cease to use (or procure the cessation of use of) the undertaker's apparatus causing such EMI until all measures necessary

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have been taken to remedy such EMI by way of modification to the source of such EMI or (in the circumstances, and subject to the consent, specified in sub-paragraph (5)) to Network Rail's apparatus.

(7) In the event of EMI having occurred –

(a) the undertaker must afford reasonable facilities to Network Rail for access to the undertaker's apparatus in the investigation of such EMI;

(b) Network Rail must afford reasonable facilities to the undertaker for access to Network Rail's apparatus in the investigation of such EMI; and

(c) Network Rail must make available to the undertaker any additional material information in its possession reasonably requested by the undertaker in respect of Network Rail's apparatus or such EMI.

(8) Where Network Rail approves modifications to Network Rail's apparatus pursuant to sub-paragraphs (5) or (6) –

(a) Network Rail must allow the undertaker reasonable facilities for the inspection of the relevant part of Network Rail's apparatus;

(b) any modifications to Network Rail's apparatus approved pursuant to those sub-paragraphs must be carried out and completed by the undertaker in accordance with paragraph 6.

(9) To the extent that it would not otherwise do so, the indemnity in paragraph 15(1) applies to the costs and expenses reasonably incurred or losses suffered by network Rail through the implementation of the provisions of this paragraph (including costs incurred in connection with the consideration of proposals, approval of plans, supervision and inspection of works and facilitating access to Network Rail's apparatus) or in consequence of any EMI to which sub-paragraph (6) applies.

(10) For the purpose of paragraph 10(a) any modifications to Network Rail's apparatus under this paragraph shall be deemed to be protective works referred to in that paragraph.

(11) (In relation to any dispute arising under this paragraph the reference in 43 (Arbitration) to the Institution of Civil Engineers shall be read as a reference to the Institution of Electrical Engineers.

6. The undertaker and Network Rail may, subject in the case of Network Rail to compliance with the terms of its network licence, enter into, and carry into effect, agreements for the transfer to the undertaker of—

(a) any railway property shown on the works and land plans and described in the book of reference;

(b) any lands, works or other property held in connection with any such railway property; and

(c) any rights and obligations (whether or not statutory) of Network Rail relating to any railway property or any lands, works or other property referred to in this paragraph.

7. Nothing in this Order, or in any enactment incorporated with or applied by this Order, shall prejudice or affect the operation of Part I of the Railways Act 1993.

8. The undertaker shall give written notice to Network Rail if any application is proposed to be made by the undertaker for the Secretary of State's consent, under article 8 (*consent to transfer the benefit of Order*) of this Order and any such notice shall be given no later than 28 days before any such application is made and shall describe or give (as appropriate)—

(a) the nature of the application to be made;

(b) the extent of the geographical area to which the application relates; and

(c) the name and address of the person acting for the Secretary of State to whom the application is to be made.

9. Any difference or dispute arising between the undertaker and Network Rail under this Part of this Schedule shall be referred to and settled by arbitration under article 43 (*arbitration*).

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2 APPENDIX 2

Property Plan

[INSERT INSET C TO SHEET 5 OF 5 OF THE LAND PLAN]

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3 APPENDIX 3

Form of Transfer of Rights

DATED [●]

RIVEROAK STRATEGIC PARTNERS LIMITED

and

NETWORK RAIL INFRASTRUCTURE LIMITED

DEED OF GRANT OF RIGHTS
For a Term of Years

relating to an asset protection agreement dated [●] in connection with the redevelopment of the Manston Airport, Kent

THIS DEED is made between Network Rail and the Grantee on the date below.

1. PARTICULARS

1.1	**Date**	
1.2	**Network Rail**	**NETWORK RAIL INFRASTRUCTURE LIMITED** (Company Number 2904587) whose registered office is at 1 Eversholt Street, London NW1 2DN
1.3	**the Grantee**	**RIVEROAK STRATEGIC PARTNERS LIMITED** (company no 10269461) whose registered office is at 16 Charles II Street, London SW1Y 4NW
1.4	**Rights**	The following rights are subject to the Rights Conditions: 1.4.1 to [construct, erect and lay] [fix and attach] the Service Media [in] [on] [over] [under] [to] Network Rail's property [(to the extent that this has not been done at the date of this Deed)] in the approximate position(s) indicated by the [broken] [blue line(s)] on the Plan [and to retain, use, maintain, repair, test, inspect, renew and remove them]; and 1.4.2 to the free passage and running of the Services through the Service Media.
1.5	**Service Media**	The service media, the specification of which is detailed in the Third Schedule to this Deed including any control or ancillary apparatus and any wrapping, sleeving, protective or other equipment as may be specified in the Third Schedule and any incidental apparatus or equipment or works to the service media required by Network Rail or any service media substituted under the provisions of this Deed.
1.6	**Services**	The [supply] [and] [disposal] of [water], [surface water], [sewerage], [drainage], [soil], [gas], [electricity], [telecommunications] [and other services or supplies].
1.7	**Plan**	The plan (number) attached to this Deed.
1.8	**Grantee's Premises**	The premises presently belonging to the Grantee situate at and known as [ ] as shown edged red on the Plan

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		and registered at the Land Registry under Title Number [ ] being the dominant land.
1.9	**Annual Payment**	The annual sum of £ [ ] (subject to review as provided in the Second Schedule to this Deed).
1.10	**Annual Payment Start Date**	[ ]
1.11	**Payment Date(s)**	The dates on which the Annual Payment is to be made, namely [quarterly][annual] payment(s) on every [ ] of the Term.
1.12	**Index Month**	[ ]
1.13	**Start Date**	[ ]
1.14	**Term**	The term of [ ] years beginning on the Start Date and ending on [ ]
1.15	**Network Rail's Surveyor**	Such person as Network Rail may appoint in this capacity.
1.16	**Network Rail's Engineer**	Such person as Network Rail may appoint in this capacity.
1.17	**Network Rail's Costs**	Network Rail's [legal costs] [and] [surveyor's fees] in connection with the grant of this Deed.

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2. THE MEANING AND USE OF WORDS IN THIS DEED

2.1 The terms defined in the Particulars have the meanings specified there subject to any further explanation set out in this clause.

2.2 In this Deed the following words and expressions shall, where the context so admits, have the following meanings.

2.2.1 "**Special Conditions**" mean such (if any) provisions as are set out in the Fourth Schedule to this Deed.

2.2.2 **"Engineering Conditions"** mean such conditions as Network Rail's Engineer may properly require for the safety, protection or operation of Network Rail's railway, property or works to its railway or property, as are notified to the Grantee in writing from time to time.

2.2.3 **"Rights Conditions"** mean the conditions set out in the First Schedule to this Deed.

2.2.4 **"CDM Regulations"** mean the Construction (Design and Management) Regulations 2007.

2.2.5 **"Health and Safety File"** means any health and safety file required to be prepared pursuant to the CDM Regulations.

2.2.6 **"Basic Interest Rate"** means the base lending rate from time to time of HSBC Bank plc. But if the base lending rate of HSBC Bank plc shall at any time cease to exist or be ascertainable, then Network Rail may substitute for it the base lending rate of such one of the London Clearing Banks as Network Rail shall prescribe in writing, or (if this shall be impracticable) such other rate or rates as Network Rail shall prescribe in writing as reasonably equivalent.

2.3 This Deed is to be interpreted as follows.

2.3.1 **"Network Rail"** includes successors in title and assigns of Network Rail.

2.3.2 **"the Grantee"** includes its successors in title.

2.3.3 **"Deed"** means this present document and all other documents which may now or in future be entered into supplementing or varying it.

2.3.4 References to the "**end of the Term**" are references to the actual ending, whenever and howsoever it comes to an end.

2.3.5 Words which refer to males also refer to females, and to companies.

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2.3.6 Where the Grantee is more than one person, their obligations can be enforced against all of them jointly and against each individually.

2.3.7 Where an Act of Parliament, or a section of it, is referred to, this includes any amendment to that Act or section, and the version of an Act which is current at any particular time will apply. This applies also to anything made under an Act of Parliament.

2.3.8 References to value added tax in this Deed shall include any tax of a similar nature that may be substituted for or added to it.

2.3.9 The Grantee's obligations under this Deed shall be treated as including a requirement that the Grantee is also to procure that the Grantee's employees and agents and any other persons under its control do not do anything and do not omit to do anything which, if done or omitted by the Grantee, would constitute a breach of those obligations.

2.3.10 This document gives no rights under the Contracts (Rights of Third Parties) Act 1999, but this does not affect any rights which are available apart from that Act.

3. GRANT

In consideration of the Annual Payment and the covenants and conditions on the part of the Grantee contained in this Deed, Network Rail grants the Rights to the Grantee for the Term solely for the benefit of the Grantee's Premises. The Annual Payment is payable on and from the Annual Payment Start Date [annually][quarterly] in advance on the Payment Date(s) in every year without any deduction or set-off, the first payment of such Annual Payment to the next Payment Date(s) to be made on the date of this Deed.

4. RIGHTS AND OTHER MATTERS

The grant of this Deed is on the following basis.

4.1 It is granted subject to any rights, reservations, privileges, covenants, restrictions, stipulations and other matters of whatever nature affecting the Rights or the Service Media so far as any of them relate to the Rights or the Service Media and are still subsisting and capable of taking effect.

4.2 Nothing in this Deed shall confer on the Grantee any right to the benefit of or to enforce any covenant or agreement contained in any other instrument relating to any property or to affect the right of Network Rail to deal with it now or at any time as Network Rail may think fit.

4.3 It is granted subject to Network Rail having the right at any time to stop up or otherwise affect any rights of way or other rights or privileges

(whether now in existence or not) which the Grantee may at any time during the Term be using or enjoying, over any neighbouring land of Network Rail. But this does not apply to any use or enjoyment by virtue of the express provisions of this Deed or of any separate grant or licence in writing from Network Rail.

4.4 It excludes any right of support from mines and minerals or from any subsoil or substrata or from Network Rail's railway, property or works to its railway or property.

4.5 Nothing in this Deed shall afford the Grantee a right of lateral or subjacent support for the Service Media or render Network Rail liable for any damage to the Service Media which may happen through any slip or settlement of Network Rail's land or by the carrying on of Network Rail's undertaking.

4.6 It is not granted exclusively but is granted in common with Network Rail and others authorised by Network Rail or otherwise entitled to exercise such rights.

4.7. All rights not specifically and expressly included in the Rights are reserved to Network Rail.

4.8 This Deed does not constitute a new tenancy within the meaning of Section 1 of the Landlord and Tenant (Covenants) Act 1995, nor is there any intention of any relationship of landlord and tenant hereby being created.

5. REVIEW OF ANNUAL PAYMENT

5.1 The Annual Payment shall be reviewed in accordance with the Second Schedule to this Deed.

5.2 If the Annual Payment shall be increased, the increased Annual Payment will be payable as from the relevant Annual Payment Review Date at the times and in the manner as provided, and the Annual Payment as so increased shall remain payable subject to further increase under the Second Schedule to this Deed.

6. THE GRANTEE'S COVENANTS

The Grantee covenants with Network Rail as follows.

6.1 **To pay the Annual Payment**

To pay to Network Rail the Annual Payment, including all increases, at the times and in the manner provided in this Deed.

6.2 **Interest on late payment**

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If the Annual Payment or any part of it is not paid when due or if any other sum payable under this Deed or any part of it remains unpaid for 14 days after the date of demand, the Grantee shall (subject as follows) pay to Network Rail interest on the amount outstanding. This is without prejudice to any of Network Rail's rights then subsisting. Such interest is to be calculated on a daily basis at the rate of four per cent above the Basic Interest Rate on the amount outstanding from the date on which it became payable until the actual date of payment to Network Rail (whether or not this is before or after judgement in any proceedings for recovery of outstanding sums). The interest is to be compounded on the usual English quarter days and paid without any deduction or set-off, except as required by statute.

6.3 **Interest on the Annual Payment review**

If the amount of any increase in the Annual Payment upon review has not been ascertained before the relevant Annual Payment Review Date (as defined in the Second Schedule), then the Grantee is to pay interest at the Basic Interest Rate on the arrears of such increase. Such interest shall run from and include the Annual Payment Review Date while the arrears are unpaid, until 14 days after the arrears are demanded by Network Rail (or earlier payment by the Grantee). But if the Grantee pays afterwards, then interest subsequently runs at four per cent above the Basic Interest Rate until actual payment.

6.4 **To pay outgoings**

To pay all existing and future rates, duties, charges, assessments and outgoings whatsoever imposed or charged upon the Service Media or upon Network Rail or upon the Grantee in respect of them or payable by either in respect of them and if the Service Media are not separately assessed and Network Rail is liable to pay then the Grantee shall pay to Network Rail such proportion of them as may be fixed or agreed with the Grantee from time to time by Network Rail's Surveyor.

6.5 **Installation and Maintenance of the Service Media**

6.5.1 To the extent that this has not been done at the date of this Deed, to construct with all due despatch and afterwards maintain the Service Media in accordance (where applicable) with the Engineering Conditions and/or the Rights Conditions to the satisfaction of Network Rail's Engineer.

6.5.2 To give to Network Rail's Engineer the period of notice required by the Engineering Conditions and/or the Rights Conditions in writing prior to commencement of any works connected with the use, maintenance, repair, testing, inspection, renewal or removal of the Service Media and to carry out such works during such times of the day and night as Network Rail's Engineer may require and in accordance (where applicable) with the Engineering Conditions and/or the Rights Conditions.

6.5.3 To comply with the Special Conditions if any.

6.6 **Conditions**

In so far as their exercise is not governed by the Engineering Conditions, to exercise the Rights in accordance with the Rights Conditions and in case of any inconsistency or conflict, the Engineering Conditions take priority over the Rights Conditions.

6.7 **Permissions**

To obtain all necessary consents and approvals under all relevant legislation including (without limitation) the Town and Country Planning Acts and Environmental Protection Acts in exercise of the Rights or the use of the Service Media and to comply with all the conditions of such consents and approvals and if requested by Network Rail to provide Network Rail with copies of any consents or approvals. The Grantee shall at all times keep Network Rail indemnified in respect of all related costs, claims, liability and expenses.

6.8 **Notices**

Immediately upon receipt of any notice, order, direction, licence, consent or permission from a local authority, governmental or similar body relating to the Service Media or the use of the Service Media,, to give full particulars to Network Rail.

6.9 **Indicators**

If Network Rail so requires:

6.9.1 to fix and maintain such indicators as may be agreed between the parties or, in default of agreement, such indicators as may be required by Network Rail's Engineer for the purpose of indicating the position and direction of the Service Media; and

6.9.2 to provide the means to cut off the supply through the Service Media in the event of emergency affecting Network Rail’s railway property or works to its railway or property and to provide Network Rail’s Engineer with the name, designation and telephone number of the person to be contacted in the event of such action being necessary.

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6.10 **Alterations**

Except as required by the Health and Safety Executive or clauses 7.4.3 and 7.4.4 of this Deed or as permitted by the Rights, not to carry out any alterations or additions to the Service Media other than in connection with routine repair or maintenance and otherwise than in accordance (where applicable) with the Engineering Conditions and/or the Rights Conditions and/or the Special Conditions.

6.11 **Use of the Service Media**

6.11.1 Not to use the Service Media otherwise than for the [running] [transmission] [discharge] of Services for the benefit of the Grantee's Premises but for no other purpose whatsoever .

6.11.2 Not to discharge or permit to be discharged through or (where appropriate) convey or permit to be conveyed by the Service Media anything in excess of that which the Service Media are designed to carry.

6.11.3 Not to permit to be discharged from the Service Media:

6.11.3.1 any deleterious, objectionable, dangerous or explosive matter or substance; or

6.11.3.2 any fluid of a poisonous or noxious nature which if it escaped would contaminate or pollute ground water or the water of any stream or river.

6.11.4 Not to apply cathodic or similar means of protection to the Service Media.

6.11.5 Not at any time to use the Service Media for telecommunications/transmission of data or similar unless exclusively for the benefit of the Grantee in connection with the use or monitoring of the Service Media.

[6.11.6 Not (where the Service Media are located above Network Rail's property) to overload the Service Media or permit to be conveyed by the Service Media anything which may cause dust or a nuisance or which could fall from the Service Media].

6.12 **Statutory requirements**

6.12.1 Without expense to Network Rail, to comply with and ensure compliance with any requirements which may be properly made under any present or future Act of Parliament or the bye-laws and regulations of any local authority, governmental or similar body in relation to the use of the Service Media or exercise of the Rights (whether required of Network Rail, the Grantee or any other person). The Grantee shall at all times keep Network Rail indemnified in respect of all related costs, claims, liability and expenses.

6.12.2 Without prejudice to the generality of this, to comply in all respects with the provisions of the CDM Regulations whenever they shall apply to any works carried out on or in relation to the Service Media other than by Network Rail. The Grantee acknowledges and declares that Network Rail will not be acting as the client in respect of any such works for the purpose of the CDM Regulations.

6.12.3 To procure that the Health and Safety Executive will be notified of any such works in accordance with the CDM Regulations, including (without limitation) notice of the person who is acting as the client in respect of such works and the Grantee shall supply to Network Rail a copy of such notice.

6.12.4 To maintain the Health and Safety File in relation to any such works, and update it as necessary, whenever any such further works are carried out, and in any event, immediately upon being required to do so by Network Rail from time to time.

6.12.5 At the Grantee's own cost, to make available the Health and Safety File in relation to any such works for inspection from time to time by Network Rail and those authorised by Network Rail, and to supply to Network Rail on request a copy of the Health and Safety File.

6.12.6 At the end of the Term, to deliver to Network Rail all Health and Safety Files relating to the Service Media which are or which ought to be held by the Grantee.

6.13 **Repair and Support**

6.13.1 To keep the Service Media and every part of them in good and substantial repair and condition [(and, if appropriate, properly jointed)] to the satisfaction of Network Rail's Engineer.

6.13.2 If required by Network Rail so to do, but in any event not less frequently than once in every five years, at the Grantee's own cost, to carry out regular detailed inspections (if necessary by CCTV survey) of the Service Media and to produce a copy of such survey to Network Rail. The Grantee shall immediately carry out any repair or maintenance then found to be wanting or required by Network Rail. Such repair or maintenance is to be undertaken in accordance with the provisions of this Deed.

6.13.3 Not to exercise the Rights in such a way that would, in Network Rail's opinion (whose decision shall be final and conclusive), affect the support to Network Rail's railway, property or works to its railway or property.

6.14 **Network Rail's works**

For the purposes of enabling Network Rail to carry out works referred to in clause 7.4.2 below, the Grantee further covenants with Network Rail as follows:

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6.14.1 at the Grantee's own cost, to cease operating or to cut off the supply through the Service Media for such duration as Network Rail may require;

6.14.2 at the Grantee's own cost, to remove or to divert (either temporarily or permanently) or to strengthen the Service Media at the request of Network Rail or (as applicable) to pay the sums due if Network Rail agrees to carry out such works;

6.14.3 to carry out any such alteration, removal, diversion, strengthening or making safe in accordance with the provisions of this Deed; and

6.14.4 to reimburse Network Rail in respect of any expense, loss or damage howsoever arising from the Grantee's failure to carry out such alterations, removal, diversion, strengthening or making safe within a reasonable time after written notice served on it by Network Rail, including in respect of any additional works resulting from such delay after the expiry of such notice.

6.15 **Yielding up**

At the end of the Term, to quietly and peaceably relinquish the Rights having first and in accordance with the provisions of this Deed [removed] [or] [made safe] the Service Media and having made good to the satisfaction of Network Rail the site of the Service Media to its original condition and all damage occasioned to Network Rail's railway or property or works to its railway or property by or in such removal.

6.16 **Public Liability**

6.16.1 To insure and keep insured at the Grantee's own cost with insurers approved by Network Rail in respect of all public liability risks or damage or injury suffered (whether by Network Rail or any third party including any consequential loss) arising in the exercise of the Rights or use of the Service Media or from any failure or defect in the Service Media in a sufficient sum not less than such as Network Rail may require.

6.16.2 To apply the proceeds of this insurance to the relevant claim or liability (including any indemnity given to Network Rail under this Lease) and to pay any shortfall in the amount required to satisfy the claim or liability and to indemnify Network Rail in respect of any deficiency in this insurance or failure to obtain it.

6.16.3 On written request from Network Rail to provide details of public liability insurance and evidence of payment of the current premium.

6.16.4 If the Grantee shall at any time during the Term fail to insure in accordance with these requirements, Network Rail may insure instead and any related costs incurred shall be repaid by the Grantee to Network Rail on demand.

6.16.5 To observe and perform the conditions of the insurance policy.

6.17 **Assignment**

Not to assign, underlet or part with or share possession of the Rights for any part of them.

6.18 **Excavations, danger and nuisance**

6.18.1 Not to excavate any earth, clay or other substance, and not to do or permit to be done anything which may endanger the safety or stability of Network Rail's railway, property or works to its railway or property or the safety or stability of any neighbouring property.

6.18.2 Not to leave or do or permit to be left or done anything on Network Rail's property which may be or become or grow to be a public or private nuisance or a danger annoyance or disturbance to Network Rail or its tenants, licensees, contractors, access beneficiaries, traders or railway users or to neighbouring property or persons.

6.18.3 Not to obstruct or permit to be obstructed any roads or footpaths.

6.19 **Contamination**

6.19.1 Not to allow any substances or materials discharged through or carried by the Service Media to leak or seep into or come onto Network Rail's railway or property or works to its railway or property or any adjoining or neighbouring land and to take all necessary steps to prevent any such leaking and seepage.

6.19.2 In the event of any bursting, leaking or spillage immediately to carry out any work of clean up, restoration and/or containment and to indemnify Network Rail against any related liability.

6.19.3 To permit Network Rail or its agents at all reasonable times to enter onto the Grantee's Premises or to have access to the Service Media for the purposes of inspection or testing and immediately to carry out such works of remediation as are required by Network Rail to remedy any breach of this clause.

6.19.4 If the Grantee fails to comply Network Rail may elect to carry out those works itself and the Grantee shall without prejudice to any other right or remedy of Network Rail pay to Network Rail on demand Network Rail's costs of and in connection with this.

6.19.5 Upon request to afford to Network Rail all reasonable assistance in identifying the contaminative consequences of any failure of the Service Media. Without prejudice to the Grantee's obligations in this clause, the Grantee shall also, at no cost to Network Rail, comply with all reasonable requests made by Network Rail for minimising the risk of contamination.

6.20 **Indemnities**

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To be responsible for and to keep Network Rail indemnified against all actions, damage, losses, costs, expenses, claims, fines and liability suffered by Network Rail arising directly or indirectly out of any failure by the Grantee to comply with any of the provisions of this Deed or any of the matters to which this Deed is subject or any act, omission or negligence in relation to this Deed or in the exercise of the Rights by the Grantee or any persons expressly or impliedly with the Grantee's authority or under the Grantee's control including (without limitation) those arising out of:

6.20.1 carrying out any works Network Rail may deem necessary for the protection of its railway and property and any additional maintenance and renewal consequent upon the existence of the Service Media; or

6.20.2 any special traffic working or speed restrictions or substitution or diversion of railway services and any costs or losses arising including (without limitation) those incurred in consequence of Network Rail being unable to deliver in timely manner any train paths for which it may then have contracted; or

6.20.3 any electrical isolation of equipment or in supporting Network Rail's railway and other property; or

6.20.4 any claim or demand arising by virtue of any failure, defect or need of repair or renewal of the Service Media; or

6.20.5 any subsidence due to the construction, erection, existence, maintenance or use of the Service Media and in accommodating the effects of any subsidence; or

6.20.6 employing any inspectors, watchmen, operating supervisors, flagmen or otherwise whom Network Rail's Engineer may think it necessary to employ for the protection of the railway or the traffic on the railway during the carrying out of any works in relation to the Service Media or exercise of the Rights.

6.21 **Costs**

To pay to Network Rail all costs, charges and expenses (including legal costs and surveyors' fees) which may be incurred by Network Rail of and incidental to:

6.21.1 preparing and serving all notices and schedules relating to lack of repair to the Service Media and agreeing such schedules with the Grantee and supervising (if Network Rail requires) the works needed to remedy such lack of repair and any other works which may be carried out to the Service Media;

6.21.2 any application under this Deed by the Grantee for consent or approval, whether or not it is given; and

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6.21.3 the recovery of any sums due under this Deed.

6.22 On or before the date of this Deed, to pay to Network Rail Network Rail's Costs.

7. CONDITIONS OF THIS DEED

This Deed is granted on the following conditions.

7.1 Determination

Network Rail may at any time determine the Term granted by this Deed (without prejudice to any of Network Rail's rights then subsisting) where upon the Grantee shall cease to be entitled to exercise the Rights and the Rights shall be extinguished from the date of such determination:

7.1.1 if the Annual Payment or any other sum due under this Deed or related value added tax shall be 21 days or more overdue (even if it was not formally demanded); or

7.1.2 if the Grantee has not complied with any of provisions of this Deed; or

7.1.3 if the Grantee, being a company (and if the Grantee consists of more than one, then any of them), shall enter into liquidation (whether compulsory or voluntary) other than for the purposes of amalgamation or reconstruction into a solvent company with a paid up capital of an amount approved by Network Rail in writing; or

7.1.4 if an administration order is made in respect of the Grantee; or

7.1.5 if the Grantee, being an individual (and if the Grantee consists of more than one, then any of them), becomes bankrupt or an interim receiver of his property is appointed; or

7.1.6 if the Grantee shall enter into any composition or arrangement with the Grantee's creditors.

7.2 Value Added Tax

7.2.1 Where under this Deed the Grantee is to pay any specific sum to Network Rail, such sum shall be regarded as being exclusive of value added tax (without prejudice as follows).

7.2.2 The Grantee's obligations under this Deed shall be treated as requiring payment to Network Rail of value added tax chargeable in respect of any payment made by or taxable supply received by the Grantee under the provisions of or in connection with this Deed.

7.2.3 Where the Grantee has agreed to reimburse Network Rail in respect of any payment made by Network Rail under the

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provisions of or in connection with this Deed and the subject matter of the payment does not constitute a taxable supply to which the preceding clause applies, then the Grantee shall also reimburse any value added tax paid by Network Rail on such payment to the extent that it is not recovered by Network Rail.

7.3 **Arbitration**

All disputes and differences relating to this Deed, where in the opinion of Network Rail's Engineer the safety of Network Rail's railway may be affected, shall be decided by Network Rail's Engineer, but all other disputes and differences arising under this Deed shall be settled by a single arbitrator under the Arbitration Act 1996. Network Rail and the Grantee may agree the appointment of an arbitrator, or either or both of them may apply to the President for the time being or other appropriate officer of the Royal Institution of Chartered Surveyors.

7.4 **Declaration and Agreement**

The following is agreed between Network Rail and the Grantee.

7.4.1 Nothing in this Deed shall render Network Rail liable to maintain its railway or property or works to its railway or property.

7.4.2 Nothing in this Deed shall prevent Network Rail (and all persons claiming under or permitted by it or any other person for the time being entitled) from:

7.4.2.1 removing or filling in any bridge, viaduct or culvert or carrying out any other such works, or

7.4.2.2 installing any necessary services, pipes, drains, wires or cables or carrying on normal railway operations including fencing, hedging and ditching or the management of line side vegetation by burning and flailing, or

7.4.2.3 carrying out any works alongside, over or under the site of the Service Media which may in the opinion of Network Rail be necessary either for the proper operation of Network Rail's undertaking including widening or altering the railway, or for carrying out works of demolition, reconstruction or redevelopment or otherwise or for doing anything which may be required to preserve or protect life or property, or

7.4.2.4 placing on, fixing or attaching to the Service Media any works or service media which may be necessary or convenient and to use and maintain them provided always that such works or service media do not interfere with the Grantee's use of the Service Media and the Service Media have sufficient capacity to facilitate such fixing or attachment.

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7.4.3 Network Rail may at any time construct or erect any works on its railway or property that it may deem necessary over, under or adjoining the Service Media and raise, widen or alter its railway or property or works to its railway or property, without payment of any compensation to the Grantee and without being liable for any damage so caused to the Service Media and, if for any of these purposes, Network Rail shall require the alteration, strengthening or relocation of the whole or part of the Service Media it may, at the expense of the Grantee, effect such alteration, strengthening or relocation itself or require the Grantee to carry out such works without payment of any compensation to the Grantee, but:

7.4.3.1 in the case of any such relocation, Network Rail shall substitute other convenient service media and the substituted service media shall be subject to the provisions, covenants and conditions of this Deed; and

7.4.3.2 the cost of any such alteration, strengthening, relocation or substitution (as certified by Network Rail's Engineer) shall be repaid by the Grantee to Network Rail on demand.

7.4.4 Network Rail may carry out or complete (to such extent as Network Rail's Engineer may deem necessary) any works as to which the Grantee shall be in default or may take whatever action Network Rail's Engineer considers necessary to safeguard Network Rail's interests, where Network Rail's Engineer considers the safety of the railway to be at risk (as to the existence of which situation the decision of Network Rail's Engineer shall be final), but:

7.4.4.1 the cost incurred by Network Rail in such works (as certified by Network Rail's Engineer) shall be repaid by the Grantee to Network Rail on demand; and

7.4.4.2 except in case of emergency or where Network Rail's Engineer so considers the safety of the railway to be at risk, Network Rail shall before so acting, give notice to the Grantee to remedy its default (if capable of remedy) and afford the Grantee such period of time as may be specified in Network Rail's Engineer's notice from the giving of such notice to complete the remedial action.

7.4.5 Where it is not possible to undertake any alteration, strengthening, relocation or substitution works to the Service Media under the provisions of clauses 7.4.3 and 7.4.4 above and Network Rail requires the site of the Service Media or any part of it for the purposes of its undertaking or for carrying out repairs for the proper operation of its undertaking (as to which requirements the decision of Network Rail's Engineer shall be final and conclusive) or for carrying out substantial works of demolition, reconstruction or redevelopment then, Network Rail may bring this Deed to an end at any time by giving to the Grantee [6 months'] previous notice in writing. At the expiration

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of any such notice this Deed shall come to an end (but without prejudice to any subsisting rights or remedies of Network Rail) whereupon the Grantee shall cease to be entitled to exercise the Rights and the Rights shall be extinguished from the expiration of any such notice.

7.4.6 No person shall enter Network Rail's property by virtue of the Rights otherwise than at his own risk and otherwise than subject to the Engineering Conditions and the Rights Conditions and where appropriate, the Special Conditions.

[7.5 **Surrender of Rights**

7.5.1 If the Grantee desires permanently to give up the Service Media and the Rights and to bring this Deed to an end then:

7.5.1.1 the Grantee is to give not more than 12 months or less than 6 months written notice to Network Rail expiring at any [ ] anniversary of the [Annual Payment] Start Date; and

7.5.1.2 before the expiration of the Grantee's notice the Grantee shall remove [and/or purge and make safe as Network Rail's Engineer may require] the Service Media and/or execute any works for the protection of Network Rail's railway or property or works to its railway or property as Network Rail's Engineer may require arising out of or in connection with such giving up, and in carrying out any of the above works, the Grantee shall comply with such of the Engineering Conditions and/or the Rights Conditions as Network Rail's Engineer requires; and

7.5.1.3 the Grantee is to make good any damage caused in the execution of any works mentioned in this clause to Network Rail's railway or property or works to its railway or property to the satisfaction of Network Rail's Engineer and, in default of the Grantee so doing within such time period as may be specified by Network Rail, it shall be lawful for Network Rail to perform the work and recover the cost (as certified by Network Rail's Engineer) by action or otherwise such cost to be paid immediately on demand; and

7.5.1.4 if the Grantee shall fail to carry out such [removal] [or purging and making safe] within the period referred to in this clause, the Grantee shall indemnify Network Rail in respect of any loss, damage or expense howsoever and whensoever arising from such failure.

7.5.2 It is agreed that upon the expiration of the Grantee's notice and provided the Grantee shall have paid all sums due under this Deed and shall have complied with all the Grantee's other obligations under this Deed up to that date, this Deed shall come to an end (but without prejudice to any rights or remedies of

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Network Rail in respect of any earlier breach of covenant) whereupon the Grantee shall cease to be entitled to exercise the Rights and the Rights shall be extinguished from the expiration of any such notice.

8. NETWORK RAIL'S COVENANTS

Network Rail covenants with the Grantee that (as long as the Grantee pays the Annual Payment when due and complies with all the Grantee's other obligations in this Deed) the Grantee shall peaceably hold and enjoy the Rights without any disturbance or interruption by Network Rail or any person or persons rightfully claiming through, under or in trust for it. But neither the carrying on by Network Rail of its undertaking on its railway or property in exercise of and subject to its statutory and common law obligations, nor the grant by Network Rail of any permission properly given to use railway facilities, nor the exercise of any rights reserved to Network Rail under this Deed shall be treated as a breach of this covenant or in derogation from Network Rail's grant or the Rights.

9. SPECIAL CONDITIONS

9.1 This Deed incorporates and is subject to:

9.1.1 the Particulars; and

9.1.2 the Special Conditions.

9.2 In the case of conflict between the Special Conditions and the other provisions of this Deed the Special Conditions take priority over the other provisions of this Deed.

10. TRANSFER OF GRANTEE'S PREMISES

10.1 If at the date of this Deed, the Grantee's Premises are registered at the Land Registry, then the following clauses shall apply.

10.1.1 Upon a transfer of all or any part of the Grantee's Premises, the Grantee shall procure that such transferee shall by deed covenant with Network Rail to perform the Grantee's covenants and all other obligations of the Grantee contained in this Deed including this clause 10.1.1.

10.1.2 Network Rail and the Grantee hereby apply to the Registrar to enter the following restriction in the Proprietorship Register of

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the title number of the Grantee's Premises as detailed in the Particulars:

"No disposition of the registered estate (other than a charge) by the proprietor of the registered estate, is to be registered without a certificate signed on behalf of Network Rail Infrastructure Limited (2904587) whose registered office is at 1 Eversholt Street, London NW1 2DN or its conveyancer that the provisions of clause 10.1.1 of the Deed of Grant dated [ ] have been complied with."

10.2 If at the date of this Deed, the Grantee's Premises are unregistered, the Grantee further covenants with Network Rail not to transfer the Grantee's Premises or any part of them, without first procuring that the transferee shall by deed covenant with Network Rail to perform the Grantee's covenants and all other obligations of the Grantee contained in this Deed.

11. LAND REGISTRY

11.1 If at the date of this Deed, the Grantee's Premises are registered at the Land Registry, the Grantee covenants with Network Rail to make an application to the Land Registry to note the burden of the Grantee's covenants and all other obligations of the Grantee contained in this Deed, in the Charges Register of the title number of the Grantee's Premises as detailed in the Particulars, and to provide Network Rail or its conveyancers with an official copy of that updated title within one month of such application being completed.

11.2 The Grantee irrevocably appoints Network Rail to act as an attorney of the Grantee on the expiry of the Term or earlier termination of this Deed in order to remove and cancel all notices, restrictions and other entries relating to this Deed registered at the Land Registry against any title of Network Rail or the Grantee.

12. NOTICES

12.1 Any notice in writing that under the provisions of this Deed to be given to Network Rail shall be treated as effectively served if and only if addressed to Network Rail and served by recorded delivery or registered post upon Network Rail at its registered office or if such notice is service by email, addressed to the email address "notices@networkrail.co.uk".

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12.2 Any notice in writing that is to be given by Network Rail to the Grantee shall be treated as effectively served if sent through the post by the recorded delivery service or in a registered letter addressed to the Grantee at the Grantee's last known place of business or abode in the United Kingdom or (where the Grantee is a company) to the Grantee's Secretary at the Grantee's registered office, as the case may require.

THIS DEED has been executed by the parties as a deed as first dated above

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THE FIRST SCHEDULE

RIGHTS CONDITIONS

Exercise by the Grantee of any of the Rights entailing access or entry onto Network Rail's property or the carrying out of any works which may affect Network Rail's property or works shall:

1. be subject to:

   1.1 the prior written approval of Network Rail's Engineer; and

   1.2 the Grantee pre-planning any such entry as long as possible beforehand so as to enable any necessary railway possessions to be obtained with minimum inconvenience to railway operations and submitting for approval detailed plans, drawings, sections and specifications, programme of work and method statement to Network Rail's Engineer; and

   1.3 any works approved being carried out to Network Rail's Engineer's satisfaction and if so required under his supervision; and

   1.4 compliance with such stipulations, directions and requirements (including as to times of the day methods and modes of access and carrying out of works) as Network Rail's Engineer shall prescribe;

2. be exercised so as to cause as little damage, disturbance or injury as practicable and so as to occasion the minimum inconvenience and disturbance to Network Rail its tenants, licensees, contractors, access beneficiaries, traders and railway users and the Grantee shall make good at its own expense as soon as is practicable to the satisfaction of Network Rail any damage, disturbance or injury caused to Network Rail's property or works and Network Rail may carry out or complete any works as to which the Grantee shall be in default or may take whatever action Network Rail's Engineer considers necessary to safeguard Network Rail's interests and the costs incurred by Network Rail in so doing shall be repaid by the Grantee to Network Rail on demand;

3. be over such route as Network Rail's Engineer shall prescribe; and

4. (where appropriate) be subject to the Engineering Conditions and adherence to all safety requirements for Network Rail's railway or any works taking place on Network Rail's property including adherence to railway industry safety standards and safety validation of contractors employed.

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THE SECOND SCHEDULE

ANNUAL PAYMENT REVIEW

1 In this Schedule

1.1.1 "**Index**" means the All Items Index Of Retail Prices published by the Office for National Statistics or its successors.

1.1.2 "**Annual Payment Review Date**" means each [ ] anniversary of the [Annual Payment] Start Date

1.2 The Annual Payment shall be increased on and from each Annual Payment Review Date. It shall increase to a sum calculated as follows:

$$\frac{A \times Y \times 1.05}{B}$$

On the first review, "A" is the Index figure for the Index Month immediately before the first Annual Payment Review Date; "B" is the Index figure for the Index Month immediately before the Start Date; and "Y" is the Annual Payment at the level payable immediately before the first Annual Payment Review Date (disregarding any payment free period or payment concessions).

On each subsequent review, "A" is the Index figure for the Index Month immediately before the relevant Annual Payment Review Date; "B" is the Index figure for the Index Month immediately before the previous Annual Payment Review Date; and "Y" is the Annual Payment at the level immediately before the relevant Annual Payment Review Date (disregarding any payment free period or payment concessions rent).

This sum is to be rounded up to the nearest whole number of pounds exactly divisible by 50.

1.3 Network Rail shall give notice to the Grantee of the sum so calculated for each review.

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1.4 If the calculation does not result in an increase in the Annual Payment payable immediately before the relevant Annual Payment Review Date, then the Annual Payment continues at its current level.

1.5 If the Index is rebased, the calculation shall be adjusted accordingly. If the calculation cannot be made because the Index ceases to be published or the method of compilation changes or for any other reason, Network Rail and the Grantee will do their utmost without delay to agree a reasonable alternative means of ascertaining the increase in the Annual Payment. But if Network Rail and the Grantee fail to agree this, then the decision of what increase (if any) ought to be made in the Annual Payment as from the Annual Payment Review Date is to be referred to arbitration in accordance with clause 7.3 of this Lease.

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THE THIRD SCHEDULE

SPECIFICATION OF SERVICE MEDIA

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THE FOURTH SCHEDULE

THE SPECIAL CONDITIONS

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EXECUTION PAGE

EXECUTED as a deed by)
RIVEROAK STRATEGIC PARTNERS LIMITED)
in the presence of:)

_____

Signature of director

_____

Signature of director/secretary

EXECUTED as a deed by affixing)
the common seal of)
NETWORK RAIL INFRASTRUCTURE LIMITED)
in the presence of:)

_____

Authorised Signatory

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4 APPENDIX 4

Documents for Existing Rights

Document	Date	Parties
Conveyance of freehold land in Foads Lane, Ramsgate, Kent	13 October 1972	(1) British Railways Board (2) Dinecrest Limited
Conveyance of freehold land in Foads Lane, Ramsgate, Kent	15 May 1973	(1) British Railways Board (2) The Mayor Alderman and Burgesses Borough of Ramsgate

Appendix CA.3.12

Department for Transport

Department for Transport
Great Minster House
33 Horseferry Road
London
SW1P 4DR

Tel: 0300 330 3000
Website: www.gov.uk/dft

FAO: Angus Walker
BDB Pitmans
50 Broadway
London
SW1H 0BL

anguswalker@bdbpitmans.com

14 May 2019

Dear Mr Walker,

Application (reference TR020002) by RiverOak Strategic Partners ("the Applicant") for an Order Granting Development Consent for the upgrade and reopening of Manston Airport ("the Application")

As Mr Goodwin is currently on leave, I am writing on behalf of the Department in response to your letter dated 2 May 2019.

As outlined in Mr Goodwin's letter dated 26 April 2019, established policy and practice in relation to development consent orders is that, insofar as the order includes requirements in connection with the development for which consent is granted, the most appropriate discharging authority is the relevant planning authority. Whilst I appreciate that the Application is the first to be made in the aviation sector, this policy and practice is of general application to development consent orders (DCOs). This is also consistent with practice in the aviation sector under the predecessor regime to the Planning Act 2008, as prior aviation developments have successfully relied upon relevant planning authorities to discharge planning conditions under the Town and Country Planning Act 1990.

The government supports the principle of localism, most obviously under the Town

and Country Planning Act 1990 and associated guidance. This principle also informs the practice for discharging requirements under the Planning Act 2008. Notwithstanding the approach on some Highways England orders, this same principle has shaped the general practice in providing for the discharge of requirements in DCOs, as expounded in the Guidance Notes published by PINS.

I appreciate that PINS Advice Note Fifteen was amended in the same month in which the Applicant submitted the DCO application. However, the advice note was 'updated to reflect contemporary best practice in the preparation and maintenance of draft DCOs throughout the Planning Act 2008 process'[1] and, indeed, even in the absence of a guidance note expressly recommending the practice, an applicant might have been expected to consult the person it proposed act as the discharging authority. Accordingly, and noting that the October 2014 version of the advice note also referenced the default position that the relevant planning authority act as the discharging authority, the expectation was that the Secretary of State would have been consulted as to his willingness to assume a discharging role prior to the submission of the Application.

I note that the Applicant has nominated the Secretary of State as discharging authority in the draft DCO, however adopting that approach in a DCO would deviate from established policy and practice without precedent for doing so in the aviation sector. In the absence of any reasons for departing from the default position, the most appropriate person to act as discharging authority remains the relevant planning authority. I repeat the conclusion of Mr Goodwin's letter, that the Secretary of State sees no reason to depart from the default approach or adopt a different approach in relation to airports development.

Further to the PINS guidance extracted in your letter (now contained in paragraph 19.3 of Advice Note Fifteen) and as Mr Goodwin suggested to you, the Department suggests that you clearly set out for the Examining Authority the alternatives to the inclusion of the Secretary of State as discharging authority, with reference to the

[1] PINS Advice note change register, https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/.

resources and expertise required to perform that function.

This letter is sent without prejudice to the Secretary of State's determination of the principle of the Application or to the content or form of any development consent order made pursuant to the Application.

Yours sincerely,

[redacted]

Rosalind Smith-Reid
Deputy Director,
Programme, Assurance & Communications,
Heathrow Expansion & Aviation and Maritime Analysis

BDB PITMANS

Examining Authority
Examining the Manston Airport DCO application

Your Ref
TR020002

Our Ref
ADW/166055.0003

Date
24 May 2019

Dear Sirs

Funding attestation

I, Angus Walker, partner at BDB Pitmans, attest that I have seen recent statements which match the accounts referred to in the PwC letter dated 5th July 2018. These two accounts with Swiss bank Julius Baer, both dated 17 May 2019, show holdings that comfortably exceed £15m each. The ultimate beneficial owners of both accounts are the same as referred to in the PwC letter and are the individuals referred to in the Helix Fiduciary letter appended to the summary of oral case at the compulsory acquisition hearing on 20 March.

Yours faithfully

[redacted]

BDB Pitmans LLP
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E anguswalker@bdbpitmans.com

Lexcel

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SRA ID Number 448617

Appendix F.3.6

Your Reference

Our Reference
CRF/652235/2512314

Ms Jo Pickering
Sharpe Pritchard
DX 353
Chancery Lane/London

Wragge Lawrence Graham & Co LLP
4 More London Riverside
London
SE1 2AU
DX 132076 London Bridge 4

14 August 2015

Dear Jo

Manston Airport, Thanet, Kent

I refer to Aidan Dickinson's e-mail to me dated 7th August and the various conversations he and I had last week about setting up a meeting between our respective clients to discuss Manston Airport. Representatives of RiverOak have been in London for the past ten days and are naturally frustrated at the Council's unwillingness to meet them or discuss this matter on any substantive level. My clients now need to return to the US, but continue in good faith to seek a meeting with the Council. It is hoped that this letter and its enclosures will enable that meeting to take place as soon as possible.

Before responding directly to the Council's request as set out in Aidan's email, RiverOak have asked me to set out some of the surrounding context.

Reacting to a vociferous public campaign against the closure of the Airport, the Council conducted a soft procurement exercise to seek a CPO indemnity partner to bring the Airport back into use. The only serious contender that emerged through that process was RiverOak.

RiverOak engaged my firm (and leading counsel) in relation to their potential appointment by the Council. We produced a draft CPO Indemnity Agreement for consideration by the Council that covers the Council's financial risk in its entirety. However, RiverOak have never had any engagement from the Council on the terms of the draft agreement.

RiverOak submitted a range of information to the Council to enable the Council to consider its expression of interest in becoming the Council's CPO indemnity partner. This included financial projections which demonstrated (at least to RiverOak's satisfaction and that of its potential investors and partners) that the reactivation of the Airport was viable and deliverable and would produce a financial return within a 5 year timescale. However, the Council decided on the recommendation of its section 151 officer not to proceed with RiverOak's appointment subject to referral to the Secretary of State. The Secretary of State appointed PwC to review the decision processes. PwC made some criticism of the Council processes.

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Despite these discouragements, RiverOak has maintained its strong interest in Manston. It presented a well-received submission to the Davies Commission on London Airports in August last year. The Davies report highlighted Manston's role as a reliever airport both for heavy cargo and passengers. It also gave similarly well-received evidence to the Parliamentary Transport Select Committee's Inquiry on the subject of regional airports in February of this year.

Shortly after the 7 May election, dialogue opened up once again between our respective clients. This culminated in a letter of 31 May from George Yerrall of RiverOak to the Leader of the Council, Chris Wells, suggesting a basis for moving forward which would cover entirely the Council's financial risk in promoting a CPO process, involving the creation of a UK escrow account. That proposal was reflected in an updated draft of the CPO Indemnity Agreement. As I mentioned in my email of Wednesday morning, RiverOak have put my firm in funds with the amount to be paid into the escrow account in due course.

Until Aidan's recent email, the Council has refused even to discuss the CPO Indemnity Agreement with RiverOak unless RiverOak produced a "letter of credit" or guarantor of committed funding for the entire project (including land acquisition). We and RiverOak have sought to explain why a third party investor would not be willing to give such a letter or guarantee, and have made it clear that neither can be offered at this time. We read Aidan's recent email as tacit acceptance by the Council of that commercial fact of life.

If we understand correctly, the Council now seeks some additional assurance beyond that which has already been provided that RiverOak will be able to attract the requisite funding to the project at the relevant time (in other words, that the test in the CPO Circular can be met) and that the project will be viable and deliverable.

To that end, RiverOak have authorised the release to the Council of letters of assurance from three significant investment partners who have been closely involved in the Manston project over the past year confirming their strong interest in investing in the project once the CPO has been confirmed by the Secretary of State.

You have seen the letter from Orix Aviation already. I enclose copies of the other two letters of assurance with this letter. One of these is from a potential investor who has met the Leader of the Council in Thanet personally to discuss the project. The other is from a major US investor who has worked with the RiverOak team for many years. I confirm that I have seen the enclosure referred to in the letter and that it indicates that the investor is in possession of sufficient funds to make the level of investment identified.

All three of the investors have confirmed that they have seen RiverOak's financial projections and are satisfied that the project is viable. Given the high level of publicity surrounding this project, the investors (with the exception of Orix) have asked that their names and details be redacted from the letters at this stage.

The next stage in the process, which I am instructed is already underway, is to develop the business plan in detail to the point where it can be placed before a CPO public inquiry. RiverOak are making arrangements to appoint BDO, a leading consultancy in this field, to lead that work. BDO's experience in recent years has included financial modelling and long term business planning for the Stobart Group (Aer Arran, Carlisle Airport, Southend Airport), Cork and Shannon Airports, Ireland Regional Airports, Manchester Airport Group (Stansted acquisition), Birmingham Airport, Bristol Airport, Bournemouth, East Midlands Airport and Gatwick Airport (review of GSM driver models for long term business planning).

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I am instructed that support for the BDO team will be drawn from Viscount Aviation whose principal, Tom Wilson, held the position of Chief Executive of Infratil Airports Europe until October 2013 and as such had overall responsibility for licensing, operations and infrastructure at both Manston and Prestwick. His role is to advise and support on the detail of the business plan as it relates to staffing structures and numbers and the details and phasing of the capital investment required to re-license and re-equip Manston in order to restore it to full operational status.

Northpoint Aviation Services will produce forecasts in relation to short, medium and long-term cargo, passenger, aircraft maintenance and re-cycling demand. Its two principals, Chris Cain and Basil O'Fee, are leading consultants in the field of aviation market analysis. Northpoint are regular advisors to the DfT and are familiar with Manston, having been retained by its previous owners for over fifteen years.

RiverOak will shortly be engaging specialist airport master planners whose role will be to produce a masterplan for the airfield and to advise on the location and phasing of essential capital improvements. This work in intended to be complemented by cost consultants to advise on the capital cost of these master planned improvements.

The Council is already aware of the interest of Airbus in establishing new re-cycling facilities at Manston. I am instructed that Airbus will have a role in the business planning process to support and review those parts of the plan which relate to the creation of long term facilities for the orderly dismantling and re-cycling of mid-life and end-of-life aircraft.

RiverOak's own in-house team will support the development of the business plan by refreshing and confirming all the work carried out last year with various cargo carriers, freight forwarders and other potential users of Manston. In addition, and with support from Northpoint, they will be seeking the participation of other carriers and users whose potential interest in Manston has emerged since last year's work was completed.

RiverOak have asked me to express their hope that, with this information now having been provided, the Council may take comfort that the project is being taken forward as a viable and deliverable proposition for which funding can be secured on usual commercial principles.

We trust that this is now sufficient for a meeting to take place, and we look forward to receiving your confirmation that this is the case.

Yours sincerely

[redacted]

Clare Fielding
+44 20 7759 6533
clare.fielding@wragge-law.com

Encs

Appendix F3.17

ORIX

ORIX USA Corporation

[redacted]

August 3, 2015

Councillor Christopher T. Wells
Leader of the Council
Thanet District Council
PO Box 9, Cecil Street
Margate, Kent, CT91XZ
UNITED KINGDOM

SUBJECT TO CONTRACT
Re: Reopening and Development Plan for Manston Airport

Dear Cllr Wells:

ORIX USA Corporation ("ORIX USA") is pleased to express our interest to support the efforts of RiverOak Strategic Partners ("ROSP"), and its various affiliates, regarding the reopening and development of Manston Airport, following a successful Compulsory Purchase Order ("CPO"), as a fully operational airport featuring an air cargo hub, aviation recycling and engineering, potential passenger traffic, search and rescue and other related aviation services operations.

ORIX USA, based on information provided by and discussions with ROSP, views Manston as a strategically important airport asset and vital piece of UK infrastructure that needs to be intelligently and strategically managed into the future. We understand that approximately £15 – 20 million of capital would be required to restore the airport to fully licensed and operational status. ORIX USA shares RiverOak's vision as to the viability of this asset for future generations, and we have been involved in the longer term plans required to manage and develop Manston. Additionally, ORIX takes a long-term view of investments such as this and the current opportunity to invest in Manston is consistent with our corporate investment strategy.

ORIX USA, a Dallas, Texas, USA-based financial services firm with more than 1,400 employees and principal offices in Atlanta; Chicago; Hartford, Conn.; Los Angeles; Minneapolis; New York; San Francisco; Seattle; Washington, D.C.; Frankfurt, Germany; London; and Paris. ORIX USA holds approximately $7 billion of assets and manages an additional approximately $30 billion. ORIX USA is a wholly owned subsidiary of ORIX Corporation ("ORIX"), a Tokyo-based, publicly-owned international financial services company with operations in 36 countries and regions worldwide. ORIX Corporation is listed on the Tokyo (8591) and New York Stock Exchanges (IX). For more information on ORIX USA, visit www.orix.com.

ORIX Corporation was founded in Japan in 1964 and has a global network of over 30,000 employees, total assets of approximately $100 billion and approximately $20 billion of equity capital.

ORIX has extensive experience in the ownership and management of important global airport assets. We are in the process of closing the sale for the right to operate Japan's Kansai International Airport. In the mid-1990's, and prior to joining ORIX USA, I had been the Chief Development Officer of Airport Group International, a global airport development and operating company, that had bought London's Luton Airport, before the company was sold in 1997, and other airport assets including the purchase of the concession for the Perth, Australia Airport, and several Latin American airports, as well as redevelopment funding for the Santiago, Chile Airport and the Budapest Ferihegy Airport.

Manston is a project that senior principals of ORIX USA, David Gilliand, ORIX Municipal and Infrastructure , and Eddie Stowe, of Dublin-based ORIX Aviation, have been following for over a year with the team from RiverOak. We are aware of the risks posed by the CPO and we are dedicated to seeing Manston reopen as to what it should be, namely a thriving commercial aviation hub. We look forward to working jointly with ROSP to execute this plan successfully.

Please note that the information provided herein does not constitute a binding legal commitment upon ORIX USA or any of its affiliates. Any decision by ORIX USA to participate in any investment or financing with respect to Manston Airport is subject to confirmation of the CPO for acquisition of the airport site, as well as, usual and customary funding terms and internal approvals.

I can be reached at barry.gold@orix.com should you have any questions or comments, or require anything further in support of this reopening and development.

Sincerely yours,

[redacted]

Barry T. Gold
Managing Director
ORIX Infrastructure

AIRBUS
GROUP

SMO – Head of International Operations

15 September 2014

Mr A. Freudmann
RiverOak Investment Corp LLC
One Atlantic Street
Stamford
CT 06901
USA

[redacted]

Manston Airport, Kent

Dear Mr. Freudmann

At the present time the aviation industry is facing the challenge of how to dispose of aircraft which have reached the end of their operational lives. Quite properly it is no longer acceptable for retired aircraft to be left to rot in the desert or to be buried in landfill sites. In this context Airbus Group is very much interested to ensure that as many as possible of our retired aircraft will be the subject of orderly and environmentally compliant dismantling and re-cycling operations in the future. The process is known in the industry as "teardown" and is intended to take place under cover, in secure airside locations, in modern, specially designed hangars.

The object of the teardown exercise is to secure as much value as possible from each aircraft, by carefully disassembling everything, including of course engines and engine parts. Currently there are very few suitable teardown facilities anywhere in the world and with the retirement of around 800 aircraft a year we believe that there will be no shortage of business for a new facility.

In conversations with you and your colleagues over the past few months we concluded that Manston would be a candidate location for a new teardown facility. It has the runway length, it has airside land for the development of several new hangars if required and it has an excellent skills base with a local tradition of aviation engineering. Ultimately the number of jobs to be created would depend on the number of teardown hangars constructed, but these will be jobs for skilled engineers with training opportunities for aspiring young engineers.

Given Manston Airport's advantages we were very surprised to learn that it had closed down and this led us begin to look elsewhere in Europe for a suitable airport. However you have explained that Thanet District Council is considering acquiring the

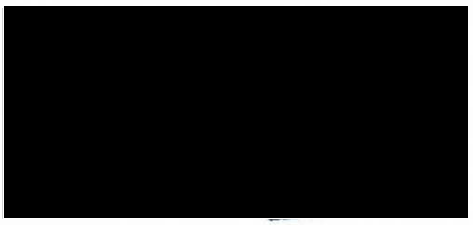
AIRBUS
GROUP

airport by compulsory purchase, with a view to its re-opening at some point next year and confirmation of this would be enough for us to maintain our interest.

For the avoidance of doubt, Airbus does not aspire to become the owner of the Manston Airport, but it will consider becoming an investor in teardown facilities at the airport. For this to occur, the airport would have to become operational again and be returned to the ownership of a competent commercial operator during the course of 2015.

I should also qualify this letter by stating that any decision by Airbus Group to invest in the airport will of course be subject to a due diligence exercise.

You have our authority to release this letter to Thanet District Council, only, but on the clear understanding that it is treated as *strictly confidential*. This is on the grounds that the information contained in this letter is commercially very sensitive.



Olivier BRUN
Airbus Group

Strictly Confidential and Private

August 12, 2015

Councillor Christopher Y. Wells
Leader of the Council
Thanet District Council
PO Box 9 Cecil Street
Margate, Kent CT91XZ
United Kingdom

Dear Councillor Wells:

Please accept this letter as evidence of my continued strong interest in participating in RiverOak's acquisition, through a Compulsory Purchase Order ("CPO"), of Manston Airport. As you know through our discussion when we met several weeks ago, I have spent considerable time and effort working and consulting with RiverOak throughout their involvement with the Airport. During our discussion, I indicated and continue to maintain that the Airport can have a strong future, initially but not exclusively focused on cargo and play an important role in the larger Thanet community and the livelihood of your constituents.

Together with RiverOak, I have studied the business plan from the commencement of the CPO through its completion and then the reopening of the Airport. It is anticipated that the capital needs through that period would fall within the 15-20mm pound range. I am confident that RiverOak together with their partners, including myself, have ample means to satisfy such required capital.

Central to my investment thesis is the very strong interest that members of the local community as well as local and national leaders have in seeing the Airport reopened. The ultimate success of this project lies not just with the financial and operational capabilities of RiverOak and its partners but also in a supportive partnership with Thanet Council and other local and civic leaders.

I have a long-standing relationship with members of the RiverOak team. We have worked diligently in assembling partners that are highly qualified both financially and in airport logistics and operations. Orix Corporation, which I believe has already expressed support of this project, is one of the leaders in their field. Additional, [redacted] has also expressed their strong support

and they have significant experience in aviation infrastructure projects. We have multiple other relationships with highly qualified parties many of whom have expressed interest in various aspects of the overall business plan.

I am a successful private investor and have been involved in numerous business ventures in the US, UK and Europe. After spending significant time over a long period studying the business plan, the local and national support for the airport and the prominent role the Airport has played in the county and country's history, I am comfortable providing you with this expression of support and interest. As you would expect, my support for this venture is conditioned on, among other factors, the CPO process being concluded in a manner satisfactory to RiverOak and its partners.

I look forward to a continued and successful relationship.

Sincerely,

August 11, 2015

Councillor Christopher T. Wells
Leader
Thanet District Council
PO Box 9, Cecil Street
Margate, Kent, CT91XZ
UNITED KINGDOM

Private and Confidential

Subject to Contract

RE: Manston Airport - RiverOak Investment

Dear Councillor Wells,

I am writing to you to confirm [redacted] interest in Manston Airport, Kent, UK. I have known the team from RiverOak for a long time, in fact I have been involved in business with one of its partners, Niall Lawlor, for over twenty years.

I am the sole 100% principal of [redacted] which has operated as a private investment vehicle since 1999. [redacted] activity has been primarily focused on US municipal debt investing.

[redacted] has been actively consulting with RiverOak concerning RiverOak's interest in Manston from its inception, commencing with the offer to acquire the Airport directly from Mrs Gloag, through to supporting their efforts to promote a CPO in partnership with Thanet DC. We see Manston as a major piece of infrastructure that can be managed in a more professional and long term strategic manner. We also view Manston as a vital airport asset, not only to our investment partnership, but to Thanet and the UK.

[redacted] is very familiar with Orix and other members of the team as potential investors assembled by RiverOak, and we are very confident of the strategic value that this collaboration can offer to the Manston opportunity.

[redacted] is aware that RiverOak is underwriting the entire cost of the CPO process with no risk to the Council, but beyond that, I understand that you are seeking comfort on the RiverOak consortium's ability to fund the acquisition and reinstatement of the airport post the successful execution of the CPO.

I am in the position to invest up to GBP 20.0m, subject to satisfactory final documentation. The final investment decision will be conditional upon standard commercial due diligence, valuation of the asset and confirmation of the CPO by the Secretary of State.

The project plan is a viable and deliverable one and I am satisfied with RiverOak's cash flow projections submitted last year in response to the "soft marketing" exercise. I am looking forward to working with RiverOak and its partners in the continued development of the business plans in order to develop this project.

Attached is a letter from [redacted], who is my primary business account holder.

Sincerely yours,

[redacted]

President

Enc.

Appendix F3.17

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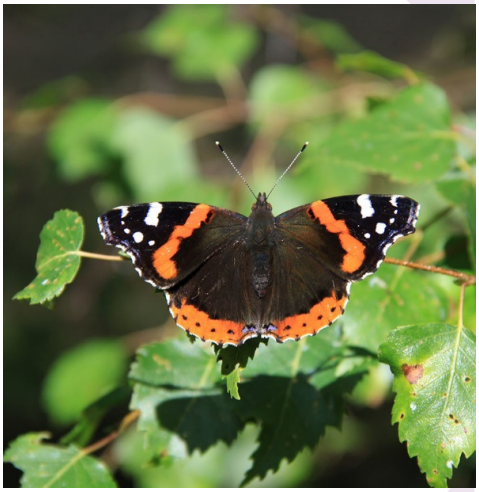
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RiverOak Strategic Partners Limited

Manston Airport Development Consent Order

Archaeological Written Scheme of Investigation







Wood Environment & Infrastructure Solutions UK Limited – May 2019

Appendix HE3.3

wood.

Report for

George Yerall

Riveroak Strategic Partners Ltd
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Document revisions

No.	Details	Date
1	Second issue	07/03/2019
2	Third Issue	22/05/2019

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Executive summary

Purpose of this report

This report has been produced for the purpose of setting out a programme of intrusive archaeological works to be carried out as mitigation of the loss of archaeological interest through the disturbance of archaeological remains within the Order Limits of the re-development of Manston Airport (the Proposed Development)..

This report sets out:

- The Proposed Development background;
- The archaeological and historical context of the site;
- The aims of the archaeological work, setting out linkages with established archaeological research agendas;
- An outline scope of archaeological works;
- Standards for archaeological works;
- Provisions relating to Health, Safety and Environment;
- Provisions for Monitoring of works by Kent County Council; and
- Outline provisions for Outreach and Engagement.

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1. Introduction

1.1 Background

1.1.1 This Written Scheme of Investigation (WSI) has been prepared in support of an application by RiverOak Strategic Partners Ltd (hereafter referred to as 'RiverOak') to re-open Manston Airport ('the site').

1.1.2 The application seeks to authorise the re-development of Manston Airport as a freight airport (hereafter referred to as the 'Proposed Development') with the capacity to handle a minimum of 10,000 air traffic movements annually.

1.1.3 This report has been produced to set out a scheme of archaeological investigation, which is intended to mitigate the adverse effects of the construction of the Proposed Development.

1.1.4 This report comprises five principal elements:

- **Section 2**: A summary of baseline archaeological knowledge, inclusive of recent field investigation ;
- **Section 3:** A statement of the aims and objectives of the investigative works, including an archaeological research agenda;
- **Section 4**: A description of the scope of the proposed investigative work ;
- **Section 5**: Standards for completion of the proposed investigative work, any post excavation analysis of artefactual material and dissemination of the results ; and
- **Section 6** and **7**: Project management procedures.

1.1.5 This WSI is supported by the following figures shown in **Appendix A**:

- **Figure 1**: Site Location; and
- **Figure 2**: Plan of areas discussed in the WSI.

1.2 Description of the Proposed Development

1.2.1 The proposals include both the use of the existing airport infrastructure and the introduction of new facilities. In summary, the Proposed Development includes:

- Upgrade of Runways (10/28) and re-alignment of the parallel taxiway (Alpha) to provide European Aviation Safety Agency (EASA) compliant clearances for runway operations;
- Construction of 19 EASA compliant Code E stands for air freight aircraft with markings capable of handling Code D and F aircraft in different configurations;
- Installation of new high mast lighting for aprons and stands;
- Construction of 65,500m^2 of cargo facilities;
- Construction of a new air traffic control tower;
- Construction of a new airport fuel farm;
- Construction of a new airport rescue and firefighting service station;

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- Development of the Northern Grass Area for airport related businesses;
- Highway improvement works; and
- Extension of passenger service facilities including an apron extension to accommodate an additional aircraft stand and increasing the current terminal size.

1.2.2 In addition to the air freight hub, RiverOak proposes to develop:

- An aircraft maintenance, repair and overhaul facility and end-of-life recycling facilities;
- A flight training school;
- A fixed base operation for executive travel; and
- Business facilities for aviation related organisations.

1.2.3 Further details can be found in **Chapter 3** of the Environmental Statement (ES) (TR020002/APP/5.2-1).

1.2.4 The site has been assessed and investigated previously. An ES was produced in 2016, followed by the production of a Historic Environment Desk-based Assessment (DBA) and ES chapter amendment were compiled subsequently. A geophysical survey was undertaken in 2016. This was followed by an archaeological evaluation on the site between November 2016 and February 2017 by AOC Archaeology Ltd (Site code FMA16).

1.3 Archaeological Response

1.3.1 This WSI sets out the archaeological response to potential disturbance of archaeological remains resulting from the construction of the Proposed Development.

1.3.2 The site can be divided, on the basis of archaeological potential and likely disturbance, into seven areas as listed below (shown on **Figure 2**):

- Northern Grass Area;
- West of Runway;
- South of Runway;
- East of Runway;
- Terminal, aircraft stands and Associated Parking;
- Apron and Freight Terminal; and
- Site entrance, taxiways and Air Traffic Control (ATC).

1.3.3 Within the Northern Grass Area and other identified areas of the site, archaeological evaluation by geophysical survey and by trial trenching would be undertaken to inform detailed design of development proposals and to allow appropriate mitigation, whether by design or by investigation and recording, (or a combination of both approaches) to be specified and designed. Where remains requiring preservation in site are identified, the information from the evaluation will allow for an informed masterplanning and/or engineering design response with appropriate provision for avoidance of these heritage assets in accordance with Requirement 3 of the Development Consent Order (DCO). Standards for trial trenching are set out at paragraph 5.3.3 and **Appendix B**.

1.3.4 Within other areas of the site, proposals for mitigation by investigation and recording are set out in principle to inform proposals for design and archaeological mitigation design once detailed design is complete. Standards for this work are set out at **Section 5** and **Appendix B**.

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2. Archaeological and Historical Context

2.1 Regional Context

2.1.1 The Proposed Development is located within a rich archaeological landscape and the present record comprises only a fraction of what survives in the area, based on chance finds, targeted investigation and techniques such as aerial photographic work that are limited by the conditions available. Experience of archaeological works on the flanks of the Wantsum and Stour Valley demonstrate that these areas were a focus for settlement and other activities from prehistoric to Saxon times and that important archaeological remains may survive. Remains that could be considered to be of national significance have been regularly encountered in the area and have arguably been observed within the site. Recently recovered remains from the Palaeolithic through to World War II (WWII) were discovered during the Thanet Earth excavations (Canterbury Archaeological Trust, 2009) and prior to the construction of the East Kent Access Road (Oxford Archaeology, 2015). Geophysical survey and subsequent archaeological evaluation undertaken within the site boundary (AOC, 2018) are discussed in further detail below.

2.1.2 The presence of previously unrecorded archaeological remains at the site may be suggested by the presence of surface finds of archaeological material, although these records could also reflect chance loss and do not presuppose the presence of related archaeological features. While it is difficult to predict the extent and significance of these deposits, comparison with the remains observed elsewhere within the site boundary suggests that any such remains are likely to represent previously unrecorded elements of asset types discussed below, and to be relatively widely distributed and to be of low or medium significance for archaeological value, although some more significant remains may be present.

2.2 Archaeological Events

2.2.1 There has been an extensive and lengthy number of archaeological investigations undertaken within the study area. Archaeological work within the peninsula has revealed notable archaeological remains from all periods and provided evidence for settlement, burial, industry and agricultural production. Previous archaeological desk studies and investigations on the site and in the study area are detailed in **Table 2.1**.

Table 2.1 Previous Archaeological Investigations within the Site Boundary

Title	When	Who	Details
Manston Aerodrome 639613	1944	Ministry of Works	Bronze Age features were excavated during the 'Excavation on Defence Sites 1939-1945' project. A mostly destroyed ring ditch of a barrow and two burials were examined (TR 36 NW 34). No grave goods were recovered. Report: Grimes, W. F., 1960 *Excavations on Defence Sites 1939-1945,* Pages 1-248.

Title	When	Who	Details
Way/Manston Airfield 639598	1944	Ministry of Works	A possible Iron Age to Roman Age industrial settlement (TR 36 NW 182) was excavated after archaeological remains were identified during construction of the Monkton gas pipeline. The site included pits, a ditch, a wall foundation, and smaller finds such as a plumb bob, bronze pins, iron slag, Potin coins, and bones. Pottery dating to the late 14th century and 16th to 17th century was also found. Report: Grimes W. F., 1985, *Kent Archaeological Society, Archaeologia Cantiana: being contributions to the history and archaeology of Kent,* Vol 102, Page 59.
Thanet Gas Pipeline, Phase I EKE3995	1971	Canterbury Archaeological Trust	Excavation for North Sea gas pipeline. 30 sites were investigated, of which 28 were previously unrecorded. The sites range in date from the Iron Age to Medieval period and include the Jutish Cemetery (TR 26 NE 13). Report: Operation Gas Pipe: Thanet Section (1973) No. 30 pages 298-301.
Lord of the Manor 639618	1976-7 & 1977-82	Isle of Thanet Archaeological Unit	Excavations of a Neolithic enclosure, and Bronze Age barrow and ring ditch (TR 36 NE 132). Reports: 1977, *Kent Archaeological Society, Archaeologia Cantiana: being contributions to the history and archaeology of Kent,* Vol 92, Pages 245-5 Isle of Thanet Archaeological Unit Publication – Interim report.
Monkton Gas Pipeline: Phases III- IV EKE4199	1983-4	Isle of Thanet Archaeological Unit	This pipeline follows the southern boundary of the site and archaeological remains from the Prehistoric to Post Medieval Period were exposed during construction. Associated monuments include a Neolithic pit (TR 26 NE 86), Bronze Age blade and fragments (TR 36 NW 193), burials and a cemetery from the Roman to Early Medieval to Anglo-Saxon Periods (TR 36 NW 186, 187 and 189), a Roman Age industrial/settlement site (TR 36 NW 182), and an Iron Age settlement site (TR 36 NW 190). Reports: Perkins, D. R. J., 1984, *The Thanet gas pipeline Phase III 1983,* 78 page 180 (article in serial) and Perkins, D. R. J. 1986, *The Monkton Gas Pipeline: Phases III & IV 1983-84,* CII pages 43-69 (article in serial).
Cliffs End 639614	1984	Isle of Thanet Archaeological Unit	During excavation to lay the Monkton-Ramsgate gas pipeline remains of a late Iron Age (possibly continuing into the early Roman period) settlement were encountered (TR 36 NW 190). The pipeline construction cut through pits and exposed animal bone, shells, and pottery sherds. Report: Perkins, D. R. J., 1985, *Kent Archaeological Society, Archaeologia Cantiana: being contributions to the history and archaeology of Kent,* Vol 102, Pages 63, 64-5.
Thorne Farm 639609	1984	Isle of Thanet Archaeological Unit	A Roman cemetery and an Early Medieval cemetery were excavated during construction of the Monkton pipeline. The Roman Age cemetery included five inhumations and four cremation burials and grave goods (TR 36 NW187). The Anglo-Saxon cemetery was dated to the late 6th to mid 7th century and was three burials, with one grave covered by what may have been a small boat (TR 36 NW 186). Report: Perkins, D. R. J., 1985, *Kent Archaeological Society, Archaeologia Cantiana: being contributions to the history and archaeology of Kent,* Vol 102, Pages 52-4, 58-61, 63, 66-9.

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Title	When	Who	Details
Watching Brief on the Sparrow Castle – Manston Water Pipeline/ Sparrow Castle to Manston Pipeline, Birchington **EKE 8131** **660252**	1989	Trust for Thanet Archaeology	Iron Age, Roman period, WWII, and undated archaeological features were encountered during monitoring of pipeline construction. Significant finds include Iron Ages pits containing pottery (TR 36 NW 368), Roman enclosures (TR 36 NW 205) and Roman Pits (TR 36 NW 369). Report: Trust for Thanet Archaeology, 1989, *An Archaeological Watching Brief on the Sparrow Castle – Manston Water Main* (unpublished document).
Geotechnical work at Manston Airport **EKE11465**	1999	Foundation and Exploration Services	During geotechnical work associated with the cargo hangers and apron taxiways, five boreholes and ten trial pits were dug. Report: Foundation and Exploration Services, 1999, *Kent International Airport Cargo Hangers and Apron Taxiways: Factual report on ground investigation.*
Evaluation of passenger and cargo side taxiways and aprons, Manston **EKE11793**	2000	Trust for Thanet Archaeology	Open area and trench excavations were conducted in four areas, resulting in the identification of archaeological features dating from the Bronze Age to the Medieval Period (TR 36 NW 466-471). Report: Trust for Thanet Archaeology, 2001, *London Manston Airport, Manston, Thanet, Kent: Archaeological Evaluations and Investigations of Passenger and Cargo side Taxiways and Aprons* (unpublished document).
189 Ramsgate Road, Broadstairs **1434919**	2002	Trust for Thanet Archaeology	Prehistoric features and an Iron Age site where identified during excavation of a proposed residential development. Report: Trust for Thanet Archaeology, 2002, *189 Ramsgate Road, Broadstairs, Kent: an archaeological evaluation.*
Survey of a Second World War air raid shelter, Manston **EKE13134**	2004	Kent Underground Research Group	While working near the Manston Airport terminal building, contractors broke though into a deep air raid shelter. A chalk cut shelter, most likely dating to 1940, was recorded (TR 36 NW 518). Report: Kent Underground Research Group, 2005, *Caves and Tunnels in South East England – Part 17* (unpublished document).
Trial trenching evaluation at the site of a new car-park, Manston Airport	2004	Swale and Thames Archaeological Survey Company	A series of multi-phase enclosures and a late Iron Age to early Roman Period settlement were encountered during excavations, which included 52 trial trenches (TR 36 NW 1176). Reports: Swale and Thames Archaeological Survey Company, 2004, *Archaeological evaluation of land east of the Kent International Airport, Manston, Isle of Thanet, Kent*.
EDF Substation Site **1410715**	2005	Museum of London Archaeology Service	Five trenches were excavated across the proposed substation location and identified Bronze Age flints, an undated post hole, and an undated pit. This work was informed by an earlier desk-based assessment. Report: Museum of London Archaeology Service, 2005, *EDF Substation, Manston, Kent: an archaeological evaluation report.*
Excavation of area prior to pipe installation, Margate to Broadstairs **EKE13336**	2005	Wessex Archaeology	Over 600 archaeological features were recorded during work related to the construction of pipeline. The features date to all periods form the Neolithic to WWII (TR 36 NE 675, 676, and 677). Report: Wessex Archaeology, 2006, *Margate and Broadstairs Urban Wastewater Treatment Scheme.*

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Title	When	Who	Details
Excavations along the route of the East Kent Access route (A256) EKE13407	2009-11	Oxford Wessex Archaeology Joint Venture	Field survey, evaluation trenching, and large-scale excavations were undertaken along the East Kent Access route. The excavations identified and recorded archaeological features and finds dating from the Palaeolithic through to WWII. Report: Oxford Wessex Archaeology Joint Venture, 2011, *East Kent Access (Phase II), Thanet Kent: Post-Excavation Assessment Volume 1.*
Survey of Buildings and Structures Associated with Manston Airport and the Surrounding Areas	2016	Kent County Council (KCC)	A survey commissioned by KCC's Heritage Group, which is designed to provide an updated historic and strategic context for Manston airport and highlight extant buildings and structures in and around Manston airfield for inclusion to the Historic Environment Record.
Geophysical survey	2016	AOC Archaeology Group	The preliminary results of a geophysical survey carried out in support of planning application OL/TH/16/0550 identified a density of potential archaeological anomalies, mainly to the far east, far west and central west of the Site. Report: WSP Parsons Brinckerhoff, 2016, *Environmental Statement, Volume 2, Appendix 10.1, Section 5.2 and Appendix C.*
Trial trenching	2016	AOC Archaeology Group	Trial trenching was carried out in support of planning application OL/TH/16/0550.

2.3 Recent Archaeological Investigations within the Site Boundary

Geophysical Survey

2.3.1 A gradiometer survey was undertaken by AOC over approximately 117ha which detected anomalies representing features previously recorded on historic mapping and aerial photography such as field boundaries and possible archaeological features. The results also identified previously unrecorded linear, curvilinear, rectilinear and pit like anomalies that possibly relate to former human activity on the site.

2.3.2 Modern features are also visible within the survey results, such as buried utilities and many pieces of infrastructure and services related to the Manston Airport as well as plough lines, land drains. These have in part either destroyed or masked earlier features as its clear that across the site there is an earlier prehistoric landscape. Subsequently detailed interpretation across the site is tentative.

Archaeological Evaluation

2.3.3 An archaeological evaluation of 123 trenches over 305ha was carried out from November 2016 to February 2017 by AOC. Prehistoric features were rare across the site and were typically narrow boundary ditches or fence lines. However, two circular features identified within the geophysics were confirmed as ring ditches, undated but most likely to represent barrows. A coherent Romano-British agricultural landscape was identified covering a large proportion of the site. Most features formed small enclosures with pits and postholes marking the habitation zones. An L-shaped linear feature identified by the earlier geophysical survey was confirmed in the southwest of the site. This was a large defensive ditch of pre-Roman/early Romano-British date, similar in profile to recorded defensive works 3.2km to the southeast and potentially connected to the Caesarian second invasion of Britain in 54BC. A significantly larger ditch on the north-eastern side of the settlement may have delineated its extent. An oven within a Roman sunken-featured building and three other sunken buildings were identified. Other boundaries probably Roman fields around this settlement.

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2.4 Protected Military Remains

2.4.1 Fourteen aircraft crash sites, which represent potential protected military remains are known within 1km of the site, 11 of which are located within the site boundary. These assets are detailed in **Table 2.2**.

Table 2.2 Potential Protected Military Remains

Reference UID	Name
DKE20136	ME109
DKE20248	BB893
DKE21799	Crash site of Messerschmitt Bf109E-4
DKE21805	Crash site of Heinkel HE 111H-2
DKE21806	Crash site of Messerschmitt BF110D
DKE21807	Crash site of Messerschmitt BF110D
DKE21808	Crash site of Supermarine Spitfire I
DKE21809	Crash site of Supermarine Spitfire I
DKE21823	Crash site of Bristol Blenheim
DKE21825	Crash site of Consolidated B24H Liberator
DKE21826	Crash site of Consolidated B24J Liberator
DKE21827	Crash site of Hawker Typhoon IB
DKE21828	Crash site of Hawker Typhoon IB
DKE21829	Crash site of Heinkel HE111H-2

2.5 Chronological Summary

Early Prehistory: Palaeolithic and Mesolithic

2.5.1 Residual evidence on the site includes a Palaeolithic flake recovered from a later feature on the southern boundary during excavations on the East Kent Access road in 2009-2011 (TR 36 NW 546); and a Lower to Middle Palaeolithic pointed implement recovered as a surface find in 1899 from the Telegraph Hill area of the site in the far southwest (TR 36 NW 55). There are no Mesolithic finds from the site, but a tranchet axe was recovered from a tree throw during the East Kent Access Route excavations in 2009-2011 (TR 36 SW 366) c. 600m to the south of the site. Most recently, a crested flint blade, interpreted as 'post-glacial', was recovered during the recent evaluation (AOC 2018, 20), though this was not clearly associated with any more substantial features and is being treated as residual.

2.5.2 The Stour Valley Characterisation project notes that most of the site (the southern side of the runway, Freight Terminal, south of Northern Grass Area, East of Runway and much of the centre)

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has a low potential for Palaeolithic and Pleistocene finds, and a low significance predicted for any finds here due to derivation from context. The remaining areas of the site are underlain by plateau brickearth deposited during colder episodes of the Pleistocene. This has a moderate potential for Palaeolithic remains, particularly in identified areas of high points in the landscape. The site occupies an area of relatively high elevation and a moderate potential for Palaeolithic remains can be inferred on the areas covered by these deposits, specifically around the fringes of the site.

2.5.3 Archaeological remains dating from these periods from within the site are isolated lithic artefacts from the small pockets of river terrace gravels and brickearths present within the site boundary. Significant discoveries are not anticipated, in line with the limited evidence and the review undertaken as part of the Stour Valley Characterisation Project.

Later Prehistory: Neolithic

2.5.4 The Neolithic period was generally characterised by the spread of farming of crops and domestication of animals, accompanied by increasing forest clearance and the establishment of permanent settlements. These local population centres often increased and expanded during the Bronze and Iron Ages, while the local landscape was transformed by the construction of field boundaries enclosing areas of pasture and farmland and the erection of highly visible symbolic structures such as monuments to the dead (e.g. bronze age round barrows).

2.5.5 No Neolithic artefacts have been recovered from the site but there is good evidence of Neolithic activity in close proximity. In the eastern part of the study area a Neolithic settlement, containing linear features and pits with pottery was found c. 900m from the site during an evaluation in 2003 by the Trust for Thanet archaeology at the Preston Park Caravan Site (TR 36 NE 598). Neolithic pits containing both Neolithic pot sherds and flints were identified during the 2009-2011 East Kent Access Road excavations at two locations c. 500m (TR 36 SE 737) and c. 600m (TR 36 SE 737) from the site, and during a pipeline excavation by Wessex Archaeology in 1995 c. 1km to the south east of the site at Chalk Hill (TR 36 SE 319). A total of seventy struck flints were recorded across the site during the 2016/17 evaluation (AOC 2018, 70), though the dating can be refined no further than the broad Neolithic/Bronze Age at present. A polished flint axe, interpreted as diagnostic of the Neolithic period, was recovered from the southwest of the site during the same evaluation (*ibid*, 18).

2.5.6 The absence of coherent remains of material dating from this period in the evaluation suggests that it is unlikely that particularly extensive remains of this date would be present, but the presence of related features in the immediate vicinity of the site suggests that dispersed and isolated remains of limited archaeological interest may occur.

Later Prehistory: Bronze Age

2.5.7 Bronze Age activity was recorded within the southwest of the site around Telegraph Hill in 2016-2017 during a programme of archaeological trial trenching. This took the form of ring-ditches indicative of round-barrows, initially recorded through geophysical survey and confirmed by field evaluation. While the features are not securely dated they match the form of barrows present in the broader area and appear to reflect a preference for siting these monuments on higher ground (AOC 2018). Also, within the site, a Middle to Late Bronze Age ditch, containing pottery and human remains was found during an evaluation on the cargo side of the airport in 2000 (within the area identified as terminal, parking and aircraft sheds) by the Trust for Thanet Archaeology (TR 36 NW 466, application ref not available). On the southern border of the site, an assemblage of Bronze artefacts found during the construction of a pipeline in 1984 (TR 36 NW 193) is thought to have been associated with a hoard, possibly disturbed by ploughing. A round barrow of probable Early Bronze Age date at the east end of the runway was examined in 1944 after being largely destroyed

(TR 36 NW 34). It contained a primary and secondary burial. The ploughed remains of a further probable round barrow c. 900m further east was excavated in 1985 (TR 36 NE 54). In the northeast corner of the site, Bronze Age flint tools were recovered in later features during a 2005 evaluation by Museum of London prior to the construction of the EDF Substation (TR 36 NW 487).

2.5.8 The East Kent Access Route excavations (2009-2011), also identified a Bronze Age agricultural settlement with four inhumation burials (TR 36 SW 374) and a Middle to Late Iron Age settlement (TR 36 SW 376), in addition to many other later prehistoric features along the route, which lies just to the south of the extant runway.

2.5.9 Archaeological remains of this period anticipated within the site comprise:

- The ring ditches observed at Telegraph Hill and potentially further barrows along the ridgeline south of the runway, although the absence of observations in the evaluation suggests that such remains may not be as well preserved as at Telegraph Hill;
- Further burials of this and later periods may be present in association with these ring ditches; and
- Remains of settlement activity may be present, particularly around the areas where such remains were observed in 2000 and 2005, although it is likely that these remains will have been significantly disturbed in earlier phases of construction.

Later Prehistory: Iron Age

2.5.10 Iron Age activity on the site is represented by a pit containing Iron Age pottery sherds excavated by the Trust for Thanet Archaeology during an evaluation on Laundry Road in 1995 (TR 36 NW 382), who also uncovered a scatter of Early Iron Age pottery recovered during evaluation works on the passenger side of the airport (TR 36 NW 469). A further concentration of pits was noted in the 1960s to lie under the east end of the runway (TR 36 NW 35). An extensive late Iron Age and early Roman settlement was revealed during evaluation works in advance of the construction of a new car park at the Airport (TR 36 NW 1176), with features containing a rare type of buildings and a pottery kiln, reflecting adaptation of Iron Age peoples to Roman influences. Recent trial trenches recorded a small prehistoric pottery assemblage (124 sherds), most of which was associated with the mid-to-later Iron Age. More substantial features that could conceivably have been of Iron Age date were typically identified as Romano-British.

2.5.11 The Scheduled Ancient Monument of Enclosure and ring ditches 200yds (180m) ENE of Minster Laundry (1004203) is situated c. 100m to the south of the western end of the runway on the site, with undisturbed Iron Age features identified as cropmarks on aerial photographs. The intensification of settlement and agricultural land use during this period emphasises the growing importance of the Wantsum Channel.

2.5.12 Archaeological remains of this period anticipated within the site comprise elements of settlement and industrial activity, although the relative absence of such remains in the Stone Hill Park evaluation trenching (WSP, 2016) suggests that these remains would be sparsely distributed and of limited significance, but may include elements of an agricultural landscape pre-dating observed Roman-British features.

Roman

2.5.13 The Roman occupation of Britain had a significant impact on north-east Kent and evidence of Roman activity is widespread in the study area. Recent evidence from Ebbsfleet has been interpreted as the landing point for Julius Caesar's 54BC arrival in Britain. The strategic geographic location of the area, formed by the Wantsum Channel, created an easily defensible gateway. The

Roman period is characterised by dense settlement patterns and proliferation of Roman structures throughout the south east comprising several roads, Roman forts and settlements, including the important sites at Richborough, c. 5km to the south of the site. Located at the south-eastern end of the Wantsum Channel, it was here that part of the subsequent Roman invasion force, under Senator Aulus Plautius landed in 43AD. The temporary camp initially constructed at this location developed into the Roman port, Rutupiae, c. 90AD. This was replaced in c. 270AD by one of several Saxon Shore forts in the region (List entry 1014642 and 1363256), which were fortifications built to protect against invading Saxon raiders. A similar Saxon Shore fort is located at Reculver (List entry 1018784), at the north-western end of the Wantsum Channel, c. 8km north west of the site.

2.5.14 An extensive Romano-British industrial and settlement site was found during the construction of a gas pipeline in 1984 along the southern edge of the site (TR 36 NW 182). Features below the floor of the trench remain intact. Further evidence for Romano-British occupation and industrial activities were found during westward expansion of the runway during WWII (TR 36 NW 209), and a Roman pit with a hearth in the base was found during excavations on the cargo side of the airport in 2000 by the Trust for Thanet Archaeology (TR 36 NW 467). The East Kent Access Route excavations in 2009-2011 identified several Roman ditches, gullies, pits and cremations (TR 36 SW 405), while an antiquarian discovery of a Roman coin hoard in c. 1630 is reported near the site of the windmill on Telegraph Hill (TR 315 657), which is detailed on historic maps.

2.5.15 Roman activity is known from the site itself. A substantial Roman landscape forming the majority of dated features was recorded through trial-trenching between 2016 and 2017, characterised in three chief forms:

- A large ditch in the southwest of the site appears to represent a significant defensive feature at the top of a hill and is thought to be related to early military activity at Ebbsfleet, perhaps associated with the second (54 BC) Caesarian invasion;
- Settlement evidence is present in the centre of the site downslope from the ridge. The deepest features here are classed as 'sunken-featured buildings', a continental style of housing fairly common across Thanet and Sheppey. The presence of this style of structure may be associated with settlement of veterans in Colonia in the early Roma period, or with migration from the Germanic provinces during the later Roman period (AOC 2018, 69); and
- Finally, Roman period settlement is represented in the form of postholes and ditches signifying the division of land for agriculture.

Early-Medieval

2.5.16 Even before the 5th Century, groups of Saxons, Jutes and Angles from the European mainland were already moving into prime agricultural areas in southern England. Saxon Shore forts were built at Richborough and Reculver, at either end of the Wantsum Channel, to defend against invasion. Findspots of Anglo-Saxon artefacts on the site include an early-medieval bead and iron knife on the southern border (TR 36 NW 216), and a silver early penny ('sceat') (TR 36 NW 498), a Merovingian gold *tremiss* (TR 36 NW 499), and pottery (TR 36 NW 471) from the passenger area of the airport. At the western end of the site, a small barrow and linear features visible as cropmarks were identified as Anglo-Saxon as a result of Anglo-Saxon finds made in close proximity (TR 36 NW 214). This spatial correlation of Early-medieval and Bronze Age funerary activity has been observed elsewhere within Kent and southern England more widely. The evaluation in 2016/17 recorded shell-tempered ware in the southwest of the site in an area largely identified with Roman period activity (AOC 2018). A ditch recorded in the southwest of the site was conjectured as of early-medieval or medieval date.

2.5.17 It is not possible to confidently predict what types of features of this date may be present within the site, which seem most likely to represent scattered elements of agricultural and associated settlement activity, and potential burial remains at the western part of the site.

Medieval

2.5.18 Settlement at Manston likely dates from the 12th Century (VCH, Kent, Vol 2), with the lord of the Manor of Manston holding important office during the reign of King John (The History and Topographical Survey of the County of Kent: Volume 10). Medieval trackways are visible on both historic mapping, shown as Dunstrete, and on a geophysical survey of the site recently completed in support of the planning application OL/TH/16/0550. Dunstrete was an important east-west aligned routeway across Thanet, a portion of which runs through the southern part of the site.

2.5.19 Medieval finds from the site include pottery, a medieval copper alloy buckle and features including ditches and pits indicating medieval occupation of the site (TR 36 NW 471; MKE80179; TR 36 NW 468). These features represent sparse survivals of the medieval agricultural landscape which would be of limited archaeological interest.

Post-Medieval

2.5.20 Both agricultural and quarrying activities have been encountered on the site. The farmstead of Foster's Folly, with a loose courtyard plan and buildings to two sides of the yard, formerly existed on the location of the passenger and cargo area of the airport (MKE87020), while a mid-18th Century chalk mine, known as Manston Caves, was excavated and backfilled in antiquity in the eastern area of the site (TR 36 NW 437). Supporting the agricultural industry, two flour mills are also known from the site, and are pictured on old Ordnance Survey maps of 1839 and 1972 (TR 36 NW 1107). These features represent sparse survivals of the post-medieval agricultural landscape which would be of limited archaeological interest.

Modern

2.5.21 Numerous extant buildings and features on the site reflect the Manston airfield's significant military history, including ten pillboxes (TR 36 NW 1062; TR 36 NE 2168; TR 36 NW 1076; TR 36 NW 1059; TR 36 NW 1072; TR 36 NW 1048; TR 36 NW 1041; TR 36 NW 1043; TR 36 NW 1047; TR 36 NW 1059), air raid shelters (TR 36 NW 332; TR 36 NW 518), trench systems (TR 36 NW 1220; TR 36 NW 1222), and a former WWII oil depot (TR 36 NW 1183). A trial trench excavated in 2016-2017 recorded part of a concrete mounting platform in the extreme southwest of the site.

2.5.22 The majority of these remains would be of limited archaeological interest and in some cases may present clear safety hazards resulting from the presence of live ordnance or significant contamination. However, as a whole, these remains may offer opportunities to better understand the use and development of the airfield.

3. Research Agenda

3.1 Research Aims

3.1.1 The aims of the archaeological works are:

- To develop a chronological characterisation of the changing use of the site over time;
- To identify and investigate specific activity areas within the site;
- To develop a spatial characterisation of the past use of the site and to understand the spatial relationships between contemporary activities; and
- To understand how the archaeological remains on the site contribute to a wider understanding of local and national historical and archaeological themes.

3.2 Research Themes

3.2.1 As mitigation by investigation and recording primarily mitigates loss of archaeological interest, it is important to set the results of any archaeological fieldwork into a wider framework of archaeological research and investigation. Overarching research agendas for the South East of England (SERF) and the Greater Thames Region (GTRF) set out key themes that archaeological investigation can inform. **Table 3.1** maps the archaeological remains anticipated to be present within the site against these identified research agendas.

Table 3.1 Key Archaeological Themes

Anticipated remains	Key Issues	Mapping to GTRF	Mapping to SERF
Artefactual material associated with the Mesolithic and Palaeolithic	1) Understand the distribution of material evidence for human occupation of the area during the Mesolithic and Palaeolithic periods.	1A.SO3 – Identifying key areas where primary context sites might be preserved. 1A.SO4 - Developing an appreciation of the contribution made by secondary context (reworked) data to understanding the range and distribution of Lower and Middle Palaeolithic activity. 1B.SO2 - To carry out field investigation of sites which previous studies have identified as having high potential. 1B.SO3 - To develop predictive techniques to identify key areas where sites may be found and good preservational contexts 1C.SO4 - Developing appreciation of human interaction with this environment.	Draft research agenda 2013-7: - How disturbed/transported are Palaeolithic remains in fluvial contexts? - Are there levels or geographic/topographic zones within deposits that are more likely to be richer in Palaeolithic artefactual remains? - Improved mapping, longitudinal correlation and dating of terrace systems within major river valley and tributary systems (Lower Thames, Stour, Medway, Arun, Rother eastern Solent Basin, Wealden rivers). - Correlations of terrace units with each other between basins/systems. - Identification of areas of colluvial/solifluction deposits that may contain undisturbed or minimally disturbed concentrations of Palaeolithic remains (cf Red Barns). - More attention to "brickearth", and characterisation as colluvial or Aeolian (or fluvial) SERF Research Agenda conference discussion points for the Upper. Palaeolithic/Mesolithic: Colonisation and occupation issues: to what degree is the region a crossroads or a backwater in terms of UP and early Mesolithic occupation patterns.

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Anticipated remains	Key Issues	Mapping to GTRF	Mapping to SERF
Features associated with Later Prehistoric occupation	1) Better understand the extent and nature of prehistoric activity within the area. 2) Consider archaeological evidence for prehistoric activity in the context of evidence from previous investigations within the area around the site.	4A.SO1 - Analysing the adaptation and evolution of settlement patterns in response to coastal change. 4A.SO9 - Analysing the pattern of settlements of all types through time as evidence of the social, economic and political evolution of the study area.	*SERF Research Agenda conference discussion points for the Middle Bronze Age/Iron Age:* - The evolution of settlement: there are major problems such as the long-term history of the land divisions laid out in the MBA/LBA; the problem of MIA settlements; the hiatus between earlier sites and those of the LIA. - The transition to the Late Iron Age: how are we to understand the important changes from MIA to LIA, including the emergence of a southern kingdom centred on west Sussex? What was the role of Kent and Surrey with regard to the emerging political structure of South-East England?
Features associated with later prehistoric ritual, funerary activity	1) Consider chronology/ extent of barrow burial features. 2) Understand relationship to contemporary/later settlement. 3) Understand whether Bronze-Age ritual activity is spatially associated with later activity. 4) Consider archaeological evidence for prehistoric activity in the context of evidence from previous investigations within the area around the site.	4A.SO9 - Analysing the pattern of settlements of all types through time as evidence of the social, economic and political evolution of the study area.	*SERF Research Agenda conference discussion points for the Middle Bronze Age/Iron Age:* - How are we to consider evidence of large-scale organisation in the landscape as signified by funerary monuments? Growing evidence of field systems in conjunction with large scale barrow cemeteries in east Kent and further afield in Sussex and Essex. - Refining understanding of longevity and site complexity e.g. Ring ditch 3 at Monkton Mount Pleasant.
Features associated with Roman military occupation of the mainland	1) Understand the extent and nature of recorded activity. 2) Confirm identification of features as of military origin 3) Better understand relationship with other early-Roman activity in Thanet. 4) Consider nature of past landform and influence on settlement.	4A.SO4 - Examining the impact of the Roman Conquest on settlement patterns and the social, economic and political articulations of the landscape.	*SERF Research Agenda conference discussion points for the Roman period*: - Clarification on nature of activity between Caesarian and Claudian invasions. - Contribute to ongoing invasion route debate.

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Anticipated remains	Key Issues	Mapping to GTRF	Mapping to SERF
Features associated with Romano-British settlement and agriculture	1) Understand the extent and nature of settlement and agricultural form. 2) Consider the effect of changing political, social and economic conditions on settlement over time. 3) Consider nature of past landform and influence on settlement. 4) Consider archaeological evidence for Romano-British activity in the context of evidence from previous investigations within the area around the site.	4A.SO3 Developing an understanding of early agriculture and land use on terrace gravels and brickearth 4A.SO4 Examining the impact of the Roman Conquest on settlement patterns and the social, economic and political articulations of the landscape. 4A.SO9 - Analysing the pattern of settlements of all types through time as evidence of the social, economic and political evolution of the study area	*SERF Research Agenda conference discussion points for the Roman period:* - Clarification of the characteristics of the lesser nucleated settlements, and their role in relationship to surrounding rural settlements. - The relationship of villa and non-villa settlements to each other and to the landscape.
Features associated with early-medieval settlement and burial activity	1) Identify extent and nature of early-medieval activity within the site. 2) Understand the relationship of early-medieval activity to activity in earlier and later periods. 3) Consider archaeological evidence for early-medieval activity in the context of evidence from previous investigations within the area around the site.	4A.SO5 Examining the chronology of the Anglo-Saxon migrations into the areas surrounding the Thames Estuary and the impact on existing settlement and material culture. 4A.SO6 Examining the development in the Anglo-Saxon period of new organisational and administrative frameworks based on secular and ecclesiastical estates and "territories".	*Draft research agenda 2013-7* - Harness the potential of the historic landscape to inform an understanding of the Romano-British/Anglo-Saxon transition. …. Work needs to be focused on the long-term evolution of field systems and their environmental context to establish definite cases of continuity in Roman estate boundaries and land use. The potential of palaeoenvironmental studies needs to be maximised by targeting gaps in off-site sequences and by dating existing sequences more closely. - Develop and test methodologies for locating Anglo-Saxon settlements, particularly targeting the Weald and other areas where land use patterns may mask potential sites. We need to know to what extent the current distribution of excavated settlements is a true reflection of the Anglo-Saxon situation. - Enhance the existing resource by refining an understanding of the landscape context of Anglo-Saxon cemeteries, particularly their spatial relationship to sites of prehistoric and Romano-British ritual activity. Data recovered by the Portable Antiquities Scheme will be of benefit here, but more work is required to interpret the meaning of finds scatters, for example, whether they represent cemeteries or settlements. - Harness bioarchaeological assemblages to better understand key transitions in crop production, animal husbandry and the process of agricultural intensification. Areas deserving attention include the change from hulled to free-threshing wheats and the changing exploitation of wild taxa as an index of social status.

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Anticipated remains	Key Issues	Mapping to GTRF	Mapping to SERF
Features associated with Medieval agriculture and settlement	1) Identify extent and nature of medieval activity within the site. 2) Understand the relationship of medieval activity to activity in earlier and later periods. 3) Consider archaeological evidence for medieval activity in the context of evidence from previous investigations within the area around the site.	4A.SO7 Examining the impact of the Norman Conquest on settlement patterns and estate organisation. 4A.SO9 Analysing the pattern of settlements of all types through time as evidence of the social, economic and political evolution of the study area. 4A.SO10 Examining the impact of the church on the historic landscape in medieval times.	Draft research agenda 2013-7: - More understanding of the landscape of primarily dispersed rural settlement in terms of development and maintenance over space and time. - Further investigation of agricultural practices (including animal husbandry) and land use through more systematic sampling and analyses than hitherto.
Features associated with post-medieval agriculture and settlement	1) Identify extent and nature of post-medieval activity within the site. 2) Understand the relationship of post-medieval activity to activity in earlier and later periods. 3) Consider archaeological evidence for post-medieval activity in the context of evidence from previous investigations within the area around the site.	4A.SO9 Analysing the pattern of settlements of all types through time as evidence of the social, economic and political evolution of the study area.	Draft research agenda 2013-7: - The study of the size of farm structures in relation to the scale of associated agriculture would help characterise agricultural landscapes. - Social aspects of rural housing, material culture, subsistence and environment, especially for the poor from the 16th to mid-20th centuries.
Features associated with 20th-century aviation	1) Better understand development of the airfield over the course of the 20th-century. 2) Work to ensure development respects, preserves and where feasible enhances upstanding wartime structures in terms of group value and intrinsic architectural/structural interest relating to RAF and military history.	6A.SO1 - Examining the impact of changes in military technology and tactical and strategic approaches on individual defence sites and defence systems. 6A.SO2 - Developing understanding of the evolution of the estuary's defences in relation to political change. 6A.SO3 - Developing interpretations of these defences integrated with wider patterns of settlement, commerce and landscape.	Draft research agenda 2013-7: - Establish provision for Operation Overlord and Operation Fortitude, the deception plan. - There is a need to list and collate the data from the main, and minor, (WWII) military airfields and temporary landing grounds many of which are being built on. - Aircraft crash sites (with or without war grave implications) need to be protected or subjected to proper excavation and recording. The standard of past recoveries has varied greatly and there are continuing concerns relating to the conservation of this archaeological resource. - Determine scope of post-WWII air defence, including protection by anti-aircraft guns, especially on new sites and possible survival.

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4. Likely Effects and Scope of Work

4.1.1 Likely effects of the Proposed Development have been considered in relation to potential ground disturbance and identified areas of archaeological potential to allow specific investigations to be proposed. The likely effects are summarised at **Table 4.1**. The detail of mitigation proposals, including the most appropriate methodology and the exact extent of any intervention, will be agreed with the Kent County Council (KCC) Archaeologist as detailed design is advanced and the extent and nature of disturbance can be more accurately predicted.

Table 4.1 Proposed Archaeological Response

Area	Location	Anticipated archaeological remains	Anticipated effects	Proposed archaeological response
A	Northern Grass Area	Uncertain. Potential survival of highly significant pre-modern remains and elements of the former airfield.	Potential removal of remains over larger areas resulting from construction of hardstandings, buildings and landscaping.	Further geophysical survey and trial trenching to ascertain survival, extent and significance of archaeological remains. This information will be used to inform decisions on whether remains merit preservation in situ and an appropriate design response, and appropriate mitigation strategies.
B	West of Runway	Survival of highly significant later-prehistoric and early-Roman activity. Potential elements of other periods, most notably relating to the former use of the airfield.	Localised disturbance resulting from renewal of the approach indicator lighting and associated services.	Establish location of particularly significant remains and design infrastructure to minimise any disturbance. Controlled strip on works to the approach indicator lighting.
C	South of Runway	Survival of elements of prehistoric and Romano-British occupation observed in EKAR excavations.	Localised disturbance resulting from renewal of services.	Controlled strip and/or archaeological monitoring of areas of archaeological interest.
D	East of Runway	Survival of elements of prehistoric and Romano-British occupation observed in EKAR excavations.	Localised disturbance resulting from renewal of the approach indicator lighting and associated services.	Controlled strip and/or archaeological monitoring.
E	Terminal, aircraft stands and Associated Parking	Survival of elements of late prehistoric, Romano British and early-medieval settlement remains in discrete pockets where not disturbed by previous phases of construction.	Disturbance of remains resulting from construction of buildings and hard standing.	Further trenching to ascertain extent of strip, map and sample of areas of archaeological interest.
E(1)	Contractor compound,	Uncertain. Area has been in arable use with minimal modern disturbance	Potential removal resulting from construction of hardstandings, buildings and landscaping.	Further geophysical survey and trial trenching to ascertain survival, extent and significance of archaeological remains. This information will be used to inform decisions on whether remains merit preservation in situ and an appropriate design response, and appropriate mitigation strategies.

Area	Location	Anticipated archaeological remains	Anticipated effects	Proposed archaeological response
E(2)	Business aviation and helicopter stands	Uncertain. Area former aviation use as grass stands for light aircraft	Potential removal resulting from construction of hardstandings and buildings.	Trial trenching to ascertain survival, extent and significance of archaeological remains. This information will be used to inform decisions on whether remains merit preservation in situ and an appropriate design response, and appropriate mitigation strategies.
F	Apron and Freight Terminal	Survival of elements of Romano-British agricultural landscape.	Disturbance of remains resulting from construction of buildings and hard standing.	Strip, map and sample.
G	Taxiways and ATC	Survival of elements of Romano-British agricultural landscape.	Disturbance of remains resulting from construction of buildings and hard standing.	Strip, map and sample.
G(1)	Site entrance	Survival of elements of Romano-British agricultural landscape.	Disturbance of remains resulting from construction of roads access.	Trial trenching to ascertain survival, extent and significance of archaeological remains. This information will be used to inform decisions on whether remains merit preservation in situ and an appropriate design response, and appropriate mitigation strategies.
H	Historic airfield structures	Surviving above and below-ground structures.	Demolition or sealing off of structures, conversion and/or refitting.	Buildings recording.

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5. Standards for Archaeological Work

5.1 General Principles

5.1.1 Archaeological work is intended to:

- Mitigate loss of archaeological interest of at-risk heritage assets; and
- Inform planning of non-archaeological (i.e. avoidance and design) mitigation.

5.1.2 All archaeological fieldwork will be planned to inform the research aims set out at **Section 3.1**.

5.2 General Methods

5.2.1 All archaeological mitigation will be proportionate to the significance and extent of the potential effects on archaeological remains, and will be designed to address the specific research agenda set out at **Section 3**.

5.2.2 In all areas identified as requiring archaeological work in this WSI, removal of topsoil, overburden and 19th/20th-century and later remains to the first significant archaeological horizon will be undertaken by a back-acting excavator fitted with a wide toothless bucket, under the continuous supervision of the archaeology contractor with the authority to halt and direct machine excavation. Spoil will be temporarily stockpiled on site at a safe distance from the trenches and other constraints, to the satisfaction of the main contractor.

5.2.3 The first significant archaeological horizon and all subsequent archaeological deposits will be cleaned by hand. Excavation of any archaeological deposits identified will proceed by hand except specifically agreed with the Kent County Council (KCC) Archaeologist.

5.2.4 Arrangements for the processing of bulk samples taken for the recovery of environmental materials and artefacts, especially carbonised plant remains and ceramics, should be confirmed. These arrangements must be sufficient to provide feedback on the character of sample assemblages concurrent with the fieldwork to enable refinement of field sample collection, as necessary to fully realise the research objectives and project aim. The advice of the Historic England Regional Science Advisor (RSA) must be sought in this regard.

5.2.5 Following completion of archaeological investigation to the satisfaction of the KCC Archaeologist and the main contractor, each trench will be backfilled with the spoil and compacted by machine to level fill, unless otherwise instructed by the main contractor.

5.2.6 The following professional standards apply:

- CIfA 2014 Standard and Guidance for Archaeological Excavation;
- CIfA 2014 Guidelines for the Collection, Documentation, Conservation and Research of Archaeological Materials;
- CIfA 2014 Code of Conduct;
- Historic England 2016 *Understanding Historic Buildings*; and
- KCC *Manual of Specifications* Part B.

5.3 Standards for Archaeological Work

Geophysical Survey

5.3.1 Geophysical survey will comprise the archaeological magnetometry survey of the area of the identified areas in order to identify geomagnetic anomalies of potential archaeological origin. This survey would aim to cover the entire developable area of the Northern Grass Area, but would exclude any confirmed safeguarded areas, areas of demonstrable past disturbance (e.g. hardstandings and modern building footprints) and any areas where safe access cannot be confirmed.

5.3.2 Geophysical work will be carried out in line with the *EAC Guidelines for the Use of Geophysics in Archaeology* (Schmidt *et al.* 2016).

Archaeological Evaluation

5.3.3 Archaeological evaluation will comprise the excavation of an agreed area sample of the Northern Grass Area using 50m by 2m trenches targeted on identified geophysical anomalies. The purpose of the evaluation is to identify and characterise the nature, extent and significance of specific archaeological foci within an extensive area. This information will be used to allow more detailed proposals for mitigation in this area to be developed.

5.3.4 Additional trenching will be carried out in Area E to allow detail proposals for mitigation to be more accurately scoped.

Archaeological Monitoring

5.3.5 It is not envisaged that an archaeologist will be present throughout the construction groundworks. The risk that archaeological remains might be present will be well-established on the basis of previous stages of evaluation and/or mitigation works. The need to monitor construction works will be predictable and appropriate arrangements for inspection visits will be acceptable in most instances.

5.3.6 Where archaeological deposits are encountered, sufficient excavation will take place to allow appropriate records to be compiled, as might be reasonably achieved. Provision will be allowed for access in keeping with health and safety considerations.

5.3.7 During and after the excavation, all recovered artefacts will be stored in the appropriate materials and storage conditions to ensure minimal deterioration and loss of information (this will include controlled storage, correct packaging, and regular monitoring of conditions, immediate selection for conservation of vulnerable material).

Controlled Strip

5.3.8 Archaeological controlled strip of specified work sites will be undertaken by a suitably qualified archaeologist who will undertake the direction of the machine operator. This will allow the excavation area to be controlled by the archaeologist during the machining of the specified work area.

5.3.9 Avoidance of the excavated area is essential during the controlled strip, so that the area is not tracked over until the area is clear of archaeological remains, the supervising site archaeologist will confirm to the contractors when an area has been released from archaeological control and vehicles can track over the specified area.

Strip, Map and Sample

5.3.10 The appointed archaeological contractor will submit a Method Statement, including a detailed plan of areas to be subject to strip, map and sample.

5.3.11 The purpose of strip, map and sample is to identify specific archaeological foci within an extensive area of potential or to expose the spatial characteristics of extensive archaeological landscape elements, such as field systems, prior to selecting locations for targeted sample excavation. This work is to be undertaken within a framework of evidence-based research objectives.

5.3.12 Following initial machine excavation (which will be directed and monitored by the Archaeological Contractor), the area should be examined and a plan of identified and potential archaeological features and deposits prepared at an appropriate scale. This will inform proposals for sample excavation, to be agreed with the KCC Archaeologist. Where necessary to allow construction works to continue, the release of a part of an area may be agreed with the KCC Archaeologist. In this situation, areas which have not been released will be clearly demarcated.

5.3.13 Key stages in strip-map-and-sample are:

- The careful stripping of identified areas to the appropriate level, in order to reveal the site plan;
- Immediate planning (mapping) of the area while the uncovered surface is fresh. The area should be subsequently checked to see if weathering reveals further features and the plan updated as appropriate; and
- Sample excavation will proceed, concentrating on established a relative chronology through feature intersections investigations and by attempting to establish a more precise chronology.

5.3.14 Following planning, investigation of an appropriate sample of identified features drawing on the standards set out in the KCC *Manual of Specifications Part B*. Key areas and nodes will be investigated in sufficient detail to understand them both in respect of themselves and also in relation to their surroundings. This work will be focused on adding to the spatial, chronological, functional and environmental context of the investigated area.

5.3.15 This requirement will be continually monitored during the course of fieldwork, and amended according to its effectiveness in meeting research objectives. In particular consideration of strip map and sample operations will be discussed with the KCC Archaeologist, with a view to extending these operations where significant archaeological remains have been observed or scaling them back operations where the potential presence of archaeological features is demonstrably low, based on:

- Identified prior truncation/disturbance;
- Absence of observed features; or
- Confirmation of prior survey results which suggest poor survival of archaeological features.

5.3.16 Any decision to scale back the scope of strip, map and sample mitigation will only be undertaken after agreement of the KCC Archaeologist has been confirmed.

5.3.17 Following completion of archaeological investigation to the satisfaction of the KCC Archaeologist the relevant area or agreed parts thereof will be released to the main contractor so that construction works may proceed.

Sample Excavation

5.3.18 Features and deposits will be sectioned and recorded in plan to the standards set out in the KCC *Manual of Specifications Part B*. Archaeological features will be hand cleaned prior to excavation to

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provide accurate definitions. For linear features such hand cleaning will be targeted at sample excavation points. Deposits interpreted as natural subsoil should be tested by hand or machine excavation to determine the validity of this interpretation.

5.3.19 The sampling strategy will be developed throughout the investigation period in consultation with the KCC Archaeologist or their advisors in the light of the results of the field work. The sampling strategy will be kept under review during the excavation work. The excavation will normally include as a minimum:

- A robust spatial framework of excavation to provide an understanding of the distribution of past activities across the investigation area including any 'special' deposits and any patterning in artefact distribution. Such a framework will take into account the inter-relationship of major features;
- The investigation of the intersections of features of archaeological date to obtain a phasing of the site; and
- Structural remains and other areas of significant and specific activity (domestic, industrial, religious, hearths, 'special'/ patterned deposits etc.) will be excavated and recorded to a degree whereby their extent, date form, function and relationship to other features and deposits can be established.

5.3.20 All burial deposits and associated remains will be fully excavated and recorded in accordance with an agreed methodology.

5.3.21 Representative non-structural linear cut features will be sample excavated and recorded to the standards set out in the KCC *Manual of Specifications Part B*, in order to establish the feature's character, date and morphology and to provide information on activities taking place in close proximity to the feature.

5.3.22 The sampling excavation strategy will be reviewed continuously throughout the course of fieldwork and, if necessary, amended in order to take account of changing circumstances and understanding. Any changes or amendments will be agreed in advance of implementation with the KCC Archaeologist:

- In some cases, it will be sufficient to excavate a representative sample of long linear features (e.g. boundary ditches) or quarry pits in order to record their form, function, and date and recover artefacts and ecofacts; and
- Where insufficient dating material or information has been retrieved from a partially sectioned feature, further sampling may be undertaken, subject to consideration of residuality or other factors that might limit the integrity of archaeological data, with reference to the research objectives and in consultation with the KCC Archaeologist.

Recording

5.3.23 A full and proper record (written, graphic and photographic, as appropriate) will be made for all work in line with the standards set out in The KCC *Manual of Specifications Part B*. A continuous numbering system will be used and the following registers kept on standardised forms: contexts; sections; plans; and photographs. The recording system to be used will be stated in the contractor's method statement and if requested copies of the manual to that system will be provided to the KCC Archaeologist.

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Environmental Sampling

5.3.24 A detailed sampling policy will be decided in consultation with the Historic England (formerly English Heritage) Regional Scientific Advisor. This will detail specific categories of material that are of interest and identify a programme of work to support the research objectives set out in the Project Design, which will be revised as appropriate throughout the excavation and post-excavation phases.

5.3.25 The on-site sampling policy will be inclusive, as the significance of individual features may not be fully understood until wider patterns of spatial distribution and phasing are understood. As set out in the general methods above, arrangements for the processing of bulk samples taken for the recovery of environmental materials should be confirmed. The final sampling and discard policy will be agreed in consultation with the project environmental specialist, the KCC Archaeologist and the Regional Scientific Advisor.

5.3.26 Archaeological deposits will be sampled systematically in bulk samples. All samples will be collected from the fills of cut features, and from any other securely stratified deposits that have the potential to provide environmental or economic information, such as occupation layers or material accumulating on use surfaces. Particular emphasis will be placed on contexts that may supply material suitable for scientific dating of potential early medieval and prehistoric features. Decisions on sampling must also take account of stratigraphic factors and consider the opportunity to employ chronological and spatial controls in the recovery of samples in order to generate environmental information of sufficient quality to meet the research objectives.

5.3.27 Provision will be made for column and other appropriate samples to be taken for geoarchaeological assessment and analysis as appropriate and in line with technical guidance. Due consideration will be given to the collection of samples suitable for microfossil analysis and other specialised analysis from suitable deposit sequences, that might inform the pattern of changing environmental conditions over time. Waterlogged and cess deposits will be specifically sampled for microfaunal and invertebrate analysis. Bulk samples will also be taken from any waterlogged deposits present for assessment of organic remains. Any organic artefacts that are retrieved during the excavation will be stored in appropriate conditions and assessed by a qualified archaeological conservator.

5.3.28 Industrial residues and waste from craft and manufacturing processes will also be routinely sampled.

Artefact Recovery

5.3.29 The recovery of material that can adequately date major archaeological phases is a key requirement. It is recognised that the incidence of artefacts may limit the quality of datable assemblages, and measures for scientific dating are also set out below. However, artefacts remain a key source of dating information.

5.3.30 Bulk finds such as pottery and animal bone will normally be collected by context. Where it is appropriate and following additional instruction, soil samples will also be recovered for sieving, specifically for the purpose of:

- Providing statistically controlled samples; and
- Enhanced recovery techniques.

5.3.31 As set out in the general methods above, arrangements for the processing of bulk samples taken for the recovery of artefacts should be confirmed.

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5.3.32 Finds will be temporarily stored on site and removed from site to a secure location as required. All finds that are retained will be washed, marked and bagged in a manner suitable for long-term storage.

5.3.33 A sampling strategy for the recovery and recording of waterlogged wood and timber will be agreed with the KCC Archaeologist, where significant quantities of such materials are observed.

5.3.34 All finds and samples will be exposed, lifted, cleaned, conserved, marked, bagged, boxed and stored in accordance with the CIfA *Guidelines for Finds Work*, the guidelines in the UKIC *Conservation Guidelines No. 2* and the requirements of the recipient museum.

5.3.35 A discard policy acceptable to the relevant receiving museum will only be implemented following quantification, assessment and recommendation from artefactual and environmental specialists. Certain classes of material, such as post-medieval pottery and building material, may be discarded after recording if a representative sample is kept, but no finds will be discarded without the prior approval of the KCC Archaeologist and the receiving museum.

Conservation

5.3.36 Procedures for the recovery, packing and transportation of artefacts will follow *First Aid for Finds* (2nd Edition) and UKIC's *Conservation Guidelines No. 2*. Where delicate artefacts are uncovered, appropriate immediate measures will be taken, and the artefacts transferred to the appropriate Conservator. If particularly complex conservation requirements become apparent, the conservator will be called to site to excavate and package the object.

Scientific Dating

5.3.37 Achieving a coherent chronology across all phases of activity is a key objective, as this may help resolve problems in the identification of cultural activity during period when ceramics were not generally available to communities in Kent, i.e. later prehistory and early medieval. A strategy for the selection of samples for scientific dating will be required, taking into consideration statistical procedures designed to enhance the accuracy of site chronologies, for instance the use of Bayesian techniques.

5.3.38 Samples of material suitable for scientific dating techniques including AMS C14 dating, archaeomagnetism (for example, charred seeds or in situ burnt clay from appropriate contexts) or thermoluminescence will be collected where available.

5.3.39 Scientific dating will be a significant consideration during the post-excavation assessment and will inform the Updated Project Design.

Archaeological Buildings Recording

5.3.40 Where historic airfield buildings are proposed to be demolished or significantly altered, it will be necessary to make a record of these structures. Recording should be carried out to Level 2 or 3 as set out in Historic England 2016 *Understanding Historic Buildings*. This record will comprise photographic and drawn records, and the exact level of recording will be agreed with the KCC Archaeologist taking into account the significance of the buildings and the extent of alteration/demolition.

5.3.41 Where historic airfield buildings are to be retained, it is proposed that recording to Level 2 as set out in Historic England 2016 *Understanding Historic Buildings* will be carried out to ensure that the appearance of the structures in their present setting can be recorded.

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5.4 Procedures in Respect of Statutorily Designated Remains

Human Remains

5.4.1 In the event of human remains being encountered they will be left in situ, covered and protected and the Coroner, the KCC Archaeologist will be informed.

5.4.2 The Archaeological Contractor will arrange receipt of the appropriate documentation and license from the Department of Justice to enable the legal removal of any human remains encountered in the works. The Archaeological Contractor is to comply with the conditions of any issued License.

5.4.3 If removal is agreed, all subsequent work will comply with relevant regulations (including local authority environmental health regulations) and technical guidance.

5.4.4 The Archaeological Contractor will have available within the team or on call an appropriately qualified and experienced osteo-archaeologist to supervise the excavation and removal of human remains from the site. The Archaeological Contractor will use an appropriately qualified and experienced archaeological conservator to assist where appropriate in the lifting of human remains and grave goods / cremation vessels.

Protected Military Remains

5.4.5 The 1986 Protection of Military Remains Act (PMRA) applies to any aircraft which have crashed while in military service and to certain wrecks of vessels which were wrecked while in military service. PMRA makes it an offence to disturb, move or unearth military remains which have been designated.

5.4.6 There are no designated protected areas or controlled sites within the site boundary, and there are no records of military vessels or aircraft having been lost within the site boundary.

5.4.7 There are records of military aircraft crash site within the site boundary, although these are likely to have been cleared at the time of the crash. Surviving remains of these or any unrecorded crash sites could be protected under the act and should be treated as controlled sites until their status has been confirmed with the Ministry of Defence and any appropriate licences for excavation granted.

5.4.8 Where remains are observed during archaeological investigation or construction work, intrusive work should cease, and the site be secured while consultation with the Ministry of Defence is undertaken.

Treasure

5.4.9 Any items which are recovered which could be deemed as treasure will be subject to the provisions of the Treasure Act 1996 and the Treasure (Designation) Order 2002. Such material shall normally be removed from site to a secure location at the end of the working day on which it is found. In addition to the statutory authorities, the relevant Portable Antiquities Officer should be informed.

5.5 Post-Excavation Work, Reporting and Dissemination

Finds

5.5.1 All finds processing, conservation work and storage of finds must be carried out in compliance with the *CIfA Guidelines for the collection, documentation, conservation and research of archaeological materials* (2008) and those set by UKIC (1990).

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5.5.2 The deposition and disposal of artefacts must be agreed with the legal owner and recipient museum prior to the work taking place. Where the landowner decides to retain artefacts, adequate provision must be made for recording them. Details of land ownership should be provided by the developer.

5.5.3 All retained artefacts must be cleaned and packaged in accordance with the requirements of the recipient museum.

Site Archive

5.5.4 Before the commencement of fieldwork, contact should be made with the landowners and recipient Museum to make the relevant arrangements. Details of land ownership should be provided by the developer. Details of the appropriate museum to be confirmed.

5.5.5 The archaeological contractor will specify the receiving museum and confirm that arrangements for receipt of archaeological material and site archives have been agreed before the commencement of fieldwork.

5.5.6 The archive and the finds must be deposited in the receiving museum, within six months of completion of the post-excavation work and report.

5.5.7 The KCC Archaeologist will require confirmation that the archive has been submitted in a satisfactory form to the receiving museum.

Post-excavation Reporting

5.5.8 Initial geophysical survey results, comprising greyscale raw and processed plots will be made available to the KCC Archaeologist within two weeks of the completion of Geophysical surveys.

5.5.9 Following trial trenching, an interim report will be made available to Historic England and the KCC Archaeologist within two weeks of completion of trenching. This will set out:

- Mapping of the results of the evaluation work undertaken;
- Key findings set out as bullet points highlighting any key observations and implications for the agreed Research Agenda;
- A clear statement of the location and extent of any areas considered to be of potential national significance;
- A clear statement of any further post-excavation work required to establish an assessment of potential national significance and a timetable for completing those works; and
- A statement of further archaeological works required as mitigation for the loss or disturbance of remains of less than national significance.

5.5.10 Any further reporting required to provide evidence to establish an assessment of potential national significance should be produced within the stated timescale as at paragraph 5.5.9. Full and detailed reporting of the results of the evaluation should be deferred to the production of the final reporting of archaeological fieldwork.

5.5.11 An initial assessment of the results will be undertaken and an Interim Report produced within 4 weeks of the completion of onsite work. Post-excavation Assessment (PXA) report following all excavation and/or strip, map and sample works (as identified in **Section 4**) and Updated Project Design will be submitted to the KCC Archaeologist. This will be followed by further analysis, as required. The PXA and Updated Project Design will be written in accordance with the KCC

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specification and subsequent PXA and reporting/ publication stages will follow as set out in the KCC specification (*Manual of Specification Part B – Strip, Map and Sample Requirements*).

5.5.12 The purposes of the interim report are to:

- Confirm the completion of fieldwork;
- Provide an indicative timetable for detailed post-excavation assessment and reporting; and
- Signpost any significant findings to inform research and development management pending the production of the full report.

5.5.13 This interim summary reporting will incorporate the following:

- Mapping of the results of the excavation work undertaken;
- Scope of work identifying the investigative techniques used at each work location; this may be set out as a table;
- Key findings set out as bullet points highlighting any key observations and implications for the agreed Research Agenda;
- An updated project design with indicative timetable compiled and agreed for post-excavation assessment and full reporting; and
- Indicative scope of PXA.

5.5.14 It is intended that the interim report presents only a very brief synthesis of the results of the fieldwork to allow for early dissemination of summary results and project planning. Tables or bullet points should be used to provide a concise but intelligible summary. Detailed Plans and maps or analysis of stratigraphic, artefactual or ecofactual material should not be included.

5.5.15 Where different elements of the archaeological fieldwork are undertaken by different specialist contractors, the summary reporting may be divided thematically to reflect the scope of works undertaken by different contractors. Where appropriate, the format and scope of each individual summary will be agreed with the KCC and CCC archaeologists.

Post-Excavation Assessment

Purpose

5.5.16 The intention of carrying out a PXA is to provide a rapid summary of the material recovered during the excavation and to allow costed recommendations to be made for the final reporting, which will be carried out following the completion of all of the archaeological fieldwork.

5.5.17 The PXA is intended to be a summary document rather than a detailed record. As such, the level of reporting will provide sufficient detail to allow recommendations to be made and justified.

5.5.18 Where works are carried out by multiple archaeological contractors, arrangements for coordination of separate PXAs or production of a single collated PXA must be agreed with the KCC Archaeologist in advance of fieldwork commencing.

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Form

5.5.19 The PXA will comprise:

- Introduction:
  - Scope of the project;
  - Circumstances and dates of fieldwork and previous work; and
  - Comments on the organisation of the report.
- Original research aims;
- Summary of the documented history of the site(s);
- Interim statement on the results of fieldwork.
- Summary of the site archive and work carried out for assessment:
  - Site records: quantity, work done on records during post-excavation assessment;
  - Finds: factual summary of material and records, quantity, range, variety, preservation, work done during post-excavation assessment;
  - Environmental material: factual summary of human and animal bone, shell and each type of sample (e.g. bulk organic, dendrochronological, monolith), quantity, range, variety, preservation, work done on the material during the PXA; and
  - Documentary records: list of relevant sources discovered, quantity, variety, intensity of study of sources during post-excavation assessment.
- Potential of the Data:
  - An appraisal of the extent to which the site archive might enable the data to meet the research aims of the project, sub-divided according to the research aims of the project rather than the form of the data;
  - A statement of the potential of the data in developing new research aims, to contribute to other projects and to advance methodologies; and
  - A summary statement of the significance of the data.
- Additional information will normally include:
  - Supporting illustrations at appropriate scales;
  - Sufficient supporting data, tabulated or in appendices, and/or details of the contents of the project archive, to permit the interrogation of the stated conclusions; and
  - Index, references and disclaimers.

OASIS

5.5.20 The overall aim of the Online Access to the Index of Archaeological Investigations (OASIS) project is to provide an online index to the mass of archaeological grey literature that has been produced as a result of the advent of large-scale developer funded fieldwork. The archaeological consultant or contractor must therefore complete the online OASIS form (available at http://ads.ahds.ac.uk/project/oasis/). Once a report has become a public document by submission to or incorporation into the Kent Historic Environment Record (HER), Kent HER will validate the OASIS form thus placing the information into the public domain on the OASIS website. The

archaeological contractor must indicate that they agree to this procedure within the method statement submitted to KCC.

Publication

5.5.21 Formal publication of the results of the fieldwork will be required. It is intended that the results of the works as a whole will be reviewed and decisions taken on the scope and level of any publication(s) following the submission of the PXA reports and review.

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6. Health, Safety, Security and Environment

6.1.1 Health, Safety, Security and Environment (HSSE) will take priority over all other requirements. A conditional aspect of all archaeological work is both safe access to the area of work and a safe working environment. All relevant Health and Safety legislation, regulations and codes of practice should be respected and adhered to. Site-specific risk assessments will be carried out in respect of each element of the mitigation fieldwork prior to commencement of the fieldwork and copies sent to the representatives of the client for approval.

6.1.2 The project will be carried out in accordance with safe working practices and under the defined Health, Safety and Environmental Policy.

6.1.3 Copies of the successful contractor's insurance policies will be required in advance by the client or their nominated representative.

6.1.4 The appointed sub-contractor/s will take responsibility for securing the excavation areas (e.g. by fencing), provision of welfare, backfilling and reinstatement of the excavation areas and the removal of materials brought onto the site during the excavation.

6.1.5 Service plans and plans of buried restrictions will be supplied by the appointed Principal Contractor. Any archaeological intervention must respect all requirements for safe stand-off distances and working practices in regard of these features.

6.1.6 The site is understood to be significantly contaminated as a result of past military and aviation use. The Construction Environmental Management Plan (CEMP) sets out safe working practices intended to avoid and minimise potential hazards to site staff, members of the public and environmental receptors. All archaeological works would be subject to these working practices.

6.1.7 The degree of contamination may be sufficient to present a constraint to normal archaeological working methods. These constraints may relate to location and depth of excavation, access to excavations, dewatering, retention of archaeological material and soil storage. In these cases, safe working practices should be adopted in line with the measures set out in the CEMP and Historic England 2017 *Land Contamination and Archaeology: Good Practice Guidance*.

7. Monitoring

7.1.1 The Kent County Council (KCC) Archaeologist must be informed of the start date and timetable in advance of work commencing.

7.1.2 Reasonable access to the site must be afforded to the KCC Archaeologist or their nominee at all times, for the purposes of monitoring the archaeological excavations.

7.1.3 Regular communication between the archaeological contractor, the KCC Archaeologist, client and other interested parties must be maintained to ensure the project aims and objectives are achieved.

8. Heritage Outreach and Engagement

8.1.1 It is anticipated that archaeological works within the site will be the subject of significant public interest within the local community and specialist interest groups more widely.

8.1.2 A Heritage Outreach Scheme will be agreed with the Kent County Council (KCC) Archaeologist separately to this Written Scheme of Investigation, and this section is intended to provide a general scope for that scheme. It is anticipated that this would comprise a range of activities intended to publicise the process and findings of archaeological work within the proposed development, and to provide a lasting legacy that would persist through the operation of the proposed development.

8.1.3 Potential themes for the Heritage Outreach Strategy could include:

- Prehistoric Thanet;
- The Roman Invasion of Britain;
- Anglo-Saxon Thanet;
- Manston Airfield;
- Invasion and the Defence of Britain; and
- Historic Trade and Contact.

8.1.4 Methods should include:

- Participation to include (where safety and security permits) involvement of volunteer or educational groups within site investigations, finds and environmental processing or documentary research;
- Engagement to include provision of regular updates on archaeological works as they progress using internet-based materials (e.g. blogs and social media) in addition to more conventional talks and site tours or open days;
- Provision of interpretation material in publicly accessible parts of the site or public access land near the site following completion of the construction programme; and
- Partnership with the Museums in order to provide space for displays of material or a location for events.

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Appendix A
Figures

Appendix HE3.3

Key

Site Boundary

m 0 750 1,500 2,250 m 3,000

Scale at A3: 1:50,000

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Manston Airport DCO
Archaeological Written Scheme of Investigation

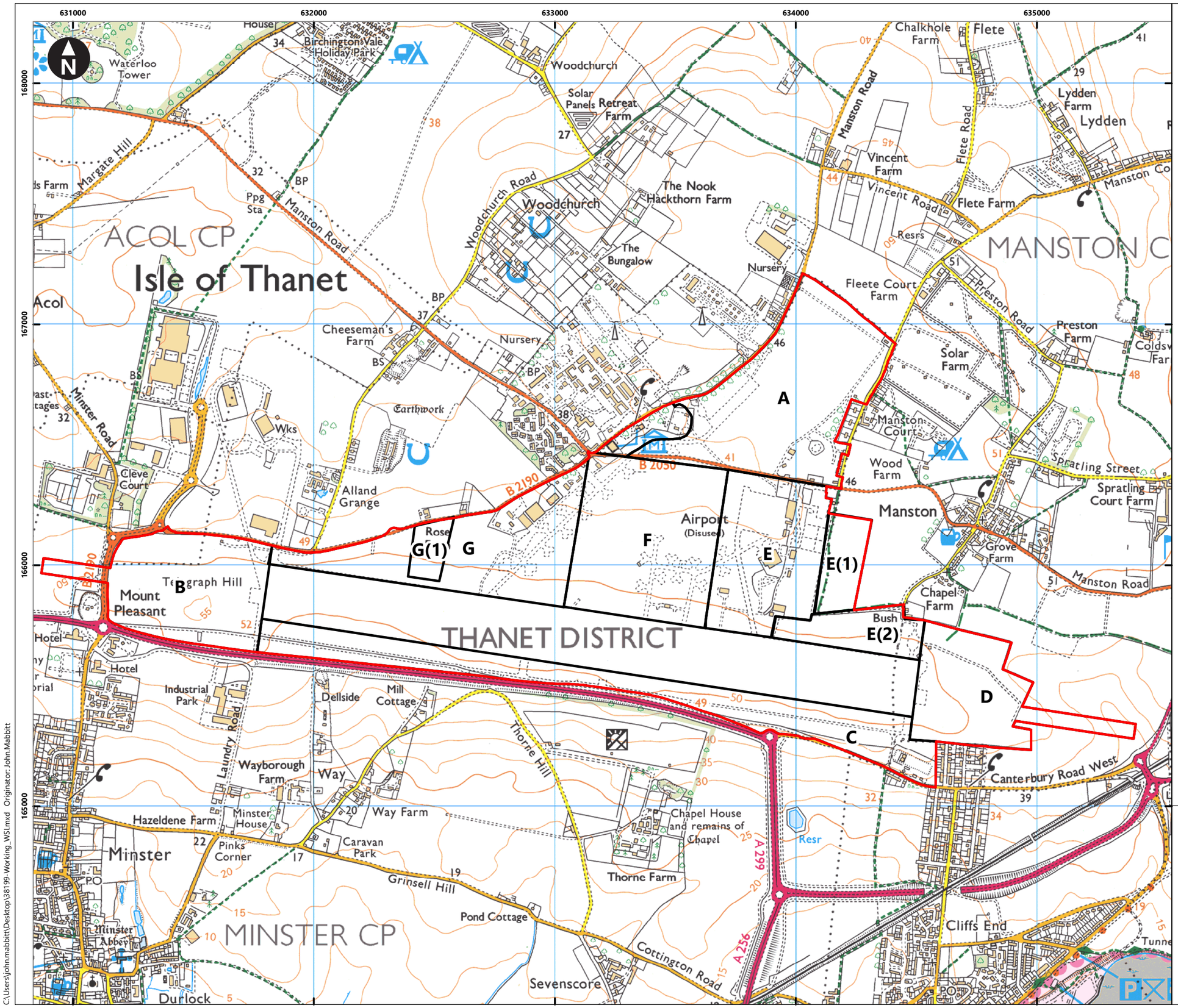
Figure 1
Site Location

May 2019

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Key

Site Boundary

0 200 400 600 800 m

Scale at A3: 1:15,000

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Manston Airport DCO
Archaeological Written Scheme of Investigation

Figure 2
Plan of site areas discussed in the WSI

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Appendix B
KCC Standards for Archaeological Work (From *Manual of Specifications* Part B)

HISTORIC BUILDING RECORDING REQUIREMENTS – BASIC PHOTOGRAPHIC SURVEY FOR APPRAISAL

1. Introduction

1.1 The following specification sets out a set of standards and requirements for the completion of a basic photographic survey for appraisal purposes. The intention is to provide an initial record of historic buildings, structures and other features to inform decision making. More detailed forms of photographic recording for both appraisal and mitigation purposes are covered by separate specifications. The basic survey comprises three elements:

- A basic written description
- An annotated ground plan
- General photographic coverage and selected detailed photographs

2. General Requirements

2.1 The survey will be carried out by an individual or organisation (from here on referred to as 'the Surveyor') acceptable to the relevant Local Planning Authority, with recognised experience and expertise in the type of survey to be undertaken. A good working knowledge of the type of buildings or structures to be surveyed will also be considered highly desirable.

3. Pre-survey Requirements

3.1 Prior to undertaking the photographic survey, the Surveyor will confirm with the Local Planning Authority's Conservation Officer and / or the County Archaeologist (whichever is appropriate) the level of survey work that is required and specific aspects that should be recorded by the survey.

3.2 The Surveyor will ensure that all reasonable measures have been taken to identify any constraints to undertaking the photographic survey. The Surveyor will seek information on any risks to health and safety.

3.3 Full copies of the Specification must be issued to the Surveyor.

4. Objectives

4.1 The purpose of the survey is to provide a basic descriptive record of historic buildings, structures and other features that may be affected by development proposals. Sufficient information should be recorded and described to be able to inform planning decisions and the development design process where appropriate.

5. Scope of Survey

5.1 The survey will comprise a written, drawn and photographic record. The following sections detail general standards and requirements for recording and reporting that

should be followed.

5.2 Particular issues that will be addressed by the survey are set out in Part A of this specification.

5.3 Any amendment to the scope of the survey should be agreed with the Conservation Officer / County Archaeologist in advance of the work being undertaken.

6. Photographic Survey

6.1 Photographs will be taken to not only show a building or structure's appearance but also to record the evidence on which the analysis of it historic development is based.

6.2 Photographs will normally be taken in 35mm format, although good definition digital photography may be adequate for assessment purposes. While black and white photography is preferable for permanent, archival purposes, colour photography should be used to record decoration and significant structural detail. Where digital photography is used image resolution must exceed five megapixels.

6.3 The survey will include:

- Photographs of each building or structure in its setting;
- Oblique photographs of all principal exterior elevations;
- Where an exterior elevation embodies complex historical information, photographs taken at right angles to the elevation.
- Photographs to demonstrate the overall appearance of the principal rooms and circulation areas.
- Photographs to illustrate specific historic details or features relevant to the proposals under consideration. These should include relevant details of construction, fittings, machinery, architectural detailing and finishes.

6.4 Each photograph should be printed on archival quality photographic paper and clearly labelled with the subject, the orientation and date taken. The photograph should be cross-referenced to a negative or digital file name.

7. Drawn Survey

7.1 Wherever possible, the Surveyor should make use of existing plans available for the site and building.

7.2 A site location plan tied into the Ordnance Survey at a scale of 1:1250 should be drawn.

7.3 A site plan at a scale of 1:500 or better should be produced showing the principal buildings and structures and clearly identifying those included within the photographic survey.

7.4 A site plan at a scale of 1:500 or better showing the position from which photographs have been taken and their direction of view.

7.5 Internal plans of buildings at a scale of 1:200 or better showing the position from which photographs have been taken and their direction of view.

7.6 All plans are to be drawn on polyester based drafting film and clearly labelled.

7.7 Plans must be fully captioned and scale drawings must include a bar scale. Standard drawing conventions must be used. North must be included on all plans and will be consistent.

8. Written Survey

8.1 A general written description should be made for each building, structure, room or feature identified in the survey. The written description should include the type of building or structure; its scale / approximate size; its place in the wider site; materials used in its construction, any visible alterations or additions.

8.2 A register of photographic images should be maintained.

9. Reporting

9.1 The site archive is to be consolidated after completion of the survey, with all site drawings inked-in, and records and finds collated and ordered as a permanent record.

9.2 Within three weeks of completion of the survey (or longer in case of complex sites as agreed with the Conservation Officer / County Archaeologist) the Surveyor will produce a report, copies of which (as a minimum) are to be provided to:

- the Developer
- the County Archaeologist
- the Local Planning Authority's Conservation Officer / Planning Team
- a copy should remain with the project archive

9.3 When submitting the report to the Local Planning Authority / County Archaeologist the Surveyor will provide written confirmation that the report has been submitted to the above parties.

9.4 If the Surveyor is required, contractually, only to submit reports directly to the developer or their agent, the Surveyor must inform the Local Planning Authority / County Archaeologist in writing that they have completed the report and whom it has been forwarded to. The Surveyor must ensure that the developer is made aware of the need to circulate the report as in 9.2 above.

9.5 The Surveyor may determine the general style and format of the report but it must be completed in accordance with this specification. The report must provide sufficient information to enable the County Archaeologist and the Local Planning Authority to reach an informed decision regarding any further mitigation measures that may be required and to stand as an appropriately detailed report on the survey of the property

for future research.

9.6 Reports that do not provide sufficient information or that have not been compiled in accordance with the relevant sections of this specification will be returned to the Surveyor for revision and resubmission.

9.7 The report will be submitted to the Local Planning Authority / County Archaeologist in a heat-bound hard-copy and in digital format. The digital copy will be supplied in .pdf format and will contain all text, images and plans present in the hard-copy report in a single .pdf file. The medium will be a CD-ROM formatted according to ISO 9660:1999.

9.8 **Report Format -** The final survey report will include as a minimum:

9.8.1 An **Abstract** summarising the scope and results of the survey.

9.8.2 An **Introduction** including:

- the location of the site with a National Grid Reference for the centre sufficient to locate the site to 1m accuracy (e.g. TQ 55555 77777 or easting: 555555, northing: 177777);
- an account of the background and circumstances of the work;
- a description of the development proposals, planning history and planning reference together with a planning condition (where appropriate);
- the nature of potential impacts arising from the proposals;
- the scope and date of the survey, the personnel involved and who commissioned it;

9.8.3 A brief account of the **Historical Background** of the development site including any designations. A map regression using readily available historic maps of the development site (including as a minimum all available Ordnance Survey editions and the Tithe Map) should be included in the report and the site development described.

9.8.4 The **Methodology** employed during the survey must be detailed in the report. Any aims and objectives specified in the specification will be included as will any further objectives identified during the course of the survey. Constraints on the survey will also be described.

9.8.5 The report will include a quantification of the project archive contents, their state and future location.

9.8.6 The report will include a descriptive summary of the site layout and topography.

9.8.7 The report will include a general description of each building, structure or identified feature (see section 8.1 above) cross referenced to plans and illustrations.

9.8.8 A short narrative **Discussion** of the site describing the significance of the findings and the potential impact of development proposals on historic elements.

9.8.9 **Figures** – The report will include copies of the maps and plans detailed above in

sections 7.2 to 7.5 above. Figures are to be fully cross-referenced within the document text. Any relevant historic maps should also be included.

9.8.10 Photographs illustrating the general descriptions (see 10.8.7 above) of each historic building, structure or feature will be selected from the survey archive and reproduced in the report. All photographs will be appropriately captioned.

9.8.11 Photographs not illustrated in the report will be listed, with subject matter, as an appendix to the report. Copies of all photographs should be provided separately in digital format on CD-ROM or alternatively on a printed contact sheet.

10. Archive Preparation & Deposition

10.1 The site archive, to include all project records, is to be prepared in accordance with *Guidelines for the preparation of excavation archives for long-term storage (UKIC 1990)*. On completion of the project the Surveyor will arrange for the archive to be deposited with a suitable record office. Any alternative arrangements will be agreed with the County Archaeologist and the Local Planning Authority.

11 Monitoring and Liaison

11.1 The Surveyor will liaise closely with the Local Planning Authority / County Archaeologist throughout the course of the survey and will arrange for on-site meetings if clarification on any particular issue is required.

12. Copyright and data protection

12.1 Information submitted to the Local Planning Authority / County Archaeologist in conjunction with planning applications automatically becomes publicly accessible and can be viewed by anyone at any time. In addition, the Local Planning Authority and Kent County Council are subject to the requirements of the Freedom of Information Act (2000) and Environmental Information Regulations (2004). Information may be subject to FoI or EIR requests and any documentation submitted in connection with the project may be made publicly available unless doing so contravenes the Data Protection Act (1998).

12.2 While copyright of reports and other information arising from the survey remains with the originator, the Surveyor will undertake to make this information available to interested parties. The Surveyor will agree to allow reports of the survey to be copied and made available to interested parties for historical research. The reports may be made available on the Internet no sooner than three months after the submission of the report. Surveyors who believe that there are special reasons for not publishing the report on the Internet should reach a separate agreement with the Local Planning Authority / County Archaeologist.

12.3 It is to be understood that photographs and notes taken by KCC Archaeological Officers in connection with the work that do not identify individuals or site locations may be used by KCC for outreach and publicity purposes, including on social media sites such as

Facebook, Twitter etc. The Archaeological Contractor should**, preferably in advance** of the works, raise with the KCC Archaeological Officer any concerns that they or their client may have over the use and dissemination of images or information for outreach purposes. In such cases the Archaeological Contractor and their client will agree a protocol with the KCC Archaeological Officer for the appropriate dissemination and use of images and information which balances the concerns of the contractor and/or client with the objective of ensuring that the people of Kent are kept informed of the archaeological discoveries in the county.'

13. Health and Safety

13.1 The Surveyor will conduct the work in compliance with the Health and Safety at Work etc Act 1974 and will carry out a risk assessment before commencing survey work.

14. KCC HER

14.1 The Surveyor is to provide the Kent Historic Environment Record with copies of all reports in both heat-bound hard-copy and digital format (see above).

MITIGATION – STRIP, MAP AND SAMPLE REQUIREMENTS

1. Introduction

1.1 A key objective of field archaeology is to see how sites and features relate to each other spatially and chronologically - the dynamics of settlement evolution. At one level it is about sites and features and their immediate surroundings but it can be about the wider use of the landscape. Accordingly in undertaking archaeological investigations of more extensive sites it is important to relate site-specific work to a broader context. Here Strip, Map and Sample archaeological excavation is a key tool.

1.2 In Strip, Map and Sample a major focus of the investigation will be on removing the overburden and establishing a phased plan of the archaeology which has been revealed, with further work then being based on an appreciation of this complete plan rather than on those more limited insights revealed from trial trenching and limited area excavation. The overall phased plan is paramount and subsequent sampling will be targeted to answering questions about the chronology and function of the component elements of the site and how they relate to each other. Relatively blank areas may also be significant.

1.3 Key stages in Strip, Map and Sample, all to be agreed with the curator, are:

- The careful stripping of the site to the agreed level, in order to reveal the site plan.
- Immediate planning of the site while the uncovered surface is fresh. The site should be regularly checked subsequently to see if weathering reveals further features and the plan updated.
- Following planning, sampling should proceed. Initially this is likely to concentrate on establishing a relative chronology through the investigation of feature intersections. Secondly an attempt should be made to establish a more precise chronology.
- Key areas and nodes should then be investigated in sufficient detail to understand them both in respect of themselves and also in relation to their surroundings.
- Additional work should be focused on adding to the spatial, chronological, functional and environmental context of the investigated area.

1.4 Excavation should be an iterative process relating to an agreed strategy which will be refined as new information emerges. At all stages of the investigation it is essential that an overall phase plan is maintained, incorporating what is being revealed through excavation.

2. General Requirements

2.1 Strip, Map and Sample archaeological excavation will be carried out by archaeological organisations (from here on referred to as ‘the Archaeological Contractor’) acceptable to the relevant Local Planning Authority, with recognised experience and expertise in the specified type of work to be undertaken. Registration with the Institute of Field Archaeologists (IFA) as a Registered Archaeological Organisation (RAO) will normally be considered as an indicator, but not a prerequisite, of such expertise and experience. A good working knowledge of the archaeology of Kent will also be considered necessary.

2.2 Prior to any work being undertaken in Kent, the Archaeological Contractor will

inform the County Archaeologist and communicate details of the proposed team, including (if required) CVs for senior staff and specialists. Such staff will be able to demonstrate an appropriate level of experience and expertise and should preferably, where appropriate, be Members of the Institute of Field Archaeologists (IFA).

2.3 Prior to undertaking the Strip, Map and Sample the Archaeological Contractor will demonstrate that appropriate provision has been made for the resources needed to undertake the work, through to and completion of reporting. The Archaeological Contractor will have available appropriate specialists necessary to support the successful completion of the archaeological fieldwork and post excavation work.

2.4 During fieldwork, the Archaeological Contractor will be represented on site at all times by a member of staff with the required level of experience and who will be responsible for the conduct of on-site work.

3. Pre-fieldwork Requirements

3.1 Prior to undertaking the investigation the Archaeological Contractor will have gathered and considered the following information:

- Relevant information on the Kent County Council Historic Environment Record (HER) maintained by the Heritage Conservation Team;
- Any earlier reports of fieldwork relevant to the site;
- Solid and drift geology;
- Geotechnical site investigation data (if available);
- Any desk based studies of the site.

3.2 In certain circumstances the following will also be considered:

- Relevant published secondary documentary sources;
- Relevant historic maps held at the Centre for Kentish Studies, Maidstone;
- Aerial photographs where cropmarks are considered to indicate archaeology on or close to the site.

3.3 The Archaeological Contractor will ensure that all reasonable measures have been taken to identify any constraints to undertaking the investigation. The Archaeological Contractor will seek information on the presence of services, any ecological constraints, the presence of Public Rights of Way, the presence of contaminated land or any other risks to health and safety.

3.4 The Archaeological Contractor will make provisional arrangements for the deposition of the site archive with an appropriate museum or suitable repository agreed with the County Archaeologist. The Archaeological Contractor will obtain a provisional accession number for the site archive from the recipient museum (except where the museum prefers to issue an accession number following completion of fieldwork) and any guidelines from the recipient museum regarding deposition of the site archive.

3.5 Full copies of the Specification must be issued to the field officer responsible for on-site work and a copy of the agreed Specification and any additional method statements must be available on site at all times. The team carrying out the investigation must be familiar with the Specification and have access on site to any previous evaluation or

survey reports.

3.6 The Archaeological Contractor will inform the County Archaeologist of their appointment, the start date (at least two working weeks before) and arrange for monitoring visits to be undertaken, using the Site Fieldwork Notification Form (see Appendix II). The Archaeological Contractor will continue to keep the County Archaeologist informed of the progress of work and will notify the County Archaeologist immediately if particularly important archaeological remains are encountered.

4. Objective

4.1 The objective of the archaeological mitigation is to identify, excavate, record and analyse any significant archaeological remains that will be disturbed by the proposed development. The physical archaeological remains will be replaced by a detailed record and a better understanding of the past activities that have taken place on the site, thereby contributing to an increased knowledge of Kent's past and providing a resource for future research and education.

4.2 The objective of the Strip, Map and Sample approach is to understand the broad pattern of settlement dynamics and how key elements of the archaeological landscape (sites, activities, deposits and finds) relate to each other spatially, functionally and chronologically.

4.3 Strip, Map and Sample will seek to :

- Establish a broad phased plan of the archaeology revealed following the stripping of the site;
- Provide a refined chronology of the archaeological phasing;
- Investigate the function of structural remains and the activities taking place within and close to the site.

4.4 The archaeological investigation will seek to understand the context of the findings in relationship to the wider settlement pattern, landscape, economy and environment.

4.5 Specific aims are detailed in Part A of this specification.

5. Scope of Strip, Map and Sample Archaeological Excavation

5.1 The site area subject to Strip, Map and Sample, as set out in Part A of this specification will be machine-stripped of overburden and mapped and then archaeologically investigated following an agreed sample excavation strategy. Any amendment to the area proposed for stripping due to on-site constraints must be agreed with the County Archaeologist in advance of the work being undertaken.

5.2 Particular issues that will be addressed during the course of the Strip, Map and Sample archaeological excavation are set out in Part A of this specification.

6. Machine Stripping

6.1 All machine stripping of overburden soils will be carried out under constant archaeological direction by a suitably experienced archaeologist familiar with the ground conditions anticipated on the investigation site.

6.2 A mechanical excavator using a large flat bladed, toothless, bucket of no less than 1.8m-width will carry out machine stripping of overburden soils. The machine stripping will be carried out by one or more large 360^0 tracked excavators working back from one or several fronts.

6.3 No mechanical excavators, earthmoving and other vehicles will travel on the freshly stripped subsoil surface and any identified areas of archaeological investigation until these areas have been signed off by the County Archaeologist or specific agreement has been reached to enable re-stripping.

6.4 Care will be taken to avoid damage to buried surfaces by manoeuvring of plant on unstripped areas of the site. The supervising archaeologist will monitor the effects of plant manoeuvring on the site and will suspend operations that are potentially damaging to underlying archaeological deposits.

6.5 The excavation by machine is to be taken down to the top of the archaeological level or to the top of 'natural' subsoil where no archaeological deposits are found at a higher level. Care will be taken not to damage archaeological deposits through excessive use of mechanical excavation. Machine excavation from the surface must be taken down in spits of no more than 100mm thickness to ensure that deposits and features are not over-excavated and that any artefacts/biological evidence in the soil are recorded.

6.6 The Archaeological Contractor will maintain a constant watch and regularly closely inspect exposed surfaces during the course of machining. If archaeological remains are found to be present cutting through soils (e.g. colluvium) which conceal lower archaeological horizons then the upper levels will be mapped and investigated prior to removal of deposits overlying the lower levels.

6.7 Topsoil and subsoil and fills from archaeological features will be removed from the excavation area and stored in areas agreed with the developer and the County Archaeologist (where appropriate). Spoil heaps will be set back at least 1 metre from the edge of excavation areas.

6.8 Machine-excavated deposits and the exposed surface will be regularly scanned for the presence and collection of artefacts. Exposed surfaces and excavated spoil will be regularly scanned by metal detector.

6.9 The supervising archaeologist will ensure that the machine exposed surface has been left in a clean state suitable for the proper identification of archaeological features. If following the stripping, there remain any areas where it is not clear that archaeological features have been adequately exposed or defined these will be hand cleaned to further define the archaeology.

6.10 Mechanical excavators will not be used to re-clean areas of excavation that have been obscured through weathering. Such areas will be cleaned by hand tools.

6.11 Measures will be taken to protect particularly significant, valuable or sensitive archaeological remains from exposure, accidental damage and / or theft.

7. Mapping

7.1 A site grid is to be established, using an EDM or theodolite, and this tied into the Ordnance Survey National Grid at the outset of the project.

7.2 On completion of, or during, machine-stripping, the resultant surface will be accurately planned at an appropriate scale (1:50 or 1:100 dependent upon complexity). Some hand-cleaning may be necessary to clarify features, particularly in areas of complexity, but generally it is hoped that a sufficiently clear surface can be gained from machine stripping.

7.3 The archaeological team is to be structured to ensure that the hand-cleaning and planning operations run in close sequence. The exposing and planning of archaeological features is to be undertaken on the same or consecutive days while the uncovered surface is fresh, whether or not those features are exposed by machine or handcleaning. Where particularly vulnerable deposits are apparent such as graves or cremations these will be given special priority.

7.4 The exposed surface will be regularly monitored during the course of the investigation to identify any further features that may appear due to weathering. Any additional features revealed will be added to the overall pre-excavation site plan.

7.5 Use will be made of spray line paint marker to record the unexcavated form of features prior to mapping.

7.6 Where initial plan data for a stripped site is captured electronically, through use of EDM, Total Stations, theodolite or GPS, the Archaeological Contractor will ensure that sufficient points are taken on any feature to provide a true reflection of its form in plan. A print out of the plan will be checked for accuracy on site.

7.7 In addition to capturing plan data, sufficient levels will be taken across the stripped surface to support future topographic modelling of the investigation site.

7.8 An overall plan of the stripped site will be prepared and provided to the County Archaeologist within one week of the completion of machine stripping. The plan is an essential pre-requisite of agreeing a suitable sampling strategy for the exposed archaeology.

8. Investigation and Sampling Strategy

8.1 The excavation strategy will be agreed with the County Archaeologist following a site meeting on the completion of machine stripping and provision of a suitable site mapping plan. A written record of the agreed strategy should be provided by the Archaeological

Contractor to the County Archaeologist within one week of agreement.

8.2 The revealed features will be excavated and recorded in accordance with the agreed excavation sampling strategy. The sampling strategy will continue to be developed throughout the investigation period in consultation with the County Archaeologist in light of the results of the field work. The excavation will include initially as a minimum:

- The investigation of the intersections of features of archaeological date to obtain a phasing of the site;
- A robust spatial framework of excavation to provide an understanding of the spatial distribution of past activities across the investigation area including any 'special' deposits and any patterning in artefact distribution. Such a framework will take into account the inter-relationship of major features.
- Structural remains and other areas of significant and specific activity (domestic, industrial, religious, hearths, 'special'/ patterned deposits etc) will be fully excavated and recorded.
- Where appropriate, for instance where the stratigraphy is complex, single context planning will be used.
- Non-structural linear cut features will be sample excavated and recorded with a sufficient number of sections to establish the feature's character, date and morphology and to provide information on activities taking place in close proximity to the feature. All terminal ends will be investigated. Sections will normally be at least 1m wide.
- Non-structural pits will be half-sectioned unless the character, number or size of the pits makes this unpractical. For instance, if a pit contains several intersections and re-cuts, it would not always be appropriate to half-section it. In this situation, the Archaeological Contractor will consider 'quadranting' or single context planning. Equally if 'special' deposits are expected pits may need to be excavated in plan rather than being half-sectioned. The strategy will need to be agreed with the County Archaeologist.
- Non-structural post and stake-holes will be half-sectioned sufficiently to clarify character, relationships and chronology.
- All burial deposits and associated remains will be fully excavated and recorded in accordance with an agreed methodology (see below).

8.3 The sampling excavation strategy will be reviewed continuously throughout the course of fieldwork and, if necessary, amended in order to take account of changing circumstances and understanding. Any changes or amendments will be agreed in advance of implementation with the County Archaeologist.

8.4 Where insufficient dating material or information has been gathered from a partially or half-sectioned feature, further sampling will be undertaken unless agreed otherwise with the County Archaeologist.

8.5 Archaeological features will be hand cleaned prior to excavation to provide a more accurate dimension than was obtained through the initial mapping. For linear features such hand cleaning will be targeted at sample excavation points.

Burial Remains

8.6 Inhumation and cremation burials will be fully excavated by hand within 24 hours of exposure unless otherwise agreed with the County Archaeologist.

8.7 The Archaeological Contractor will put in place arrangements to ensure the security, protection from deterioration and damage, and the respectful treatment of human remains and burial goods.

8.8 Where burial remains are expected the Archaeological Contractor will submit to and agree with the County Archaeologist detailed procedures for the excavation and recording of inhumation and cremation burials.

8.9 The Archaeological Contractor will have available within the team or on call an appropriately qualified and experienced osteoarchaeologist to supervise the excavation and removal of human remains from the site. The Archaeological Contractor will use an appropriately qualified and experienced archaeological conservator to assist where appropriate in the lifting of human remains and grave goods / cremation vessels.

8.10 In the event that human burials are discovered, a Ministry of Justice Licence will be required (in accordance with Section 25 of the Burial Act 1857) before the remains can be lifted. The need for a Ministry of Justice Licence applies to both inhumation and cremated remains. Application for a Licence will be made by the Archaeological Contractor. The Archaeological Contractor is to comply with the conditions of the Licence and discuss any requirements of that Licence which conflict with the agreed method of investigation with the County Archaeologist.

9. Finds recovery processing and treatment

9.1 All artefacts recovered during the excavations on the site are the property of the Landowner. They are to be suitably bagged, boxed and marked in accordance with the United Kingdom Institute for Conservation, *Conservation Guidelines no.2* and on completion of the archaeological post-excavation programme the landowner will arrange for them to be deposited in a museum or similar repository agreed with the County Archaeologist and the Local Planning Authority.

9.2 Artefacts will be excavated carefully by hand. The Archaeological Contractor will use an appropriately qualified and experienced archaeological conservator to assist where appropriate in the lifting of fragile finds of significance and / or value.

9.3 Artefacts will be collected and bagged by archaeological context. The location of special finds will be recorded in three dimensions. Three-dimensional recording of in-situ flint working deposits will be carried out.

9.4 Where appropriate to address the research objectives of the archaeological investigation, sieving of deposits will be undertaken to maximise recovery of small artefacts. A strategy for such sieving will be agreed in advance with the County Archaeologist.

9.5 Records of artefact assemblages will clearly state how they have been recovered, sub-sampled and processed.

9.6 Excavated artefacts will be bagged upon recovery or placed in finds trays. They must not be left loose on site.

9.7 **Treatment of treasure -** Finds, discovered by the Archaeological Contractor, falling under the statutory definition of Treasure (as defined by the Treasure Act of 1996 and its revision of 2002) will be reported immediately to the relevant Coroner's Office, the Kent Finds Liaison Officer (FLO) who is the designated treasure co-ordinator for Kent, the landowner and the County Archaeologist. A Treasure Receipt (obtainable from either the FLO or the DCMS website) must be completed and a report submitted to the Coroner's Office and the FLO within 14 days of understanding the find is Treasure. Failure to report within 14 days is a criminal offence. The Treasure Receipt and Report must include the date and circumstances of the discovery, the identity of the finder (put as unit/contractor) and (as exactly as possible) the location of the find.

9.8 Finds processing will normally be carried out during the course of the archaeological fieldwork and provisional spot dating fed back to inform investigation strategy.

9.9 All metal objects, other than late post medieval objects, will be X-rayed unless otherwise agreed with the County Archaeologist.

10. Archaeological Science and Environmental Sampling

10.1 An appropriate and structured programme of environmental sampling will be implemented. The strategy and methodology for the sampling, recording, processing, assessment, analysis and reporting of deposits with environmental archaeology potential will be in accordance with English Heritage Centre for Archaeology Guidelines "Environmental Archaeology – A guide to the theory and practice of methods, from sampling and recovery to post-excavation" March 2002. Any variation to this guidance will be agreed in advance with both the County Archaeologist and the English Heritage Regional Scientific Advisor. Particular note will be taken of the following requirements.

10.2 The Archaeological Contractor will use an appropriately qualified and experienced geo-archaeologist to record any deposits of particular significance such as buried soils or advise on depositional processes.

10.3 An appropriately qualified and experienced environmental archaeologist will devise and supervise the implementation of the environmental sampling strategy.

10.4 The advice of the English Heritage Regional Scientific Advisor is to be sought regarding specialist sampling requirements and any scientific applications relevant to the archaeological investigation of this site.

10.5 Where deposits are dry, bulk samples for the recovery of charred plant remains, small bones and finds, will be taken from sealed and datable features such as pits, ditches, hearths and floors. Each context will normally be sampled. The size of the sample is expected to be in the range of 40-60 litres per context or 100% of smaller contexts.

Samples will not be taken from the intersection of features.

10.6 For large features / spreads appropriate consideration will be given to sampling on a grid system.

10.7 Where good conditions for the preservation of bone have been identified, all large bones will be collected by hand and sieving of bulk samples up to 100 litres will be undertaken as appropriate.

10.8 Mollusc samples of 2 litres each will be taken vertically from appropriate sections to investigate the changes of vegetation through time.

10.9 Where deposits are wet, waterlogged or peaty, monoliths will be taken along cleaned vertical surfaces for the retrieval of pollen, diatoms, ostracods and foraminifera. The numbers to be taken will be agreed with the County Archaeologist.

10.10 For wet, waterlogged or peaty deposits, bulk samples of 20 litres will be taken from visible layers or spits for the retrieval of plant macro-remains and insects.

10.11 Environmental samples from dry deposits will normally be processed by flotation during the course of the archaeological fieldwork and the residues will be sorted to retrieve small bones, small finds and charcoal that has not floated. Environmental samples from wet deposits will normally be sent to specialists for processing in laboratory conditions. Provisional results should be fed back to the on site team to inform subsequent investigation strategy.

10.12 The Archaeological Contractor will make appropriate provision for the application of scientific dating techniques such as radiocarbon, dendrochronology, archaeomagnetic dating, OSL and thermoluminescence dating. The advice of the English heritage regional Scientific Advisor will be sought in advance of the application of these techniques.

10.13 Where appropriate the guidance in the following English Heritage papers will be followed:

- "Guidelines on the recording, sampling, conservation, and curation of waterlogged wood" 1996
- "Dendrochronology – guidelines on producing and interpreting dendrochronological dates" 1997
- "Archaeometallurgy" 2001
- "Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation" 2002
- "Human bones from Archaeological Sites: Guidelines for Producing Assessment Documents and Analytical Reports" 2004
- "Geoarchaeology" 2004
- "Wet Wood and Leather"
- "Archaeomagnetic Dating: Guidelines on producing and interpreting archaeomagnetic dates" 2006
- "Guidelines on the X-radiography of archaeological metalwork" 2006

11. Recording

11.1 All features, deposits and finds are to be recorded according to accepted professional standards.

11.2 All archaeological contexts are to be recorded individually on context record sheets. A further more general record of the work comprising a description and discussion of the archaeology is to be maintained as appropriate. Context sheets are to be primarily filled in by the archaeologist excavating the feature or deposit.

11.3 A plan to indicate the location of the boundaries of the excavated area and the site grid is to be drawn at a scale of 1:1250 (or a similar appropriate scale). Sections will be drawn at a scale of 1:10. Significant archaeological features will normally be drawn in plan at a scale of 1:20 or 1:10 if appropriate. All detailed plans and sections are to be related to the 1:100 plan (see 7.2 above). The 1:1250 and 1:100 plans are to be related accurately to the National Grid.

11.4 All plans and sections are to be levelled with respect to OD.

11.5 All plans and sections are to be drawn on polyester based drafting film and clearly labelled.

11.6 A full black and white and colour (35mm transparency) photographic record of the work is to be kept. The photographic record is to be regarded as part of the site archive.

11.7 The Archaeological Contractor will keep a day to day digital photographic record of the investigation. Consideration will be given to maintaining a video record of key features, findings and operations during the fieldwork

11.8 The Archaeological Contractor will ensure that the complete site archive including finds and environmental samples are kept in a secure place throughout the period of excavation and post excavation works.

11.9 The site archive is to be consolidated after completion of the whole project, with all site drawings inked-in, and records and finds collated and ordered as a permanent record.

12. Completion of fieldwork

12.1 On completion of fieldwork the site will be left in a safe state and in accordance with the requirements of the landowner / client.

12.2 On completion of fieldwork the Archaeological Contractor will complete the relevant section of the Fieldwork Notification Form and submit to the County Archaeologist.

13. Reporting

13.1 Within 4 weeks of completion of the work on site, the Archaeological Contractor will carry out an initial assessment of the results and produce an **Interim Report**. This will comprise a basic description of the archaeology and a plan at an appropriate scale (e.g.

1:500), one copy of which will be provided to:

- the County Archaeologist,
- the site developer
- the Local Planning Authority.
- Local Archaeological Society

13.2 Within 3 months of completion of the work on the site the Archaeological Contractor will carry out an assessment of the results and produce a MAP2 '**Post-excavation Assessment Report**', copies of which are to be provided as in 13.1 above. An additional copy will be provided to the English Heritage Regional Scientific Advisor. This report will include a '**Proposal'** to be agreed with the County Archaeologist that sets out a programme of post excavation analysis through to completion of a '**Full Report**' and '**Publication**' of the findings.

13.3 The Archaeological Contractor may determine the general style and format of the '**Post-excavation Assessment Report'** and the '**Full Report'** but they must be completed in accordance with this specification. The reports must provide sufficient information and assessment to stand as a detailed report on the archaeological fieldwork for future research and to inform on further stages of the post excavation programme.

13.4 Reports that do not provide sufficient information or that have not been compiled in accordance with the relevant sections of this specification will be returned to the Archaeological Contractor for revision and resubmission.

13.5 The **Post Excavation Assessment Report** is to include as a minimum:

13.5.1 An **Abstract** summarising the scope and results of the archaeological investigation.

13.5.2 An **Introduction** including:

- the location of the site including a National Grid Reference for the centre sufficient to locate the site to 1m accuracy (e.g. TQ 55555 77777 or easting: 555555, northing: 177777);
- an account of the background and circumstances of the work;
- a description of the development proposals, planning history and planning reference together with the planning condition (where appropriate);
- the nature of potential impacts arising from the proposals;
- the scope and date of the fieldwork, the personnel involved and who commissioned it;

13.5.3 An account of the **Archaeological Background** of the development site including:

- geology, soils and topography;
- any known existing disturbances on the site;
- background archaeological potential of the site. This will include a summary of the known Historic Environment Record entries within 500m of the boundaries of the site (or wider where appropriate). The HER entries should be quoted with their full KHER identifier (e.g. TR 36 NW 12);

- summary of any previous phases of archaeological investigation at the development site;
- any constraints on the archaeological investigation.

13.5.4 The **Methodology** employed during the investigation must be detailed in the report. Simply referring to the methodology outlined in the specification is not acceptable. Any aims and objectives specified in the specification will be included, as will any further objectives identified during the course of the investigation.

13.5.5 The report will include a quantification of the archive contents, their state and future location.

13.5.6 A description of the **Results** of the archaeological investigation. This description must include:

- the nature and depth of overburden soils encountered;
- a description of the geological subsoil encountered across the site;
- description of all archaeological features and finds encountered, their dimensions, states of preservation and interpretation;
- heights related to Ordnance Datum will be provided for each feature and deposit.
- For complex remains a Harris Matrix diagram will be provided

13.5.7 The **Finds** recovered during the course of the investigation will be described, quantified and assessed by artefact type within the report. The report will also indicate the potential of each category of artefact for further analysis and research. For each category of artefact the report will describe the method of processing, any sub-sampling, conservation and assessment undertaken. Where appropriate local reference collections will be referred to for descriptive and analytical consistency. Any implications for future archive, conservation or discard of the artefacts will also be detailed.

13.5.8 The report will include a table showing the contexts, classes and quantity of artefacts recovered, together with their date and interpretation.

13.5.9 The report will include an assessment of the **Environmental** potential of the site. Details will be provided of any environmental sampling undertaken in connection with the fieldwork and the results of any processing and assessment of the samples. The report will describe the method of processing, any sub-sampling and assessment. Any potential for future analysis of the samples or environmental remains recovered from the investigation will be described. Implications for future archive, conservation or discard of environmental samples or remains will be detailed.

13.5.10 The report will include, as appropriate, tables summarising environmental samples taken, together with the results of processing and assessment.

13.5.11 Any results from the application of archaeological scientific techniques e.g. specialist dating will be included in the assessment report.

13.5.12 An **Interpretation** of the archaeology of the site. This will be a synthesis of the stratigraphic, finds and environmental results of the investigation and a consideration

of the site in its wider context as appropriate. This section will be supported by a phased interpretative plan of the site, clearly showing the major areas and periods of archaeological activity.

13.5.13 The report will include an assessment of the results of the archaeological investigations and their potential to address both the original research aims and objectives of the project and any further research objectives identified during the course of the on-site and post excavation works.

13.5.14 The report will include a detailed proposal for any further analysis necessary on the project records, artefact and environmental assemblages to achieve the research potential of the site. A justification will be included for each analysis proposed.

13.5.15 The proposal will set out a timetable for completion of analysis and reporting, detailing all individual tasks to be completed, resources required and the key personnel involved. The proposal will set out arrangements for monitoring of the post excavation process.

13.5.16 The report will include a synopsis of the proposed '**Full Report'** and '**Publication'** and identify the likely destination of the publication.

13.5.17 Figures - as a minimum the assessment report will include the following figures:

- a site location plan tied into the Ordnance Survey at 1:1250 or in the case of larger sites at 1:2500. The plan will also include at least two National Grid points and show the site boundary;
- a plan at 1:1250, or a scale to be agreed with the County Archaeologist, showing the layout of the development groundworks clearly indicating the areas investigated. The plan will show significant archaeological features, coloured by phases or period as related to the development site. This plan will also include two National grid points;
- plans of the features revealed in each of the investigation areas at a larger scale e.g. 1:20 or 1:50; such plans are to also illustrate areas of disturbance, change in subsoil and location of sections; The location of significant finds and samples taken will also be indicated;
- relevant section drawings and soil trench profiles as appropriate;
- illustrations and/or photographs of significant finds will be included where appropriate.

13.5.18 All report illustrations must be fully captioned and scale drawings must include a bar scale. Standard archaeological drawing conventions must be used. Plan and section illustrations must include the numbers of all contexts illustrated. North must be included on all plans. Sections must indicate the orientation of the section and the Ordnance Datum height of the section datum.

13.5.19 Black & White or Colour photographs will be included to illustrate the archaeology of the site, the development operations or the range of soil profiles encountered. All photographs will be appropriately captioned.

13.6 The report will be submitted to the County Archaeologist in a heat-bound hard-copy and in digital format. The digital copy will be supplied in .pdf format and will contain all text, images and plans present in the hard-copy report in a single .pdf file. The

medium should be a CD-ROM formatted according to ISO 9660:1999.

13.7 **Full Report and Publication** – Following submission of the Assessment Report and proposal for analysis and publication, the Archaeological Contractor will discuss and agree with the County Archaeologist the scope of the Full Report and the format and destination of subsequent publication(s) arising from excavation and post-excavation work on the site. The Archaeological Contractor will be expected to produce a paper suitable for publication within 18 months of completion of work on the site.

14. Archive Preparation & Deposition

14.1 The site archive, to include all project records and cultural material produced by the project, is to be prepared in accordance with *Guidelines for the preparation of excavation archives for long-term storage (UKIC 1990)*. On completion of the project the Archaeological Contractor will arrange for the archive to be deposited in accordance with the provisional arrangements made with a suitable museum or repository at the onset of fieldwork. Any alternative arrangements will be agreed with the County Archaeologist and the Local Planning Authority.

15 Monitoring and Liaison

15.1 The Archaeological Contractor is to allow the site records to be inspected and examined at any reasonable time, during or after the excavation, by the client/developer, the County Archaeologist or any designated representative of the Local Planning Authority

15.2 Once the site has been stripped and mapped and an initial assessment of the archaeology carried out, there will be an on-site meeting with the County Archaeologist to determine the scope of subsequent investigation.

15.3 The Archaeological Contractor will liaise closely with the County Archaeologist throughout the course of the investigation and will arrange for on-site meetings at key decision points.

15.4 The Archaeological Contractor is to make contact with the local archaeological society and keep them informed on the progress of the investigation. Subject to health and safety constraints the Archaeological Contractor will afford opportunity to the local archaeological society to visit the investigation site. Copies of all reports will be provided to the local archaeological society.

15.5 The Archaeological Contractor is to circulate a completed Fieldwork Notification Form (Appendix 2) at the start and completion of fieldwork and at the completion of post excavation reporting stages.

16. Copyright and data protection

16.1 Information submitted to the County Archaeologist in conjunction with planning applications automatically becomes publicly accessible and can be viewed by anyone at any time. In addition, the Local Planning Authority and Kent County Council are subject to the requirements of the Freedom of Information Act (2000) and Environmental

Information Regulations (2004). Information may be subject to FoI or EIR requests and any documentation submitted in connection with the project may be made publicly available unless doing so contravenes the Data Protection Act (1998).

16.2 While copyright of reports and other information arising from the fieldwork remains with the originator, the Archaeological Contractor will undertake to make this information available to interested parties. The Archaeological Contractor will agree to allow reports of the fieldwork to be copied and made available to interested parties for archaeological research. The reports may be made available on the Internet no sooner than three months after the submission of the report. Archaeological Contractors who believe that there are special reasons for not publishing the report on the Internet should reach a separate agreement with the County Archaeologist.

17. Health and Safety

17.1 The Archaeological Contractor will conduct the work in compliance with the Health and Safety at Work etc Act 1974. The Archaeological Contractor will also follow the guidance set out in "Health and Safety in Field Archaeology" Standing Conference of Archaeological Unit Managers 1997.

17.2 The Archaeological Contractor is expected to maintain a Health and Safety Policy and a procedures manual and have available appropriate expertise in Health and Safety advice. Site staff will have an appropriate level of training to enable them to carry out fieldwork safely.

17.3 The Archaeological Contractor will maintain the site in a safe condition. All hazards will be appropriately identified and managed. Deep excavations will be appropriately fenced.

17.4 The Archaeological Contractor will carry out a risk assessment prior to commencement of fieldwork and where appropriate a COSHH assessment. Risks and measures to reduce risk will be communicated to all working on and visiting the site.

17.5 The Archaeological Contractor will have available suitable site accommodation, welfare and toilet facilities.

18. General

18.1 In carrying out the work the Archaeological Contractor is to abide by:

- all statutory provisions and by-laws relating to the work in question,
- the Institute of Field Archaeologists *Code of Conduct*
- the Institute of Field Archaeologists *Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology*.

19. KCC HER

19.1 The Archaeological Contractor is to provide the Kent Historic Environment Record with copies of all reports in both heat-bound hardcopy and digital format (see 13.6 above).

19.2 Upon completion of the excavation the Archaeological Contractor will supply the Kent Historic Environment Record with a completed HER form (see Appendix 1)

19.3 The Archaeological Contractor will supply the Kent Historic Environment Record with the following digital datasets:

- A .dxf file containing polygon data that describes in detail all excavated/ watched area boundaries, whether trenches, test pits, excavated areas or areas examined by watching brief. This .dxf file must be internally geo-referenced (i.e. the co-ordinate system used in the file must be the Ordnance Survey co-ordinate system).
- A separate .dxf file that contains a number of Layers. Each Layer should represent a different phase of the archaeological remains on site. The name of each Layer must be the phase number used on the site accompanied by a date range (e.g. "2 from –2000 to –800", "7A from 410 to 700" etc). Each layer must contain only the features relevant to that phase digitized as polylines. Where the dating is based on scientific dating methods such as radiocarbon, the dates must be calibrated calendar dates.

19.4 A guidance document has been produced for Kent County Council that will inform contractors as to how this information can be produced within AutoCad. This document is available from the County Archaeologist and Kent County Council Historic Environment Record.

19.5.1 The Archaeological Contractor should also provide a representative selection of digital site photographs illustrating the archaeology of the site and the operations of the investigation. These will be in .jpg format at a minimum 300dpi. These will be deposited with the County HER and will be used for presentations on aspects of the archaeology of Kent.

19.6 It is to be understood that photographs and notes taken by KCC Archaeological Officers in connection with the work that do not identify individuals or site locations may be used by KCC for outreach and publicity purposes, including on social media sites such as Facebook, Twitter etc. The Archaeological Contractor should**, preferably in advance** of the works, raise with the KCC Archaeological Officer any concerns that they or their client may have over the use and dissemination of images or information for outreach purposes. In such cases the Archaeological Contractor and their client will agree a protocol with the KCC Archaeological Officer for the appropriate dissemination and use of images and information which balances the concerns of the contractor and/or client with the objective of ensuring that the people of Kent are kept informed of the archaeological discoveries in the county.

Appendix HE3.3

APPENDIX 1 Kent County Council HER summary form

Site Name:	
Site Address:	
Summary: (50 words max)	
District/Unitary:	Parish:
Period(s):	
NGR (centre of site : 8 figures): (NB if large or linear site give multiple NGRs)	
Type of archaeological work (underline) Evaluation: Watching Brief Field Walking Documentary study Building recording Earthwork survey Excavation: Geophysical Survey Field Survey Geoarchaeological investigation	
Date of Recording:	
Unit undertaking recording:	
Geology:	
Title and author of accompanying report:	
Summary of fieldwork results (begin with earliest period first, add NGRs where appropriate) (200 words max) (cont on attached sheet)	
Location of archive/finds:	
Contact at Unit:	Date:

APPENDIX 2 - FIELDWORK NOTIFICATION FORM

Guidance for Completing the Kent Archaeological Fieldwork Notification Form

Purpose

The purpose of the form is to improve the notification, tracking and monitoring of archaeological fieldwork in Kent. Its primary purpose relates to archaeological work being undertaken for the purposes of planning and development but it is hoped that it will be also used by archaeological societies and other bodies undertaking fieldwork in the county.

Approach

- The archaeological body undertaking the fieldwork should fill in the form. Sections A and B should be filled in before fieldwork starts and submitted to the County Archaeologist. This may be submitted in digital copy to speed things along but a signed copy should follow in the post.

- Section A contains details of the project while Section B refers specifically to the onset of the phase of fieldwork. In signing section B the Archaeological Contractor is confirming that the necessary funds and resources to complete the works to the specification have been made available.

- The form should not be filled in separately for each period of an intermittent watching brief but should be filled in for major stages of fieldwork, for example separate phases of evaluation and excavation.

- Section C should be submitted at the completion of the fieldwork stage and should if known indicate whether further work is anticipated. This section sets out a brief summary of findings and what reports are to be submitted. For excavations these will include interim, assessment and full reports. Again the form may be submitted digitally with a signed copy to follow in the post. (The details of Sections A and B should remain filled in on the same form).

- Section D should be submitted as reports are submitted to the County Archaeologist. For excavations the form need not be submitted with interim reports but should be submitted with assessment and full reports.

EVALUATION – TRIAL TRENCHING REQUIREMENTS

1. Introduction

1.1 Archaeological trial trenching involves the sampling of a site to determine whether archaeological remains are present and if so, to assess their character, extent, date, condition and potential importance. Trial trenching will aim to determine, as far as is practicable and without comprising the integrity of important archaeological deposits, the full stratigraphic sequence at the site, including information on the 'natural' substrate and soil conditions.

2. General Requirements

2.1 Trial trenching will be carried out by archaeological organisations (from here on referred to as 'the Archaeological Contractor') acceptable to the relevant Local Planning Authority, with recognised experience and expertise in the specified type of work to be undertaken. Registration with the Institute of Field Archaeologists (IFA) as a Registered Archaeological Organisation (RAO) will normally be considered as an indicator, but not a prerequisite, of such expertise and experience. A good working knowledge of the archaeology of Kent will also be considered highly desirable.

2.2 Prior to any work being undertaken the Archaeological Contractor will inform the County Archaeologist and communicate details of the proposed team, including (if required) CVs for senior staff and specialists. Senior staff and specialists will need to demonstrate an appropriate level of experience and expertise and should preferably be, where appropriate, Members of the Institute of Field Archaeologists (IFA).

2.3 Prior to undertaking the trial trenching the Archaeological Contractor will need to demonstrate that the necessary resources are in place to undertake the work, through to reporting. The Archaeological Contractor will have available appropriate specialists necessary to support the successful completion of the archaeological fieldwork and post-excavation work.

2.4 The work will be supervised on site at all times by a member of staff with the required level of experience and who will be responsible for the conduct of on-site work.

3. Pre-site Requirements

3.1 Prior to undertaking trial trenching the Archaeological Contractor will have gathered and considered the following information:

- Relevant information on the County Historic Environment Record (HER) held by Kent County Council and maintained by the Heritage Conservation Team;
- Any earlier reports of fieldwork relevant to the site;

- Solid and drift geology;
- Geotechnical site investigation data (if available);
- Any desk-based studies of the site.

3.2 In certain circumstances the following will also be considered:
- Relevant published secondary sources
- Relevant historic maps held at the Centre for Kentish Studies
- Aerial photographs where cropmarks are considered to indicate archaeology on or close to the site.

3.3 The Archaeological Contractor will ensure that all reasonable measures have been taken to identify any constraints to undertaking the evaluation trenching. The Archaeological Contractor will seek information on the presence of services, any ecological constraints, the presence of Public Rights of Way, the presence of contaminated land or any other risks to health and safety.

3.4 The Archaeological Contractor will make provisional arrangements for the deposition of the site archive with an appropriate museum or suitable repository agreed with the County Archaeologist. The Archaeological Contractor will obtain a provisional accession number for the site archive from the recipient museum (except where the museum prefers to issue an accession number following completion of fieldwork) and any guidelines from the recipient museum regarding deposition of the site archive.

3.5 Full copies of the Specification must be issued to the field officer responsible for on-site work and a copy of the agreed Specification and any additional method statements must be available on site at all times. The team carrying out the trial trenching must be familiar with the Specification and have access on site to any previous evaluation or survey reports.

3.6 The Archaeological Contractor will inform the County Archaeologist of the start date of the work (at least five working days before) and arrange for monitoring visits to be undertaken, using the Site Fieldwork Notification Form (see Appendix II). The Archaeological Contractor will continue to keep the County Archaeologist informed of the progress of work and will notify the County Archaeologist immediately if particularly important archaeological remains are encountered.

4. Objectives

4.1 The purpose of the evaluation is to establish whether there are any significant archaeological deposits at the site that may be affected by the proposed development.

4.2 The evaluation is thus to
a) ascertain the extent, depth below ground surface, depth of deposit, character, date, significance and condition of any archaeological remains on site;

b) establish the extent to which previous development and/or other processes have affected archaeological deposits at the site; and

c) establish the likely impact on archaeological deposits of the proposed development.

5. Scope of trial trenching

5.1 The layout and number of trenches excavated will be in accordance with the Specification, details of which are given in Part A. Any amendment to trench design due to on-site constraints will be agreed with the County Archaeologist in advance of the work being undertaken.

5.2 Particular issues that will be addressed by the evaluation are set out in part A of this specification.

6. Machine and Hand Excavations

6.1 All machine excavation of trial trenches will be carried out under constant archaeological direction by a suitably experienced archaeologist familiar with the ground conditions anticipated on the investigation site.

6.2 Machine excavation of trial trenches will be undertaken by a mechanical excavator using a flat-bladed bucket. No mechanical excavators, earthmoving or other vehicles will travel within any excavated trench until it has been signed off by the County Archaeologist or specific agreement has been reached to enable re-stripping.

6.3 The Archaeological Contractor will maintain a constant watch and closely inspect on an ongoing basis surfaces exposed during the course of machining. Surfaces will be maintained clear of loose spoil.

6.4 Subject to additional requirements of the landowner or client, turf, topsoil and other distinct deposits will be stored separately and at least 1 metre from the edge of the evaluation trench.

6.5 Machine-excavated deposits and the exposed surface will be regularly scanned for the presence and collection of artefacts. Exposed surfaces and excavated spoil will be scanned by metal detector.

6.6 The excavation by machine is to be taken down to the top of any significant archaeological level or to the top of ‘natural’ subsoil where no archaeological deposits have been found at a higher level. In the event of significant archaeological deposits being encountered the County Archaeologist is to be informed immediately. Some further limited excavation may be required to clarify the nature, character and date of the archaeological deposits but the primary objective is to establish the presence/absence of archaeological deposits, their depth and extent.

6.7 Where complex archaeological stratification is encountered, deposits will be left in situ and measures to assess the depth of this stratification agreed with the County Archaeologist. Where modern features are seen to truncate the archaeological stratification, then these will be carefully removed without damage to surrounding deposits to enable the depth of stratification to be assessed.

6.8 If archaeological remains of limited significance are found to be present cutting through or overlying soils (e.g. colluvium) which conceal lower archaeological horizons then these will need to be recorded and investigated prior to removal of the underlying soil with the agreement of the County Archaeologist.

6.9 Machine excavation from the surface must be taken down in spits of no more than 100mm thickness to ensure that deposits and features are not over-excavated and that any artefacts/biological evidence in the soil are recorded.

6.10 Test sondages may need to be excavated through 'natural' subsoil in trial trenches to confirm that the solid geology has been reached. Such sondages will be positioned to avoid damage to archaeological remains.

7. Investigation and Sampling Strategy

7.1 Archaeological features will generally only be sampled sufficiently to characterise and date them. Full excavation of features will not be undertaken at this stage unless otherwise agreed with the County Archaeologist. Care will be taken not to damage archaeological deposits through excessive use of mechanical excavation.

7.2 Where necessary the surface and sections of trenches will be hand cleaned to define archaeological deposits and features clearly.

7.3 Measures will be taken to protect particularly significant, valuable or sensitive archaeological remains from exposure, accidental damage and / or theft.

7.4 Exposed surfaces will be left for a minimum of 48 hours to allow weathering-out of features to occur. No trenches will be backfilled until agreed with the County Archaeologist.

Burial Remains

7.5 Inhumation and cremation burials will normally be left in-situ for the purposes of evaluation. Subject to agreement with the County Archaeologist, graves may be partially excavated to confirm the presence of human remains and their state of preservation but skeletal remains will be left in situ. Graves will be scanned by metal detector to assess whether any grave objects are likely to be present.

7.6 Inhumation and cremation burials which are in a fragile state and are likely to

be damaged by the reinstatement of evaluation trenches will be excavated and lifted subject to agreement with the County Archaeologist.

7.7 The Archaeological Contractor will put in place arrangements to ensure the security, protection from deterioration and damage, and the respectful treatment of human remains and burial goods.

7.8 On sites where burial remains are expected the Archaeological Contractor will submit to and agree with the County Archaeologist detailed procedures for the assessment, recording and, where necessary, the excavation of inhumation and cremation burials.

7.9 The Archaeological Contractor will have available within the team or on call an appropriately qualified and experienced osteoarchaeologist to supervise the excavation and removal of any human remains (where this is necessary) from the site. The Archaeological Contractor will use an appropriately qualified and experienced archaeological conservator to assist, where appropriate, the lifting of human remains and grave goods / cremation vessels.

7.10 In the event that human burials are discovered, a Ministry of Justice Licence will be required (in accordance with Section 25 of the Burial Act 1857) before the remains can be lifted. The need for a Ministry of Justice Licence applies to both inhumation and cremated remains. Application for a Licence will be made by the Archaeological Contractor. The Archaeological Contractor is to comply with the conditions of the Licence and discuss any requirements of that Licence which conflict with the agreed method of investigation with the County Archaeologist.

8. Finds recovery processing and treatment

8.1 All artefacts recovered during the excavations on the site are the property of the Landowner. They are to be suitably bagged, boxed and marked in accordance with the United Kingdom Institute for Conservation, *Conservation Guidelines no.2* and on completion of the archaeological post-excavation programme the landowner will arrange for them to be deposited in a museum or similar repository agreed with the County Archaeologist and the Local Planning Authority.

8.2 Artefacts will be excavated carefully by hand. The Archaeological Contractor will use an appropriately qualified and experienced archaeological conservator to assist in the lifting of fragile finds of significance and / or value.

8.3 Artefacts will be collected and bagged by archaeological context. The location of special finds will be recorded in three dimensions. Three-dimensional recording of in-situ flint working deposits will be carried out.

8.4 Where appropriate to address the research objectives of the archaeological evaluation, sieving of deposits will be undertaken to maximise recovery of

small artefacts. A strategy for such sieving will be agreed in advance with the County Archaeologist.

8.5 Records of artefact assemblages will clearly state how they have been recovered, sub-sampled and processed.

8.6 Excavated artefacts will be bagged upon recovery or placed in finds trays. They must not be left loose on site.

8.7 **Treatment of treasure -** Finds, discovered by the Archaeological Contractor, falling under the statutory definition of Treasure (as defined by the Treasure Act of 1996 and its revision of 2002) will be reported immediately to the relevant Coroner's Office, the Kent Finds Liaison Officer (FLO) who is the designated treasure co-ordinator for Kent, the landowner and the County Archaeologist. A Treasure Receipt (obtainable from either the FLO or the DCMS website) must be completed and a report submitted to the Coroner's Office and the FLO within 14 days of understanding the find is Treasure. Failure to report within 14 days is a criminal offence. The Treasure Receipt and Report must include the date and circumstances of the discovery, the identity of the finder (put as unit/contractor) and (as exactly as possible) the location of the find.

8.8 All metal objects, other than late post medieval objects, will be X-rayed unless otherwise agreed with the County Archaeologist.

9. Archaeological Science and Environmental Sampling

9.1 A structured programme of environmental sampling appropriate to the aims of the evaluation will be implemented. The strategy and methodology for the sampling, recording, processing, assessment, analysis and reporting of deposits with environmental archaeology potential will be in accordance with English Heritage Centre for Archaeology Guidelines "Environmental Archaeology – A guide to the theory and practice of methods, from sampling and recovery to post-excavation" (March 2002). Any variation to this guidance will be agreed in advance with both the County Archaeologist and the English Heritage Regional Scientific Advisor. Particular note will be taken of the following requirements.

9.2 The Archaeological Contractor will use an appropriately qualified and experienced geo-archaeologist to record any deposits of particular significance such as buried soils or advise on depositional processes.

9.3 An appropriately qualified and experienced environmental archaeologist will devise and supervise the implementation of the environmental sampling strategy.

9.4 The advice of the English Heritage Regional Scientific Advisor is to be sought regarding specialist sampling requirements and any scientific applications relevant to the archaeological evaluation of this site.

9.5 Where deposits are dry, bulk samples for the recovery of charred plant remains, small bones and finds, will be taken from sealed and datable features such as pits, ditches, hearths and floors. Each context will normally be sampled. The size of the sample is expected to be in the range of 40-60 litres per context or 100% of smaller contexts. Samples will not be taken from the intersection of features.

9.6 For large features / spreads appropriate consideration will be given to sampling on a grid system if this fits in with the aims of the evaluation.

9.7 Where good conditions for the preservation of bone have been identified, all large bones will be collected by hand and sieving of bulk samples up to 100 litres will be undertaken as appropriate.

9.8 Mollusc samples of 2 litres each will be taken vertically from appropriate sections to investigate the changes of vegetation through time.

9.9 Where deposits are wet, waterlogged or peaty, monoliths will be taken along cleaned vertical surfaces for the retrieval of pollen, diatoms, ostracods and foraminifera. The numbers to be taken will be agreed with the County Archaeologist.

9.10 For wet, waterlogged or peaty deposits, bulk samples of 20 litres will be taken from visible layers or spits for the retrieval of plant macro-remains and insects.

9.11 Environmental samples from dry deposits will normally be processed by flotation following the evaluation fieldwork and the residues will be sorted to retrieve small bones, small finds and charcoal that has not floated. Environmental samples from wet deposits will normally be sent to specialists for processing in laboratory conditions. The Archaeological Contractor will agree with the County Archaeologist any necessary delay in completion of the reporting of the evaluation to enable provisional results to be included.

9.12 The Archaeological Contractor will make appropriate provision for the application of scientific dating techniques such as radiocarbon, dendrochronology, archaeomagnetic dating, OSL and thermoluminescence dating. The advice of the English heritage regional Scientific Advisor will be sought in advance of the application of these techniques. The Archaeological Contractor will agree with the County Archaeologist any necessary delay in completion of the reporting of the evaluation to enable provisional results to be included.

9.13 Where appropriate the guidance in the following English Heritage papers will be followed:

- “Guidelines on the recording, sampling, conservation, and curation of waterlogged wood” 1996

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- "Dendrochronology – guidelines on producing and interpreting dendrochronological dates" 1997
- "Archaeometallurgy" 2001
- "Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation" 2002
- "Human bones from Archaeological Sites: Guidelines for Producing Assessment Documents and Analytical Reports" 2004
- "Geoarchaeology" 2004
- "Wet Wood and Leather"
- "Archaeomagnetic Dating: Guidelines on producing and interpreting archaeomagnetic dates" 2006
- "Guidelines on the X-radiography of archaeological metalwork" 2006

10. Recording

10.1 All trenches, structures, deposits and finds will be recorded according to accepted professional standards. Sufficient data must be recorded to allow the required level of assessment and reporting (see section 11).

10.2 Recording must be carried out to a sufficiently high standard to provide a full record of the deposits evaluated, including in trenches where no archaeology is identified.

10.3 All features, deposits and finds are to be recorded according to accepted professional standards.

10.4 All archaeological contexts are to be recorded individually on context record sheets. A further more general record of the work, comprising a description and discussion of the archaeology, is to be maintained as appropriate. Context sheets are to be primarily filled in by the archaeologist excavating the feature or deposit.

10.5 A plan to indicate the location of the boundaries of the evaluated area and the site grid is to be drawn at a scale of 1:1250 (or a similar appropriate scale). Plans indicating the location of the excavated trenches and the location of all archaeological features encountered are to be drawn at an appropriate scale. An overall site plan is to be maintained at a scale of 1:100 or larger scale where appropriate. Sections will be drawn at a scale of 1:10. Significant archaeological features will normally be drawn in plan at a scale of 1:20 or 1:10 if appropriate. All detailed plans and sections are to be related to the 1:100 or 1:1250 plans. The 1:1250 and 1:100 plans are to be accurately related to the National Grid.

10.6 Long Sections indicating the full stratigraphic sequence will be drawn for all trenches. Where a very simple sequence is revealed representative sections (minimum 1m wide) at each end of the trench will be sufficient, but where more complex stratigraphy is encountered, complete trench sections will be drawn. In the case of complex stratigraphy, all four sections will be drawn.

10.7 All plans and sections are to be levelled with respect to OD.

10.8 All plans and sections are to be drawn on polyester based drafting film and clearly labelled.

10.9 A full black and white and colour (35mm transparency) photographic record of the work is to be kept. The photographic record is to be regarded as part of the site archive.

10.10 The Archaeological Contractor will keep a day to day digital photographic record of the investigation.

10.11 The Archaeological Contractor will ensure that the complete site archive including finds and environmental samples are kept in a secure place throughout the period of evaluation and post excavation works.

10.12 The site archive is to be consolidated after completion of the evaluation, with all site drawings inked-in, and records and finds collated and ordered as a permanent record.

11. Reinstatement and completion of fieldwork

11.1 On completion, trenches will be backfilled, reinstated and left in a safe state to the requirements of the landowner / client.

11.2 Where vulnerable archaeological deposits remain within trial trenches these will be appropriately protected from damage as part of the reinstatement. Consideration will be given to providing a marker in backfilled trenches to highlight vulnerable archaeological deposits should re-excavation be necessary.

11.3 On completion of fieldwork the Archaeological Contractor will complete the relevant section of the Fieldwork Notification Form and submit it to the County Archaeologist.

12. Reporting

12.1 Within three weeks of completion of the evaluation fieldwork (or longer in case of complex sites as agreed with the County Archaeologist) the Archaeological Contractor will produce a report, copies of which (as a minimum) are to be provided to:

- the Developer
- the County Archaeologist
- the Local Planning Authority
- the Local Archaeological Society

12.2 When submitting the report to the County Archaeologist the Archaeological Contractor will provide written confirmation that the report has been submitted to the above parties.

12.3 If the Archaeological Contractor is required, contractually, only to submit reports directly to the developer or their agent, the Archaeological Contractor must inform the County Archaeologist in writing that they have completed the report and whom it has been forwarded to. The Archaeological Contractor must ensure that the developer is made aware of the need to circulate the report as in 12.1 above.

12.4 The Archaeological Contractor may determine the general style and format of the evaluation report but it must be completed in accordance with this specification. The report must provide sufficient information and assessment to enable the County Archaeologist and the Local Planning Authority to reach an informed decision regarding any further mitigation measures that may be required and to stand as an appropriately detailed report on the archaeological fieldwork for future research.

12.5 Reports that do not provide sufficient information or that have not been compiled in accordance with the relevant sections of this specification will be returned to the Archaeological Contractor for revision and resubmission.

12.6 The report will be submitted to the County Archaeologist in a heat-bound hard-copy and in digital format. The digital copy will be supplied in .pdf format and will contain all text, images and plans present in the hard-copy report in a single .pdf file. The medium will be a CD-ROM formatted according to ISO 9660:1999.

12.7 **Report Format** - The final evaluation report will include as a minimum:

12.7.1 An **Abstract** summarising the scope and results of the archaeological evaluation.

12.7.2 An **Introduction** including:

- the location of the site with a National Grid Reference for the centre sufficient to locate the site to 1m accuracy (e.g. TQ 55555 77777 or easting: 555555, northing: 177777);
- an account of the background and circumstances of the work;
- a description of the development proposals, planning history and planning reference together with the archaeological condition (where appropriate);
- the nature of potential impacts arising from the proposals;
- the scope and date of the fieldwork, the personnel involved and who commissioned it;

12.7.3 An account of the **Archaeological Background** of the development site including:

- geology, soils and topography;

- any known existing disturbances on the site;
- background archaeological potential of the site. This will include a summary of the known Historic Environment Record entries within 500m of the boundaries of the site (or wider where appropriate). The HER entries will be quoted with their full KHER identifier (e.g. TR 36 NW 12);
- summary of any previous phases of archaeological investigation at the development site;

12.7.4 The **Methodology** employed during the evaluation must be detailed in the report. Any aims and objectives specified in the specification will be included as will any further objectives identified during the course of the evaluation. Constraints on the evaluation will also be described.

12.7.5 The report will include a quantification of the project archive contents, their state and future location.

12.7.6 The **Results** of the evaluation field work will be described trench by trench. This description must include for each trench:

- the dimensions of the trench;
- the nature and depth of overburden soils encountered;
- description of all archaeological features and finds encountered in each trench, their dimensions, states of preservation and interpretation;
- a description of the geological subsoil encountered in each trench;
- heights related to Ordnance Datum for a sufficient number of features and deposits. Where the trench results are complex a table showing the dimensions and heights of features and deposits will be included for each trench.
- for complex stratigraphy a Harris Matrix diagram.

12.7.7 The **Finds** recovered during the course of the evaluation will be described, quantified and assessed by artefact type within the evaluation report. The report will also provide an indication of the potential of each category of artefact for further analysis and research. For each category of artefact the report will describe the method of processing, any sub-sampling, conservation and assessment undertaken. Where appropriate local reference collections will be referred to for descriptive and analytical consistency. Any implications for future archive, conservation or discard of the artefacts will also be set out.

12.7.8 The report will include a table showing, per trench, the contexts, classes and quantity of artefacts recovered, together with their date and interpretation.

12.7.9 The evaluation report will include an assessment of the **Environmental** potential of the site. Details will be provided of any environmental sampling undertaken in connection with the fieldwork and the results of any processing and assessment of the samples. The report will describe the method of processing, any sub-sampling and assessment. Any potential for future analysis of the samples or environmental remains recovered from the evaluation will be described. Implications for future archive, conservation or discard of environmental samples or remains will be detailed.

12.7.10 The report will include, as appropriate, tables summarising environmental samples taken, together with the results of processing and assessment.

12.7.11 Any results from the application of archaeological scientific techniques e.g. specialist dating will be included in the evaluation report.

12.7.12 An **Interpretation** of the archaeology of the site will be provided, including its location, extent, date, condition, significance and importance. This will be a synthesis of the stratigraphic, finds and environmental results of the investigation and will include, even if no archaeology is identified as present on the site, description of areas of disturbance, non-archaeological deposits and changes in geological subsoil where appropriate. This section of the report will be supported by a phased interpretative plan of the site, clearly showing the major areas and periods of archaeological activity.

12.7.13 An **Impact Assessment** will consider the potential effects of the development on the archaeological remains. This will summarise the archaeological results, describe how any identified archaeological potential identified relates to the site and how the development proposals will affect that archaeology. The report will highlight any areas of sensitivity within the site. Particular note will be made of any variations in the depth of overburden covering any archaeological deposits revealed.

12.7.14 The **Conclusion** will summarises the method, results, interpretation and impact assessment.

12.7.15 The evaluation report will assess the potential for preservation at the site to inform decisions about mitigation strategies. It will not include any recommendations on preservation measures or further work unless otherwise agreed with the County Archaeologist.

12.7.16 The evaluation report will include comments on the effectiveness of the methodology employed and the confidence of the results and interpretation.

12.7.17 **Figures / illustrations** – The report will include sufficient illustrations to support descriptions and interpretations within the report text. Figures are to be fully cross-referenced within the document text. As a minimum the evaluation report will include the following figures:

- a site location plan tied into the Ordnance Survey at 1:1250. The plan will also include at least two National Grid points to 1m accuracy and show the site boundary;
- trench location plans at an appropriate scale showing the layout of archaeological features, coloured by phases or period. The plan will show the location of all trenches and features. A copy of the plan will be overlain on the proposed development plan where this is known. Where possible, projection of archaeological features outside of the trench areas will be included on the plan. This plan will also include two National Grid points;

- plans of the features revealed in each of the trenches at a larger scale e.g. 1:20 or 1:50; such plans are to also illustrate areas of disturbance, change in subsoil and location of sections; The location of significant finds and samples taken will also be indicated;
- relevant section drawings and trench soil profiles as appropriate;
- illustrations and/or photographs of significant finds.

12.7.18 All report illustrations must be fully captioned and scale drawings must include a bar scale. Standard archaeological drawing conventions must be used. Plan and section illustrations must include the numbers of all contexts illustrated. North must be included on all plans and will be consistent. Sections must indicate the orientation of the section and the Ordnance Datum height of the section datum.

12.7.19 Black & White or Colour photographs will be included to illustrate key archaeological features, trenches and site operations. All photographs will be appropriately captioned.

13. Archive Preparation & Deposition

13.1 The site archive, to include all project records and cultural material produced by the project, is to be prepared in accordance with *Guidelines for the preparation of excavation archives for long-term storage (UKIC 1990)*. On completion of the project the Archaeological Contractor will arrange for the archive to be deposited in accordance with the provisional arrangements made with a suitable museum or repository at the onset of fieldwork. Any alternative arrangements will be agreed with the County Archaeologist and the Local Planning Authority.

14 Monitoring and Liaison

14.1 The Archaeological Contractor is to allow the site records to be inspected and examined at any reasonable time, during or after the evaluation fieldwork, by the client/developer, the County Archaeologist or any designated representative of the Local Planning Authority

14.2 Once the trenches have been evaluated and an initial assessment of the archaeology carried out, there will be an on-site meeting with the County Archaeologist to determine if further evaluation work is appropriate in order to meet the objectives.

14.3 The Archaeological Contractor will liaise closely with the County Archaeologist throughout the course of the evaluation and will arrange for on-site meetings at key decision points.

14.4 The Archaeological Contractor is to make contact with the local archaeological society and keep them informed on the progress of the evaluation. Subject to

health and safety constraints the Archaeological Contractor will afford opportunity to the local archaeological society to visit the evaluation site. Copies of all reports will be provided to the local archaeological society.

14.5 The Archaeological Contractor is to circulate a completed Fieldwork Notification Form (Appendix 2) at the start and completion of fieldwork and at the completion of post excavation reporting stages.

15. Copyright and data protection

15.1 Information submitted to the County Archaeologist in conjunction with planning applications automatically becomes publicly accessible and can be viewed by anyone at any time. In addition, the Local Planning Authority and Kent County Council are subject to the requirements of the Freedom of Information Act (2000) and Environmental Information Regulations (2004). Information may be subject to FoI or EIR requests and any documentation submitted in connection with the project may be made publicly available unless doing so contravenes the Data Protection Act (1998).

15.2 While copyright of reports and other information arising from the fieldwork remains with the originator, the Archaeological Contractor will undertake to make this information available to interested parties. The Archaeological Contractor will agree to allow reports of the fieldwork to be copied and made available to interested parties for archaeological research. The reports may be made available on the Internet no sooner than three months after the submission of the report. Archaeological Contractors who believe that there are special reasons for not publishing the report on the Internet should reach a separate agreement with the County Archaeologist.

16. Health and Safety

16.1 The Archaeological Contractor will conduct the work in compliance with the Health and Safety at Work etc Act 1974. The Archaeological Contractor will also follow the guidance set out in “Health and Safety in Field Archaeology” Standing Conference of Archaeological Unit Managers 1997.

16.2 The Archaeological Contractor is expected to maintain a Health and Safety Policy and a procedures manual and have available appropriate expertise in Health and Safety advice. Site staff will have an appropriate level of training to enable them to carry out fieldwork safely.

16.3 The Archaeological Contractor will maintain the site in a safe condition. All hazards will be appropriately identified and managed. Deep excavations will be appropriately fenced.

16.4 The Archaeological Contractor will carry out a risk assessment prior to commencement of fieldwork and where appropriate a COSHH assessment.

Risks and measures to reduce risk will be communicated to all working on and visiting the site.

16.5 The Archaeological Contractor will have available suitable site accommodation, welfare and toilet facilities.

17. KCC HER

17.1 The Archaeological Contractor is to provide the Kent Historic Environment Record with copies of all reports in both heat-bound hard-copy and digital format (see 12.6 above).

17.2 Upon completion of the excavation the Archaeological Contractor will supply the Kent Historic Environment Record with a completed HER form (see Appendix 1)

17.3 The Archaeological Contractor will supply the Kent Historic Environment Record with the following digital datasets:

- A .dxf file containing polygon data that describes in detail all excavated/ watched area boundaries, whether trenches, test pits, excavated areas or areas examined by watching brief. This .dxf file must be internally geo-referenced (i.e. the co-ordinate system used in the file must be the Ordnance Survey co-ordinate system).
- A separate .dxf file that contains a number of Layers. Each Layer should represent a different phase of the archaeological remains on site. The name of each Layer must be the phase number used on the site accompanied by a date range (e.g. “2, from –2000 to –800”, “7A, from 410 to 700” etc). Each layer must contain only the features relevant to that phase digitized as polylines. Where the dating is based on scientific dating methods such as radiocarbon, the dates must be calibrated calendar dates.

17.4 A guidance document has been produced for Kent County Council that will inform contractors as to how this information can be produced within AutoCad. This document is available from the County Archaeologist and Kent County Council Historic Environment Record.

17.5 The Archaeological Contractor should also provide a representative selection of digital site photographs illustrating the archaeology of the site and the operations of the investigation. These will be in .jpg format at a minimum 300dpi. These will be deposited with the County HER and will be used for presentations on aspects of the archaeology of Kent.

17.6 It is to be understood that photographs and notes taken by KCC Archaeological Officers in connection with the work that do not identify individuals or site locations may be used by KCC for outreach and publicity purposes, including on social media sites such as Facebook, Twitter etc. The Archaeological

Contractor should**, preferably in advance** of the works, raise with the KCC Archaeological Officer any concerns that they or their client may have over the use and dissemination of images or information for outreach purposes. In such cases the Archaeological Contractor and their client will agree a protocol with the KCC Archaeological Officer for the appropriate dissemination and use of images and information which balances the concerns of the contractor and/or client with the objective of ensuring that the people of Kent are kept informed of the archaeological discoveries in the county.'

18 General

18.1 In carrying out the work the Archaeological Contractor is to abide by:

- all statutory provisions and by-laws relating to the work in question,
- the Institute of Field Archaeologists *Code of Conduct,*
- the Institute of Field Archaeologists *Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology*.

APPENDIX 1 Kent County Council HER summary form

Site Name:	
Site Address:	
Summary: (50 words max)	
District/Unitary:	Parish:
Period(s):	
NGR (centre of site : 8 figures): (NB if large or linear site give multiple NGRs)	
Type of archaeological work (underline) Evaluation: Watching Brief Field Walking Documentary study Building recording Earthwork survey Excavation: Geophysical Survey Field Survey Geoarchaeological investigation	
Date of Recording:	
Unit undertaking recording:	
Geology:	
Title and author of accompanying report:	
Summary of fieldwork results (begin with earliest period first, add NGRs where appropriate) (200 words max) (cont on attached sheet)	
Location of archive/finds:	

Appendix HE3.3

Contact at Unit:	Date:

APPENDIX 2 - FIELDWORK NOTIFICATION FORM

Guidance for Completing the Kent Archaeological Fieldwork Notification Form

Purpose

The purpose of the form is to improve the notification, tracking and monitoring of archaeological fieldwork in Kent. Its primary purpose relates to archaeological work being undertaken for the purposes of planning and development but it is hoped that it will be also usable by archaeological societies and other bodies undertaking fieldwork in the county.

Approach

- The archaeological body undertaking the fieldwork should fill in the form. Sections A and B should be filled in before fieldwork starts and submitted to the County Archaeologist. This may be submitted in digital copy to speed things along but a signed copy should follow in the post.

- Section A contains details of the project while Section B refers specifically to the onset of the phase of fieldwork. In signing section B the Archaeological Contractor is confirming that the necessary funds and resources to complete the works to the specification have been made available.

- The form should not be filled in separately for each period of an intermittent watching brief but should be filled in for major stages of fieldwork, for example separate phases of evaluation and excavation.

- Section C should be submitted at the completion of the fieldwork stage and should if known indicate whether further work is anticipated. This section sets out a brief summary of findings and what reports are to be submitted. For excavations these will include interim, assessment and full reports. Again the form may be submitted digitally with a signed copy to follow in the post. (The details of Sections A and B should remain filled in on the same form).

- Section D should be submitted as reports are submitted to the County Archaeologist. For excavations the form need not be submitted with interim reports but should be submitted with assessment and full reports.

May 2019
Doc Ref. 40820GOSr02i2

Appendix HE3.3

Marine Management Organisation

UK Sea Fisheries Statistics 2017



ENVIRONMENT ISO 14001 CERTIFIED

QUALITY ISO 9001 CERTIFIED

INVESTORS IN PEOPLE | Bronze

disability confident EMPLOYER

Appendix ND.3.2

Appendix ND.3.2

UK SEA FISHERIES STATISTICS 2017

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Appendix ND.3.2

A National Statistics Publication

National Statistics status means that official statistics meet the highest standards of trustworthiness, quality and public value.

All official statistics should comply with all aspects of the *Code of Practice for Official Statistics*. They are awarded National Statistics status following an assessment by the Authority's regulatory arm. The Authority considers whether the statistics meet the highest standards of Code compliance, including the value they add to public decisions and debate.

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The National Statistics Code of Practice can be found at:
http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html

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This document is available on the MMO website.

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Preface

UK Sea Fisheries Statistics 2017 provides a broad picture of the UK fishing industry and its operations. This publication includes data on the structure, activity and landings of the UK fleet alongside additional information on overseas trade, exploitation of stocks and the world fishing industry.

Several tables in this publication have been fully revised to reflect the latest data available. Please see Appendix 5 for details. Tables in this publication are produced in accordance with National Statistics guidelines; however, data sourced externally are official statistics and are not certified as National Statistics. Such data are marked clearly throughout the publication.

The tables shown in this publication along with more detailed tables can be found on the MMO website. Please see https://www.gov.uk/government/collections/uk-sea-fisheries-annual-statistics for details.

We recommend that you refer to the explanatory notes and glossary of terms which are important in interpreting some of the data.

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Appendix ND.3.2

Explanatory notes

1. The tables refer, as far as possible, to the United Kingdom, including the Isle of Man and the Channel Islands, with separate figures for England, Wales, Scotland and Northern Ireland. In some cases figures for the various parts of the United Kingdom are not strictly comparable and differences are explained in the headings and footnotes of the tables.

2. The figures in the tables in Chapters 3 and 6 for landings are given in terms of live weight. Those in Chapter 4 are for landed weight.

3. Landings by foreign vessels into the UK include landings by fishing vessels and carriers (if first point of sale of fish).

4. Landings figures include a quantity caught by UK vessels but not actually landed at UK ports. These quantities are transhipped to foreign vessels in coastal waters and are later recorded as exports.

5. The following symbols apply throughout:

   - means "nil"
   .. means "negligible" (less than half the last digit shown)
   nd means "no data available"
   na means "not applicable"
   R means “revision”

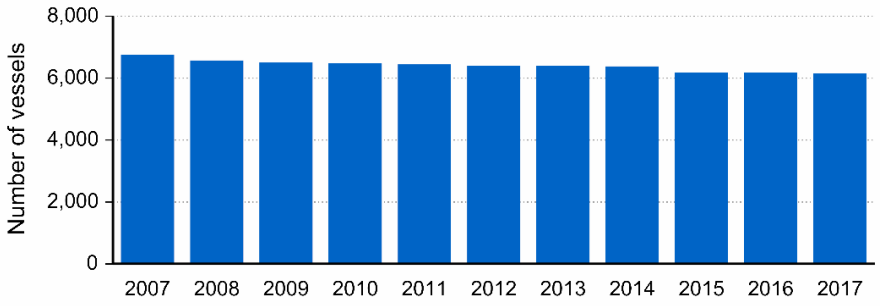
Appendix ND.3.2

1 Overview of the UK fishing industry

Fleet size and employment

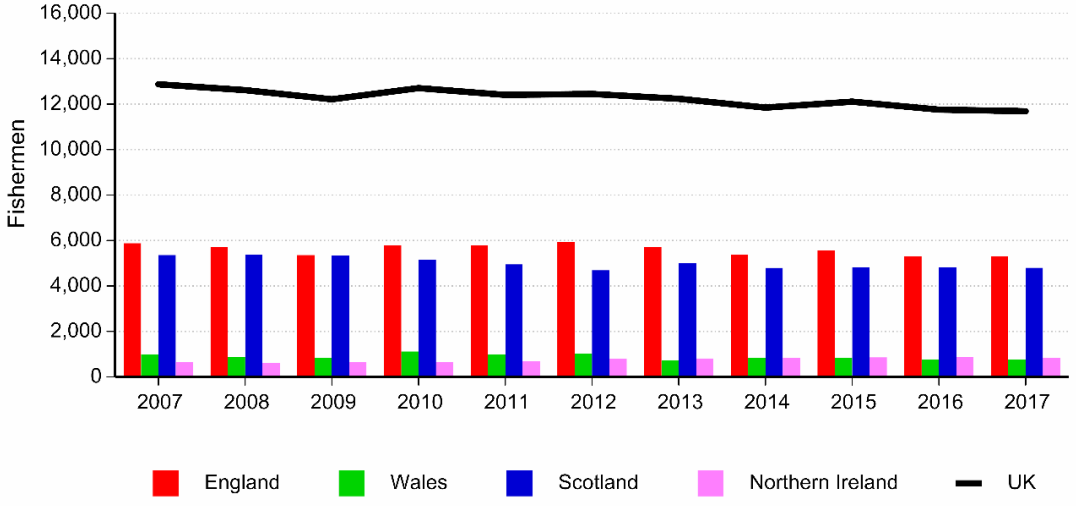
In 2017, the UK fishing industry had 6,148 fishing vessels, 43 vessels fewer than in the previous year. The fleet in 2017 comprised 4,834 10 metre and under vessels and 1,314 over 10 metre vessels.

Chart 1.1: UK fleet size: 2007 to 2017



There were an estimated 11,692 fishermen in 2017, down 9 per cent since 2007 and 65 fewer than in 2016. Of these, 5,299 were based in England, 756 in Wales, 4,799 in Scotland and 838 in Northern Ireland. Part-time fishermen accounted for 17 per cent of the total in 2017 compared with 20 per cent a decade ago. Further details can be found in Chapter 2.

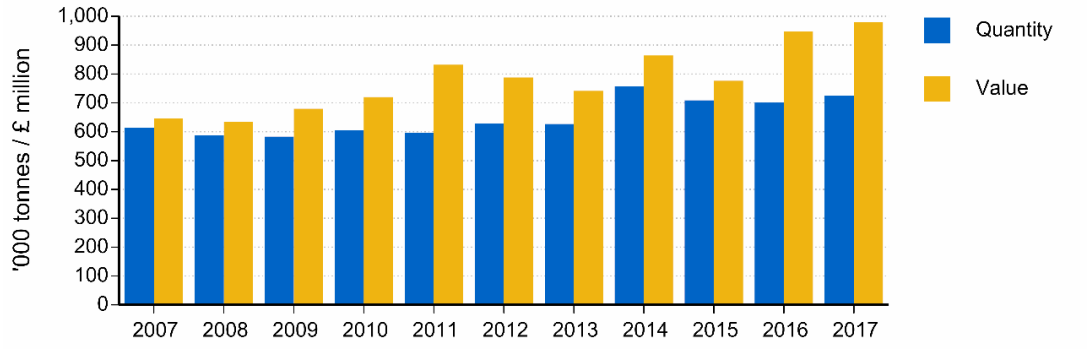
Chart 1.2: Number of fishermen in the UK: 2007 to 2017



Catch by UK vessels

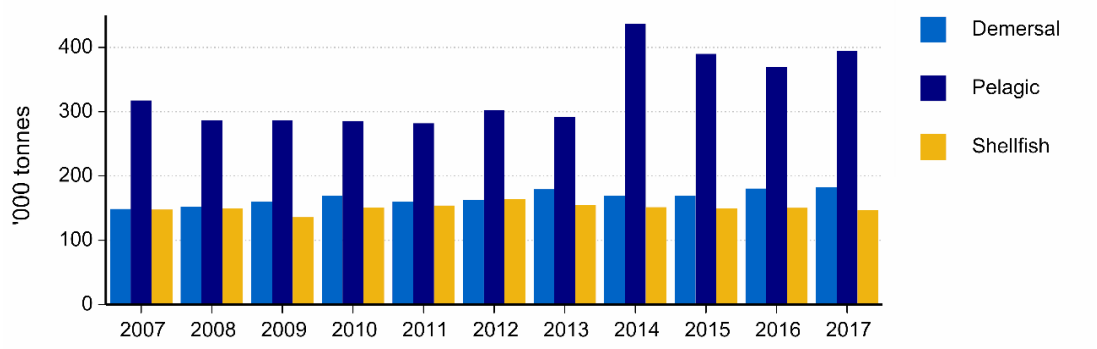
Chapter 3 presents information on quantity (live weight), value and area of capture for all UK vessels landing into the UK and abroad as well as for foreign vessels landing into the UK. Landings by member states against individual European Commission quotas for each fish stock targeted by the UK are also provided.

Chart 1.3: UK vessels landing into the UK and abroad: 2007 to 2017



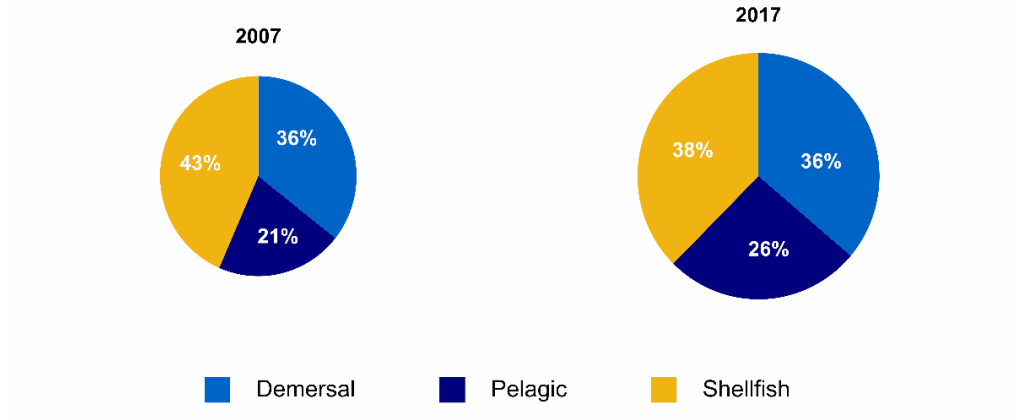
In 2017, UK vessels landed 724 thousand tonnes of sea fish (including shellfish) into the UK and abroad with a value of £980 million. This represents a 3 per cent increase in quantity and a 4 per cent increase in value compared with 2016. Landings abroad by the UK fleet rose by 13 per cent.

Chart 1.4: UK vessels landing into the UK and abroad by species group: 2007 to 2017



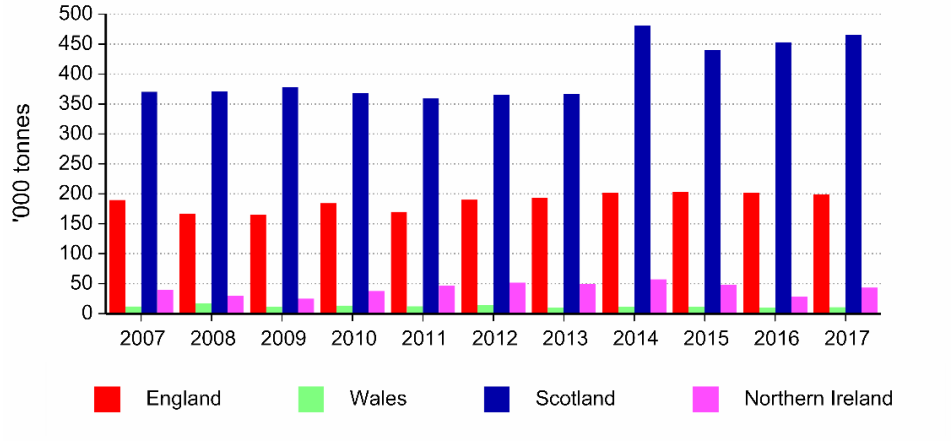
The quantity of pelagic fish landed rose by 7 per cent in 2017 but is still 10 per cent lower than in 2014 when mackerel quotas were at their peak. However, mackerel landings, and consequently pelagic landings, are still far higher than they were a few years ago. Demersal landings are 1 per cent higher than in 2016 while shellfish landings are 2 per cent lower.

Chart 1.5: Value of landings by UK vessels into the UK and abroad



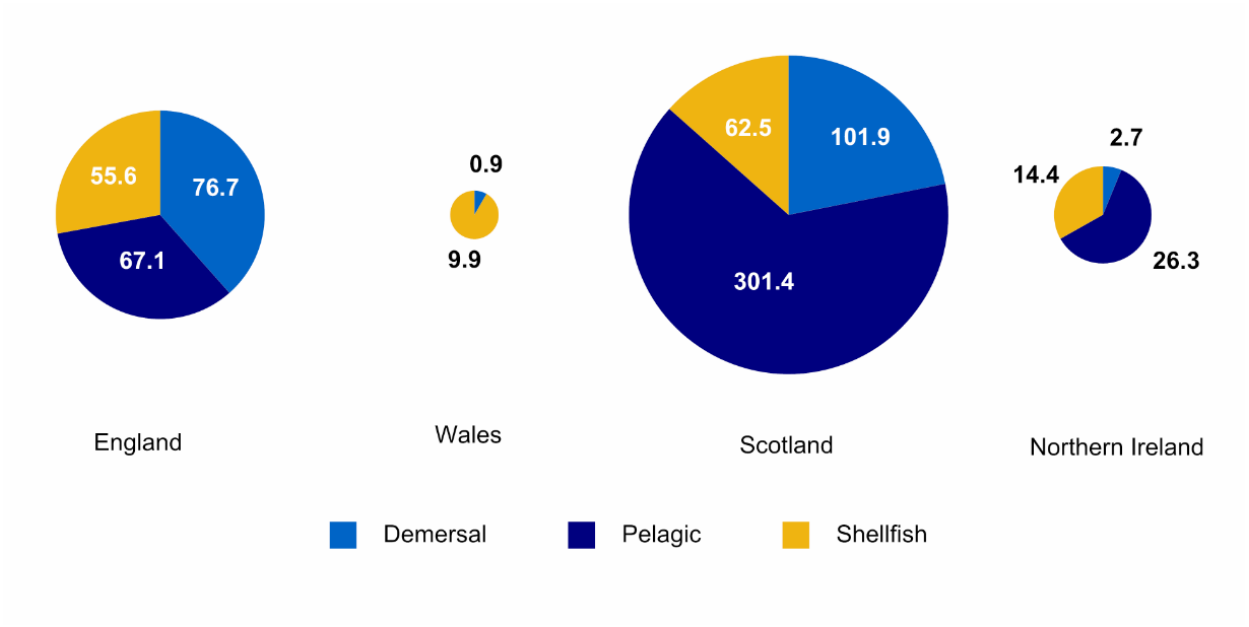
The share of the value of pelagic landings has increased by 5 percentage points over the last ten years to 26 per cent, largely at the expense of shellfish landings. Despite this, shellfish still account for the largest share - 38 per cent.

Chart 1.6: Landings into the UK and abroad by vessel nationality: 2007 to 2017



Landings by Scottish vessels were well over 400 thousand tonnes in each of the last four years, a result of increased mackerel landings. In 2017, the Scottish fleet's share of total landings was 64 per cent, compared with 28 per cent for the English fleet.

Chart 1.7: Landings into the UK and abroad by vessel nationality and species group: 2017 (’000 tonnes)

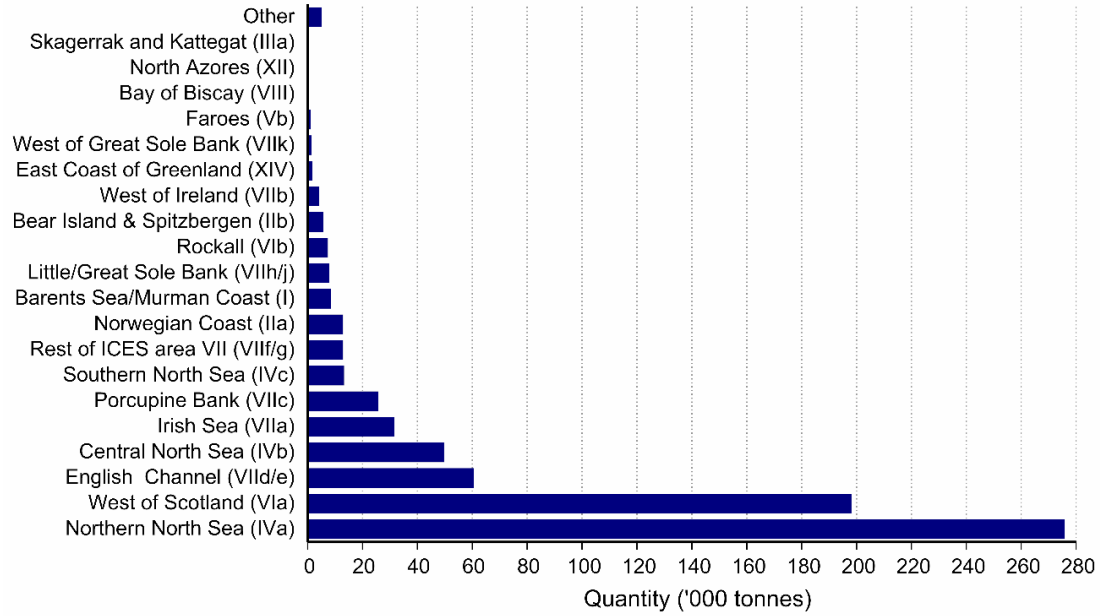


In terms of quantity, around two thirds of the Scottish fleet’s landings were pelagic fish. Pelagic species have replaced shellfish as the major species group for Northern Ireland. Demersal species accounted for the largest share of English fleet landings, although there were significant shares in pelagic and shellfish too. A large majority of the Welsh fleet’s landings were shellfish.

Catch by sea area

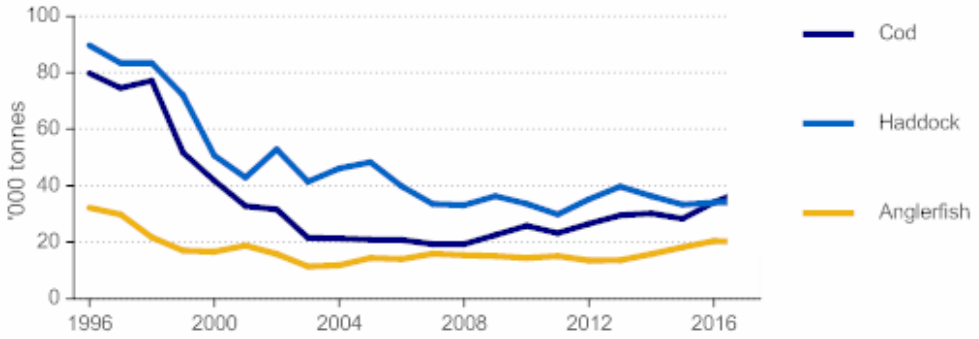
In 2017, almost two thirds of all landings by UK vessels were caught from Northern North Sea and West of Scotland (ICES divisions IVa and VIa – see Appendix 3 for a map of fishing areas).

Chart 1.8: Catch by sea area, UK vessels: 2017



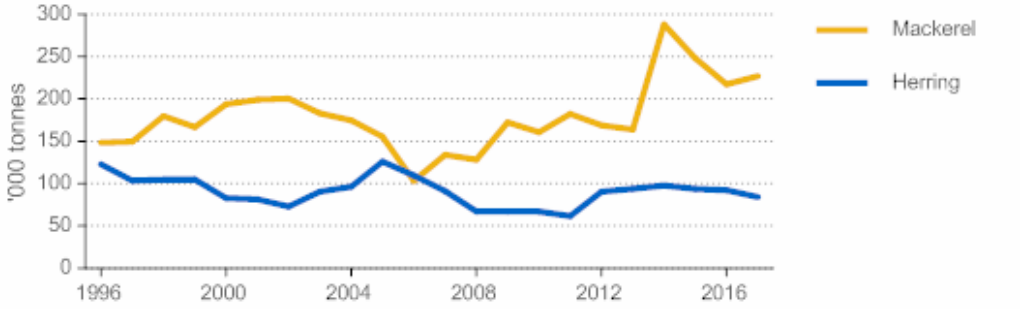
Catch by individual species

Chart 1.9: Landings of key demersal species into the UK and abroad by UK vessels: 1996 to 2017



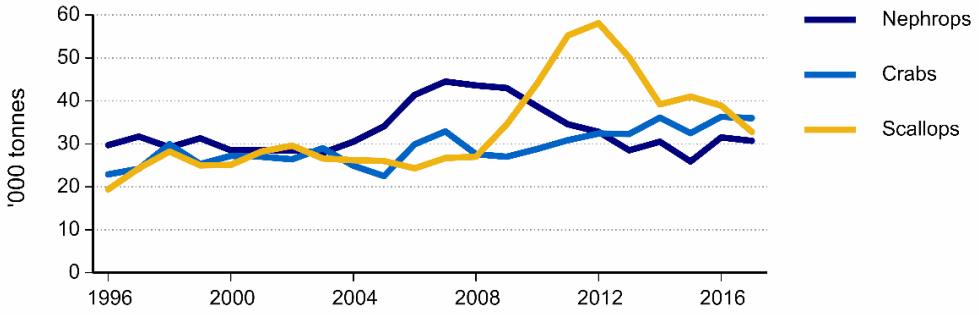
Falling catches of cod and haddock have contributed to the large reduction in demersal landings since 1996. In 2017, the UK fleet landed 38 thousand tonnes of cod (down 52 per cent since 1996) and 34 thousand tonnes of haddock (down 62 per cent since 1996). This represents a combined decrease of 97 thousand tonnes. Anglerfish is now the third highest demersal species in terms of live weight quantity landed.

Chart 1.10: Landings of key pelagic species into the UK and abroad by UK vessels: 1996 to 2017



In 2017, mackerel landings rose to 227 thousand tonnes but are still lower than the 288 thousand tonne peak of 2014. Landings of herring fell by 9 per cent in the year.

Chart 1.11: Landings of key shellfish species into the UK and abroad by UK vessels: 1996 to 2017



In 2017, 31 thousand tonnes of nephrops (langoustines) were landed, a 31 per cent decrease since the high point of 2007. Landings of crabs have increased by 57 per cent since 1996 to 36 thousand tonnes. The quantity of scallops landed was 33 thousand tonnes, 44 per cent lower than the peak in 2012.

Landings into UK ports

Table 1.1 shows landings figures for three key ports in each UK country. In 2017, Peterhead, Lerwick and Fraserburgh accounted for 50 per cent by quantity and 35 per cent by value of all landings by UK vessels into the UK.

TABLE 1.1 Landings by UK vessels into key ports: 2017

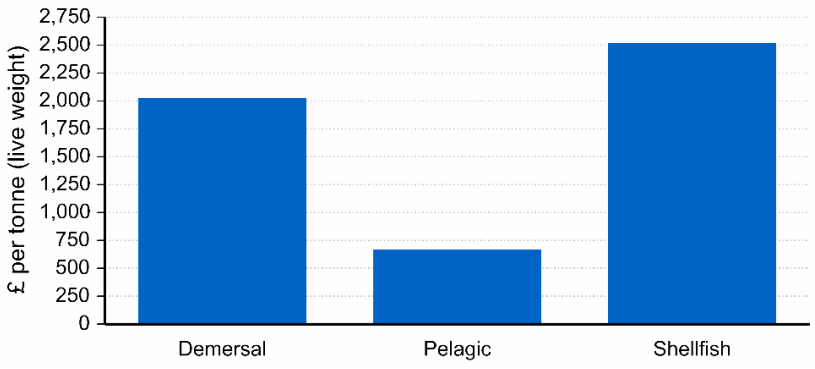
	Quantity ('000 tonnes)				Value (£ million)			
	Demersal	Pelagic	Shellfish	**Total**	Demersal	Pelagic	Shellfish	**Total**
England								
Brixham	4.7	1.6	8.7	**15.1**	15.6	0.5	24.6	**40.6**
Newlyn	6.5	3.9	3.2	**13.6**	19.4	1.6	8.9	**29.9**
Plymouth	1.3	6.5	2.9	**10.7**	4.5	3.3	8.1	**15.9**
Wales								
Fishguard	..	-	2.2	**2.2**	..	-	2.9	**2.9**
Milford Haven	0.5	..	1.0	**1.5**	1.5	..	2.0	**3.5**
Holyhead	..	..	1.3	**1.3**	..	..	2.0	**2.0**
Scotland								
Peterhead	48.2	98.6	4.1	**150.9**	86.9	66.2	13.6	**166.7**
Lerwick	9.7	29.7	0.3	**39.8**	18.6	21.6	1.0	**41.3**
Fraserburgh	8.7	11.5	6.3	**26.5**	15.0	9.6	21.4	**46.0**
Northern Ireland								
Belfast	-	6.2	..	**6.2**	-	3.8	..	**3.8**
Kilkeel	1.5	-	3.3	**4.8**	2.4	-	7.2	**9.6**
Portavogie	0.4	..	2.7	**3.1**	0.4	..	6.2	**6.6**

Source: Fisheries Administrations in the UK

Note: Additional data on the UK fishing industry are available for download from the MMO website as supplementary Table 1.2.

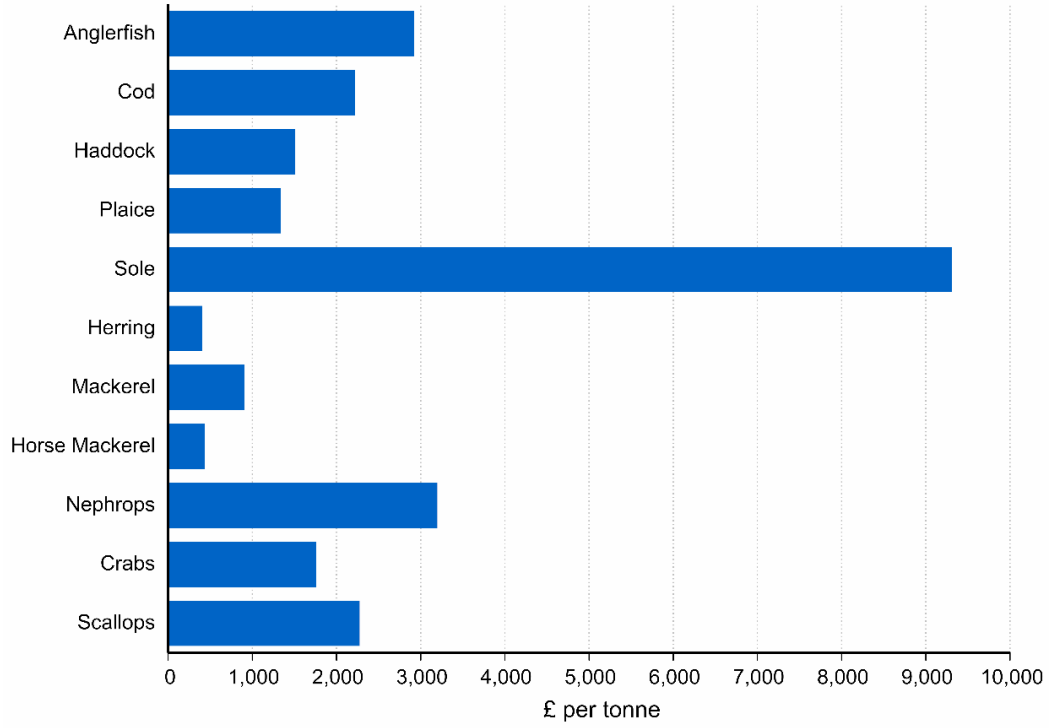
Average value

Chart 1.12: Average live weight value, UK vessels landing into the UK: 2017



In 2017, the average value of shellfish landed by UK vessels into the UK was around £2,500 per tonne (live weight) compared with £2,200 per tonne in 2016. For demersal species, the average price increased from £1,900 per tonne in 2016 to £2,000 per tonne in 2017. Pelagic prices fell from an average of £710 per tonne to £670 per tonne. Figures for key species are shown below.

Chart 1.13: Average live weight value of key species, UK vessels landing into the UK: 2017



Catch by sector

In 2017, 99 per cent of the pelagic fish and 97 per cent of the demersal fish landed by the UK fleet were caught by vessels in a producer organisation. In contrast, only 44 per cent of all shellfish were landed by vessels in a producer organisation.

Chapter 2 shows the membership of fish producer organisations for vessels over 10 metres in length. An overview of the landings by each producer organisation, as well as for the non-sector and the 10 metres and under pool, is given in Chapter 3.

Fishing effort

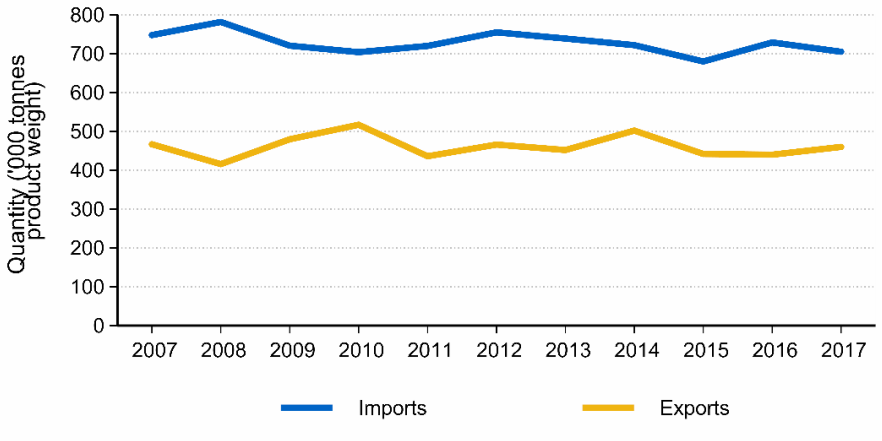
An overview of fishing effort (kW days) in recovery areas is given in Chapter 2. In 2017:

- UK fishing effort by the over 10 metre fleet is 39 per cent lower than in 2002.
- Fishing effort with regulated whitefish trawls (TR1) is 29 per cent lower than when the Cod Recovery Zone was implemented in 2003, despite a rise in each of the last five years.
- Activity in the Sole Recovery Zone with regulated beam trawls is 3 per cent lower than when it was created in 2004. Effort fell sharply between 2006 and 2010 but has risen in each of the last four years.
- Effort on fishing trips targeting scallops in ICES sub-area VII has increased by 27 per cent since 2002, while effort on similar trips in ICES sub-areas V and VI has more than halved.

Imports and exports

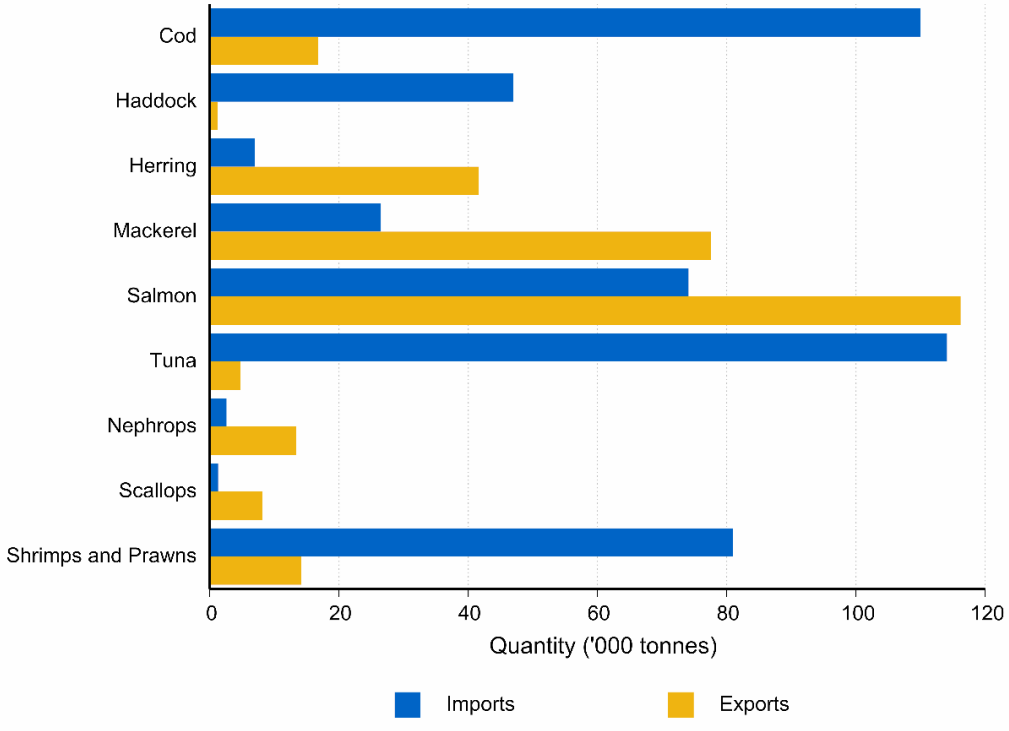
In 2017, imports of fish and fish preparations fell by 25 thousand tonnes to 705 thousand tonnes. Exports rose by 20 thousand tonnes to 460 thousand tonnes.

Chart 1.14: UK imports and exports: 2007 to 2017



In 2017, imports were highest for tuna, cod, shrimps and prawns and salmon. The UK's main exports were salmon, mackerel and herring.

Chart 1.15: UK imports and exports by key species: 2017



In 2017, imports into the UK were highest from China (67 thousand tonnes), Iceland (56 thousand tonnes), Germany (50 thousand tonnes) and Denmark (43 thousand tonnes). Of the UK exports, the largest amounts went to France (89 thousand tonnes), the Netherlands (68 thousand tonnes), Spain (45 thousand tonnes) and the USA (36 thousand tonnes). Full details on imports and exports are in Chapter 4.

Chapter 5 provides summary information on the scientific assessment of key fish stocks. Chapter 6 compares the UK fishing industry with other European countries and the rest of the world.

2 Structure and activity of the UK fishing industry

Introduction

In 2017 the UK had 6,148 registered fishing vessels, 43 fewer than in the previous year. There were 11,692 fishermen on UK registered vessels, a drop of 65 in the year. The number of kW days spent at sea by vessels over 10 metres in length has risen by 3 per cent since 2016.

This chapter brings together information on:

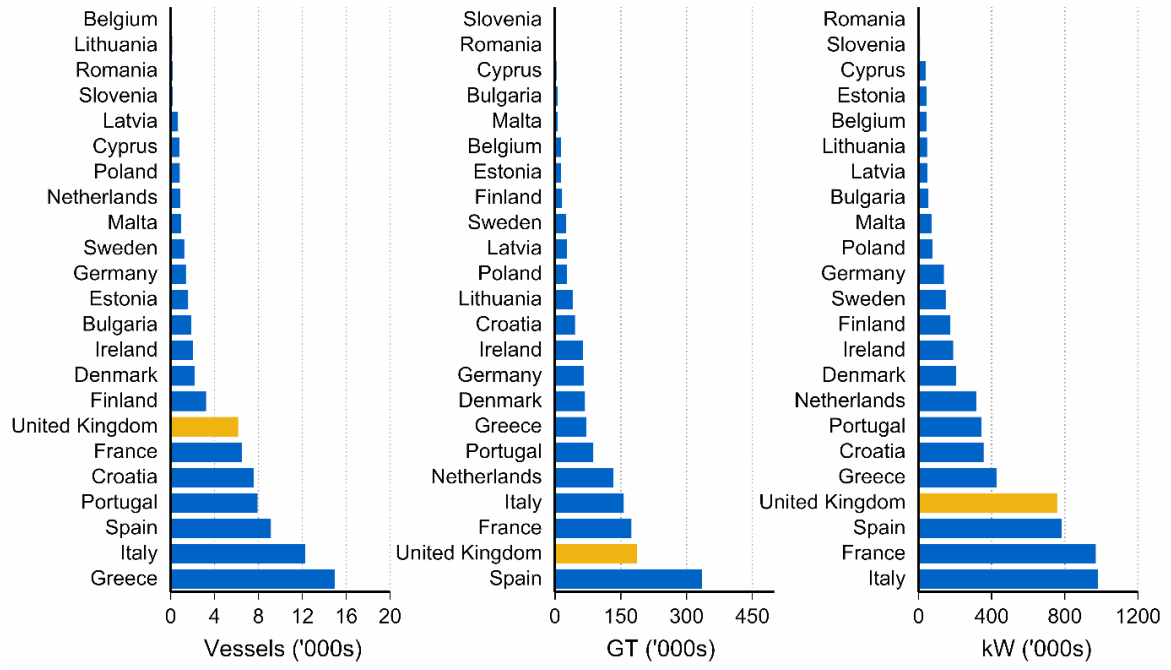
- Size and composition of the UK fishing fleet
- Number of fishermen on UK registered fishing vessels
- Accidents involving fishing vessels and fishermen
- Fishing effort by UK vessels, including coverage of effort in the Cod and Sole Recovery Zones and the Western Waters

All tables presented here are available to download as spreadsheets from the MMO website. Supplementary tables showing more detail can also be found on the website.

The EU fishing fleet

In 2017, the highest number of fishing vessels in the European Union was in Greece (14,977) while the UK was seventh with 6,148 (see Chart 2.1). Spain's capacity (335 thousand GT) is by far the largest, with the UK in second place with 187 thousand GT. The UK has the fourth most powerful fleet (0.76 million kW).

Chart 2.1: Size of the EU fishing fleet by member state: 2017



Note: Data for Chart 2.1 are available for download from the MMO website as supplementary Table 2.12.

The UK fishing fleet

The number of registered UK fishing vessels has fallen by 29 per cent since 1996. Capacity (GT) and power (kW) have decreased by 32 per cent and 28 per cent respectively over the same period (see Table 2.1). As well as an underlying downward trend in the size of the fleet associated with reduced fishing opportunities, UK fisheries administrations have operated decommissioning exercises in 2001-2002, 2003, 2007 and 2008-2009. The decommissioning exercises aimed to withdraw some capacity and effort from UK fisheries to help ensure a sustainable future, and to allow vessel owners to take a business decision on whether to remain in the fishery under the terms of fishery management plans.

TABLE 2.1 Size of the UK fishing fleet: 1996 to 2017[a]

At year end:

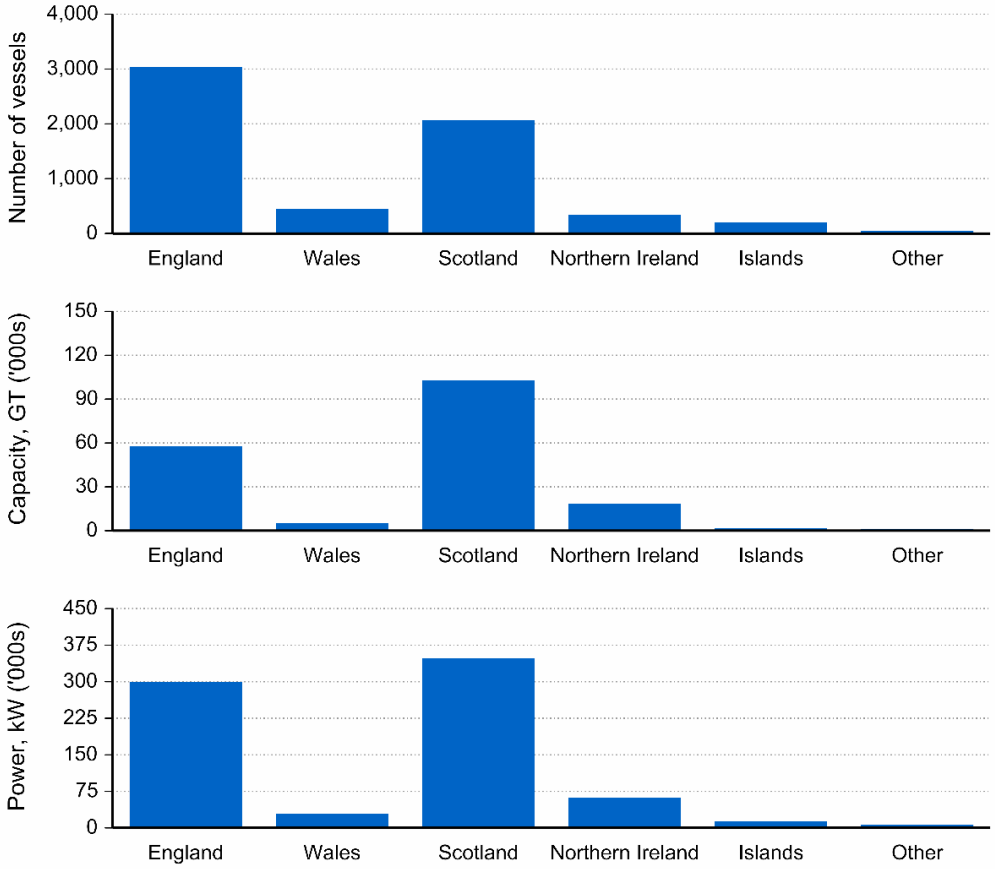
	Number	GT [b]	Power
1996	8,667	274,532	1,054,927
1997	8,458	272,421	1,026,542
1998	8,271	270,644	1,006,071
1999	8,039	264,453	978,644
2000	7,818	262,406	980,636
2001	7,721	263,040	1,001,648
2002	7,578	240,898	947,964
2003	7,096	227,449	907,340
2004	7,022	222,529	897,398
2005	6,716	217,617	876,479
2006	6,752	214,181	863,496
2007	6,763	212,816	858,011
2008	6,573	207,423	836,485
2009	6,500	208,025	832,284
2010	6,477	207,424	826,668
2011	6,444	202,048	808,887
2012	6,406	200,697	804,208
2013	6,399	197,283	797,661
2014	6,383	195,121	789,714
2015	6,187	187,371	769,532
2016	6,191	185,734	765,810
2017	6,148	187,014	757,899

Source: Maritime and Coastguard Agency and Fisheries Administrations in the UK

(a) Includes Channel Islands, the Isle of Man and vessels without an administration port. Excludes mussel dredgers.
(b) The series for GT is on the basis of GT at the end of 2003.

The UK fishing fleet by country

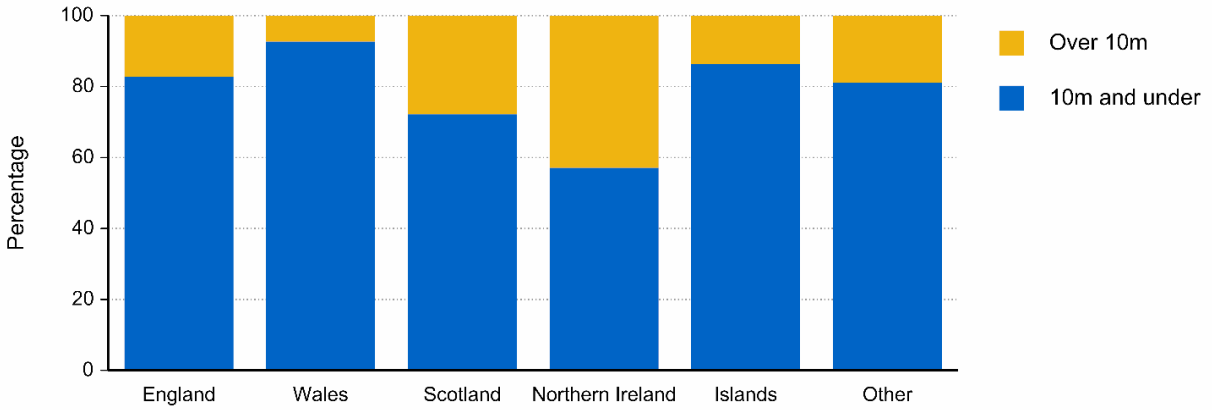
Chart 2.2: Size of the UK fishing fleet by country: 2017



Just under half of all vessels were English. Scottish vessels accounted for 34 per cent of the UK fleet. However, Scotland has the highest share of capacity (GT), 55 per cent, and power (kW), 46 per cent, compared with 31 per cent and 39 per cent respectively in England (see Chart 2.2).

To understand why England has a larger number of vessels than Scotland and yet has a smaller share of capacity and power requires a more detailed analysis of the fleet composition based on vessel length (see Table 2.3). This difference can partly be explained by the higher proportion of vessels of 10 metres and under in length in the English fleet (83 per cent) compared with 72 per cent in Scotland (see Chart 2.3).

Chart 2.3: Percentage of vessels in the 10m and under and over 10m sectors by country: 2017



The overlapping areas of interest of the fleets make it difficult to provide a simple explanation of the differences in fleet structure across the UK. One relevant factor is the different fishing opportunities the fleets are engaged in. Key elements of the Scottish fleet are engaged in several fisheries that are high volume but lower priced, such as herring and mackerel caught in the North Sea and West of Scotland waters. The Scottish fleet has moved towards having higher capacity vessels, which, for economic viability, cover large sea areas and can catch several hundred tonnes of fish per trip.

Compared with this, the English fleet is involved in several key fisheries that are typically lower volume but higher priced, such as the Channel fisheries for sole and plaice. In addition, a greater proportion of the fisheries pursued by the English fleet cover inshore areas. Together these factors have allowed the English fleet to develop with a greater proportion of smaller vessels that are able to be economically viable through catching smaller quantities of more valuable fish. Changes over time in the nature of fishing opportunities available to the different elements of the UK fleet have also been key drivers for the development of the fleet.

Table 2.2 shows the number, capacity (GT) and power (kW) of registered UK fishing vessels by vessel nationality and sector, i.e. over 10 metres and 10 metres and under in length.

TABLE 2.2 Size of the UK fishing fleet, by country of administration: 2014 to 2017[a]

At year end:

			England	Wales	Scotland	Northern Ireland	Islands [b]	Other [c]	Total
2014	10m and under vessels	No.	2,573	426	1,458	225	299	45	5,026
		GT	8,869	1,110	6,409	901	744	85	18,119
		kW	144,045	21,644	78,256	12,215	16,896	2,439	275,496
	Over 10m vessels	No.	555	40	590	143	25	4	1,357
		GT	54,435	4,429	101,607	14,483	980	1,068	177,002
		kW	166,159	9,551	282,795	47,451	4,242	4,021	514,219
	Total	**No.**	**3,128**	**466**	**2,048**	**368**	**324**	**49**	**6,383**
		GT	**63,304**	**5,539**	**108,017**	**15,385**	**1,724**	**1,153**	**195,121**
		kW	**310,204**	**31,195**	**361,052**	**59,666**	**21,138**	**6,459**	**789,714**
2015	10m and under vessels	No.	2,598	412	1,434	201	182	36	4,863
		GT	8,772	1,044	5,198	833	525	100	16,472
		kW	147,874	20,950	78,405	11,285	10,070	2,104	270,688
	Over 10m vessels	No.	541	32	573	148	27	3	1,324
		GT	53,906	4,064	99,082	12,570	1,109	167	170,899
		kW	164,797	8,362	276,471	43,890	4,634	691	498,844
	Total	**No.**	**3,139**	**444**	**2,007**	**349**	**209**	**39**	**6,187**
		GT	**62,679**	**5,108**	**104,280**	**13,403**	**1,634**	**267**	**187,371**
		kW	**312,671**	**29,312**	**354,876**	**55,175**	**14,704**	**2,794**	**769,532**
2016	10m and under vessels	No.	2,569	419	1,456	202	181	49	4,876
		GT	8,672	1,028	5,284	851	516	129	16,479
		kW	147,745	20,892	80,606	11,513	9,513	2,427	272,696
	Over 10m vessels	No.	529	32	575	149	27	3	1,315
		GT	50,140	4,159	100,112	13,065	1,109	670	169,255
		kW	155,969	8,500	277,306	45,337	4,634	1,368	493,114
	Total	**No.**	**3,098**	**451**	**2,031**	**351**	**208**	**52**	**6,191**
		GT	**58,813**	**5,186**	**105,395**	**13,916**	**1,625**	**799**	**185,734**
		kW	**303,714**	**29,392**	**357,912**	**56,850**	**14,147**	**3,795**	**765,810**
2017	10m and under vessels	No.	2,512	417	1,493	193	176	43	4,834
		GT	8,594	1,003	5,374	767	501	123	16,362
		kW	146,145	19,998	82,818	10,441	9,011	2,424	270,837
	Over 10m vessels	No.	522	33	576	145	28	10	1,314
		GT	49,067	4,121	97,558	17,566	1,121	1,219	170,652
		kW	152,801	8,737	265,089	51,921	4,811	3,703	487,062
	Total	**No.**	**3,034**	**450**	**2,069**	**338**	**204**	**53**	**6,148**
		GT	**57,661**	**5,124**	**102,933**	**18,333**	**1,622**	**1,342**	**187,014**
		kW	**298,946**	**28,735**	**347,908**	**62,362**	**13,822**	**6,127**	**757,899**

Source: Maritime and Coastguard Agency and Fisheries Administrations in the UK

(a) Excludes Mussel Dredgers.

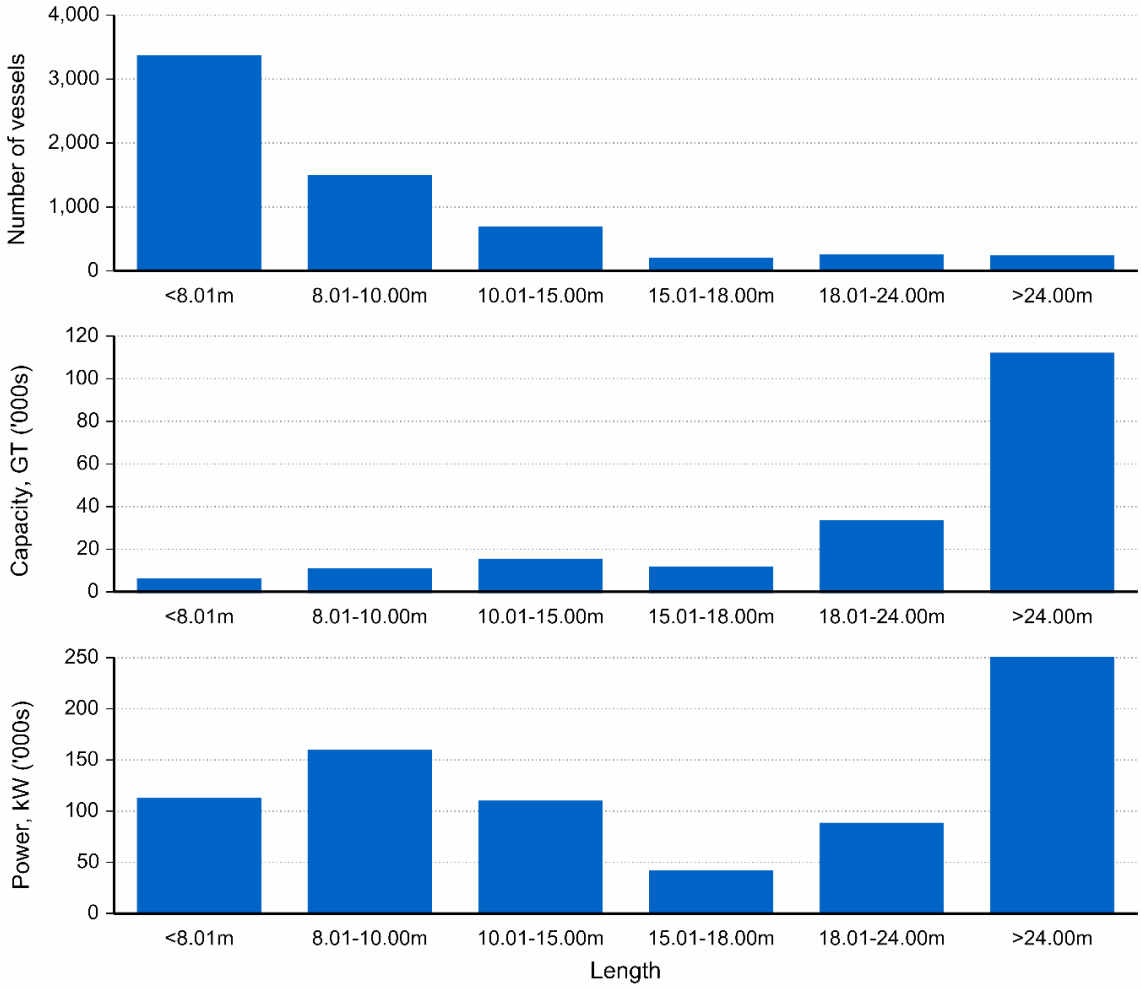
(b) Islands include Guernsey, Jersey and the Isle of Man.

(c) Vessels which are registered but not administered by a port; typically new vessels and vessels changing administrations.

Note: Additional data on the UK fishing fleet are available for download from the MMO website as supplementary Table 2.2a.

The UK fishing fleet by length

Chart 2.4: Size of the UK fishing fleet by length: 2017



Almost four fifths of the UK fleet is made up of vessels of 10 metres and under in length. These vessels account for 9 per cent of the fleet's capacity and 36 per cent of the fleet's power. However, vessels over 24 metres in length account for just 4 per cent of the total number but for three fifths of total capacity and a third of total power (see Chart 2.4).

Table 2.3 shows the number, capacity (GT) and power (kW) of registered UK fishing vessels by vessel nationality and vessel length.

Scotland and Northern Ireland have higher proportions of large vessels than England. For example, 17 per cent of the Scottish fleet and 30 per cent of the far smaller - in number - Northern Irish fleet exceed 15 metres in length compared with 5 per cent in England. The capacity of the 356 Scottish vessels over 15 metres in length (6 per cent of all UK vessels) equals the capacity of the rest of the UK fleet combined.

TABLE 2.3 UK fishing fleet by vessel length and country of administration: 2017

At year end:

	Overall length	8.00m and under	8.01 - 10.00m	10.01 - 15.00m	15.01 - 18.00m	18.01 - 24.00m	Over 24.00m	Total
England	Number	1,733	779	364	32	51	75	**3,034**
	Gross tonnage	2,886	5,708	8,093	1,795	6,234	32,945	**57,661**
	Engine power	58,949	87,196	61,742	6,719	14,503	69,837	**298,946**
Wales	Number	329	88	24	3	1	5	**450**
	Gross tonnage	440	563	1,076	135	97	2,813	**5,124**
	Engine power	11,516	8,482	3,412	553	221	4,551	**28,735**
Scotland	Number	995	498	220	108	125	123	**2,069**
	Gross tonnage	1,890	3,485	4,197	6,943	19,259	67,159	**102,933**
	Engine power	31,793	51,026	33,700	25,416	50,663	155,310	**347,908**
Northern Ireland	Number	119	74	44	27	56	18	**338**
	Gross tonnage	214	553	1,069	1,471	6,324	8,703	**18,333**
	Engine power	3,142	7,299	6,909	5,182	19,969	19,861	**62,362**
Islands [(a)]	Number	147	29	16	10	2	-	**204**
	Gross tonnage	279	222	477	503	140	-	**1,622**
	Engine power	5,235	3,776	2,459	1,988	365	-	**13,822**
Other [(b)]	Number	33	10	4	3	3	-	**53**
	Gross tonnage	50	74	53	316	850	-	**1,342**
	Engine power	1,181	1,243	771	1,267	1,665	-	**6,127**
Total	**Number**	**3,356**	**1,478**	**672**	**183**	**238**	**221**	**6,148**
	Gross tonnage	**5,758**	**10,604**	**14,965**	**11,163**	**32,904**	**111,620**	**187,014**
	Engine power	**111,816**	**159,021**	**108,992**	**41,125**	**87,386**	**249,559**	**757,899**

Source: Maritime and Coastguard Agency and Fisheries Administrations in the UK

(a) Islands include Guernsey, Jersey and the Isle of Man.

(b) Vessels which are registered but not administered by a port; typically new vessels and vessels changing administrations.

Note: Additional data on the UK fishing fleet are available for download from the MMO website as supplementary Table 2.3a.

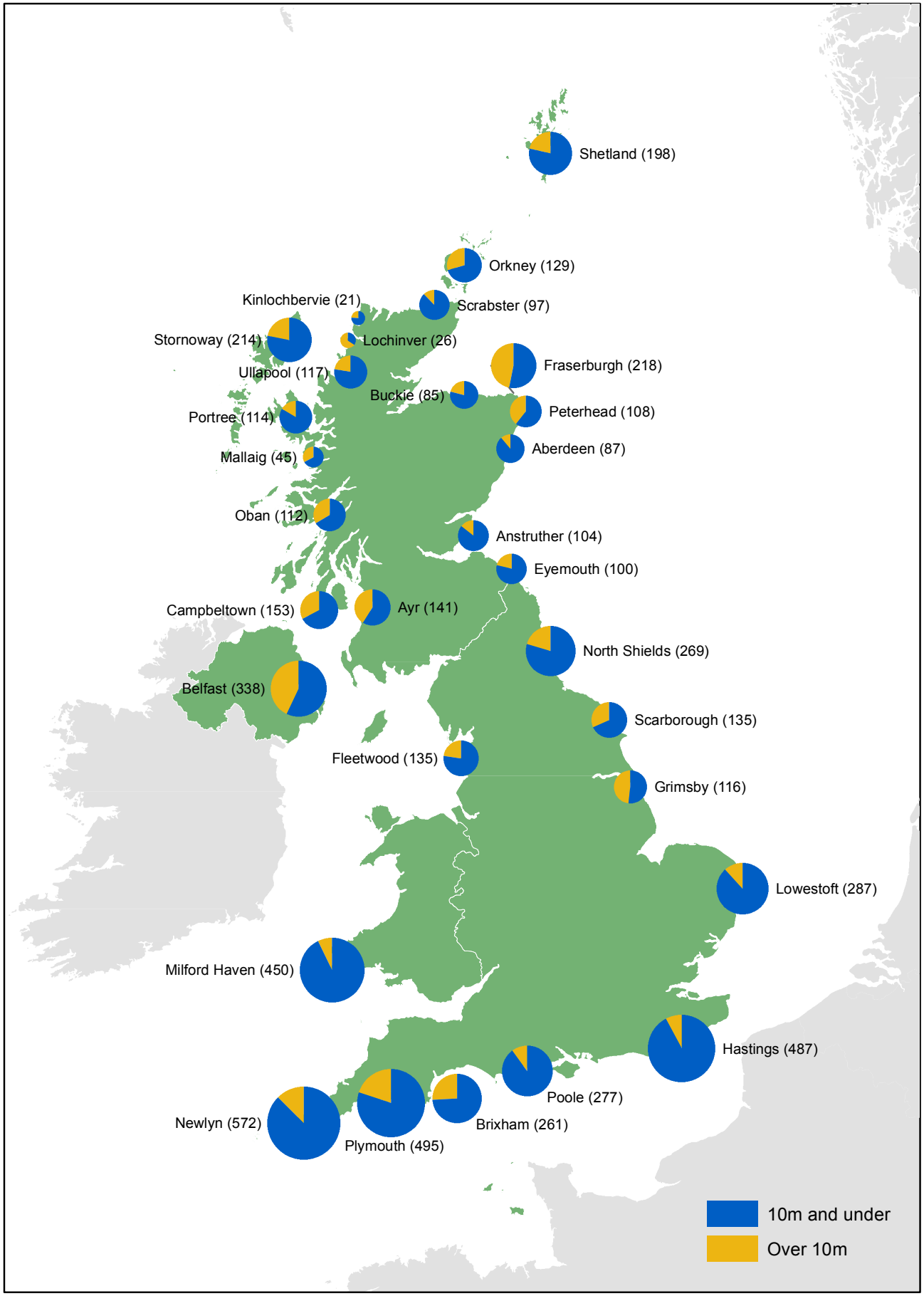
The UK fishing fleet by administration port

Charts 2.5 to 2.7 show the fleet size by number of vessels, capacity (GT) and power (kW) for each administration port in the UK. Each chart shows the relative size of the fleet broken down into the over 10 metres and 10 metres and under sectors.

In 2017:

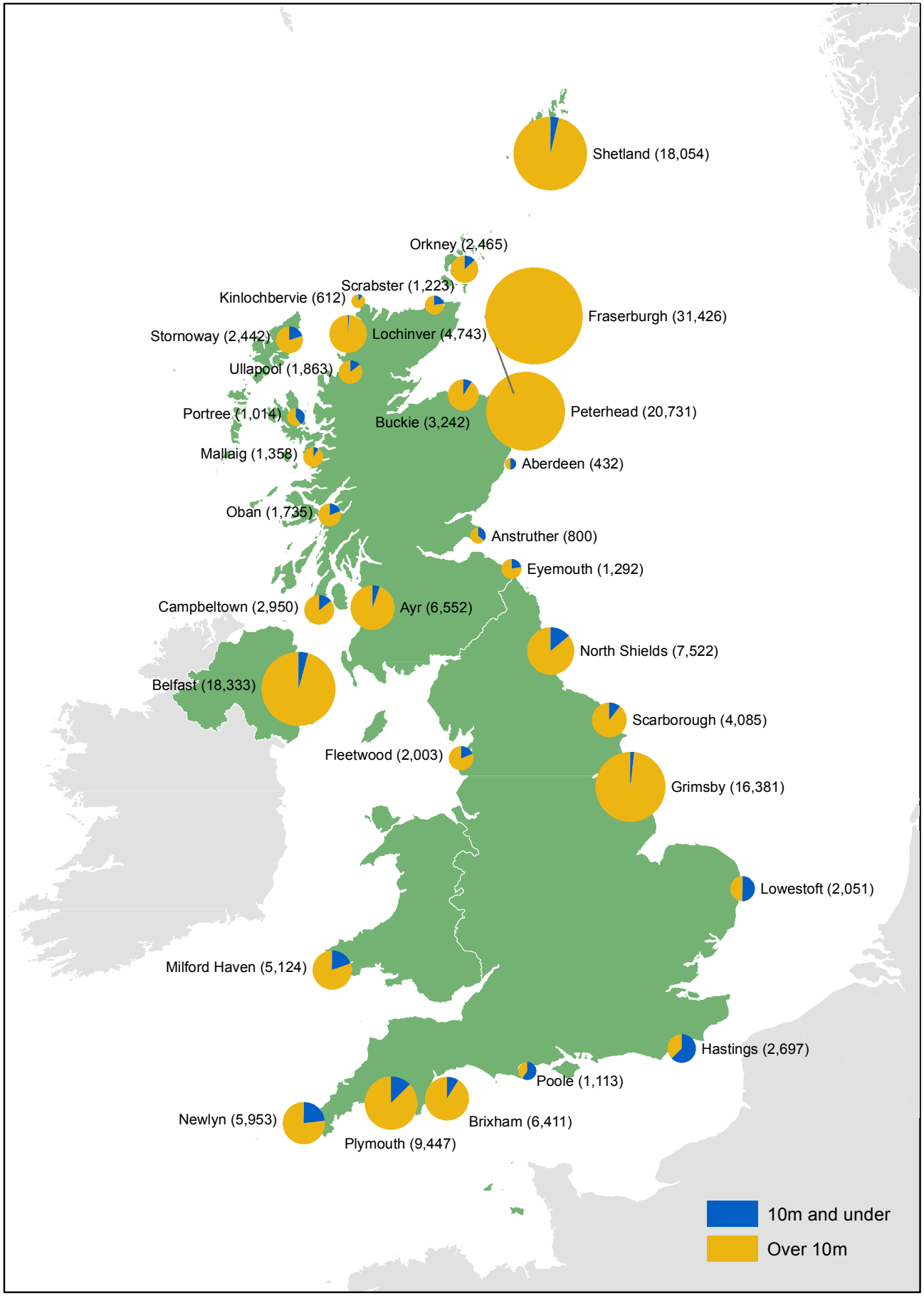
- Newlyn had the largest number (572) of vessels in its administration. 87 per cent of these were of 10 metres and under in length.
- The fleet administered by Fraserburgh had by far the largest capacity (31,426 GT) and power (83,976 kW).
- The largest proportions of 10 metre and under vessels were in Milford Haven (93 per cent) and Hastings (92 per cent). Lochinver had the highest proportion of over 10 metre vessels (65 per cent).

Chart 2.5: Number of vessels by administration port: 2017



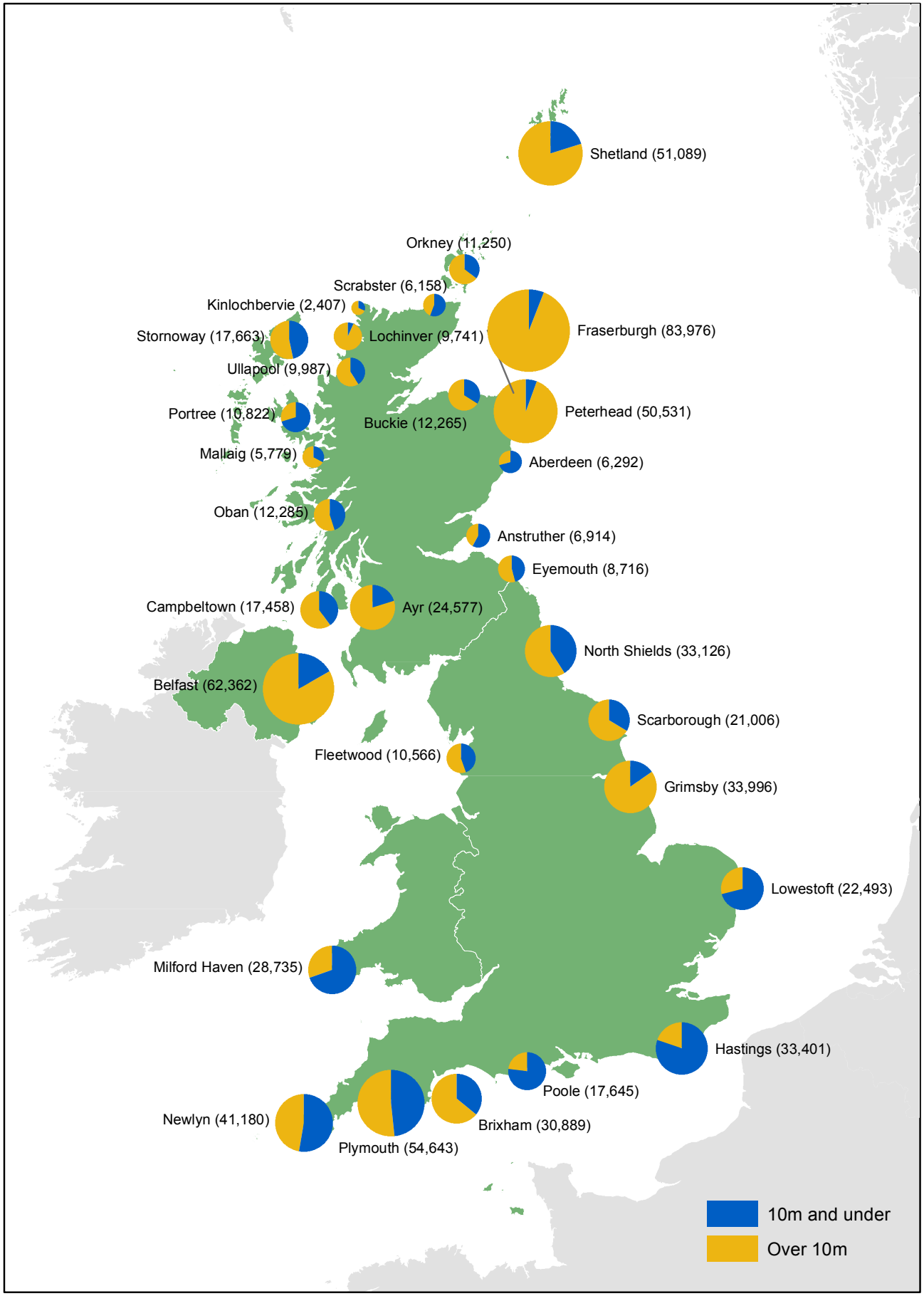
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Chart 2.6: Capacity (GT) of fleet by administration port: 2017



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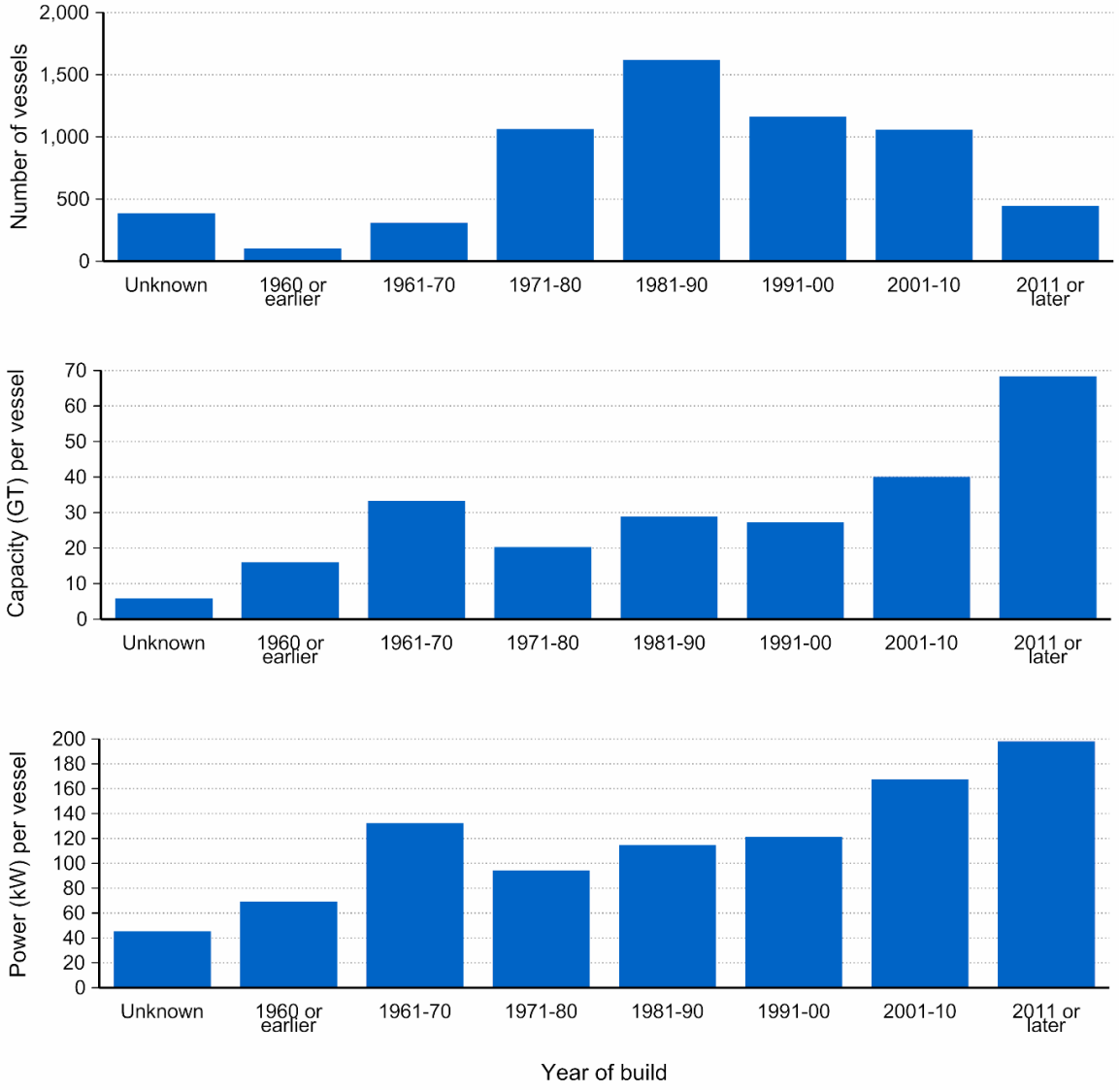
Chart 2.7: Power (kW) of fleet by administration port: 2017



Contains Collins Bartholomew data. © Collins Bartholomew copyright and database right 2017.

The UK fishing fleet by age

Chart 2.8: Size, average capacity and power of the UK fishing fleet by year of construction: 2017



More than half of all vessels in the UK fleet (whose age is known) were built before 1991. While the number of vessels being built since the 1980s has decreased, the average capacity and power of vessels built since 2000 has increased significantly (see Chart 2.8).

Table 2.4 shows a breakdown of the fleet by age in each country within the UK.

TABLE 2.4 Age of UK vessels by country of administration: 2017

		Year of construction								
		Unknown	**1960 or earlier**	**1961-1970**	**1971-1980**	**1981-1990**	**1991-2000**	**2001-2010**	**2011 or later**	**Total**
England	Number	165	51	143	519	783	601	557	215	**3,034**
	Gross tonnage	670	629	4,101	7,526	20,593	7,959	9,463	6,720	**57,661**
	Engine power (kW)	7,722	3,221	17,547	41,354	82,456	55,740	63,813	27,093	**298,946**
Wales	Number	50	7	9	56	127	77	82	42	**450**
	Gross tonnage	174	65	170	277	2,398	441	639	960	**5,124**
	Engine power (kW)	1,998	235	614	2,818	8,918	4,217	5,766	4,168	**28,735**
Scotland	Number	128	39	105	368	572	362	337	158	**2,069**
	Gross tonnage	981	740	3,821	9,697	20,015	20,640	29,418	17,622	**102,933**
	Engine power (kW)	5,335	2,763	14,240	40,639	77,639	67,562	94,579	45,151	**347,908**
Northern Ireland	Number	17	4	36	76	83	66	45	11	**338**
	Gross tonnage	367	231	1,814	3,635	2,987	2,367	2,141	4,791	**18,333**
	Engine power (kW)	1,636	960	6,898	12,511	12,626	9,717	8,962	9,054	**62,362**
Islands [(a)]	Number	17	3	17	40	44	46	32	5	**204**
	Gross tonnage	25	7	422	408	251	273	211	25	**1,622**
	Engine power (kW)	420	34	1,691	2,744	2,192	3,074	3,166	503	**13,822**
Other [(b)]	Number	9	-	-	4	12	11	4	13	**53**
	Gross tonnage	29	-	-	11	558	19	520	204	**1,342**
	Engine power (kW)	350	-	-	87	2,162	611	916	2,001	**6,127**
Total	**Number**	**386**	**104**	**310**	**1,063**	**1,621**	**1,163**	**1,057**	**444**	**6,148**
	Gross tonnage	**2,247**	**1,671**	**10,327**	**21,554**	**46,803**	**31,699**	**42,392**	**30,322**	**187,014**
	Engine power (kW)	**17,460**	**7,214**	**40,990**	**100,152**	**185,993**	**140,921**	**177,200**	**87,970**	**757,899**

Source: Maritime and Coastguard Agency and Fisheries Administrations in the UK

(a) Islands include Guernsey, Jersey and the Isle of Man.

(b) Vessels which are registered but not administered by a port; typically new vessels and vessels changing administrations.

Note: Additional data on the UK fishing fleet are available for download from the MMO website as supplementary Tables 2.4a, 2.4b and 2.4c.

Membership of Fish Producer Organisations

On 1 January 2017, 36 per cent of vessels over 10 metres in length were not members of a Fish Producer Organisation (FPO), i.e. they were members of the over 10 metre or Isle of Man non-sectors. The Scottish FPO had the highest membership (174 vessels), followed by Northern Ireland FPO (132 vessels).

TABLE 2.5 Fish Producer Organisation (FPO) membership[(a)]: 2016 to 2017

Membership as at 1 January for each year

	2016 [(b)]		2017 [(b)]	
	Vessels in membership	Members as a % of total	Vessels in membership	Members as a % of total
Scottish FPO Ltd	169	*13%*	174	*13%*
Northern Ireland FPO Ltd	124	*9%*	132	*10%*
Cornish FPO Ltd	93	*7%*	92	*7%*
South Western FPO Ltd	87	*7%*	89	*6%*
Anglo Northern Irish FPO Ltd	36	*3%*	47	*3%*
Anglo Scottish FPO Ltd	34	*3%*	40	*3%*
West of Scotland FPO Ltd	31	*2%*	39	*3%*
Fife FPO Ltd	30	*2%*	36	*3%*
Shetland FPO Ltd	37	*3%*	35	*3%*
Eastern England FPO Ltd	29	*2%*	31	*2%*
North East of Scotland FO Ltd	24	*2%*	24	*2%*
Northern Producers Organisation Ltd	23	*2%*	24	*2%*
Aberdeen FPO	15	*1%*	23	*2%*
Isle of Man Non-Sector	20	*2%*	22	*2%*
Fleetwood FPO Ltd	20	*2%*	19	*1%*
North Sea FPO Ltd	14	*1%*	14	*1%*
Orkney FPO Ltd	13	*1%*	13	*1%*
Interfish	11	*1%*	11	*1%*
The FPO Ltd	9	*1%*	10	*1%*
Wales and West Coast FPO Ltd	6	*0%*	6	*0%*
Lunar Group	4	*0%*	5	*0%*
Lowestoft FPO Ltd	6	*0%*	4	*0%*
Klondyke	3	*0%*	3	*0%*
North Atlantic FPO Ltd	1	*0%*	2	*0%*
Non-sector vessels [(c)]	476	*36%*	479	*35%*
Total	**1,315**	***100%***	**1,374**	***100%***

Source: Fisheries Administrations in the UK

(a) Vessels over 10 metres only. Excludes vessels 10 metres and under in FPO membership.

(b) Includes some Channel Islands and Isle of Man vessels.

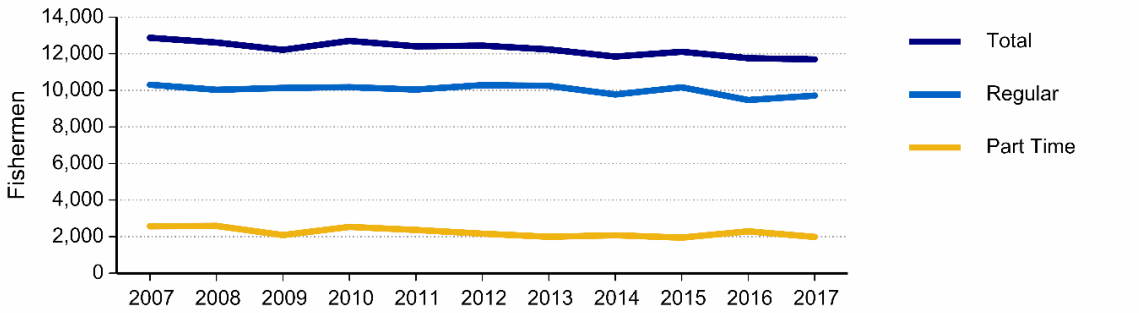
(c) Over 10m vessels not in FPO membership.

Number of fishermen

Statistics on the number of fishermen are drawn from surveys carried out by the Marine Management Organisation in England, the Welsh Assembly Government, the Department of Agriculture, Environment and Rural Affairs in Northern Ireland and Marine Scotland. Details of the survey methodology are provided in Appendix 4.

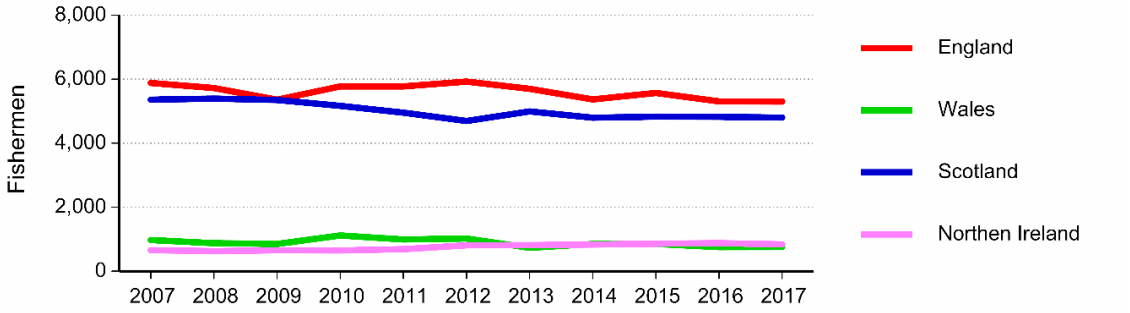
The number of fishermen on UK registered vessels has decreased by 9 per cent since 2007 from 12,871 to 11,692 in 2017. The number of regular fishermen has decreased by 6 per cent and the number of part-time fishermen has decreased by 23 per cent over this period (see Chart 2.9). The decrease in fishermen numbers may be associated with reductions in fleet size as well as decreased fishing opportunities.

Chart 2.9: Number of fishermen on UK registered vessels: 2007 to 2017



Since 2007, the numbers of fishermen on English and Scottish administered vessels have both decreased by 10 per cent. In Northern Ireland, fishermen numbers increased by 27 per cent but fell by 22 per cent in Wales (see Chart 2.10).

Chart 2.10: Number of fishermen by country of administration: 2007 to 2017



Over the last twenty years, the proportion of part-time fishermen has fluctuated between 16 and 22 per cent. In 2017, they accounted for 17 per cent of all fishermen. Forty two per cent of fishermen on vessels administered in Wales were part-time compared with 12 per cent for vessels administered in England, 18 per cent in each of Scotland and Northern Ireland (see Chart 2.11).

Chart 2.11: Number of regular and part-time fishermen by country of administration: 2017

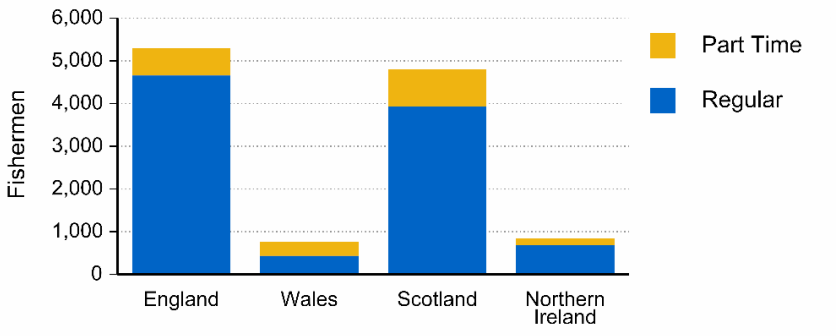


Table 2.6 shows a breakdown of the number of regular and part-time fishermen by country in the UK from 1938 to 2017. Since 1938:

- The number of fishermen on UK registered vessels has decreased by 76 per cent.
- The proportion of fishermen in each country of administration hasn't changed dramatically. In 1938 fishermen numbers in England and Wales represented 61 per cent of the UK total, while Scotland represented 37 per cent. In 2017, the proportions were 52 per cent and 41 per cent respectively.

TABLE 2.6 Number of UK fishermen: 1938 to 2017

	ENGLAND & WALES[a][b]			SCOTLAND			NORTHERN IRELAND			UNITED KINGDOM		
	Regular	Part-time	Total	Regular	Part-time	Total	Regular	Part-time	Total	Regular	Part-time	Total
1938	26,062	2,949	29,011	12,976	4,939	17,915	342	556	898	39,380	8,444	47,824
1948	25,946	3,373	29,319	12,080	5,148	17,228	800	300	1,100	38,826	8,821	47,647
1960	12,712	3,646	16,358	8,795	2,451	11,246	500	150	650	22,007	6,247	28,254
1965	11,064	4,045	15,109	8,057	2,088	10,145	480	140	620	19,601	6,273	25,874
1970	9,424	2,382	11,806	7,656	1,441	9,097	400	140	540	17,480	3,963	21,443
1975	9,016	3,447	12,463	7,507	1,341	8,848	538	285	823	17,061	5,073	22,134
1980	8,455	5,135	13,590	7,561	1,138	8,699	780	240	1,020	16,796	6,513	23,309
1981	8,450	5,992	14,442	7,376	1,085	8,461	775	312	1,087	16,601	7,389	23,990
1982	8,258	5,465	13,723	7,247	937	8,184	841	263	1,104	16,346	6,665	23,011
1983	8,022	5,355	13,377	7,173	902	8,075	811	324	1,135	16,006	6,581	22,587
1984	8,142	4,571	12,713	7,198	899	8,097	764	295	1,059	16,104	5,765	21,869
1985	7,984	5,036	13,020	7,170	932	8,102	808	294	1,102	15,962	6,262	22,224
1986	8,801	4,461	13,262	7,244	992	8,236	861	275	1,136	16,906	5,728	22,634
1987[c]	8,737	4,027	12,764	7,522	970	8,492	894	274	1,168	17,153	5,271	22,424
1988	8,467	4,039	12,506	7,672	891	8,563	956	295	1,251	17,095	5,225	22,320
1989	nd	nd	nd	7,862	803	8,665	950	283	1,233	nd	nd	nd
1990	nd	nd	nd	7,550	766	8,316	1,050	316	1,366	nd	nd	nd
1991	nd	nd	nd	7,303	792	8,095	1,081	288	1,369	nd	nd	nd
1992	nd	nd	nd	7,181	865	8,046	1,036	296	1,332	nd	nd	nd
1993[d]	nd	nd	nd	7,675	1,347	9,022	957	272	1,229	nd	nd	nd
1994	7,542	3,425	10,967	7,160	1,410	8,570	938	228	1,166	15,640	5,063	20,703
1995	8,240	2,192	10,432	6,889	1,506	8,395	933	226	1,159	16,062	3,924	19,986
1996	7,867	2,130	9,997	6,689	1,395	8,084	815	148	963	15,371	3,673	19,044
1997	7,253	2,176	9,429	6,729	1,465	8,194	850	131	981	14,832	3,772	18,604
1998	7,149	1,962	9,111	6,395	1,376	7,771	892	115	1,007	14,436	3,453	17,889
1999	6,977	1,654	8,631	6,042	1,288	7,330	845	90	935	13,864	3,032	16,896
2000	6,193	1,868	8,061	5,594	1,308	6,902	612	74	686	12,399	3,250	15,649
2001	6,279	1,483	7,762	5,353	1,284	6,637	513	46	559	12,145	2,813	14,958
2002	6,505	1,382	7,887	4,369	1,338	5,707	568	43	611	11,442	2,763	14,205
2003	5,778	1,570	7,348	3,968	1,308	5,276	458	40	498	10,204	2,918	13,122
2004	6,364	1,195	7,559	4,124	1,151	5,275	535	84	619	11,023	2,430	13,453
2005	6,026	1,081	7,107	3,952	1,203	5,155	514	55	569	10,492	2,339	12,831
2006	5,702	1,414	7,116	4,109	1,096	5,205	547	66	613	10,358	2,576	12,934
2007	5,340	1,514	6,854	4,408	951	5,359	557	101	658	10,305	2,566	12,871
2008	4,911	1,686	6,597	4,585	807	5,392	532	93	625	10,028	2,586	12,614
2009	5,185	1,024	6,209	4,403	946	5,349	541	113	654	10,129	2,083	12,212
2010[e]	5,380	1,509	6,889	4,257	909	5,166	535	113	648	10,172	2,531	12,703
2011	5,386	1,378	6,764	4,076	877	4,953	578	110	688	10,040	2,365	12,405
2012[f]	5,877	1,067	6,944	3,752	941	4,693	654	154	808	10,283	2,162	12,445
2013[g]	5,478	951	6,429	4,092	900	4,992	675	139	814	10,245	1,990	12,235
2014	5,109	1,108	6,217	3,980	816	4,796	683	149	832	9,772	2,073	11,845
2015	5,469	951	6,420	3,985	843	4,828	708	151	859	10,162	1,945	12,107
2016	4,934	1,125	6,059	3,834	989	4,823	700	175	875	9,468	2,289	11,757
2017	5,092	963	6,055	3,932	867	4,799	686	152	838	9,710	1,982	11,692

(a) Prior to 1952 figures were based on information supplied by the Registrar General of Shipping and Seamen. Since 1952 figures have been supplied by the District Fishery Officers of Defra and now the MMO.

(b) From 1966 these figures exclude 'hobby' fishermen, that is, fishermen who do not fish commercially. The corresponding figures for Scotland and Northern Ireland have never included 'hobby' fishermen.

(c) Includes 1986 figures for Newlyn and Plymouth.

(d) The apparent increase in fishermen in Scotland reflected the licensing of 10m and under vessels when more information became available on the numbers of such active vessels.

(e) From 2010, revised guidance was issued to ports in England and Wales on the classification of regular and part-time fishermen leading to improved recording of fishermen numbers.

(f) Between 2011 and 2012 there was an increase in the number of fishermen in Northern Ireland due to the figures for two areas now including local coastal activity (mainly pot fishing).

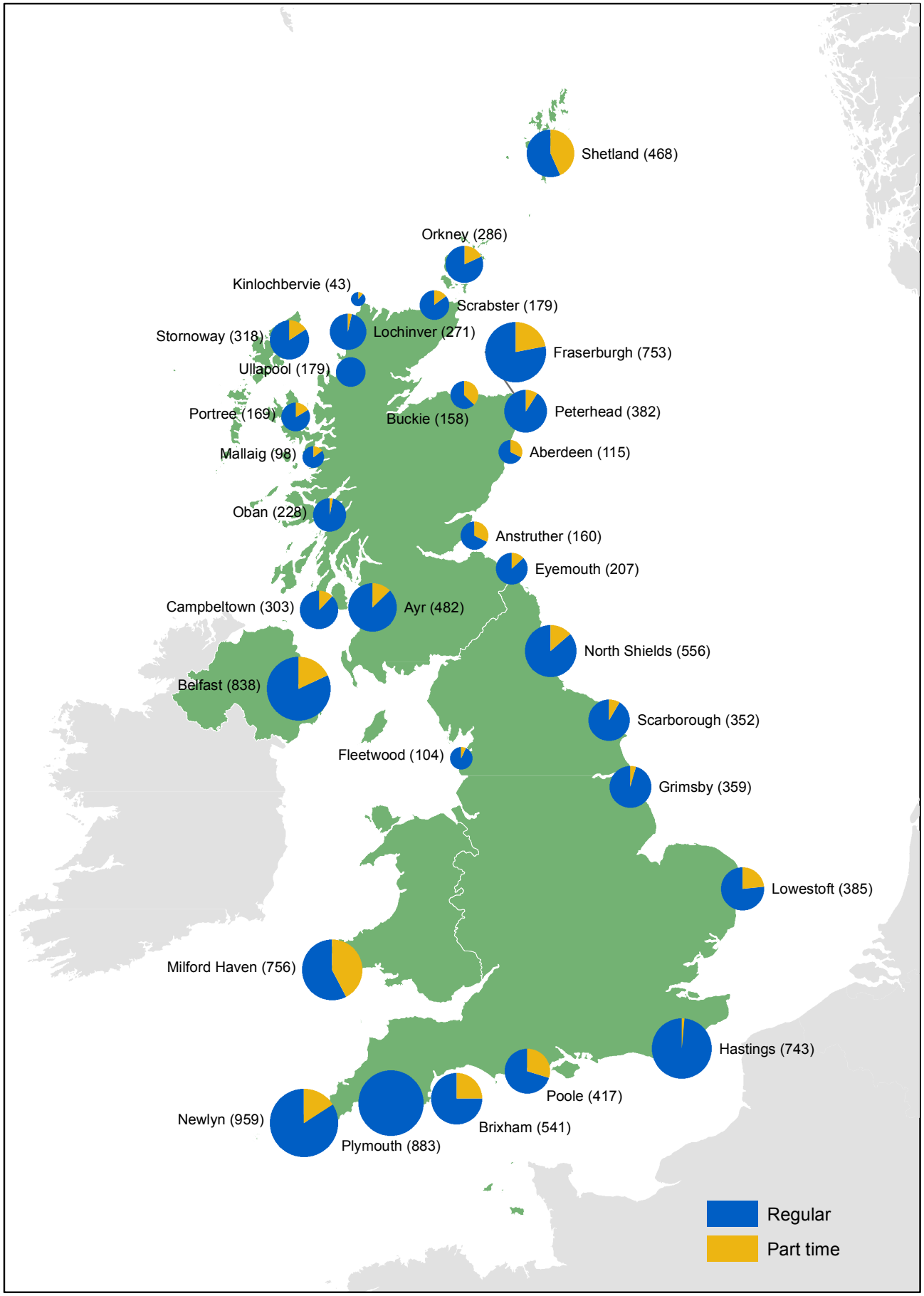
(g) Amendments to fishermen numbers for England, which are reflected in England & Wales and UK figures.

Note: Additional data on UK fishermen are available for download from the MMO website as supplementary Tables 2.6a and 2.6b.

Chart 2.12 shows the total number of fishermen for each administration port in the UK. In 2017:

- Newlyn is the administration port with the largest number of fishermen in the UK (959).
- The largest number of part-time fishermen is found on vessels administered by Milford Haven (321).
- Fraserburgh has the largest number of fishermen in Scotland (753).
- Ports with higher numbers of vessels tend to have higher numbers of fishermen (see Chart 2.5).
- Ports with greater total vessel power tend to have a higher number of fishermen (Chart 2.7).

Chart 2.12: Fishermen numbers by administration port: 2017



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Accidents, lost vessels and fatalities

Figures on accidents involving fishing vessels and fishermen are provided by the Marine Accident Investigation Branch, part of the Department for Transport (see Table 2.7).

TABLE 2.7 Number of accidents, lost vessels and fatalities involving UK fishing vessels: 2007 to 2017

Accident type	2007	2008	2009 [a]	2010	2011	2012	2013	2014	2015	2016	2017
Capsize/Listing	2	2	2	6	7	5	3	3	2	-	2
Collision	18	17	10	15	11	16	12	14	14	10	14
Contact	4	2	6	4	4	4	3	3	1	4	2
Fire/Explosion	9	11	7	10	15	11	5	1	2	2	3
Flooding/Foundering	33	34	31	25	26	23	22	15	6	18	10
Grounding	24	28	26	16	25	21	23	13	19	15	10
Heavy Weather Damage	5	-	3	1	1	1	-	-	-	-	-
Machinery Failure[b]	213	156	140	184	195	174	180	104	69	114	105
Missing Vessel	-	-	-	-	-	-	-	-	1	-	-
Person Overboard	8	7	13	9	15	5	8	4	3	7	5
Other	1	-	-	2	-	-	-	-	1	-	-
Total accidents	**317**	**257**	**238**	**272**	**299**	**260**	**256**	**157**	**118**	**170**	**151**
Vessel losses	**21**	**21**	**15**	**14**	**24**	**9**	**18**	**12**	**13**	**8**	**6**
Injuries	**64**	**60**	**75**	**45**	**58**	**50**	**33**	**46**	**35**	**40**	**32**
Fatalities[c]	**8**	**8**	**13**	**5**	**8**	**6**	**4**	**8**	**7**	**9**	**5**

Source: Marine Accident Investigation Branch

Note: The data in this table are official statistics but are not subject to National Statistics accreditation.

(a) From 2009 these figures include workers on board vessels who are not crew members.

(b) For the Marine Accident Investigation Branch Annual Report 2013 accidents by machinery failure are now sepearated into two categories, Damage to ship and equipment or Loss of control. Further details can be found on their webiste (www.maib.gov.uk).

(c) Number of crew deaths on UK registered fishing vessels.

UK over 10m fishing fleet effort

The effort data table relating to activity in the Western Waters (WW) Regime contained within this publication was updated in 2013 to incorporate more information on effort limits and percentage uptake. Table 2.10 now includes information on other Member States for comparative purposes. This approach reflects that of the quota table (Table 3.12) in Chapter 3. The data shown in the tables, unless indicated otherwise, reflect the data held on the Commission's database (FIDES). Table 2.8 relating to activity in the Sole Recovery Zone (SRZ) has retained the same format as these data are not submitted to the European Commission on an annual basis like other effort schemes, and instead are requested by the Commission on an ad hoc basis in line with their requirements. This means that comparable data for other Member States related to the sole recovery regime are not available.

Since 2002, fishing effort (in kW days) by the over 10 metre fleet has decreased by 39 per cent. (Chart 2.13). This reduction is primarily due to a decline in effort in the demersal trawl and seine segment of 46 per cent (Chart 2.14). The beam trawl segment, which has relatively lower levels of effort, fell by 59 per cent. Falls in effort over this period were recorded for all other gear types except those using dredges, hooks, pots and traps and the rarely used purse seine.

This reduction in effort in the demersal trawl and seine segment was largely due to decommissioning exercises carried out by UK fisheries administrations in 2001-2002 and 2003. The latter focussed on removing fleet capacity targeting cod in the Cod Recovery Zone (a combination of North Sea, West of Scotland and Irish Sea fishing areas), and was particularly focussed on vessels that used demersal trawls fishing for whitefish. A further exercise was carried out to remove excess beam trawl fishing capacity in the Western Channel fishing area (ICES division VIIe), as part of the recovery regime for sole. This removed 8 active vessels in this area.

More information on the control of fishing effort under the cod and sole recovery regimes, and in the Western Waters, is given below.

Chart 2.13: UK fishing fleet effort in kW days at sea: 2002 to 2017

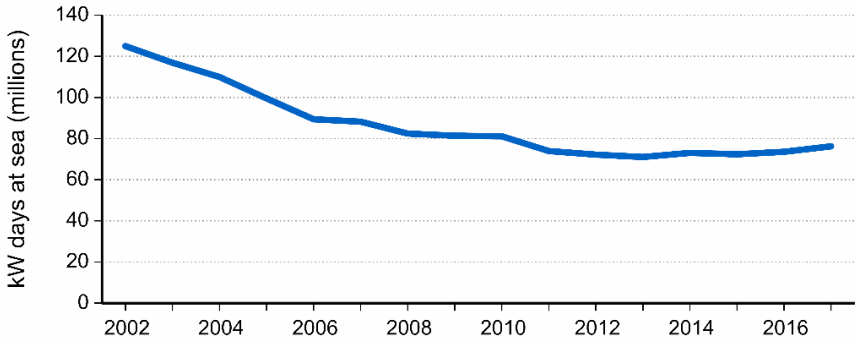
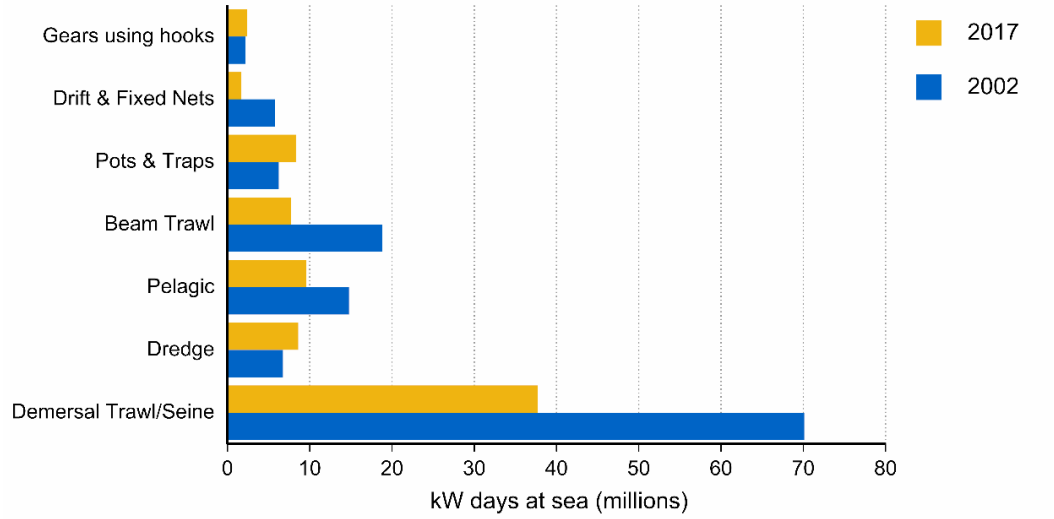


Chart 2.14: UK fishing fleet effort in kW days at sea by gear type: 2002 and 2017



Note: Data for Charts 2.13 and 2.14 are available for download from the MMO website as supplementary Table 2.11.

Effort of vessels fishing in the Sole Recovery Zone (SRZ)

As part of the measures for recovery of sole stocks, a Sole Recovery Zone was established from February 2004 to apply effort controls to vessels of 10 metres or over using certain gears in the Western Channel (ICES division VIIe). The regimes which applied in 2010 are described in Annex IIC of Council Regulations (EC) Nos 43/2009 and 53/2010.

Limits apply on the number of days spent at sea by vessels fishing with beam trawls of mesh size greater than or equal to 80mm and by vessels using static nets (including gill nets, trammel nets and tangle nets) with mesh size less than 220mm. The Marine Management Organisation controls effort in the Western Channel by allocating days for fishing with these gears to eligible vessels.

Table 2.8 shows the number of vessels fishing with regulated beam trawls in the Western Channel and the effort exerted.

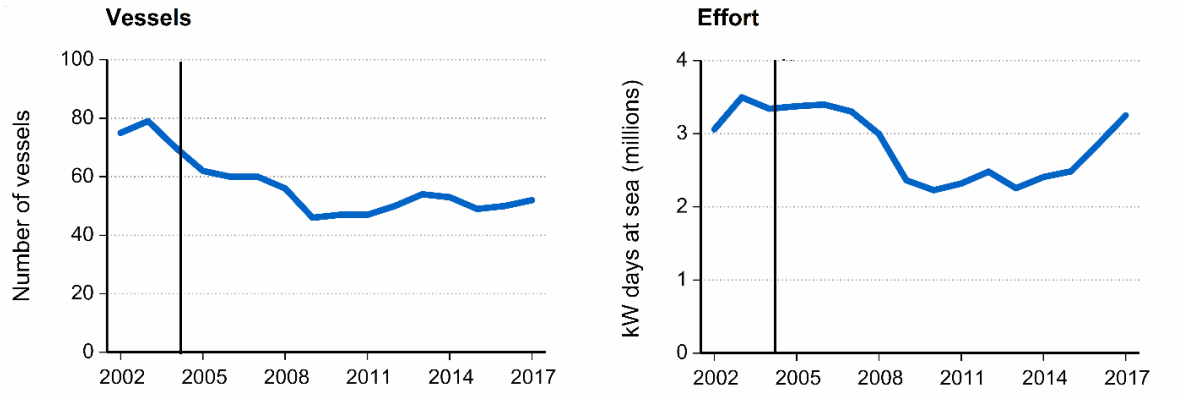
Table 2.8 Beam Trawl activity in the Sole Recovery Zone: 2002 to 2017

Year	Vessels	Days at sea	kW days
2002	75	6,474	3,059,302
2003	79	7,205	3,497,479
2004	70	6,285	3,341,233
2005	62	6,309	3,375,415
2006	60	6,224	3,398,988
2007	60	6,665	3,302,943
2008	56	6,319	2,997,036
2009	46	4,963	2,363,694
2010	47	5,071	2,227,990
2011	47	5,685	2,318,843
2012	50	6,652	2,480,724
2013	54	6,121	2,255,310
2014	52 [R]	6,116	2,407,901
2015	49	6,246	2,485,062
2016	50	6,786	2,859,242
2017	52	7,545	3,250,485

Source: Fisheries Administrations in the UK

From 2002 to 2004 the number of vessels beam trawling in the Western Channel decreased by 7 per cent; however, fishing effort (kW days) increased by 9 per cent. Since the implementation of the SRZ, the number of vessels beam trawling in the Western Channel fell dramatically, as did effort. Reasons for this may include the effect of decommissioning schemes as well as reduced fishing opportunities owing to effort and quota controls. However, the number of vessels and effort has increased in recent years (Chart 2.15).

Chart 2.15: Fleet size and effort (kW days) of vessels using beam trawls in the Sole Recovery Zone: 2002 to 2017



Note: The Sole Recovery Regime was established in 2004.

Effort of vessels fishing in the Cod Recovery Zone (CRZ)

As part of the measures for recovery of cod stocks, a Cod Recovery Zone was established from February 2003 to apply effort controls to vessels of 10 metres or over using specified gears in the North Sea and West of Scotland. The regime was extended in 2004 to include the Irish Sea (ICES division VIIa) and the Eastern Channel (ICES division VIId). The effort controls of the CRZ were repealed in November 2016 by EU Parliament and Council regulation No 2016/2094. Under this amended regulation an individual vessel's effort with regulated gears is unlimited but the combined engine power capacity of the fleet is capped at 2006 or 2007 levels in each of the four management areas.

The regime in operation during 2016 (before repeal) was established by Council Regulation (EC) No 1342/2008. The CRZ included four sea areas: Kattegat, Irish Sea (ICES division VIIa), North Sea (ICES division IIIa excluding Kattegat; ICES sub-area IV; EU waters of ICES division IIa; ICES division VIId) and West of Scotland (ICES division VIa and EU waters of ICES division Vb). Nine regulated gears were defined in the CRZ regulations, identified as causing significant cod mortality. Up to repeal UK Fisheries Administrations operated schemes to limit the number of days spent fishing with these gears in each sea area. Effort was allocated to each gear type in each area based on the member state's historic track record in that gear/area combination.

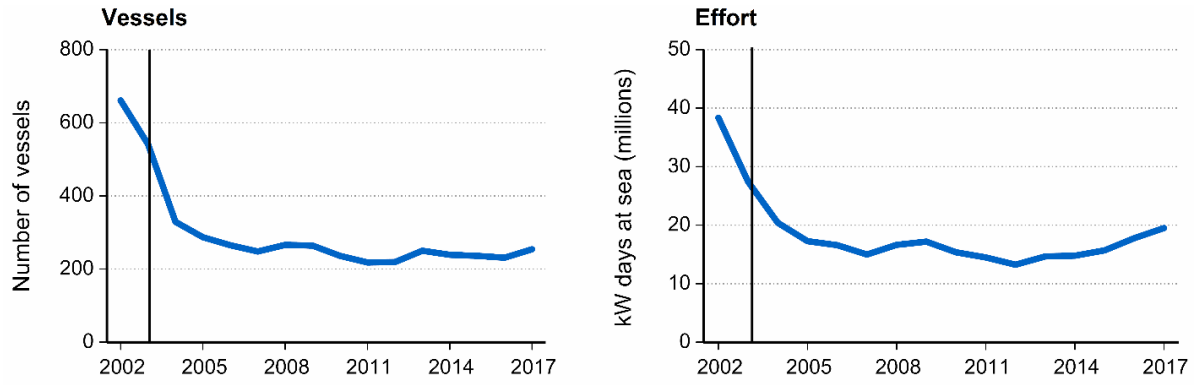
Surplus effort for one gear type was transferable to other gear groups in the same CRZ area. Transfers of effort between CRZ areas were prohibited. Any inter-gear transfers of effort required an adjustment to account for the differences in the levels of cod mortality between the gears in question. The TR1 and TR2 gear groups were merged into a single group in the North Sea under Implementing Regulation No 2324/2015 in 2015. This merger removed the cod mortality adjustments previously required to transfer surplus TR2 effort to TR1. This merger increased available TR1 effort, as TR2 effort was consistently underutilised when compared with TR1 effort. The overall trends for these important gear groups are discussed below.

Gear type TR1

Gear type TR1 includes bottom trawls, Danish seines and similar towed gear, excluding beam trawls, of mesh size greater than or equal to 100 mm. Gears of this type are typically used to target whitefish, including cod.

From 2002 to the end of 2003 the number of vessels fishing in the CRZ using gear type TR1 fell by 18 per cent (Chart 2.16). Over the same period, effort (kW days) decreased by 29 per cent, in part due to decommissioning schemes targeting the demersal fleet. Since the implementation of the CRZ, the number of vessels using gear type TR1 has decreased by 53 per cent and effort (kW days) by 29 per cent.

Chart 2.16: Fleet size and effort (kW days) of vessels using gear type TR1 in the Cod Recovery Zone: 2002 to 2017



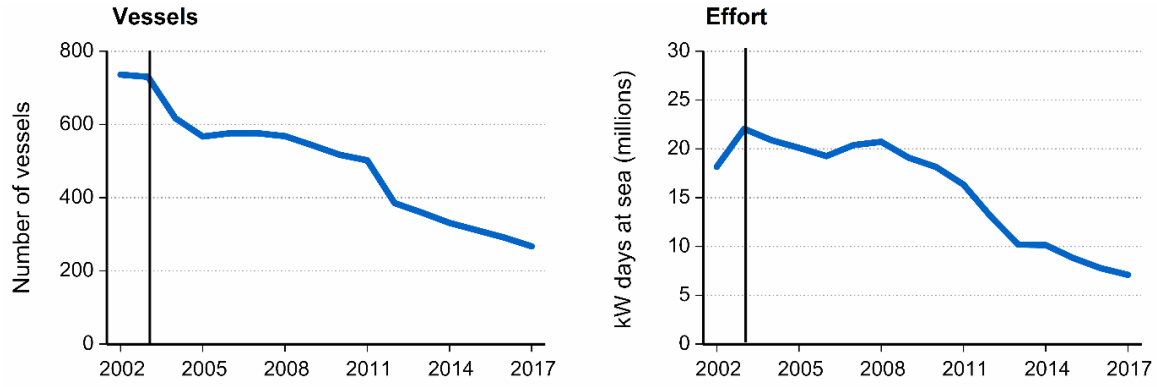
Note: The Cod Recovery Regime was established in 2003, initially limited to the North Sea and West of Scotland, but was expanded in 2004 to include the Irish Sea (ICES division VIIa) and the Eastern Channel (ICES division VIId).

Gear type TR2

Gear type TR2 includes bottom trawls, Danish seines and similar towed gear, excluding beam trawls, of mesh size greater than or equal to 70 mm and less than 100 mm. Gears of this type are typically used to target langoustines (*nephrops*), but may also catch significant amounts of cod.

From 2002 to the end of 2003 the number of vessels fishing in the CRZ using gear type TR2 decreased by 1 per cent while effort (kW days) increased by 21 per cent. Since the implementation of the CRZ, the number of vessels using gear type TR2 has decreased by 63 per cent and effort (kW days) decreased by 68 per cent (Chart 2.17).

Chart 2.17: Fleet size and effort (kW days) of vessels using gear type TR2 in the Cod Recovery Zone: 2002 to 2017



Note: The Cod Recovery Regime was established in 2003, initially limited to the North Sea and West of Scotland, but was expanded in 2004 to include the Irish Sea (ICES division VIIa) and the Eastern Channel (ICES division VIId).

Table 2.9 Effort of UK 10m and over vessels fishing in the Cod Recovery Zone: 2017

kW days

Gear	Irish Sea	North Sea	West of Scotland	All CRZ Areas
	VIIa	*IIa, IV, VIId*	*VIa, Vb*	
BT1	-	344,626	-	344,626
BT2	910	2,348,517	-	2,349,426
GN1	843	227,980	22,997	251,821
GT1	-	6,509	-	6,509
LL1	2,461	799,269	579,310	1,381,040
TR1	421,296	16,760,654	2,319,053	19,501,003
TR2	2,157,175	2,663,333	2,273,802	7,094,310
Total Regulated Gears	**2,582,685**	**23,150,888**	**5,195,162**	**30,928,735**

Source: Fisheries administrations in the UK

Appendix ND.3.2

Effort of vessels fishing in the Western Waters

To prevent growth in fishing activity in the sea areas to the west of the UK, Ireland, Spain, Portugal and Morocco an area (the 'Western Waters') was established from November 2003 in which fishing effort is limited. The regime was established by Council Regulation (EC) No 1954/2003 and remains in force.

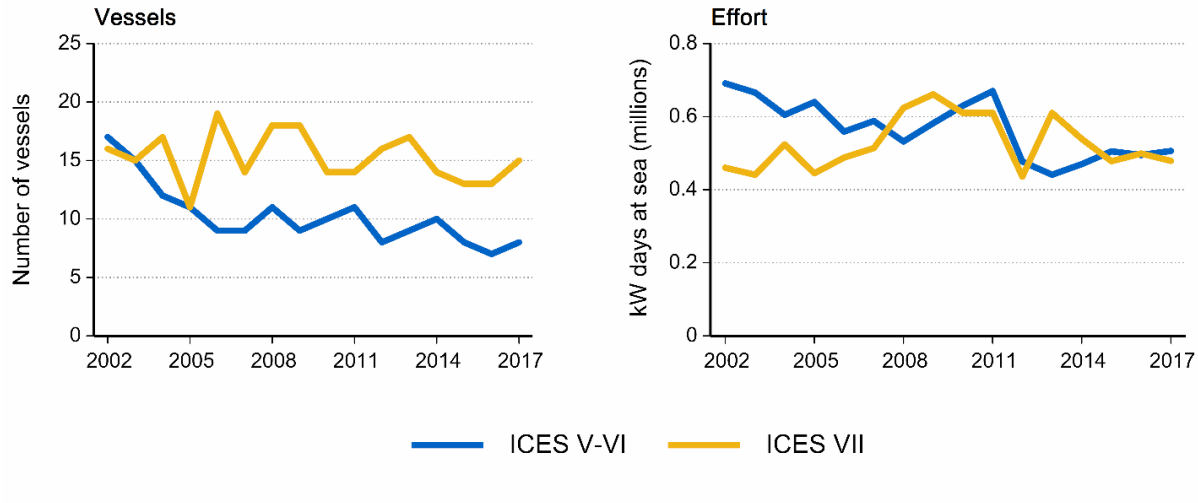
The Western Waters regime covers nine sea areas. Regulated activity is permitted for UK registered vessels in four of these. Ceilings exist on the maximum fishing effort to be exerted by 15 metres and over vessels targeting certain species in ICES sub-areas V and VI; ICES sub-area VII; and ICES sub-area VIII. The fourth area is a region to the south and west of Ireland with high concentrations of juvenile hake known as the Biologically Sensitive Area (BSA). Ceilings in this region apply to fishing effort exerted by 10 metres and over vessels.

The information included in this section represents that which is submitted to the Commission under the Western Waters regime. Within this reporting regime, the UK and other Member States are required to submit monthly reports on fishing effort.

Trips targeting crabs

Trips targeting edible crabs and spider crabs are covered by the Western Waters regime. From 2002 to 2017 the number of vessels targeting crabs in ICES sub-areas V and VI has fallen from 17 to 8 while the number in ICES sub-area VII has fluctuated between 6 vessels in 2002 and 15 vessels in 2017. Effort levels have also fluctuated over this period and were 27 per cent lower for ICES sub-areas V and VI and were 4 per cent higher for ICES sub-area VII (Chart 2.18).

Chart 2.18: Fleet size and effort (kW days) of vessels targeting crabs in the Western Waters: 2002 to 2017

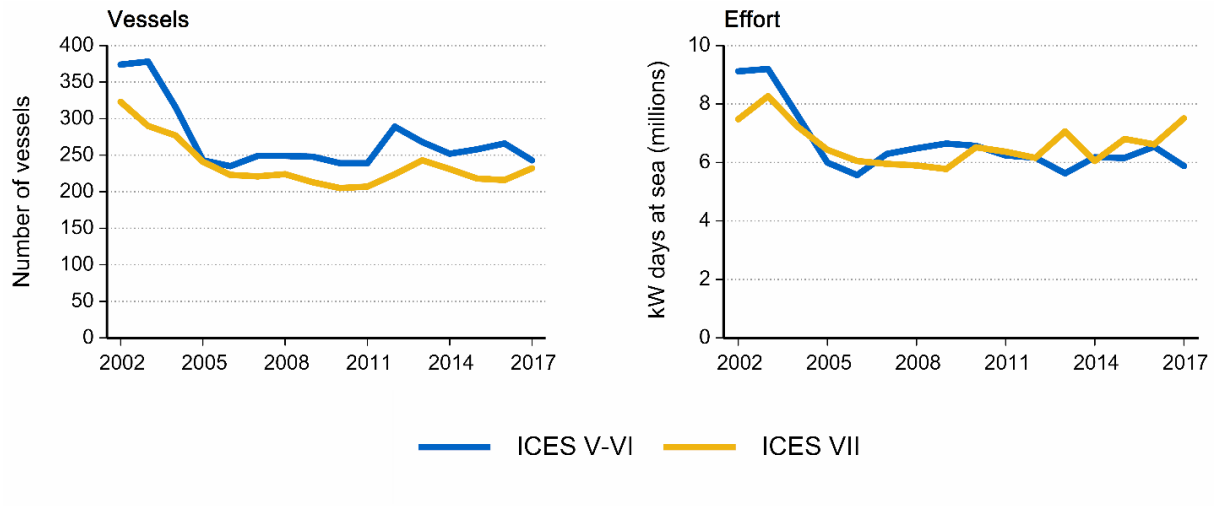


Trips targeting demersal species

The Western Waters regime places limits on the effort exerted on trips targeting demersal species excluding certain deep sea species.

From 2002 to 2017 the number of vessels targeting demersal species in ICES sub-areas V and VI decreased by 35 per cent and the effort fell by 36 per cent. The reductions may be partly attributed to decommissioning schemes and limited fishing opportunities due to effort and quota controls. For ICES sub-area VII, the number of vessels fell by 28 per cent although effort is now back to 2002 levels.

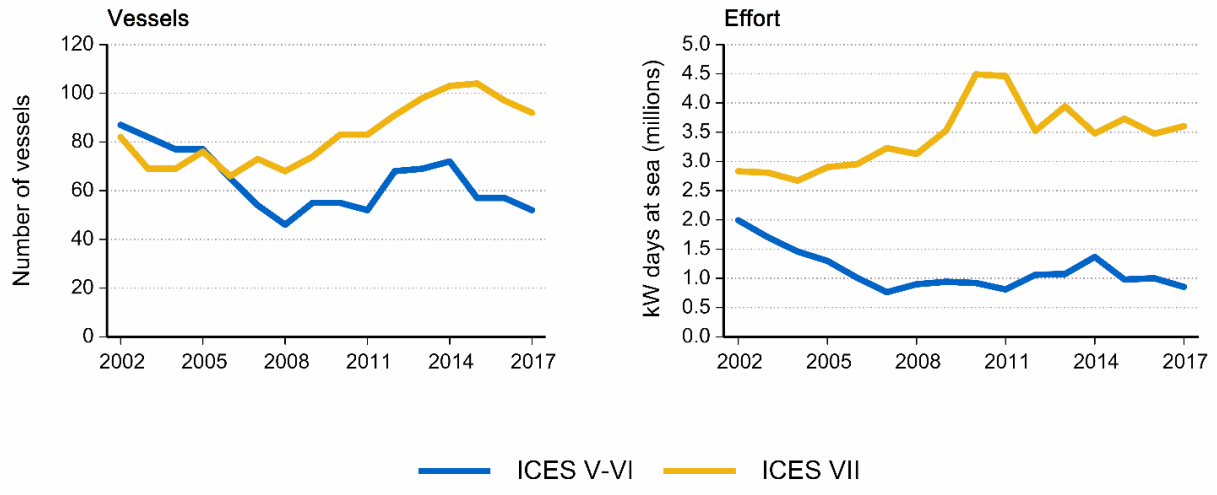
Chart 2.19: Fleet size and effort (kW days) of vessels targeting demersal species in the Western Waters: 2002 to 2017



Trips targeting scallops

From 2002 to 2017, the number of vessels targeting scallops in ICES sub-areas V and VI decreased by 40 per cent while the number in ICES sub-area VII increased by 12 per cent. Over the same period, effort in ICES sub-areas V and VI fell by 57 per cent, but effort in ICES sub-area VII increased by 27 per cent. This increase is partly due to diversion of activity from other sea areas as well as increased activity by vessels already fishing in ICES sub-area VII.

Chart 2.20: Fleet size and effort (kW days) of vessels targeting scallops in the Western Waters: 2002 to 2017



A summary of effort uptake by relevant member states is shown in Table 2.10 below.

Table 2.10 Effort of UK 15m and over vessels fishing in the Western Waters: 2017

kW days

Species	ICES Area		UK	Belgium	Denmark	France	Germany	Ireland	Netherlands	Portugal	Spain
			GBR	BEL	DNK	FRA	DEU	IRL	NLD	PRT	ESP
Crabs	**V, VI**	Limit	702,292	-	-	-	-	465,000	-	-	-
		Effort	506,175	-	-	-	-	134,187	-	-	-
		Uptake %	72%	-	-	-	-	29%	-	-	-
	VII	Limit	543,366	-	-	1,946,719	-	-	-	-	-
		Effort	479,429	-	-	325,246	-	-	-	-	-
		Uptake %	88%	-	-	17%	-	-	-	-	-
Demersal	**V, VI**	Limit	24,017,229	58,452	215,234	11,649,154	186,370	2,324,932	-	-	2,460,000
		Effort	5,879,666	-	-	2,623,864	nd	790,203	-	-	871,224
		Uptake %	24%	0%	0%	23%	-	34%	-	-	35%
	VII	Limit	25,786,266	7,346,910	-	40,657,844	233,560	7,544,120	760,279	-	17,957,785
		Effort	7,510,466	4,988,445	-	12,393,424	nd	4,627,574	725,597	-	4,201,517
		Uptake %	29%	68%	-	30%	-	61%	95%	-	23%
	VIII	Limit	218,406	742,465	-	24,963,097	4,952	-	403,327	2,552,222	33,100,000
		Effort	48,621	514,945	-	9,739,141	nd	-	-	260,357	14,048,605
		Uptake %	22%	69%	-	39%	-	-	0%	10%	42%
	BSA	Limit	3,061,485	235,432	-	9,559,653	8,326	7,054,490	-	-	5,642,215
	(Biologically	Effort	747,516	167,848	-	-	nd	3,210,863	-	-	1,754,759
	Sensitive Area)	Uptake %	24%	71%	-	0%	-	46%	-	-	31%
Scallops	**V, VI**	Limit	1,974,425	-	-	-	-	-	-	-	-
		Effort	854,215	-	-	-	-	-	-	-	-
		Uptake %	43%	-	-	-	-	-	-	-	-
	VII	Limit	4,035,619	354,066	-	6,727,932	-	525,012	155,157	-	-
		Effort	3,604,208	85,173	-	2,548,352	-	315,758	-	-	-
		Uptake %	89%	24%	-	38%	-	60%	0%	-	-

Source: European Commission

3 Landings

Introduction

In 2017, UK vessels landed 724 thousand tonnes of sea fish (including shellfish) into the UK and abroad with a value of £980 million. This is a 3 per cent increase in quantity and a 4 per cent increase in value compared with the previous year.

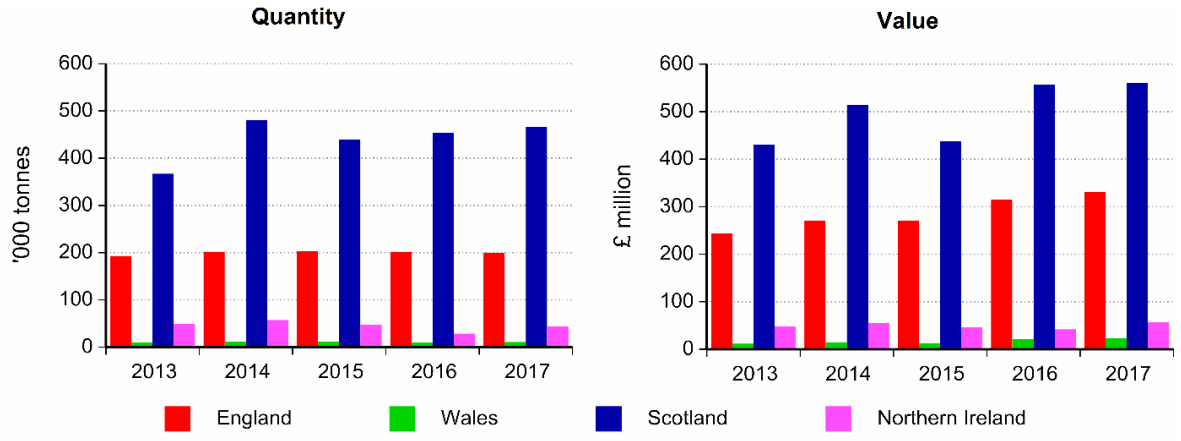
This chapter provides a comprehensive overview of the weight and value of landings by UK vessels into the UK and abroad and by foreign vessels into the UK. The publication includes breakdowns of landings data according to:

- Vessel nationality
- Port and country of landing
- Area of capture and fishing gear used
- Vessel size and sectoral membership

Data are also provided on landings and quota uptake for all EU member states. All **landings data are given in terms of live weight**. The calculation of average prices excludes landings with zero value to better reflect the price of fish.

All tables presented here are available to download as spreadsheets from the MMO website. Supplementary tables showing more detail can also be found on the website. Also available for download is a summary report showing estimates of UK and non-UK landings by Exclusive Economic Zone of capture.

Chart 3.1: Quantity and value of landings into the UK and abroad by UK vessels by vessel nationality: 2013 to 2017



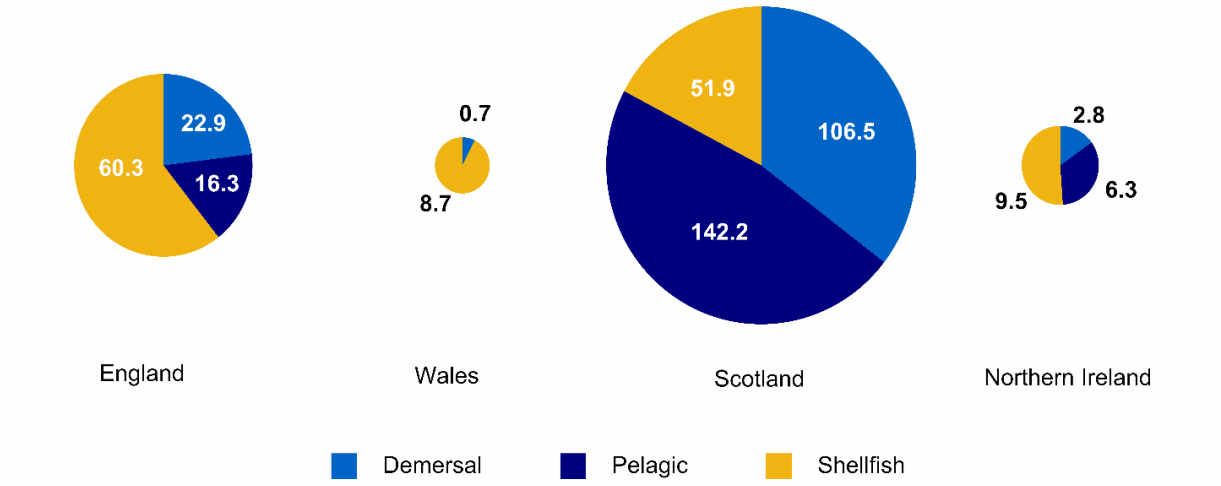
Landings by all UK vessels and by foreign vessels into the UK

Sixty per cent of fish caught by the UK fleet were landed in the UK (74 per cent in terms of value). Chart 3.1 shows the landings into the UK and abroad by vessel nationality. Table 3.1 shows that Scottish vessels accounted for 64 per cent of the weight of landings by UK vessels (57 per cent by value). English vessels accounted for 28 per cent of the weight (34 per cent by value). The Northern Irish fleet caught 6 per cent of landings by weight and value. Welsh vessels caught 1 per cent of the landings and 2 per cent of the value. Island fleets caught the remaining 1 per cent of landings and value.

Landings by UK vessels into the UK fell by 2 per cent to 434 thousand tonnes in 2017. Shellfish used to account for the largest share of UK fleet landings. But since 2014, with the increase in mackerel quota and resultant catch, pelagic landings now have the highest share (38 per cent) but only 15 per cent of the value. Relatively high value shellfish and demersal species each account for 31 per cent of landings and 47 and 37 per cent in terms of value respectively. This shows that average prices of shellfish are the highest overall while average prices of pelagic species are the lowest.

Chart 3.2 shows a breakdown of landings by species group into England, Wales, Scotland and Northern Ireland by UK vessels. The largest amount, 301 thousand tonnes, was landed into Scotland with a value of £453 million. Landings into England were 100 thousand tonnes (£212 million).

Chart 3.2: Landings into UK countries by UK vessels: 2017 ('000 tonnes)



Breakdowns by species of landings into the UK by UK vessels, landings into the UK by foreign vessels and landings abroad by UK vessels are given in Tables 3.2 to 3.6. In 2017:

- 40 per cent of all landings by the UK fleet were made abroad, up from 37 per cent in 2016 (see Tables 3.5 and 3.6). Forty five per cent of all our landings abroad were mackerel. Overall, 58 per cent of pelagic fish were landed abroad compared with 27 per cent of demersal fish and 7 per cent of shellfish.
- The UK fleet accounted for 90 per cent of all fish landed into the UK (see Tables 3.2 and 3.4). Foreign landings into the UK fell from 53 thousand tonnes in 2016 to 48 thousand tonnes in 2017. Key species were mackerel, hake and saithe.
- Shellfish, which are largely exempt from quotas, formed the majority of landings by the UK fleet into England, Wales and Northern Ireland. Pelagic fish had the highest share of landings into Scotland (see Tables 3.2a to 3.2d and Chart 3.2).

TABLE 3.1 Landings into the UK and abroad by UK vessels: 2013 to 2017

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
(i) **Vessels administered in the UK**										
Demersal	179.4	169.8	169.1	180.4	182.3	281.2	299.5	293.7	346.4 R	354.7
Pelagic	292.1	436.6	389.8	369.8 R	394.8	191.4	271.5	206.6	261.2 R	257.2
Shellfish	155.3	151.6	149.8 R	150.4 R	147.2	268.7	293.1	276.1 R	339.0 R	368.1
Total Fish	**626.8**	**757.9**	**708.7** R	**700.6** R	**724.3**	**741.3**	**864.1**	**776.4** R	**946.7** R	**980.1**
(ii) Vessels administered in England										
Demersal	73.8	77.9	74.4	81.4	76.7	136.8	151.2	144.9	171.4 R	164.0
Pelagic	59.7	66.2	68.5	65.2 R	67.1	18.6	25.3	30.3	31.7 R	38.5
Shellfish	59.5	58.1	60.4	55.5	55.6	88.3	94.6	96.0	111.7	128.0
Total Fish	193.1	202.1	203.3	202.0 R	199.4	243.8	271.2 R	271.2	314.8 R	330.5
(iii) Vessels administered in Wales										
Demersal	1.0	1.2	1.3	1.1	0.9	2.1	2.8	2.9	3.1 R	2.9
Pelagic	..	..	..	..	..	..	..	..	..	..
Shellfish	8.8	10.6	9.7	8.8	9.9	9.7	12.1	10.2	18.6	20.6
Total Fish	9.8	11.8	11.1	9.9	10.8	11.8	14.9	13.1	21.7	23.5
(iv) Vessels administered in Scotland										
Demersal	102.1	88.7	90.8	95.4	101.9	139.4	143.2	142.8	168.7	183.9
Pelagic	202.6	330.4	291.5	294.4	301.4	153.2	220.2	160.1	222.3	197.1
Shellfish	62.3	61.6	57.8	63.6	62.5	137.4	150.8	134.4	165.9 R	179.5
Total Fish	367.0	480.7	440.1	453.3	465.8	430.0	514.1	437.4	556.9	560.5
(v) Vessels administered in Northern Ireland										
Demersal	2.3	1.8	2.3	2.4	2.7	2.5	2.1	2.5	2.7	3.8
Pelagic	29.8	40.0	29.8	10.2	26.3	19.6	26.0	16.1	7.3	21.6
Shellfish	17.3	15.5	15.8 R	15.9 R	14.4	25.9	27.7	27.6 R	32.0 R	30.9
Total Fish	49.4	57.3	47.9 R	28.5 R	43.4	48.0	55.8	46.2 R	42.0 R	56.3
(vi) Vessels administered in the Islands (a)										
Demersal	0.1	0.1	0.2	0.2	0.1	0.4	0.3	0.6	0.5	0.2
Pelagic	..	..	..	..	..	..	..	..	..	..
Shellfish	7.4	5.7	6.1	6.6	4.8	7.3	7.9	8.0	10.8	9.1
Total Fish	7.5	5.9	6.3	6.8	4.9	7.7	8.2	8.6	11.3	9.3

Source: Fisheries Administrations in the UK

(a) Jersey, Guernsey and the Isle of Man

Note: Additional data on UK vessel landings are available for download from the MMO website as supplementary Table 3.1a.

TABLE 3.2 Landings into the UK by UK vessels: 2013 to 2017 [a]

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Bass	0.8	1.0	0.6	0.5	0.4	5.6	7.3	5.4	4.8	4.2
Brill	0.3	0.3	0.3	0.4	0.3	1.6	1.6	1.6	2.0	2.0
Cod	13.0	14.0	15.4	20.7	21.6	25.8	27.8	29.5	41.7 R	48.0
Dogfish	0.7	0.7	1.6	1.7	1.5	0.2	0.1	0.3	0.4	0.4
Gurnard	1.8	1.3	1.6	1.8	1.5	1.2	0.9	1.0	1.2	1.2
Haddock	38.7	35.4	32.4	33.1	33.6	43.5	49.3	44.2	44.0 R	50.7
Hake	6.5	8.5	8.8	11.4	12.6	16.1	19.7	20.9	26.9	27.4
Halibut	..	..	0.1	0.1	0.2	0.5	0.4	0.4	0.9	1.4
Lemon Sole	2.5	2.3	1.8	2.0	1.6	7.6	7.9	7.3	8.3	7.3
Ling	4.0	4.4	4.1	4.9	5.3	5.5	5.4	5.3	7.0	8.7
Megrim	4.0	3.3	3.1	3.2	3.0	9.1	8.6	7.6	9.0	8.4
Monks or Anglers	10.1	11.4	14.3	16.4	16.3	30.3	31.4	34.8	46.8	46.9
Plaice	4.1	3.6	3.5	4.7	4.8	4.0	3.6	3.6	5.3	6.5
Pollack (Lythe)	1.6	1.9	1.6	1.9	1.5	3.4	3.4	3.1	4.3	3.9
Saithe	12.9	11.1	9.9	10.0	10.0	11.0	10.2	8.5	10.3	9.8
Sand Eels	..	..	..	..	..	..	..	..	..	..
Skates and Rays	2.6	2.4	2.4	2.4	2.4	3.3	2.7	2.8	3.0	3.0
Sole	1.8	1.8	1.4	1.5	1.5	12.8	12.4	10.4	13.3	14.0
Turbot	0.4	0.5	0.5	0.5	0.6	3.7	4.2	4.2	4.7	5.3
Whiting	12.0	11.1	10.7	10.3	9.8	11.5	11.8	11.0	10.8	12.3
Witch	0.8	0.8	0.6	0.8	1.0	0.8	0.7	0.7	1.0	1.1
Other Demersal [b]	3.9	4.2	3.4	3.6	3.5	5.5	5.7	6.2	9.0 R	6.1
Total Demersal	**122.6**	**120.0**	**118.4**	**132.2 R**	**132.9**	**203.0**	**215.3**	**208.9**	**254.9 R**	**268.7**
Blue Whiting	8.2	9.7	12.1	11.9	13.1	1.8	1.3	2.0	2.4	1.6
Herring	37.5	38.3	38.6	40.5	44.9	13.6	10.5	13.4	25.3	18.2
Horse Mackerel	2.5	3.1	2.9	0.9	0.1	0.9	1.1	1.3	0.3	0.1
Mackerel	78.2	126.2	94.8	103.9	95.5	70.1	104.1	60.6	88.8	86.4
Sardines	3.7	3.4	4.2	8.0	7.1	1.0	0.8	1.6	2.6	2.4
Other Pelagic	4.8	5.7	3.8	5.3	4.1	1.0	2.1	0.8	1.3	1.1
Total Pelagic	**134.9**	**186.3**	**156.4**	**170.4**	**164.9**	**88.4**	**119.9**	**79.6**	**120.7**	**109.7**
Cockles	10.1	10.2	11.2	5.0	6.0	5.3	7.9	5.7	3.5	4.3
Crabs	29.2	32.6	29.1	32.4 R	30.7	39.0	44.4	39.2	47.0 R	53.8
Cuttlefish	3.7	3.1	6.0	5.0	7.0	6.5	6.5	10.6	14.0	25.4
Lobsters	3.0	3.4	3.1	3.3	3.4	29.9	33.5	32.2	39.6 R	44.3
Mussels	0.5	0.2	1.0	0.3 R	0.7	0.2	0.1	0.8	0.2	0.6
Nephrops	28.3	30.3	25.7	30.7	29.9	86.0	98.5	81.9	100.5	95.6
Scallops	48.7	38.6	40.8	38.5 R	32.6	62.6	58.3	64.3	74.1	74.0
Shrimps and Prawns	0.9	0.6	0.3	0.8	0.6	2.4	1.4	0.8	3.0	2.6
Squid	1.8	2.9	1.8	2.0	3.4	7.0	9.2	6.4	8.2	13.0
Whelks	20.0	19.8	20.9	22.7	20.8	13.7	16.2	18.6	22.9	22.7
Other Shellfish	1.8	1.1	1.3	1.2	1.3	5.4	3.7	4.0	4.7	6.0
Total Shellfish	**148.0**	**142.8**	**141.2**	**141.8 R**	**136.2**	**257.9**	**279.6**	**264.6**	**317.8 R**	**342.3**
Total All Species	**405.5**	**449.2 R**	**416.0 R**	**444.4 R**	**434.1**	**549.3**	**614.8**	**553.0**	**693.4 R**	**720.7**

Source: Fisheries Administrations in the UK

(a) Landings data include transhipments and Islands figures.

(b) Includes fish roes and livers.

TABLE 3.2a Landings into England by UK vessels: 2013 to 2017 [a]

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Bass	0.7	0.9	0.6	0.5	0.4	5.1	6.7	4.9	4.3	3.7
Brill	0.3	0.3	0.3	0.3	0.3	1.5	1.5	1.6	1.9	1.9
Cod	1.0	1.0	1.3	4.2	3.5	2.0	1.8	2.2	7.3 R	6.0
Dogfish	0.3	0.3	1.0	1.2	0.9	0.1	0.1	0.2	0.3	0.3
Gurnard	1.4	0.9	1.0	1.2	1.1	0.9	0.7	0.7	0.9	1.0
Haddock	1.6	0.9	0.9	0.7	0.7	2.2	1.5	1.4	1.2 R	1.3
Hake	0.8	0.9	1.2	1.3	1.5	1.7	1.8	2.2	2.7	3.6
Halibut	..	..	..	..	..	..	..	0.1	0.1	0.2
Lemon Sole	1.8	1.7	1.1	1.2	0.9	5.7	5.8	4.9	5.3	4.2
Ling	0.3	0.4	0.2	0.3	0.2	0.4	0.4	0.3	0.3	0.2
Megrim	1.2	1.0	1.0	0.9	0.9	2.0	2.4	2.3	2.3	2.2
Monks or Anglers	3.0	3.4	3.4	3.3	2.6	9.1	8.5	7.9	9.3	8.0
Plaice	2.4	2.2	1.8	2.5	2.7	2.7	2.5	2.3	3.1	3.9
Pollack (Lythe)	1.2	1.5	1.0	1.4	1.0	2.5	2.7	2.1	3.3	2.5
Saithe	0.2	0.1	0.2	0.1	..	0.2	0.1	0.1	0.1	..
Sand Eels	..	..	..	..	..	..	..	..	..	..
Skates and Rays	1.8	1.6	1.5	1.6	1.6	2.5	1.9	1.9	2.0	2.1
Sole	1.8	1.8	1.4	1.5	1.5	12.7	12.3	10.2	13.2	14.0
Turbot	0.4	0.5	0.5	0.5	0.5	3.2	3.7	3.6	4.2	4.7
Whiting	1.9	1.7	1.6	1.5	1.1	1.3	1.3	1.1	1.1	0.9
Witch	..	..	..	..	..	..	..	..	..	..
Other Demersal [b]	2.0	2.3	1.6	1.8	1.7	2.6	3.0	2.3	2.8	2.8
Total Demersal	**24.0**	**23.4**	**21.6**	**26.0**	**22.9**	**58.5**	**58.7**	**52.5**	**65.7 R**	**63.6**
Blue Whiting	-	-	..	-	-	-	-	..	-	-
Herring	3.9	2.9	3.1	2.5	3.8	1.1	1.0	1.0	1.1	1.6
Horse Mackerel	1.9	2.3	2.2	0.9	0.1	0.5	0.7	0.8	0.3	0.1
Mackerel	1.2	1.8	2.6	2.3	2.6	1.4	1.6	2.0	1.9	2.4
Sardines	3.7	3.4	4.2	8.0	7.1	1.0	0.8	1.6	2.6	2.4
Other Pelagic	3.8	4.1	2.7	3.1	2.6	0.8	1.7	0.5	0.8	0.7
Total Pelagic	**14.5**	**14.5**	**14.8**	**16.8**	**16.3**	**4.8**	**5.9**	**5.9**	**6.7**	**7.2**
Cockles	10.1	10.2	11.2	5.0	6.0	5.3	7.9	5.7	3.5	4.3
Crabs	13.6	15.8	14.1	16.1	14.6	18.2	21.1	18.9	22.7	25.0
Cuttlefish	3.6	3.1	6.0	5.0	7.0	6.5	6.5	10.6	14.0	25.4
Lobsters	1.7	1.8	1.7	1.8	1.9	16.4	17.8	17.8	22.2	23.7
Mussels	0.2	0.1	0.1	..	..	..	..	..	..	..
Nephrops	3.5	3.2	2.1	3.4	2.9	10.7	10.3	7.0	11.3	9.3
Scallops	14.3	13.4	14.3	11.6	15.2	22.3	22.0	25.9	24.1	35.4
Shrimps and Prawns	0.9	0.6	0.3	0.8	0.6	2.3	1.3	0.8	3.0	2.5
Squid	0.6	0.7	0.5	0.3	0.5	2.7	3.0	2.2	1.7	2.4
Whelks	13.7	13.8	13.8	13.3	11.1	9.1	11.4	12.2	13.3	11.9
Other Shellfish	0.7	0.5	0.8	0.6	0.6	1.3	1.2	1.8	1.6	1.7
Total Shellfish	**62.9**	**63.3**	**64.9**	**58.0**	**60.3**	**94.8**	**102.5**	**103.0**	**117.5**	**141.6**
Total All Species	**101.4**	**101.2**	**101.3**	**100.8**	**99.5**	**158.0**	**167.1**	**161.4**	**189.9 R**	**212.4**

Source: Fisheries Administrations in the UK

(a) Landings data include transhipments

(b) Includes fish roes and livers.

TABLE 3.2b Landings into Wales by UK vessels: 2013 to 2017 [a]

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Bass	0.1	0.1	0.1	0.1	0.1	0.5	0.6	0.5	0.5	0.5
Brill	..	..	..	..	..	..	..	..	..	..
Cod	..	..	..	..	..	0.1	0.1	..	..	..
Dogfish	..	..	..	0.1	..	..	..	..	..	..
Gurnard	..	..	..	..	..	..	..	..	..	..
Haddock	..	..	..	..	..	..	..	..	..	..
Hake	0.1	0.1	0.1	0.1	..	0.1	0.1	0.2	0.2	0.1
Halibut	-	-	-	-	-	-	-	-	-	-
Lemon Sole	..	..	..	..	..	..	..	..	..	..
Ling	..	..	..	..	..	..	..	..	..	..
Megrim	0.6	0.3	0.3	0.3	0.2	1.8	1.0	1.0	1.1	0.6
Monks or Anglers	0.5	0.2	0.3	0.3	0.1	1.6	0.8	1.2	1.2	0.5
Plaice	..	..	..	..	..	..	..	..	..	..
Pollack (Lythe)	..	..	..	..	..	..	..	..	..	..
Saithe	..	..	..	..	..	..	..	..	..	..
Sand Eels	-	-	-	-	-	-	-	-	-	-
Skates and Rays	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Sole	..	..	..	..	..	0.1	0.1	0.1	0.1	0.1
Turbot	..	..	..	..	..	0.1	..	..	..	..
Whiting	..	..	..	..	..	..	..	..	..	..
Witch	0.1	..	..	..	..	0.2	..	0.1	0.1	..
Other Demersal [b]	0.1	0.1	0.1	0.1	..	0.1	0.1	0.1	0.1	0.1
Total Demersal	**1.8**	**1.0**	**1.2**	**1.2**	**0.7**	**4.9**	**3.1**	**3.6**	**3.8** [R]	**2.1**
Blue Whiting	-	-	-	..	-	-	-	-	..	-
Herring	..	..	..	..	..	..	..	..	..	..
Horse Mackerel	-	-	-	..	-	-	-	-	..	-
Mackerel	..	..	..	..	..	..	..	..	..	..
Sardines	-	-	-	-	-	-	-	-	-	-
Other Pelagic	-	..	..	-	-	-	..	..	-	-
Total Pelagic	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**
Cockles	-	-	-	..	..	-	-	-	..	..
Crabs	0.8	0.6	0.5	0.5	0.8	1.0	0.7	0.6	0.7	1.2
Cuttlefish	..	..	..	..	..	..	..	..	..	..
Lobsters	0.2	0.2	0.2	0.2	0.2	1.6	1.8	1.9	2.0	2.1
Mussels	-	-	-	- [R]	..	-	-	-	-	..
Nephrops	..	0.1	..	..	..	..	0.3	..	0.1	..
Scallops	5.5	3.6	2.4	2.4	0.8	5.0	3.6	2.4	2.7	1.4
Shrimps and Prawns	-	-	-	..	..	-	-	-	..	..
Squid	..	..	..	..	..	..	..	..	..	..
Whelks	5.1	4.5	5.1	6.5	6.9	3.7	3.6	4.6	7.0	7.9
Other Shellfish	0.1	0.1	..	..	..	0.5	0.5	0.3	0.5	0.4
Total Shellfish	**11.6**	**9.0**	**8.2**	**9.6** [R]	**8.7**	**11.8**	**10.5**	**9.9**	**12.9**	**13.1**
Total All Species	**13.4**	**10.0**	**9.4**	**10.9** [R]	**9.4**	**16.7**	**13.6**	**13.5**	**16.7**	**15.3**

Source: Fisheries Administrations in the UK

(a) Landings data include transhipments.

(b) Includes fish roes and livers.

TABLE 3.2c Landings into Scotland by UK vessels: 2013 to 2017 [(a)]

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Bass	..	..	..	..	..	..	..	..	..	..
Brill	..	..	..	..	..	..	..	..	..	..
Cod	11.9	12.9	14.0	16.5	18.1	23.5	25.9	27.2	34.3	41.9
Dogfish	..	0.1	0.2	0.2	0.2	..	..	..	..	..
Gurnard	0.4	0.4	0.6	0.6	0.4	0.2	0.2	0.3	0.3	0.2
Haddock	36.7	34.1	30.9	31.6	31.6	41.0	47.4	42.1	41.8	47.5
Hake	5.5	7.5	7.4	9.9	10.9	14.3	17.8	18.4	23.8	23.2
Halibut	..	..	..	0.1	0.2	0.4	0.3	0.4	0.7	1.2
Lemon Sole	0.7	0.7	0.7	0.8	0.7	1.9	2.1	2.4	3.0	3.0
Ling	3.7	4.0	3.8	4.6	5.1	5.0	4.9	5.0	6.7	8.4
Megrim	2.2	2.0	1.8	2.1	1.9	5.3	5.2	4.2	5.6	5.6
Monks or Anglers	6.5	7.6	10.3	12.5	12.9	19.3	21.9	25.1	35.8	36.8
Plaice	1.7	1.4	1.7	2.2	2.1	1.3	1.1	1.2	2.2	2.6
Pollack (Lythe)	0.4	0.4	0.5	0.4	0.5	0.8	0.7	1.0	1.0	1.3
Saithe	12.7	11.0	9.8	9.8	9.9	10.8	10.0	8.4	10.2	9.8
Sand Eels	-	-	-	-	-	-	-	-	-	-
Skates and Rays	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.6
Sole	..	..	..	..	..	..	..	..	..	..
Turbot	..	..	0.1	0.1	0.1	0.4	0.4	0.5	0.4	0.5
Whiting	10.1	9.3	9.1	8.8	8.7	10.2	10.5	9.8	9.7	11.4
Witch	0.6	0.7	0.5	0.7	0.9	0.6	0.6	0.6	0.8	1.0
Other Demersal [(b)]	1.8	1.7	1.7	1.7	1.7	2.7	2.6	3.7	6.0	3.2
Total Demersal	**95.5**	**94.4**	**93.8**	**103.1**	**106.5**	**138.2**	**152.2**	**150.7**	**183.0**	**198.3**
Blue Whiting	8.2	9.7	12.1	11.9	13.1	1.8	1.3	2.0	2.4	1.6
Herring	29.0	31.3	32.1	33.1	37.4	10.9	8.5	11.3	21.7	15.2
Horse Mackerel	0.6	0.8	0.7	..	..	0.3	0.4	0.5	..	..
Mackerel	75.1	122.1	90.6	99.2	90.3	67.0	99.9	57.5	85.3	81.5
Sardines	-	-	-	-	-	-	-	-	-	-
Other Pelagic	1.0	1.5	1.1	2.2	1.4	0.2	0.4	0.2	0.5	0.3
Total Pelagic	**113.9**	**165.4**	**136.6**	**146.4**	**142.2**	**80.4**	**110.5**	**71.5**	**109.8**	**98.7**
Cockles	..	..	..	..	..	..	..	..	..	..
Crabs	12.8	14.3	12.8	13.9	13.5	18.0	20.5	18.1	21.7	25.4
Cuttlefish	..	-	..	..	..	..	-	..	..	0.1
Lobsters	1.0	1.2	1.0	1.1	1.2	10.6	12.6	11.1	13.7	17.1
Mussels	0.3	0.1	-	-	..	0.1	..	-	-	..
Nephrops	17.9	20.2	16.1	20.0	20.8	61.7	73.1	59.2	72.6 [R]	71.4
Scallops	17.8	13.8	14.1	16.2	11.0	26.5	23.6	24.7	33.2	25.9
Shrimps and Prawns	..	..	..	..	..	..	..	..	..	0.1
Squid	1.2	2.2	1.3	1.7	2.9	4.1	6.2	4.2	6.5	10.6
Whelks	0.7	0.9	1.1	1.9	1.8	0.5	0.7	0.9	1.7	1.9
Other Shellfish	1.1	0.5	0.4	0.6	0.7	3.6	1.9	1.9	2.6	3.8
Total Shellfish	**52.7**	**53.1**	**46.8**	**55.3**	**51.9**	**125.1**	**138.6**	**120.1**	**152.0** [R]	**156.3**
Total All Species	**262.1**	**312.9**	**277.2**	**304.9**	**300.6**	**343.7**	**401.3**	**342.3**	**444.8**	**453.3**

Source: Fisheries Administrations in the UK

(a) Landings data include transhipments.

(b) Includes fish roes and livers.

TABLE 3.2d Landings into Northern Ireland by UK vessels: 2013 to 2017 [(a)]

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Bass	..	..	..	..	..	..	..	..	..	..
Brill	..	..	..	..	..	..	..	..	..	0.1
Cod	0.1	0.1	0.1	..	..	0.2	0.1	0.1	0.1	0.1
Dogfish	0.2	0.2	0.4	0.2	0.5	..	..	0.1	..	0.1
Gurnard	..	..	..	..	..	..	..	..	..	..
Haddock	0.3	0.4	0.6	0.8	1.3	0.3	0.4	0.7	1.0	1.9
Hake	0.1	..	0.1	0.1	0.2	0.1	..	0.2	0.2	0.4
Halibut	-	..	..	..	..	-	..	..	..	..
Lemon Sole	..	..	..	..	..	..	..	..	..	..
Ling	..	..	..	..	..	..	..	..	..	..
Megrim	..	..	..	..	..	..	..	..	..	..
Monks or Anglers	0.1	0.1	0.2	0.3	0.6	0.3	0.2	0.5	0.6	1.5
Plaice	..	..	..	..	..	..	..	..	..	..
Pollack (Lythe)	..	..	..	0.1	..	..	..	0.1	0.1	0.1
Saithe	..	..	..	..	..	..	..	..	..	..
Sand Eels	-	-	-	-	-	-	-	-	-	-
Skates and Rays	0.1	..	..	..	0.1	0.1	..	..	..	0.1
Sole	..	..	..	..	..	..	..	..	..	..
Turbot	..	..	..	..	..	0.1	0.1	0.1	0.1	0.1
Whiting	0.1	0.1	..	..	..	0.1	0.1	..	..	..
Witch	0.1	..	..	..	..	..	..	..	..	..
Other Demersal [(b)]	..	..	..	..	..	..	..	..	..	..
Total Demersal	**1.2**	**1.1**	**1.7**	**1.8**	**2.8**	**1.3**	**1.2**	**1.8**	**2.2**	**4.5**
Blue Whiting	-	-	-	-	-	-	-	-	-	-
Herring	4.6	4.1	3.4	4.8	3.8	1.6	1.0	1.0	2.5	1.3
Horse Mackerel	-	..	-	-	-	-	..	-	-	-
Mackerel	1.9	2.3	1.6	2.3	2.6	1.6	2.5	1.1	1.6	2.5
Sardines	-	-	-	-	-	-	-	-	-	-
Other Pelagic	-	-	-	..	-	-	-	-	..	-
Total Pelagic	**6.5**	**6.4**	**5.0**	**7.1**	**6.3**	**3.2**	**3.5**	**2.1**	**4.1**	**3.8**
Cockles	-	-	-	-	-	-	-	-	-	-
Crabs	1.5	1.4	1.2	1.3 [R]	1.4	1.4	1.4	1.1	1.2	1.6
Cuttlefish	-	-	-	..	..	-	-	-	..	..
Lobsters	0.1	0.1	0.1	0.1	0.1	0.8	1.0	0.9	0.9 [R]	0.8
Mussels	..	-	0.9	0.3	0.7	..	-	0.7	0.2	0.5
Nephrops	6.8	6.9	7.5	7.3	6.2	13.5	14.8	15.6	16.5	14.7
Scallops	3.0	2.1	2.3	1.6	1.1	2.8	2.8	3.3	3.5	3.1
Shrimps and Prawns	..	..	..	..	..	..	..	..	..	..
Squid	..	..	..	..	..	0.1	..	..	..	..
Whelks	0.1	..	..	0.1	0.1	0.1	..	..	0.1	0.1
Other Shellfish	..	..	..	..	..	..	..	..	..	..
Total Shellfish	**11.7**	**10.5**	**12.1**	**10.6**	**9.5**	**18.7**	**20.1**	**21.8**	**22.5** [R]	**20.8**
Total All Species	**19.4**	**18.0**	**18.8**	**19.5**	**18.7**	**23.3**	**24.8**	**25.8**	**28.8** [R]	**29.2**

Source: Fisheries Administrations in the UK

(a) Landings data include transhipments.

(b) Includes fish roes and livers.

TABLE 3.3 Landings into the UK by foreign vessels: 2013 to 2017 [(a)]

	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Bass	..	..	..	..	..	0.1	0.1	0.1	0.1	..
Brill	0.1	0.1	0.1	0.1	..	0.3	0.2	0.3	0.3	0.2
Cod	0.5	0.7	1.4	0.9	0.7	0.8	1.4	2.4	1.9	1.5
Dogfish	0.2	0.2	0.2	0.2	0.2	0.1	..	0.1	0.1	0.1
Gurnard	0.2	0.1	0.2	0.1	0.1	0.1	..	0.1	0.1	0.1
Haddock	0.5	1.8	1.1	0.7	0.8	0.6	2.4	1.4	1.0	1.0
Hake	4.5	7.1	7.1	8.5	8.5	11.1	17.7	17.5	20.7	18.5
Halibut	..	..	..	..	..	..	0.1	..	0.1	..
Lemon Sole	0.3	0.3	0.2	0.2	0.2	0.6	0.7	0.9	0.7	0.5
Ling	1.3	1.6	1.7	2.1	2.3	1.7	2.2	2.4	3.3	3.7
Megrim	0.7	0.3	0.4	0.5	0.7	0.9	0.7	1.0	1.2	1.6
Monks or Anglers	1.9	1.3	1.5	2.3	3.0	4.5	3.7	4.1	6.0	5.4
Plaice	0.7	0.8	0.9	0.5	0.3	0.7	0.6	0.9	0.5	0.4
Pollack (Lythe)	..	0.1	..	0.1	0.1	..	0.2	0.1	0.1	0.1
Saithe	6.8	6.4	8.9	7.5	5.9	6.1	6.9	8.5	8.5	5.9
Sand Eels	-	-	-	-	3.4	-	-	-	-	0.6
Skates and Rays	0.9	0.7	0.8	0.7	0.6	1.2	0.8	1.2	1.1	0.9
Sole	0.8	0.8	0.7	0.6	0.5	5.3	4.1	5.4	5.2	4.8
Turbot	0.1	0.1	0.1	0.1	0.1	0.6	0.4	0.5	0.6	0.5
Whiting	0.3	0.5	0.6	0.7	0.5	0.2	0.5	0.6	0.6	0.5
Witch	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other Demersal [(b)]	7.0	7.6	5.7	6.4	3.8	10.7	11.8	7.7	9.2	5.1
Total Demersal	**27.0**	**30.7**	**31.7**	**32.3**	**31.9**	**45.8**	**54.6**	**55.3**	**61.3**	**51.5**
Blue Whiting	1.2	..	-	-	-	0.3	..	-	-	-
Herring	8.5	10.4	3.5	7.5	2.4	3.3	3.0	1.2	4.2	0.9
Horse Mackerel	0.4	0.6	0.4	0.8	0.1	0.3	0.5	0.2	0.5	..
Mackerel	21.4	29.4	9.1	10.6	12.8	19.3	21.7	5.9	8.7	12.6
Sardines	..	-	..	..	-	..	-	-	..	-
Other Pelagic	0.4	..	..	0.8	..	0.1	..	..	0.3	-
Total Pelagic	**31.8**	**40.5**	**12.9**	**19.6**	**15.2**	**23.3**	**25.1**	**7.3**	**13.6**	**13.6**
Cockles	-	-	-	-	-	-	-	-	-	-
Crabs	0.1	0.1	0.2	0.2	0.1	0.1	0.4	0.5	0.6	0.5
Cuttlefish	0.1	..	0.2	0.1	0.2	0.1	..	0.3	0.4	0.6
Lobsters	..	..	..	..	..	..	..	..	..	..
Mussels	..	-	-	-	-	..	-	-	-	-
Nephrops	0.2	0.1	0.2	0.1	0.1	0.4	0.3	0.3	0.3	0.1
Scallops	0.7	1.1	0.7	1.0	0.9	1.1	1.9	1.4	1.9	2.2
Shrimps and Prawns	-	-	-	-	-	-	-	-	-	-
Squid	0.1	..	0.1	..	0.1	0.3	0.1	0.1	0.1	0.2
Whelks	..	..	..	..	..	..	..	..	..	..
Other Shellfish	0.1	..	..	..	..	..	..	..	..	..
Total Shellfish	**1.2**	**1.5**	**1.4**	**1.5**	**1.4**	**1.9**	**2.8**	**2.7**	**3.4**	**3.6**
Total All Species	**60.0**	**72.7**	**46.0**	**53.4**	**48.4**	**71.0**	**82.5**	**65.3**	**78.3**	**68.6**

Source: Fisheries Administrations in the UK

(a) Landings data include transhipments and exclude landings abroad by foreign vessels.

(b) Includes fish roes and livers.

TABLE 3.4 Landings into the UK by UK and foreign vessels: 2013 to 2017 [a]

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Bass	0.8	1.0	0.7	0.5	0.4	5.7	7.4	5.4	4.9	4.2
Brill	0.3	0.3	0.4	0.4	0.4	1.9	1.8	1.9	2.3	2.3
Cod	13.5	14.7	16.7	21.7	22.4	26.7	29.3	31.9	43.6 R	49.6
Dogfish	0.8	0.8	1.8	1.9	1.7	0.2	0.2	0.5	0.5	0.5
Gurnard	2.0	1.4	1.9	1.9	1.6	1.3	0.9	1.1	1.2	1.3
Haddock	39.2	37.2	33.5	33.9	34.4	44.1	51.7	45.6	45.0	51.7
Hake	11.0	15.6	15.9	19.9	21.1	27.2	37.4	38.4	47.6	45.8
Halibut	0.1	..	0.1	0.1	0.2	0.5	0.4	0.4	0.9	1.5
Lemon Sole	2.8	2.7	2.1	2.2	1.7	8.3	8.6	8.2	9.0	7.8
Ling	5.3	6.1	5.8	7.0	7.6	7.2	7.6	7.7	10.3	12.4
Megrim	4.6	3.7	3.5	3.7	3.6	10.0	9.4	8.7	10.2	10.0
Monks or Anglers	12.0	12.7	15.8	18.7	19.2	34.8	35.1	38.8	52.9	52.3
Plaice	4.9	4.3	4.4	5.2	5.1	4.8	4.1	4.5	5.9	6.9
Pollack (Lythe)	1.6	2.0	1.7	2.0	1.6	3.5	3.6	3.2	4.5	4.0
Saithe	19.7	17.5	18.8	17.4	15.9	17.1	17.0	17.0	18.8	15.7
Sand Eels	..	..	..	..	3.4	..	..	..	..	0.7
Skates and Rays	3.5	3.1	3.2	3.1	3.0	4.4	3.5	4.0	4.1	3.9
Sole	2.6	2.6	2.1	2.1	2.0	18.1	16.5	15.7	18.6	18.8
Turbot	0.5	0.6	0.6	0.6	0.7	4.3	4.6	4.7	5.3	5.7
Whiting	12.4	11.7	11.3	11.0	10.3	11.7	12.3	11.6	11.4	12.8
Witch	0.9	0.8	0.7	0.9	1.1	0.9	0.8	0.8	1.1	1.2
Other Demersal [b]	10.9	11.8	9.0	10.1	7.3	16.1	17.5	13.9	18.2	11.1
Total Demersal	**149.5**	**150.7**	**150.1**	**164.4**	**164.8**	**248.8**	**269.8**	**264.1**	**316.2** R	**320.2**
Blue Whiting	9.4	9.7	12.1	11.9	13.1	2.1	1.3	2.0	2.4	1.6
Herring	46.0	48.8	42.0	47.9	47.3	16.9	13.5	14.6	29.5	19.1
Horse Mackerel	2.9	3.7	3.2	1.7	0.2	1.1	1.6	1.5	0.8	0.1
Mackerel	99.6	155.6	103.9	114.5	108.2	89.4	125.7	66.5	97.5	99.0
Sardines	3.7	3.4	4.2	8.0	7.1	1.0	0.8	1.6	2.6	2.4
Other Pelagic	5.2	5.7	3.8	6.1	4.1	1.1	2.1	0.8	1.6	1.1
Total Pelagic	**166.7**	**226.9**	**169.3**	**190.0**	**180.1**	**111.6**	**145.1**	**86.9**	**134.3**	**123.2**
Cockles	10.1	10.2	11.2	5.0	6.0	5.3	7.9	5.7	3.5	4.3
Crabs	29.3	32.8	29.4	32.5	30.8	39.1	44.8	39.8	47.6	54.3
Cuttlefish	3.7	3.1	6.2	5.2	7.2	6.6	6.5	10.9	14.4	26.0
Lobsters	3.0	3.4	3.1	3.3	3.4	29.9	33.5	32.2	39.6 R	44.3
Mussels	0.5	0.2	1.0	0.3 R	0.7	0.2	0.1	0.8	0.2	0.6
Nephrops	28.5	30.5	25.9	30.9	30.0	86.3	98.8	82.3	100.8	95.8
Scallops	49.4	39.7	41.5	39.4	33.5	63.7	60.3	65.7	76.0	76.2
Shrimps and Prawns	0.9	0.6	0.3	0.8	0.6	2.4	1.4	0.8	3.0	2.6
Squid	1.9	2.9	1.9	2.0	3.5	7.3	9.3	6.6	8.3	13.2
Whelks	20.1	19.8	20.9	22.7	20.8	13.8	16.2	18.6	22.9	22.7
Other Shellfish	1.9	1.1	1.3	1.2	1.3	5.4	3.7	4.0	4.7	6.0
Total Shellfish	**149.2**	**144.3**	**142.6**	**143.3** R	**137.6**	**259.9**	**282.4**	**267.3**	**321.2** R	**345.9**
Total All Species	**465.4**	**521.8**	**462.0**	**497.8** R	**482.5**	**620.3**	**697.3**	**618.3**	**771.7** R	**789.3**

Source: Fisheries Administrations in the UK

(a) Landings data include transhipments and exclude landings abroad.

(b) Includes fish roes and livers.

TABLE 3.5 Landings abroad by UK vessels: 2013 to 2017 [(a)]

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Bass	..	..	..	..	..	0.2	0.3	0.3	0.2	0.1
Brill	0.1	0.1	0.1	0.1	0.1	0.6	0.7	0.5	0.7	0.6
Cod	16.4	16.3	12.9	13.4	16.8	20.0	22.1	19.6	21.0 [R]	29.9
Dogfish	..	..	..	0.1	..	..	..	..	..	..
Gurnard	0.4	0.5	0.5	0.7	0.6	0.5	0.5	0.6	0.8	0.6
Haddock	1.1	0.9	0.9	0.9	0.7	1.1	1.1	1.0	1.0 [R]	0.8
Hake	2.5	2.8	3.8	2.9	2.2	6.7	6.3	8.4	6.9	4.5
Halibut	..	..	..	..	..	..	..	..	..	0.1
Lemon Sole	0.5	0.5	0.4	0.5	0.4	1.3	1.5	1.5	1.5	1.2
Ling	0.6	0.4	0.5	0.5	0.4	0.8	0.5	0.6	0.7	0.6
Megrim	1.3	1.6	1.7	1.7	1.7	3.8	5.8	5.5	5.8	5.4
Monks or Anglers	3.5	4.5	3.9	4.1	3.9	10.8	14.4	11.9	13.2	11.8
Plaice	17.1	15.6	15.3	16.5	13.0	18.1	17.1	19.0	22.9	18.0
Pollack (Lythe)	0.6	0.6	0.5	0.4	0.4	1.4	0.6	0.6	1.0	0.7
Saithe	1.8	1.6	3.1	2.4	1.9	1.9	2.0	3.2	2.5 [R]	1.9
Sand Eels	2.4	..	2.0	-	3.3	0.5	..	0.4	-	0.4
Skates and Rays	0.3	0.4	0.4	0.4	0.3	0.7	0.6	0.7	0.7	0.3
Sole	0.5	0.6	0.6	0.5	0.3	3.8	4.4	4.7	4.7	2.9
Turbot	0.3	0.3	0.2	0.3	0.3	2.3	2.6	1.9	2.4	2.2
Whiting	0.7	0.7	0.7	0.4	0.5	0.6	0.6	0.6	0.4	0.4
Witch	0.2	0.2	0.3	0.3	0.3	0.3	0.5	0.6	0.7	0.6
Other Demersal [(b)]	6.4	2.2	2.7	2.2	2.3	3.0	2.6	3.3	4.3	3.1
Total Demersal	**56.8**	**49.7**	**50.7**	**48.3**	**49.4**	**78.2**	**84.3**	**84.9**	**91.5** [R]	**86.0**
Blue Whiting	5.3	18.1	19.6	26.4	53.3	1.2	3.9	4.6	6.3	9.9
Herring	56.3	59.3	55.2	51.8	39.1	19.7	18.2	19.6	31.1	17.6
Horse Mackerel	8.9	9.7	4.7	5.6	5.3	3.9	4.4	2.3	2.4	2.8
Mackerel	85.6	161.8	153.2	113.8 [R]	131.4	76.2	123.1	99.2	99.7 [R]	117.0
Sardines	0.3	0.5	0.1	1.4	0.5	0.1	0.2	..	0.5	0.2
Other Pelagic	0.8	0.8	0.6	0.4	0.4	1.9	1.7	1.3	0.6	0.2
Total Pelagic	**157.2**	**250.2**	**233.4**	**199.4** [R]	**230.0**	**103.0**	**151.5**	**127.0**	**140.6** [R]	**147.6**
Cockles	..	..	-	..	..	..	..	-	0.1	..
Crabs	3.1	3.5	3.5 [R]	4.4 [R]	5.3	4.5	5.5	4.9 [R]	6.0 [R]	8.2
Cuttlefish	..	..	..	..	..	0.1	0.1	0.1	0.1	0.1
Lobsters	..	..	..	..	..	0.3	0.3	0.3	0.2	0.5
Mussels	-	-	-	-	-	-	-	-	-	-
Nephrops	0.2	0.2	0.2	0.8	0.7	1.1	1.0	1.1	3.2	3.6
Scallops	1.3	0.7	0.3	0.4	0.2	1.0	0.9	0.3	0.7 [R]	0.3
Shrimps and Prawns	..	..	-	-	..	..	..	-	-	0.1
Squid	2.2	4.0	4.4	2.7	4.1	3.4	5.3	4.5	10.5	12.6
Whelks	0.1	0.3	0.1	0.1	0.4	0.1	0.2	0.1	0.1	0.4
Other Shellfish	0.2	0.1	0.1	0.1	0.2	0.3	0.3	0.2	0.3	0.1
Total Shellfish	**7.3**	**8.8**	**8.7** [R]	**8.6** [R]	**10.9**	**10.7**	**13.5**	**11.5** [R]	**21.2** [R]	**25.8**
Total All Species	**221.3**	**308.8**	**292.7** [R]	**256.2** [R]	**290.3**	**192.0**	**249.3**	**223.4** [R]	**253.3** [R]	**259.4**

Source: Fisheries Administrations in the UK

(a) Landings data include transhipments and exclude landings abroad by foreign vessels.

(b) Includes fish roes and livers.

TABLE 3.6 Landings into the UK and abroad by UK vessels: 2013 to 2017 [(a)]

	Quantity ('000 tonnes)					Value (£ millions)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Bass	0.8	1.0	0.7	0.6	0.4	5.8	7.6	5.7	5.1 [R]	4.3
Brill	0.4	0.4	0.4	0.5	0.5	2.2	2.3	2.2	2.7	2.6
Cod	29.5	30.2	28.3	34.1	38.4	45.8	49.9	49.1	62.6 [R]	77.9
Dogfish	0.7	0.7	1.6	1.8	1.5	0.2	0.1	0.4	0.4	0.5
Gurnard	2.2	1.8	2.2	2.5	2.1	1.6	1.4	1.6	2.0	1.8
Haddock	39.7	36.3	33.3	34.0	34.3	44.6	50.5	45.1	45.0 [R]	51.5
Hake	9.0	11.3	12.7	14.3	14.8	22.8	26.0	29.4	33.9	31.9
Halibut	0.1	..	0.1	0.1	0.2	0.5	0.4	0.4	0.9	1.5
Lemon Sole	3.0	2.8	2.3	2.5	2.0	9.0	9.4	8.8	9.8	8.5
Ling	4.6	4.9	4.6	5.4	5.7	6.3	5.9	5.9	7.8	9.3
Megrim	5.3	5.0	4.8	4.9	4.6	12.9	14.5	13.1	14.8	13.8
Monks or Anglers	13.6	15.8	18.2	20.4	20.1	41.1	45.9	46.7	60.0	58.7
Plaice	21.2	19.1	18.9	21.2	17.8	22.1	20.6	22.5	28.3	24.4
Pollack (Lythe)	2.3	2.5	2.1	2.3	1.9	4.9	4.0	3.7	5.3	4.6
Saithe	14.7	12.8	13.0	12.4	11.8	12.9	12.2	11.8	12.8 [R]	11.7
Sand Eels	2.5	..	2.0	..	3.3	0.5	..	0.4	..	0.4
Skates and Rays	3.0	2.8	2.8	2.8	2.7	3.9	3.3	3.6	3.7	3.3
Sole	2.3	2.3	2.0	2.0	1.8	16.6	16.8	15.1	18.0	17.0
Turbot	0.7	0.8	0.8	0.9	0.9	6.0	6.8	6.1	7.1	7.5
Whiting	12.7	11.8	11.4	10.7	10.3	12.1	12.5	11.6	11.2	12.7
Witch	1.0	1.0	0.9	1.1	1.3	1.1	1.2	1.3	1.6	1.7
Other Demersal [(b)]	10.3	6.4	6.0	5.8	5.8	8.5	8.3	9.4	13.3	9.2
Total Demersal	**179.4**	**169.8**	**169.1**	**180.4**	**182.3**	**281.2**	**299.5**	**293.7**	**346.4** [R]	**354.7**
Blue Whiting	13.5	27.8	31.8	38.3	66.4	3.0	5.1	6.6	8.7	11.4
Herring	93.8	97.7	93.7	92.2	84.1	33.3	28.8	32.9	56.3	35.8
Horse Mackerel	11.4	12.7	7.6	6.5 [R]	5.4	4.8	5.5	3.6	2.8 [R]	2.9
Mackerel	163.8	288.0	248.0	217.6 [R]	226.9	146.3	227.2	159.8	188.5 [R]	203.4
Sardines	4.0	3.9	4.3	9.4	7.6	1.1	1.0	1.6	3.1	2.5
Other Pelagic	5.6	6.5	4.4	5.7	4.5	2.9	3.9	2.0	1.8	1.2
Total Pelagic	**292.1**	**436.6**	**389.8**	**369.8** [R]	**394.8**	**191.4**	**271.5**	**206.6**	**261.2** [R]	**257.2**
Cockles	10.1	10.2	11.2	5.1 [R]	6.0	5.3	7.9	5.7	3.6	4.3
Crabs	32.3	36.1	32.6 [R]	36.8 [R]	36.0	43.5	49.8	44.2 [R]	53.0 [R]	62.1
Cuttlefish	3.7	3.1	6.1	5.1	7.1	6.6	6.6	10.7	14.2	25.5
Lobsters	3.0	3.4	3.1	3.3	3.4	30.2	33.8	32.5	39.9 [R]	44.8
Mussels	0.5	0.2	1.0	0.3 [R]	0.7	0.2	0.1	0.8	0.2	0.6
Nephrops	28.5	30.5	25.9	31.5	30.7	87.1	99.5	83.0	103.7	99.2
Scallops	50.1	39.2	41.0	38.9	32.8	63.6	59.3	64.6	74.8	74.3
Shrimps and Prawns	0.9	0.6	0.3	0.8	0.6	2.4	1.4	0.8	3.0	2.6
Squid	4.0	6.9	6.2	4.7	7.5	10.4	14.5	10.9	18.8	25.6
Whelks	20.2	20.1	20.9	22.8	21.1	13.8	16.4	18.7	23.0	23.2
Other Shellfish	2.1	1.2	1.4	1.3	1.4	5.7	4.0	4.3	5.0	6.1
Total Shellfish	**155.3**	**151.6**	**149.8** [R]	**150.4** [R]	**147.2**	**268.7**	**293.1**	**276.1** [R]	**339.0** [R]	**368.1**
Total All Species	**626.8**	**757.9**	**708.7** [R]	**700.6** [R]	**724.3**	**741.3**	**864.1**	**776.4** [R]	**946.7** [R]	**980.1**

Source: Fisheries Administrations in the UK

(a) Landings data include transhipments and exclude landings abroad by foreign vessels.

(b) Includes fish roes and livers.

Appendix ND.3.2

Information on all landings into the UK, by UK and foreign vessels, going back as far as 1938 is shown in Table 3.7. In 2017, landings of demersal fish were just over a fifth of the quantity landed in 1970. The decline in landings of demersal fish has a number of causes, including reductions in fleet size, declining fish stocks and restricted fishing opportunities. EU and UK regulations have limited demersal fishing activity in recent decades, through decommissioning of fishing vessels, reductions in quotas and fishing effort limits and other provisions of stock management plans.

Landings of pelagic species have fluctuated over the same period but in 2017 were 12 per cent lower than in 1970. Many pelagic species are under stock management plans with quotas set by the European Commission, but pelagic landings have not seen the same reduction as demersal species.

However, since 1970, reported landings of shellfish into the UK have increased by a factor of 2.4. When compared with 1960, the factor rises to 5. The increase in shellfish landings into the UK may partly be explained by diversion of fishing activity into this sector, in which there are often fewer restrictions. For shellfish, quotas currently only apply to nephrops. Another factor in the perceived increase is improved reporting. A large proportion of shellfish landings are made by vessels 10 metres or under in length, for which there is no statutory obligation to complete a fishing logbook or landing declaration. Successive improvements in data collection for this sector in recent years, including the introduction of mandatory reporting of first sales of fish, may account for some of the increase in reported landings.

TABLE 3.7 Landings into the UK by UK and foreign vessels: 1938 to 2017 [(a)]

	1938	1948	1960	1970	1980	1990	2000	2010	2017
Demersal									
Quantity ('000 tonnes)	807.8	923.5	758.8	778.6	484.2	336.7	246.4	149.0	164.8
Value (£ million)	14.6	46.4	52.0	67.5	194.4	327.7	304.3	262.1	320.2
Pelagic									
Quantity ('000 tonnes)	295.0	287.6	127.8	204.0	319.2	267.8	152.1	229.5	180.1
Value (£ million)	2.0	6.0	3.0	5.8	30.1	32.1	23.7	139.3	123.2
Shellfish									
Quantity ('000 tonnes)	32.1	28.7	28.1	56.4	70.2	97.5	127.7	141.0	137.6
Value (£ million)	0.5	1.4	2.1	6.7	34.5	105.1	154.5	250.9	345.9
Total									
Quantity ('000 tonnes)	**1,134.9**	**1,239.8**	**914.7**	**1,039.1**	**873.6**	**702.0**	**526.3**	**519.5**	**482.5**
Value (£ million)	**17.2**	**53.8**	**57.0**	**80.0**	**259.0**	**464.8**	**482.5**	**652.3**	**789.3**

Source: Fisheries Administrations in the UK

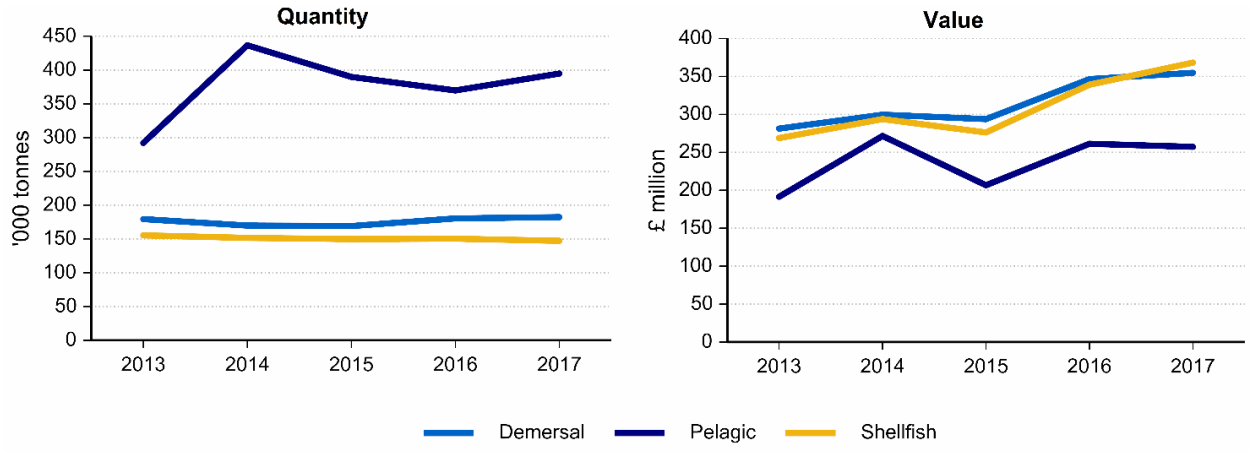
(a) Landing data include transhipments. Blue whiting treated as demersal prior to 1994 and as pelagic from 1994 onwards.

Demersal, pelagic and shellfish landings

In 2017, the UK fleet landed 182 thousand tonnes of demersal species, 1 per cent more than in 2016. Over the same period, the value of demersal landings rose by 2 per cent to £355 million. Although pelagic landings rose by 7 per cent to 395 thousand tonnes, the market value fell by 2 per cent to £257 million. Herring prices in particular were down.

Shellfish landings fell slightly to 147 thousand tonnes but their overall value increased by 9 per cent to £368 million, helped by the rise in the price of crabs, cuttlefish and scallops.

Chart 3.3: Landings into the UK and abroad by UK vessels: 2013 to 2017

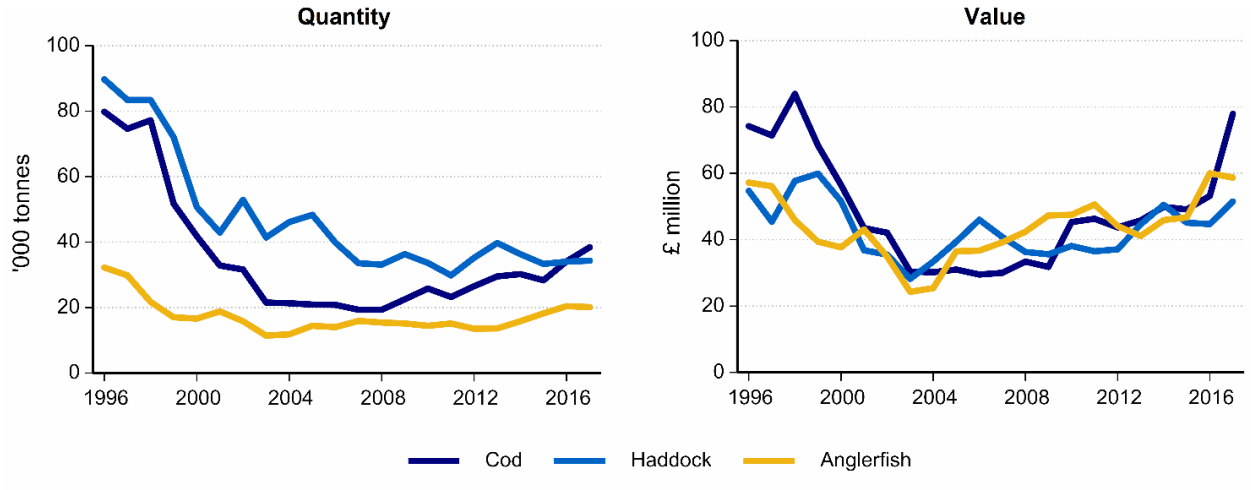


Demersal fish

Cod, haddock and plaice have traditionally been the three main demersal species landed by the UK fleet in terms of weight, accounting for half the quantity of all demersal species landed in 2017 (see Table 3.6). Anglerfish has now overtaken plaice in terms of landings and achieves much higher prices at market.

Cod landings have fallen considerably since 1996 although the 38 thousand tonnes landed in 2017 is the highest since 2000 and the highest of any demersal species. This is a result of increases in some of the quotas for cod stocks. Forty four per cent of landings were made abroad. In 2017, cod was sold for a total value of £78 million.

Chart 3.4: Landings of key demersal species into the UK and abroad by UK vessels: 1996 to 2017

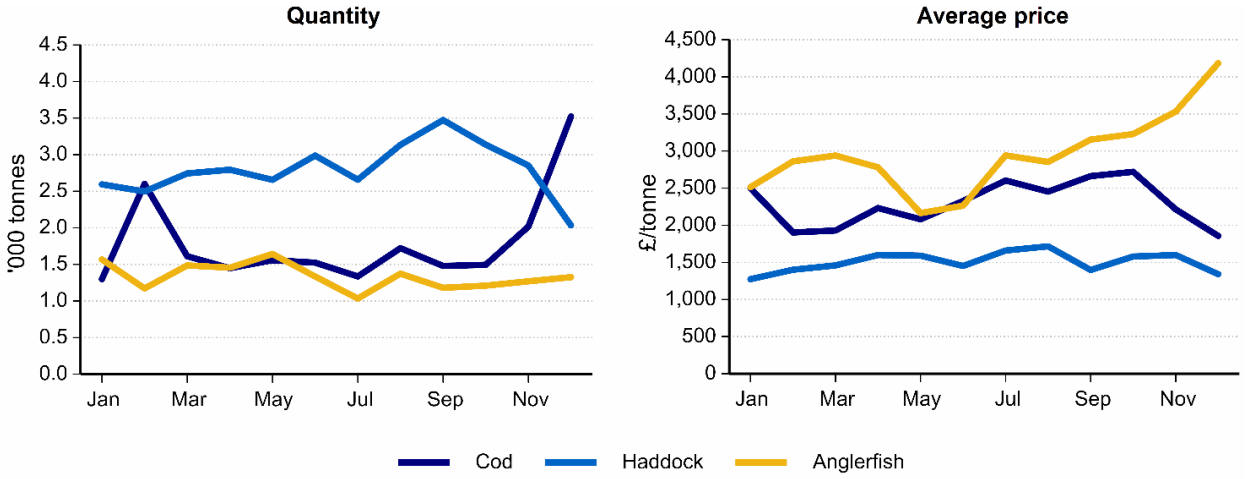


Haddock landings rose ever so slightly while the value increased by 15 per cent to £52 million. Just 2 per cent of haddock landings were made abroad.

Anglerfish replaces plaice in Chart 3.4 as their landings have risen by 40 per cent since 2010 and the value to the UK fleet is the second highest for demersal species. One fifth of all Anglerfish landings were made abroad.

Bass commands the highest price of demersal species landed by the UK fleet – almost £10 per kilo – possibly down to reduced supply following restrictions placed on vessels since 2015.

Chart 3.5: Landings of key demersal species into the UK by UK vessels by month: 2017



Landings of cod by UK vessels into the UK fluctuated between around 1,300 and 3,500 tonnes per month during 2017 (Chart 3.5). The majority of these landings are captured in the North Sea (area IV). Average prices for cod landed into the UK by the UK fleet peaked in October at £2.72 per kilo. The lowest prices (£1.86 per kilo) were achieved in December when supply was at its highest.

Haddock landings by UK vessels into the UK ranged from a peak of 3,500 tonnes in September to a low of 2,000 tonnes in December. The best average price of £1.72 per kilo was achieved in August.

Landings of Anglerfish by UK vessels into the UK peaked in May, when average prices were at their lowest. Prices rose in the second half of the year and were highest in December - £4.18 per kilo.

Chart 3.6 shows that the largest amounts of demersal fish landed abroad by the UK fleet were into Norway and the Netherlands (17 and 14 thousand tonnes respectively). France tops the list of foreign vessels landing into the UK, with 15 thousand tonnes of demersal fish.

Chart 3.6: Landings of demersal species abroad by UK vessels and landings into the UK by foreign vessels: 2017

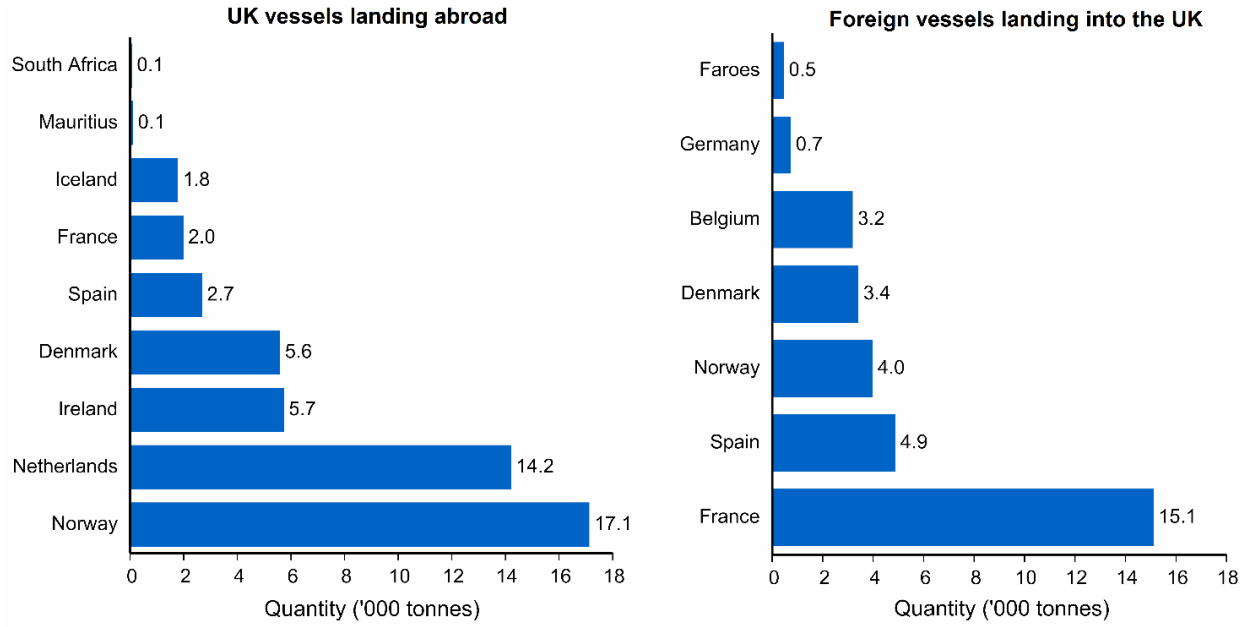


Chart 3.7 shows landings of demersal species by the UK fleet in 2017 by ICES rectangle of capture. Large quantities of demersal species were captured to the north-east of Scotland, in the central North Sea and in the English Channel. These fishing grounds also yielded the highest total value of demersal species per rectangle. However, demersal species with the highest average prices were captured from waters to the south and west of the UK and Ireland, as well as in the southern North Sea.

Appendix ND.3.2

Chart 3.7: Demersal landings by UK vessels by ICES rectangle: 2017

Chart 3.7a: Quantity of landings by ICES rectangle

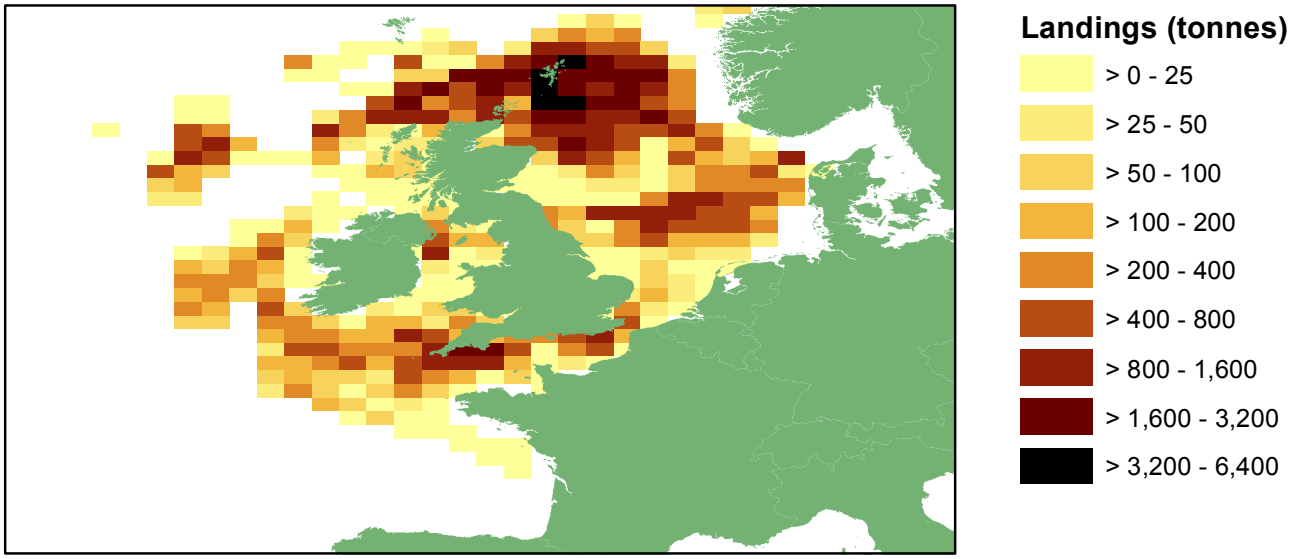


Chart 3.7b: Value of landings by ICES rectangle

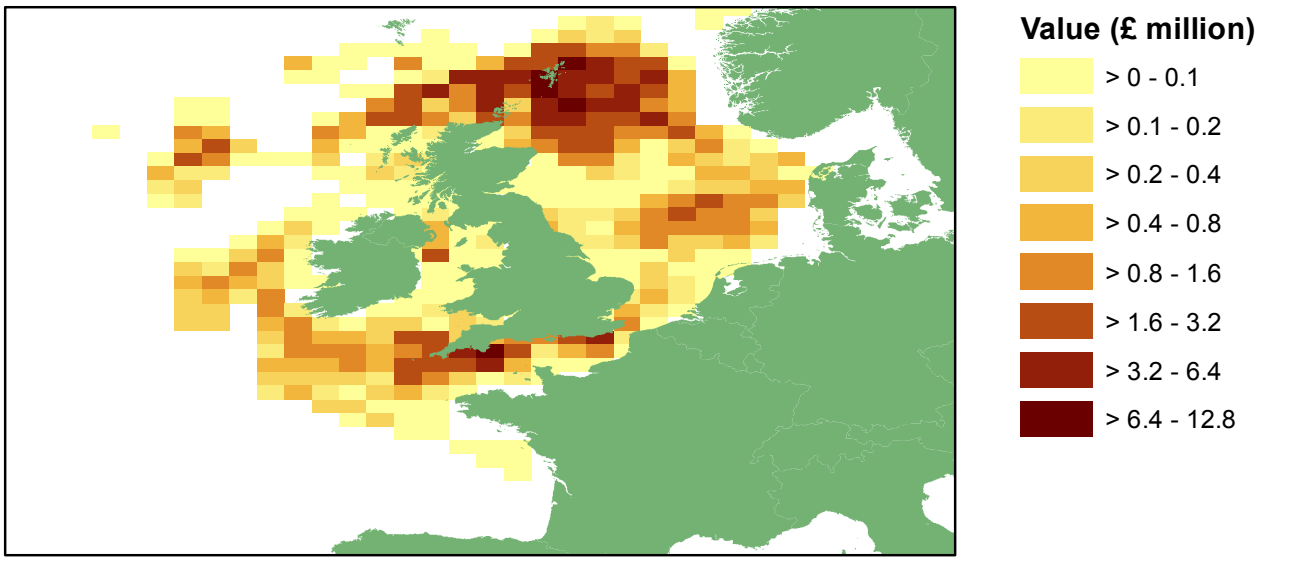
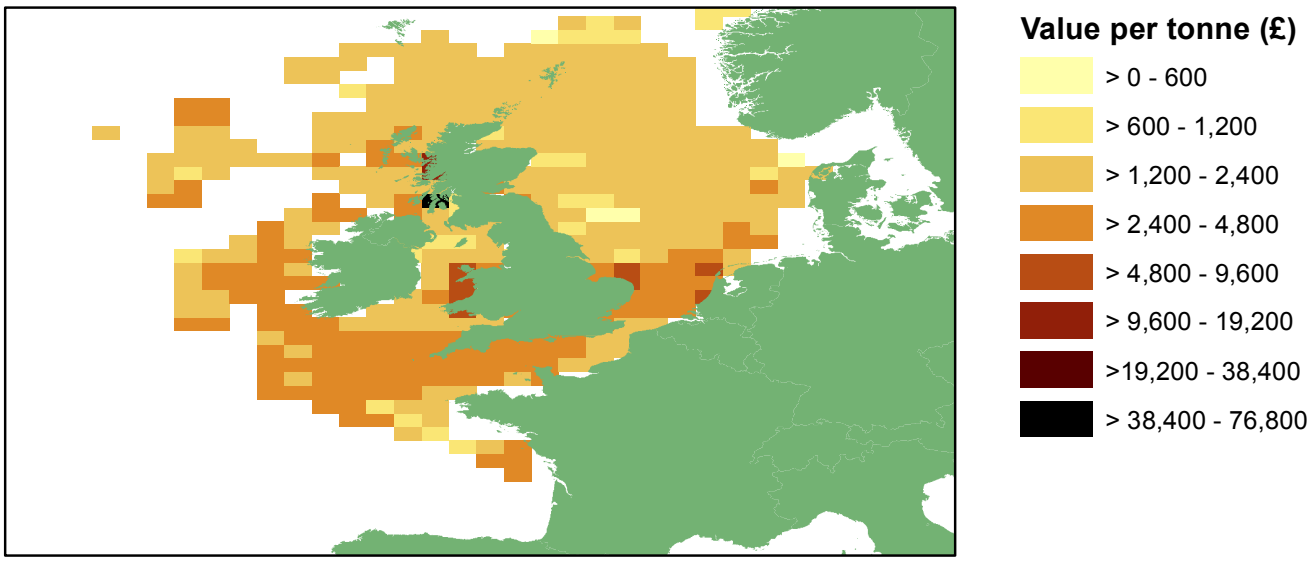


Chart 3.7c: Value of landings per tonne by ICES rectangle



*Note: Legend has been adapted to account for high values and so is not directly comparable with value per tonne charts for years prior to 2016.

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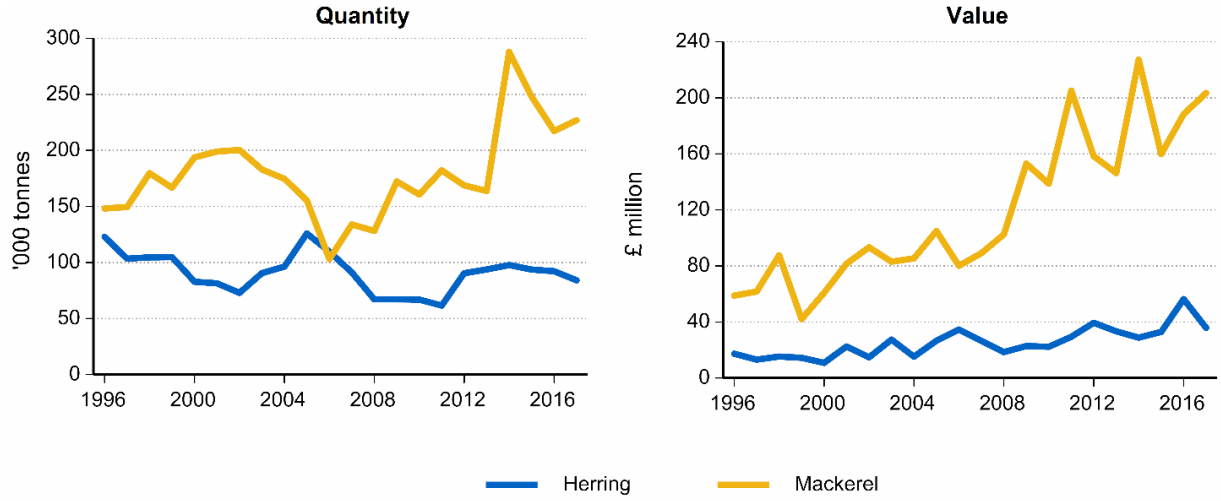
Pelagic fish

Mackerel and herring are the two main pelagic species landed by the UK fleet. These species accounted for 79 per cent by weight and 93 per cent by value of total pelagic landings in 2017. Their share of all UK fleet landings was 43 per cent in 2017, down from 51 per cent in 2014 when mackerel quotas were at their highest.

The UK fleet catches more mackerel than any other species. In 2014, landings of mackerel by UK vessels rose by 76 per cent to 288 thousand tonnes but with reduced quotas fell to 227 thousand tonnes in 2017. Almost three in every five tonnes were landed abroad.

The amount of herring landed by UK vessels has been fairly constant in recent years but fell by 9 per cent in 2017 to 84 thousand tonnes. The greater fall in the value of the herring - by 36 per cent to £36 million in 2017 – indicates a sharp drop in the average price of herring.

Chart 3.8: Landings of key pelagic species into the UK and abroad by UK vessels: 1996 to 2017

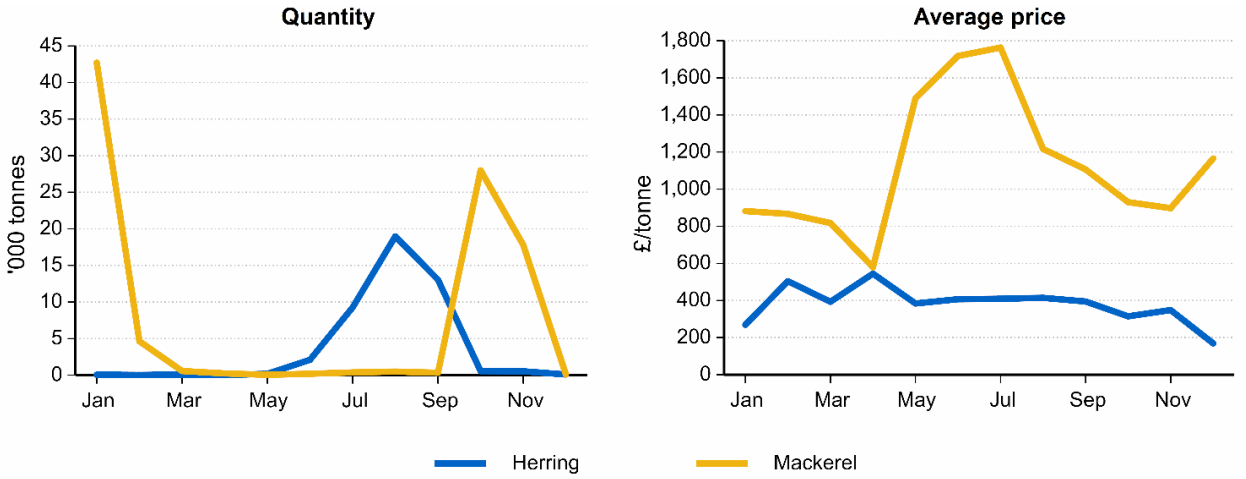


Longer-term trends in mackerel and herring landings by the UK fleet show much fluctuation (see Chart 3.8).

UK fleet landings of sardines fell from 24 thousand tonnes in 2010 (see Sea Fisheries Statistics 2014) to 4 thousand tonnes in 2015 but now stand at 8 thousand tonnes. Landings of blue whiting have increased by a factor of five over the last four years. This species is generally used for fish meal but it is also exported to provide a relatively low priced source of food. Blue whiting provides the pelagic industry with a useful source of income between the mackerel and herring fisheries.

Mackerel has a winter fishery so large landings were seen in January and then later in the year in October and November. Quotas had more or less been exhausted by then and so catches were low in December. Ninety three per cent of all mackerel landings into the UK by the UK fleet in 2017 were in those three peak months. The sources of these two peaks are different: the January peak is derived almost entirely from landings captured off the West of Scotland (area VIa), while the mackerel landings later in the year come from a fishery in the Northern North Sea (area IVa). This fishery tends to attract higher prices.

Chart 3.9: Landings of key pelagic species into the UK by UK vessels by month: 2017



A four month period (June to September) accounts for 97 per cent of herring landed into the UK by the UK fleet. Landings over the summer came primarily from the Northern North Sea (area IVa) and were supplemented in August and September by fisheries in the West of Scotland and the Irish Sea (areas VIa and VIIa).

The largest quantities of pelagic species landed by the UK fleet abroad were into Norway and the Netherlands at 109 and 47 thousand tonnes respectively (Chart 3.10). Irish vessels landed 6 thousand tonnes into the UK in 2017 and Norwegian vessels landed 5 thousand tonnes.

Chart 3.10: Landings of pelagic species abroad by UK vessels and landings into the UK by foreign vessels: 2017

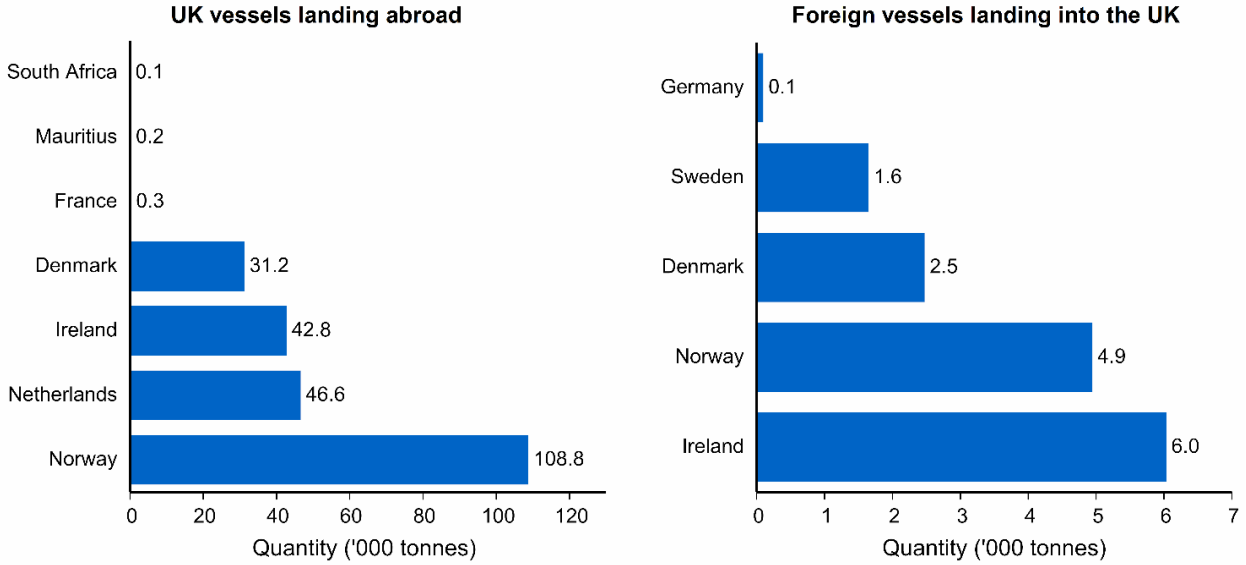


Chart 3.11 shows that large quantities and values of pelagic species were captured from rectangles near Shetland and from the north coast of Scotland down to the north-west coast of Ireland.

Chart 3.11: Pelagic landings by UK vessels by ICES rectangle: 2017

Chart 3.11a: Quantity of landings by ICES rectangle

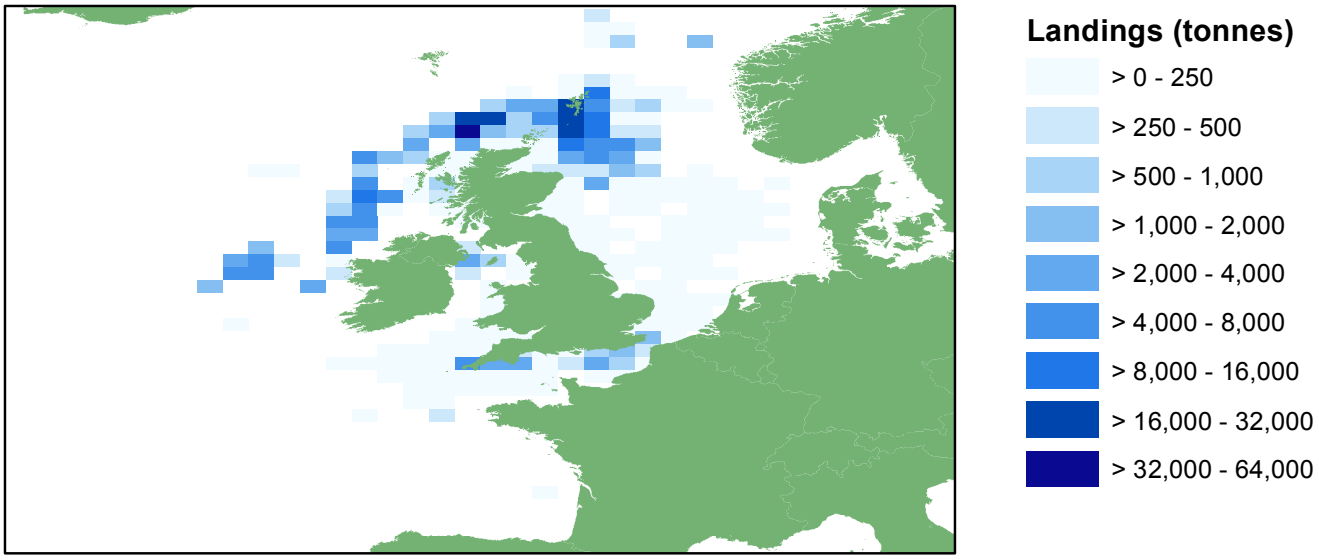


Chart 3.11b: Value of landings by ICES rectangle

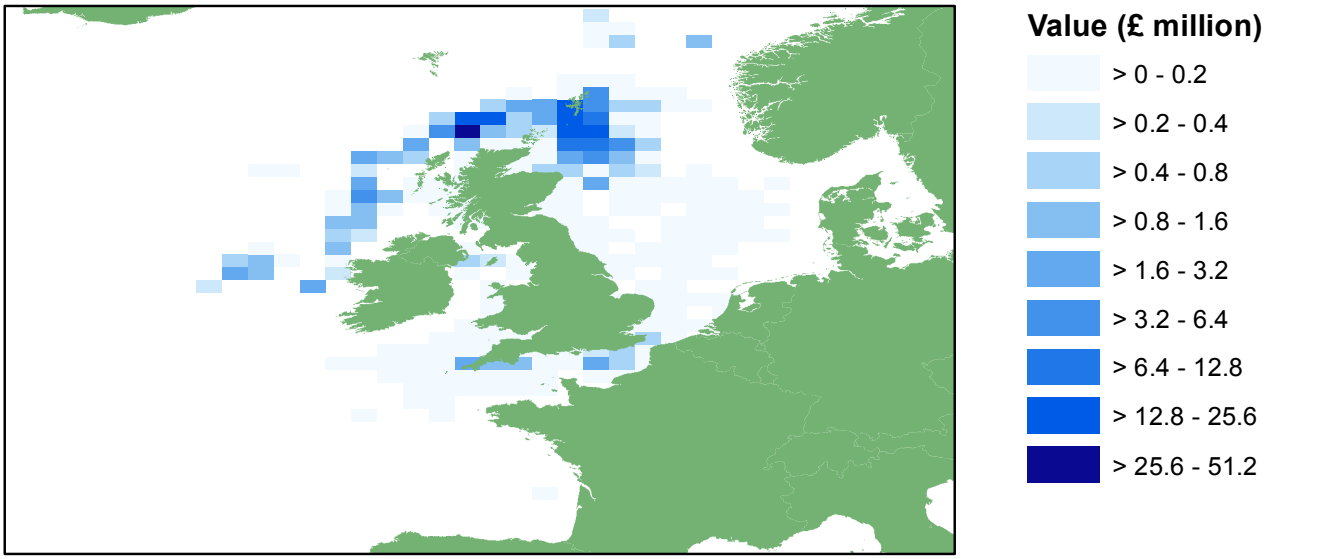
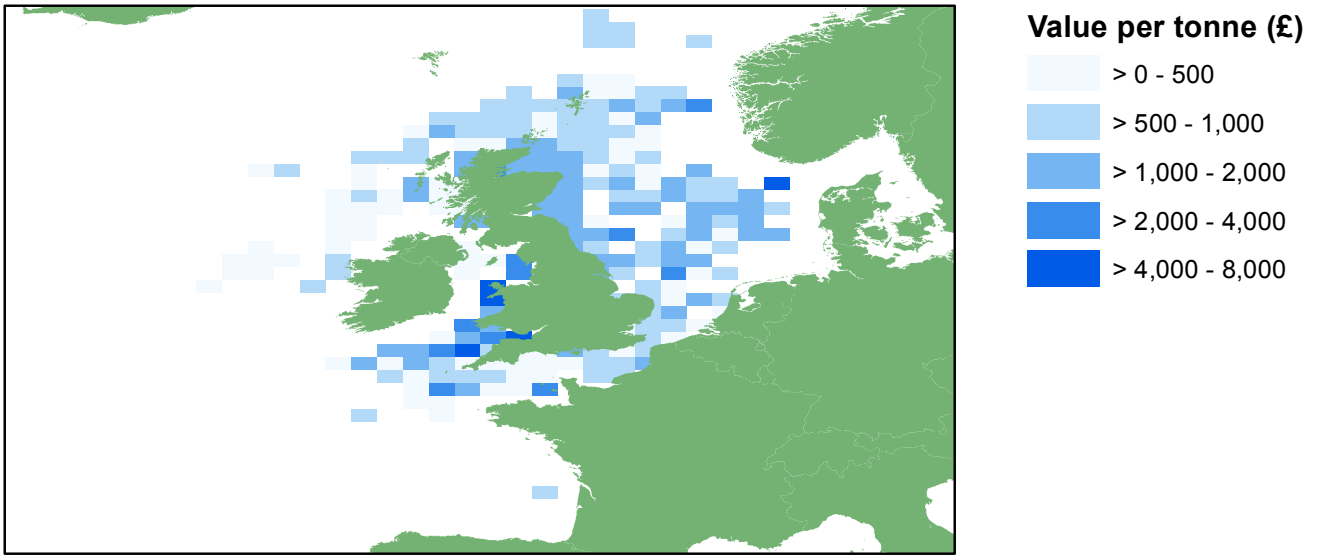


Chart 3.11c: Value of landings per tonne by ICES rectangle



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Shellfish

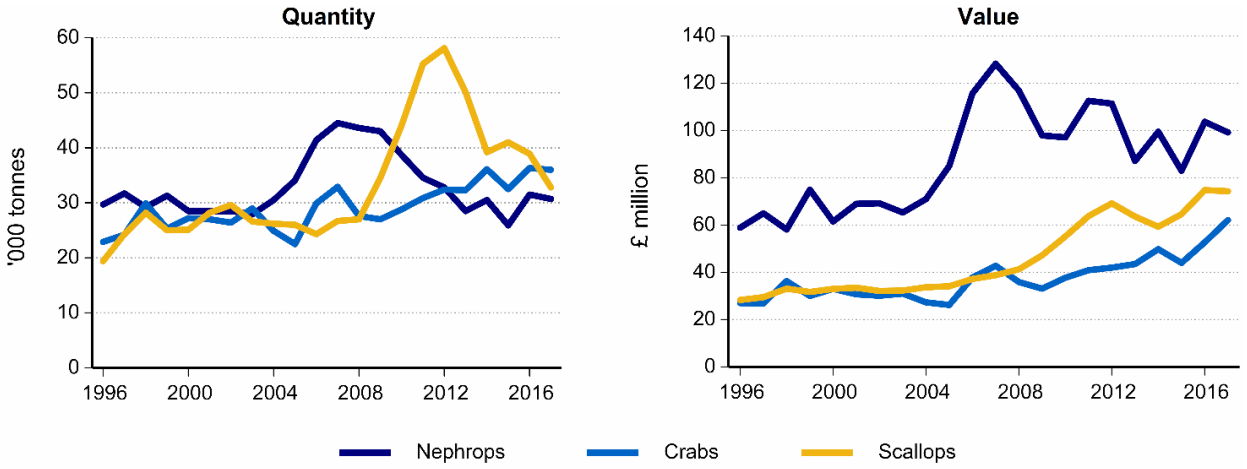
Crabs, scallops and nephrops (langoustines) are the three main species of shellfish landed by UK vessels into the UK and abroad, accounting for around two thirds of the quantity and value landed in 2017.

Landings of crabs by the UK fleet totalled 36 thousand tonnes with a value of £62 million. Around 15 per cent of these landings were outside the UK. Overall, landings of crabs by the UK fleet have increased since 1996 although this could be down to better recording of shellfish catches.

Scallop landings more than doubled between 2008 and 2012, rising to a peak of 58 thousand tonnes. But landings have fallen in recent years to 33 thousand tonnes as some vessels have diversified into other fisheries. Very little was landed abroad.

Nephrops landings stood at 31 thousand tonnes and £99 million. Almost all of this was landed into the UK. Nephrops are not as abundant as they have been and landings by the UK fleet have fallen back in recent years.

Chart 3.12: Landings of key shellfish species into the UK and abroad by UK vessels: 1996 to 2017



For other shellfish species:

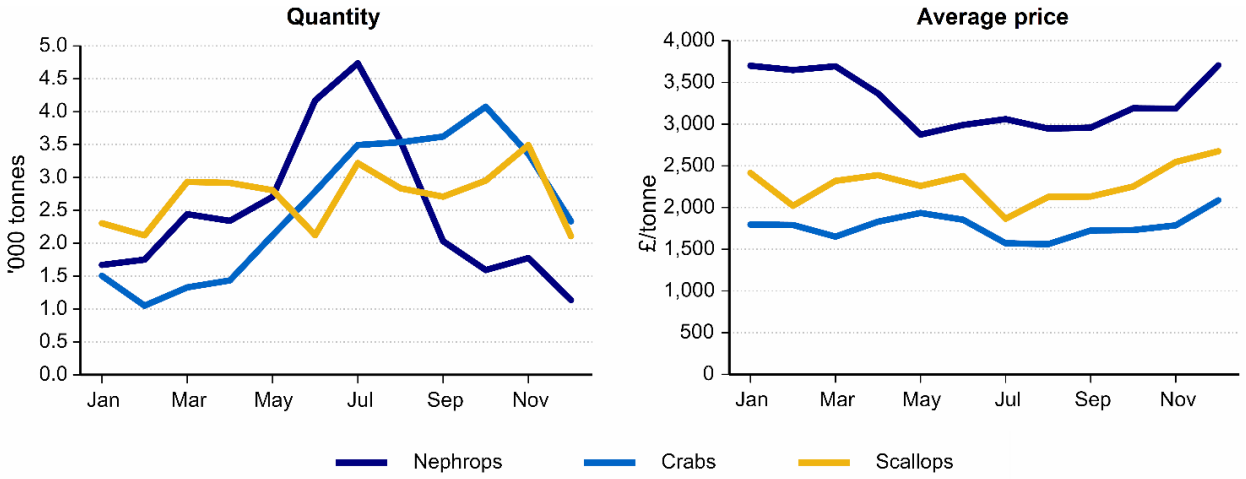
- Lobsters commanded the highest average price of all species landed by the UK fleet at over £13 a kilo in 2017. While lobsters accounted for only 2 per cent of the weight of shellfish landings by the UK fleet, they formed 12 per cent of the value.
- Landings of cuttlefish have almost doubled in the last four years to 7 thousand tonnes. Over this period, the average price has doubled as well.

Landings of crab by the UK fleet into the UK went from a low of 1,100 tonnes in February and rose steadily to a peak of 4,100 tonnes in October. Typical prices were around £1.80 per kilo.

Landings of scallops were highest in November (3,500 tonnes) and were lowest in the following month (2,100 tonnes). Typical prices were around £2.30 per kilo.

The largest landings of nephrops occurred during summer months with average prices over the period of around £3.00 per kilo.

Chart 3.13: Landings of key shellfish species into the UK by UK vessels by month: 2017



Only 8 thousand tonnes of shellfish were landed abroad by the UK fleet, with an even smaller amount - 1,400 tonnes - landed by foreign vessels into the UK in 2017. Chart 3.14 shows the largest amounts of shellfish landed abroad by the UK fleet were into Ireland (4 thousand tonnes). They, in return, landed the largest amount of any country into the UK (700 tonnes, of mostly scallops).

Chart 3.14: Landings of shellfish species abroad by UK vessels and landings into the UK by foreign vessels: 2017

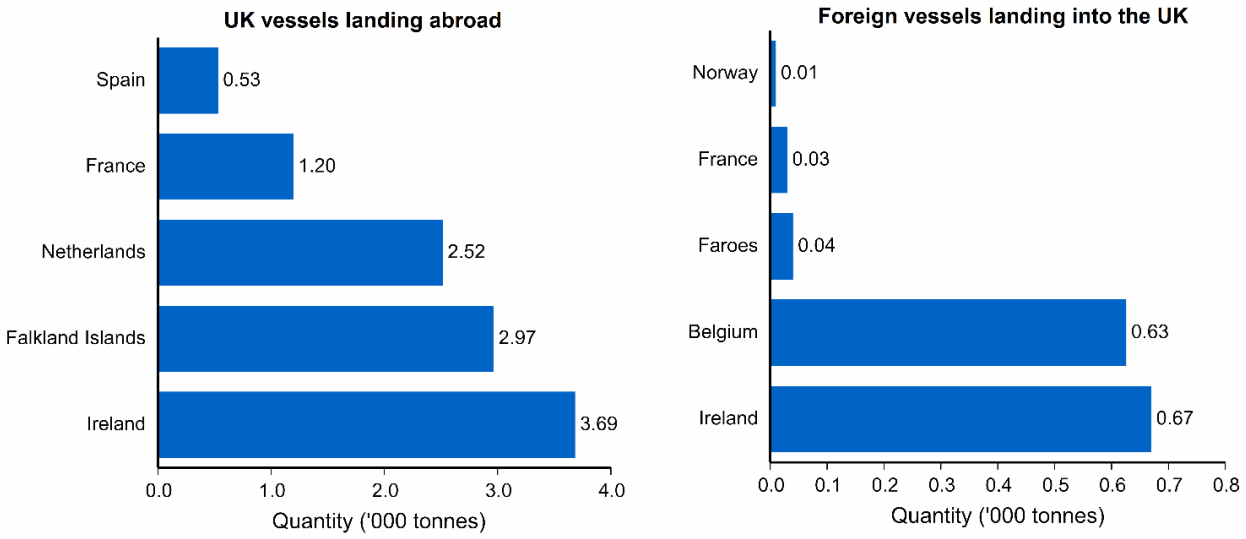


Chart 3.15 shows landings of shellfish by the UK fleet in 2017 by ICES rectangle of capture. In 2017, both the largest quantity and value of shellfish were captured in rectangles relatively close to the coast of the UK. However, shellfish species with high prices were typically captured in rectangles away from coastal areas.

Chart 3.15: Shellfish landings by UK vessels by ICES rectangle: 2017

Chart 3.15a: Quantity of landings by ICES rectangle

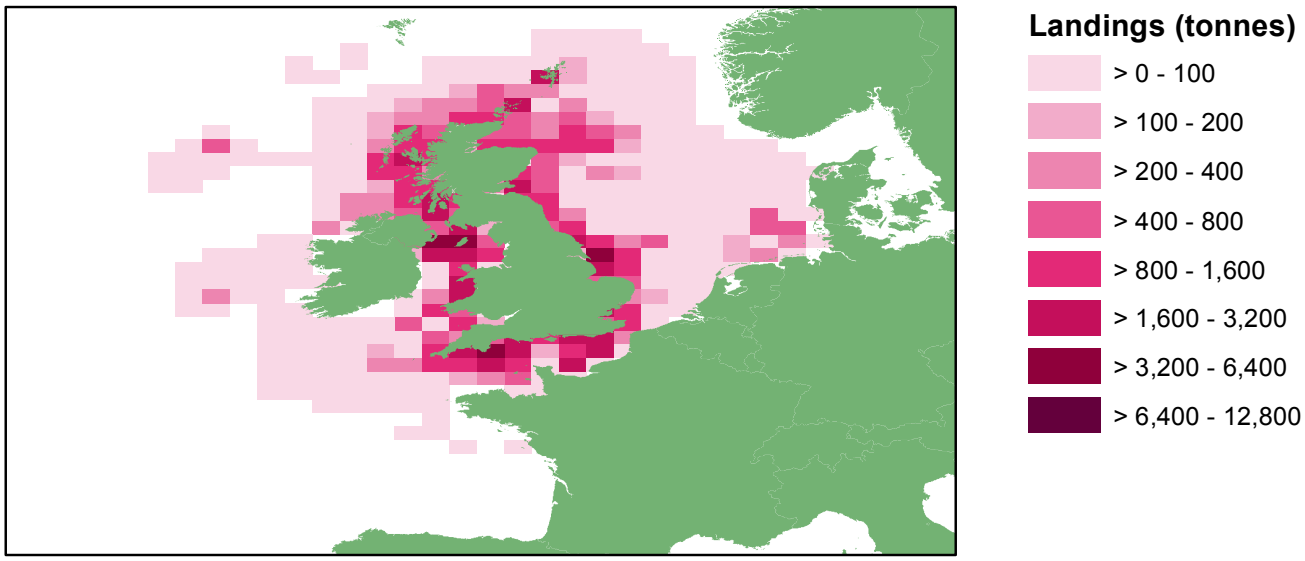


Chart 3.15b: Value of landings by ICES rectangle

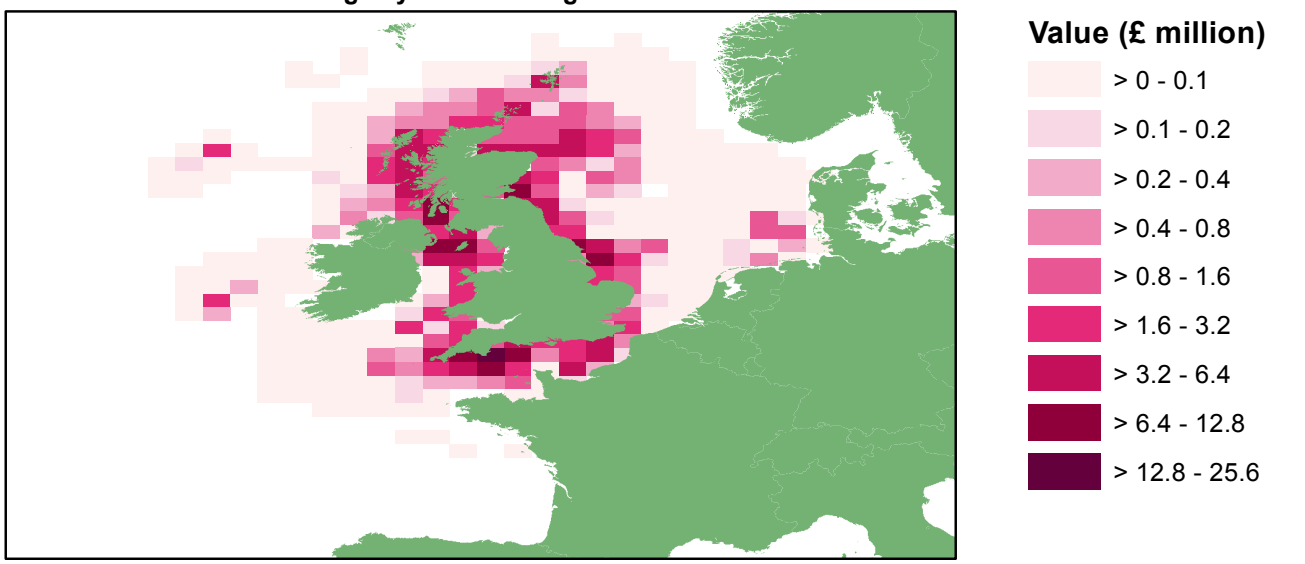
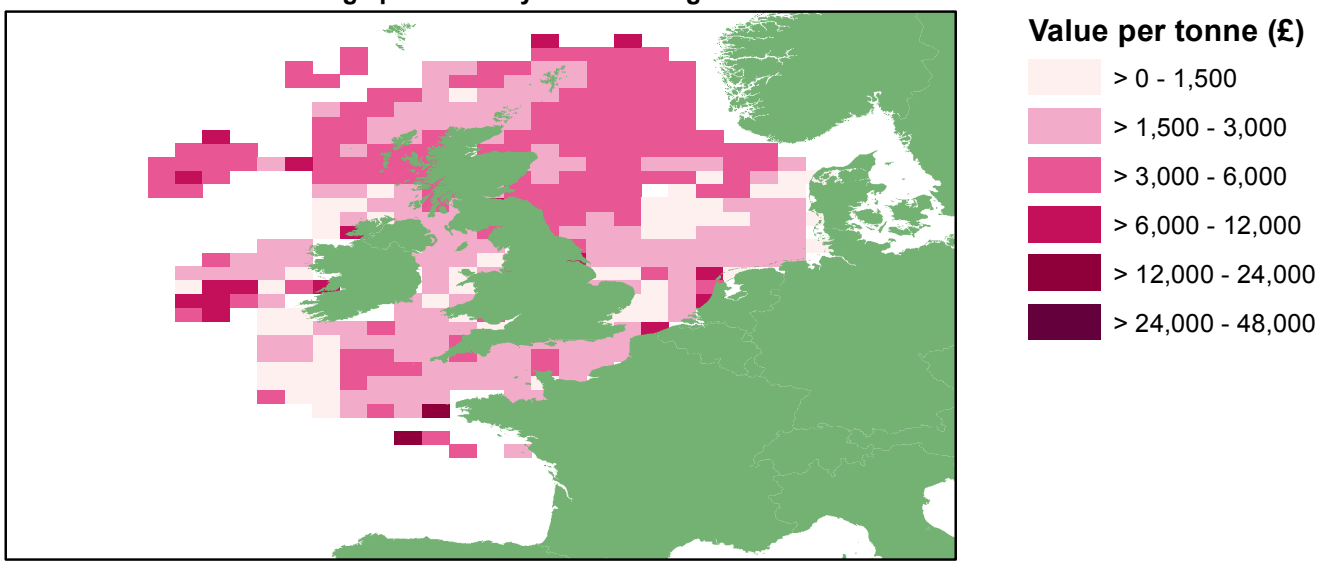


Chart 3.15c: Value of landings per tonne by ICES rectangle



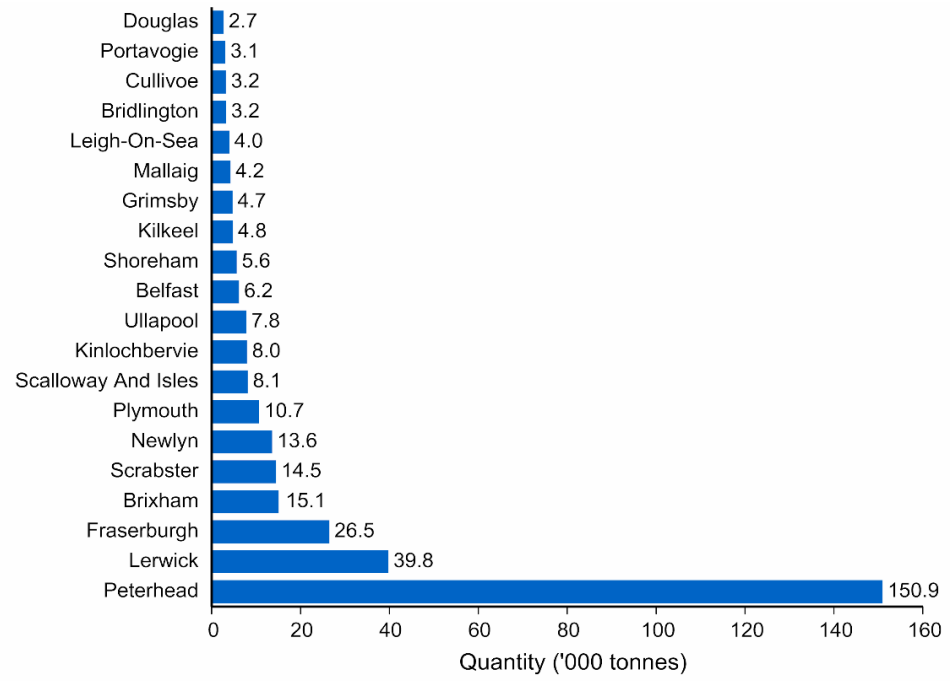
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Landings into major ports by the UK fleet

Chart 3.16 shows the top twenty UK ports based on the quantity and value landed by UK vessels in 2017. Peterhead remains the port with by far the highest landings - 151 thousand tonnes, with a value of £167 million. Lerwick is still in second place with 40 thousand tonnes, although this is down by 11 thousand tonnes on 2016 landings. Fraserburgh remains third highest with landings of 26 thousand tonnes.

In 2017, Brixham was the port with the largest quantity and value of landings in England (15 thousand tonnes, £41 million), followed by Newlyn (14 thousand tonnes, £30 million). Both ports' landings comprise mainly high value shellfish and demersal species. Next came Plymouth (11 thousand tonnes, £16 million) where the majority of landings are relatively low value pelagic fish.

Chart 3.16: Landings into the top 20 UK ports by UK vessels: 2017



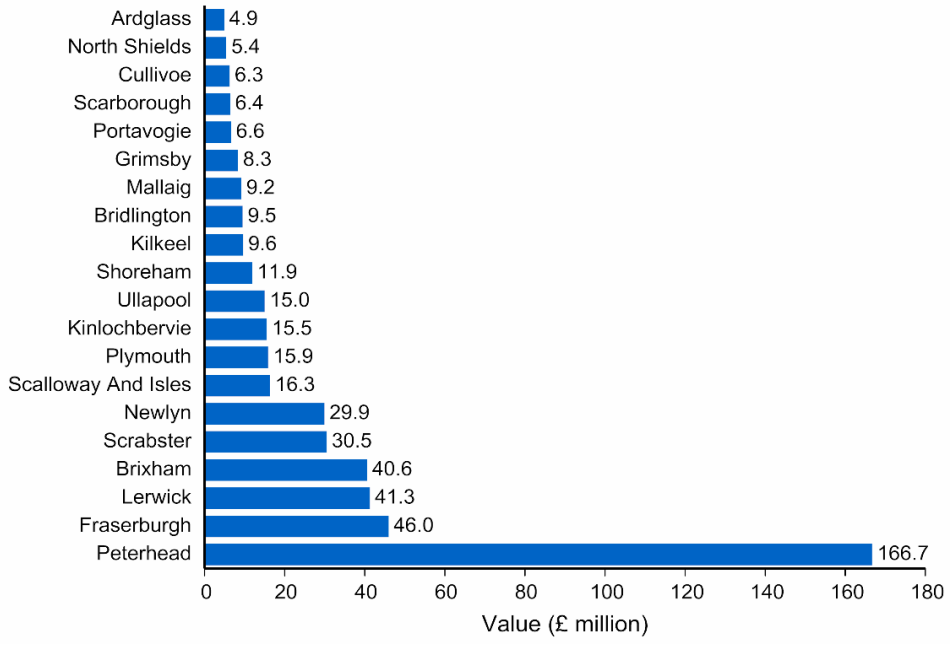
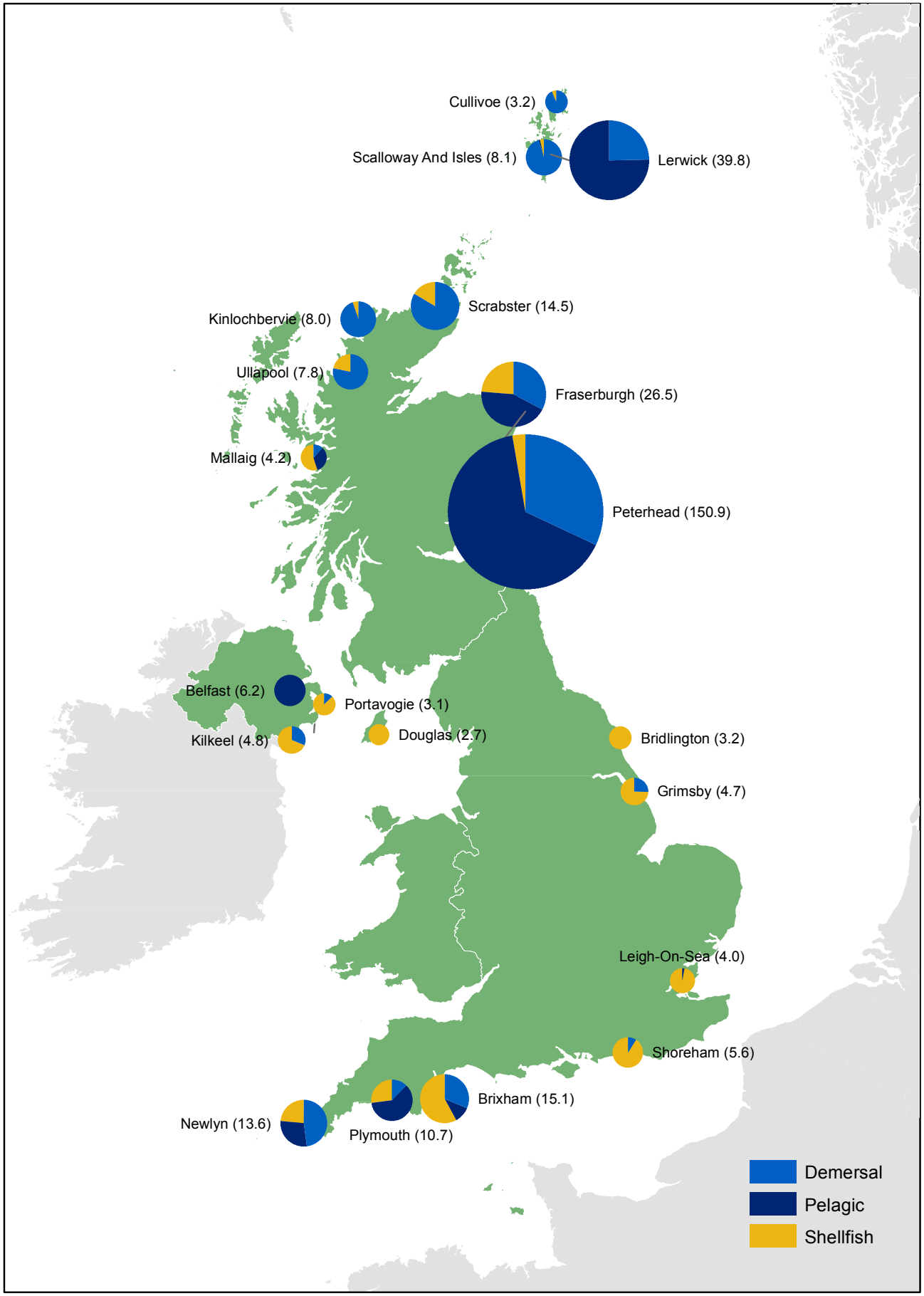


Chart 3.17: Landings into the top 20 UK ports[a] by UK vessels by species type: 2017 ('000 tonnes)



[a] Shows the top 20 major ports based on the quantity of fish landed by UK vessels at each port in 2017.
Contains Collins Bartholomew data. © Collins Bartholomew copyright and database right 2017.

Appendix ND.3.2

The difference in species composition of landings is illustrated in Chart 3.17. The relatively low value per tonne of landings into Peterhead, Lerwick, Fraserburgh and Plymouth is because these are ports which specialise in relatively lower value pelagic species. These four ports alone account for 89 per cent of all UK landings of pelagic species into the UK.

Landings into the top three ports in Scotland account for 72 per cent of all landings by UK vessels into Scotland by quantity. In contrast, landings into Plymouth, Brixham and Newlyn form only 40 per cent of landings into England, with remaining landings more evenly spread around the English coast. The low number of English ports in Charts 3.16 and 3.17 is explained by the broad distribution of landings across English ports.

Landings abroad by the UK fleet

In 2017, UK vessels landed 290 thousand tonnes of fish abroad. Of this, 126 thousand tonnes of mostly mackerel and herring were landed into Norway. Sixty three thousand tonnes were landed by UK vessels into the Netherlands and 52 thousand tonnes into Ireland. A small sector of the UK registered fishing fleet is in Dutch economic ownership; landings by these vessels contribute to the large quantities of fish landed into the Netherlands. Chart 3.18 shows the quantity of fish landed into each country, where this exceeds one thousand tonnes.

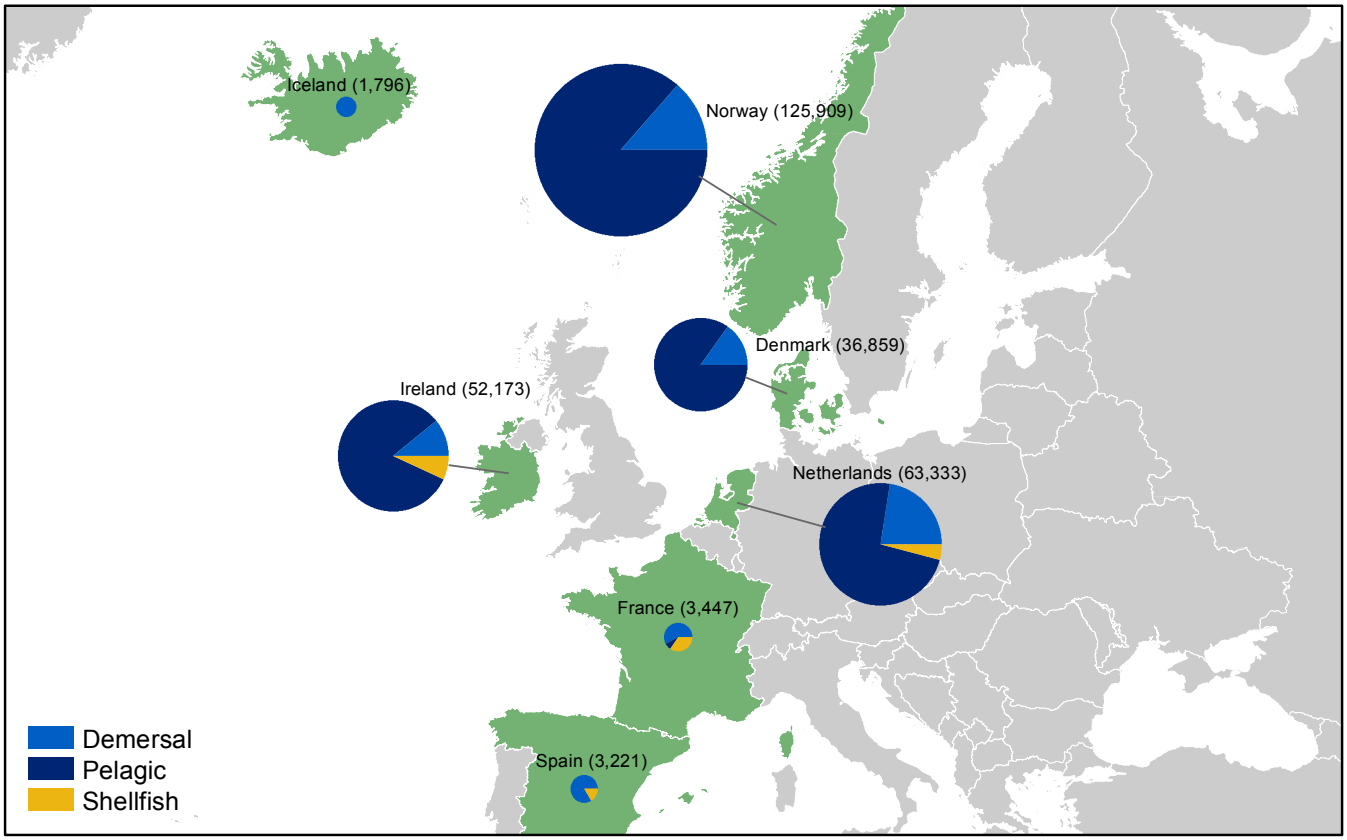
Seventy nine per cent of fish landed abroad by UK vessels were pelagic and 17 per cent were demersal. Different countries receive different species: the majority of fish landed into the Netherlands, Ireland and Denmark were pelagic while most fish landed into France and Spain were demersal. Almost all landings into the Falkland Islands were squid. The species landed into each country is typically determined by market conditions and consumer tastes.

Landings into the UK by foreign vessels

In 2017, 48 thousand tonnes of fish were landed into the UK by foreign vessels, down 5 thousand tonnes on 2016, largely a result of a decrease in herring landings. Chart 3.19 shows the quantities landed by vessel nationality, where these exceed one thousand tonnes.

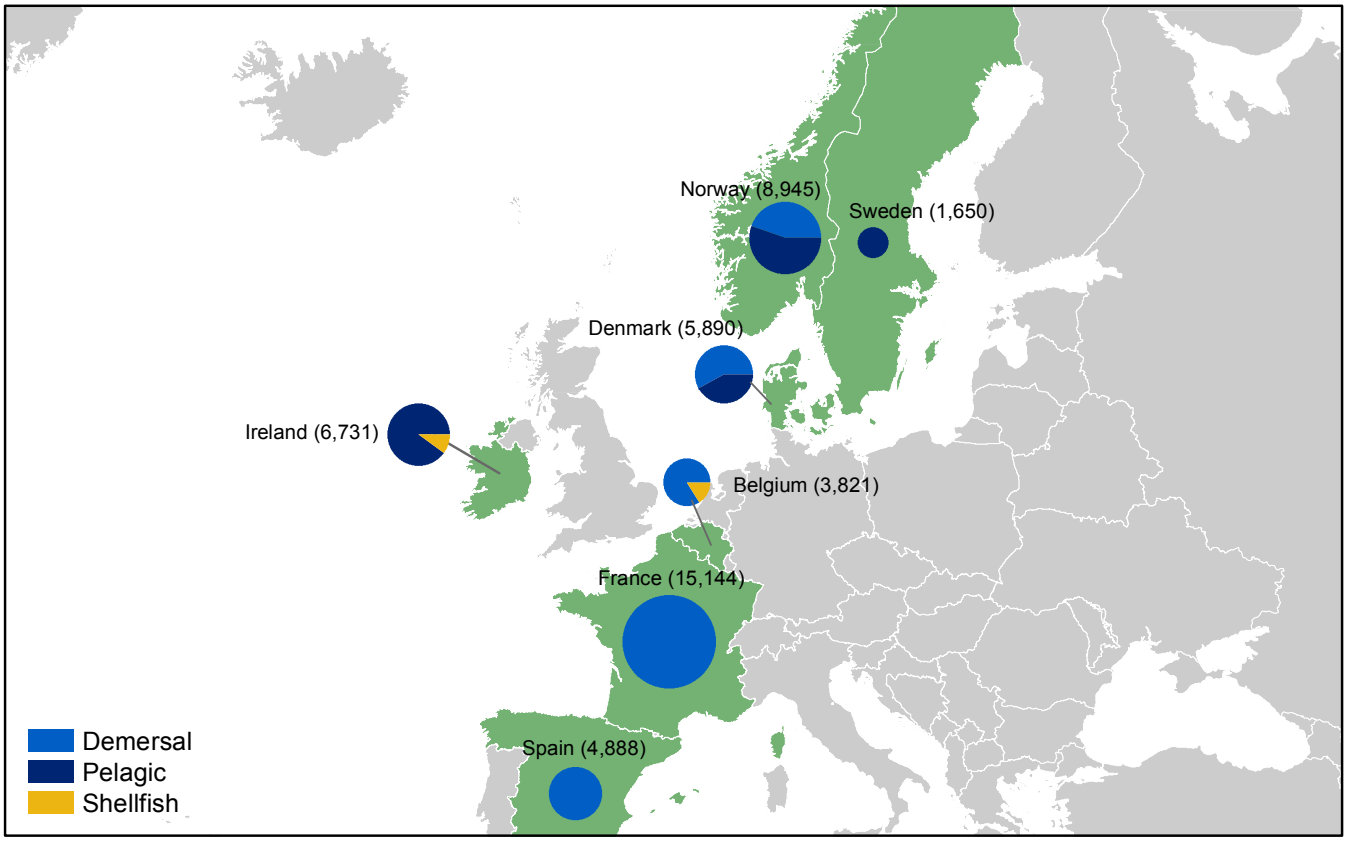
French and Norwegian registered vessels landed the largest quantity of fish into the UK in 2017 (15 and 9 thousand tonnes respectively). Two thirds of all fish landed into the UK are demersal with the large majority of the remainder being pelagic.

Chart 3.18: Landings abroad by UK vessels by country of landing: 2017 (tonnes)



Note: Only landings over 1,000 tonnes are shown. Excludes Falklands Islands (3,007 tonnes).

Chart 3.19: Landings into the UK by foreign vessels by vessel nationality: 2017 (tonnes)



Note: Only landings over 1,000 tonnes are shown.

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Appendix ND.3.2

Landings by the UK fleet by area of capture

Table 3.8 and Chart 3.20 show that 38 per cent (276 thousand tonnes) of the quantity of fish landed by UK vessels in 2017 was caught in the Northern North Sea (area IVa). There has been a large shift to the West of Scotland (area VIa) where landings have increased from 153 thousand tonnes in 2015 to 198 thousand tonnes in 2017. Landings from the English Channel (area VIId/e) were 61 thousand tonnes.

Different sea areas yield different proportions of species. The North Sea (areas IVa, IVb and IVc) provided 60 per cent of the demersal fish landed by the UK fleet, while the Northern North Sea and the West of Scotland were the source of 83 per cent of pelagic fish landed by UK vessels in 2017. The Irish Sea (area VIIa), the West of Scotland and the English Channel provided 56 per cent of the shellfish landed by the UK fleet. Typically, shellfish landings form a high proportion of landings from enclosed sea areas with large coastal stretches (Irish Sea, Bristol Channel, English Channel and the Southern North Sea), while pelagic species form the majority of landings from open waters such as the West of Scotland, Northern North Sea, West of Ireland (area VIIb) and Porcupine Bank (area VIIc).

TABLE 3.8 Landings into the UK and abroad by UK vessels by area of capture: 2017

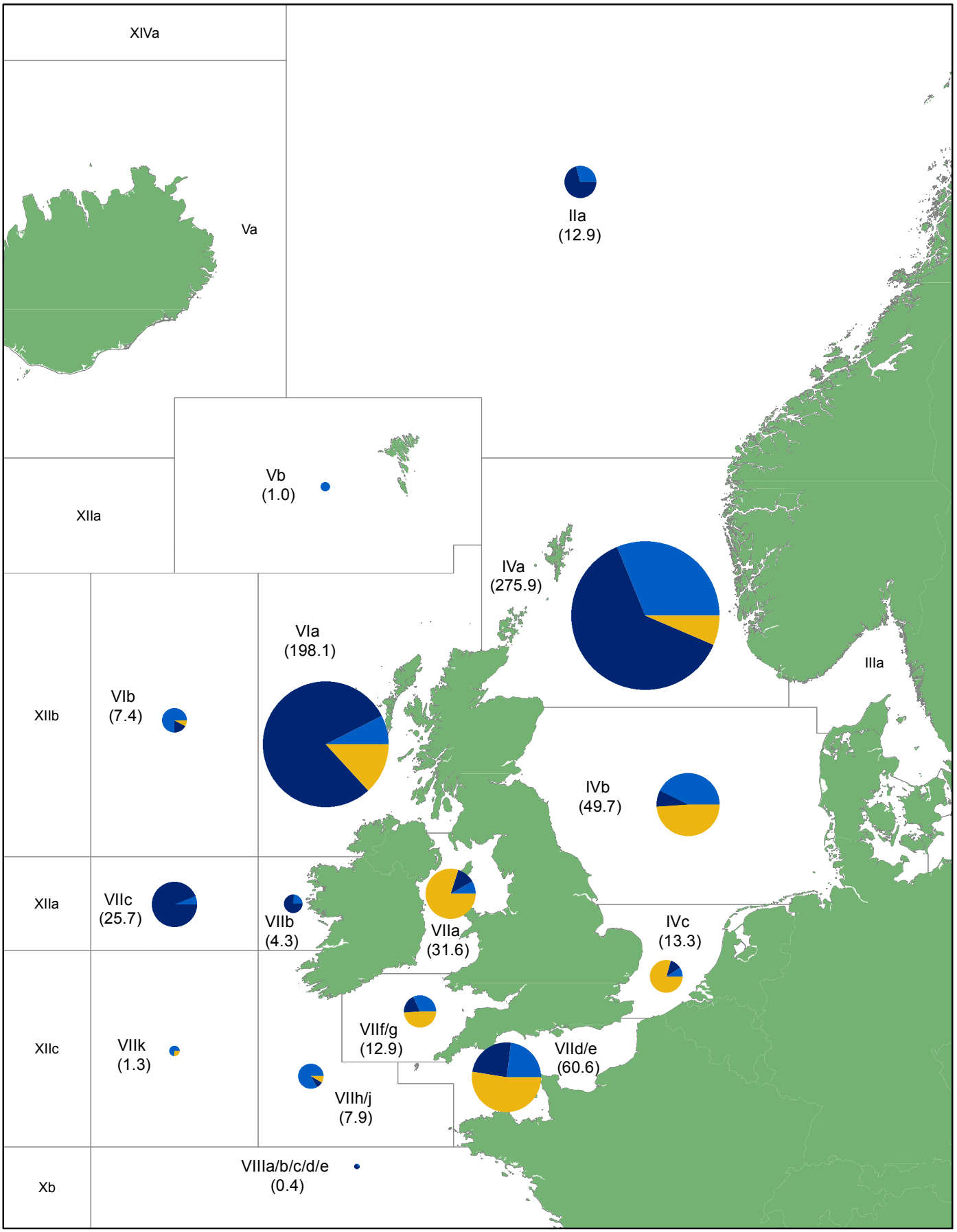
	Demersal		Pelagic		Shellfish		Total	
	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)
Barents Sea/Murman Coast (I)	8.6	14.8	-	-	-	-	**8.6**	**14.8**
Norwegian Coast (IIa)	3.8	6.2	9.1	6.0	-	-	**12.9**	**12.2**
Bear Island & Spitzbergen (IIb)	5.8	10.1	-	-	-	-	**5.8**	**10.1**
Skagerrak and Kattegat (IIIa)	-	-	-	-	-	-	**-**	**-**
Northern North Sea (IVa)	86.2	161.0	171.9	124.6	17.8	52.0	**275.9**	**337.5**
Central North Sea (IVb)	21.3	29.1	4.1	2.5	24.3	73.8	**49.7**	**105.3**
Southern North Sea (IVc)	1.2	3.6	1.5	0.9	10.5	12.4	**13.3**	**16.9**
Faroes (Vb)	1.0	2.0	..	..	..	..	**1.0**	**2.0**
West of Scotland (VIa)	14.8	27.8	157.2	105.8	26.1	73.1	**198.1**	**206.7**
Rockall (VIb)	5.5	10.2	1.3	0.2	0.6	2.1	**7.4**	**12.5**
Irish Sea (VIIa)	2.6	3.6	3.7	1.3	25.3	46.6	**31.6**	**51.5**
West of Ireland (VIIb)	1.0	3.0	3.2	2.6	..	..	**4.3**	**5.6**
Porcupine Bank (VIIc)	1.6	3.8	24.1	4.8	0.1	0.4	**25.7**	**8.9**
English Channel (VIId/e)	14.0	41.7	14.9	6.8	31.8	79.1	**60.6**	**127.7**
Little/Great Sole Bank (VIIh/j)	6.6	18.7	0.7	0.4	0.7	1.6	**7.9**	**20.7**
West of Great Sole Bank (VIIk)	1.0	2.2	..	-	0.3	2.2	**1.3**	**4.4**
Rest of ICES area VII (VIIf/g)	4.1	11.8	2.5	1.1	6.3	14.9	**12.9**	**27.8**
Bay of Biscay (VIII)	0.1	0.3	0.2	0.2	..	..	**0.4**	**0.5**
East Coast of Greenland (XIV)	1.8	2.9	-	-	..	0.1	**1.8**	**3.0**
North Azores (XII)	..	..	-	-	..	..	**..**	**..**
Other Areas [(a)]	1.4	1.9	0.3	0.1	3.4	9.9	**5.1**	**12.0**
Total UK	**182.3**	**354.7**	**394.8**	**257.2**	**147.2**	**368.1**	**724.3**	**980.1**

Source: Fisheries Administrations in the UK

(a) Includes areas outside ICES areas such as the Indian Ocean and the North West and South West Atlantic.

Note: Additional data on UK vessel landings are available for download from the MMO website as supplementary Table 3.8a.

Chart 3.20: Landings into the UK and abroad by UK vessels by area of capture: 2017 ('000 tonnes)



Demersal
Pelagic
Shellfish

Key to fishing areas follows on the next page. Landings from ICES areas I, IIb, XII and XIV are excluded from chart but can be found in Table 3.8.

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Key to fishing areas

I. Barents Sea and Murman Coast

II. Northward of the Norwegian Coast
IIa. Norwegian Coast
IIb. Bear Island and Spitzbergen

III. Skagerrak, Kattegat, The Sound, Belts and Baltic
IIIa. Skagerrak and Kattegat

IV. North Sea
IVa. Northern North Sea
IVb. Central North Sea
IVc. Southern North Sea

V. Iceland and Faroes

VI. West of Scotland and Rockall
VIa. West of Scotland
VIb. Rockall

VII. West of Ireland and Channels
VIIa. Irish Sea
VIIb. West of Ireland
VIIc. Porcupine Bank
VIId, VIIe. English Channel (East, West)
VIIf, VIIg. Bristol Channel, South East of Ireland
VIIh, VIIj. Little Sole Bank, Great Sole Bank
VIIk. West of Great Sole Bank

VIII. Biscay

Appendix ND.3.2

Landings by the UK fleet by sector

Eighty seven per cent of the quantity of all landings by the UK fleet in 2017 was landed by vessels in a producer organisation. Table 3.9 shows the quantity and value of landings by the different sectors of the UK fleet.

Vessels in the Scottish FPO accounted for 19 per cent of the quantity and 17 per cent of the value of fish landed by the UK fleet (138 thousand tonnes, £171 million).

There is clear specialisation among producer organisations with regard to species targeted. For example, vessels in North Atlantic FPO, Lunar Group, Interfish and Klondyke primarily target pelagic species.

Over a third of UK vessels over 10 metres in length were in the non-sector (vessels without producer organisation membership). These vessels typically have limited access to fishing quota and primarily target shellfish species, which are mostly non-quota stocks. In 2017 they caught a third of all shellfish landed by the UK fleet. Vessels in the non-sector landed only small quantities of demersal and pelagic species.

TABLE 3.9 Landings into the UK and abroad by UK vessels by sector: 2017 [(a)]

	Demersal		Pelagic		Shellfish		Total	
	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)
Scottish FPO Ltd	39.1	67.7	85.0	57.6	14.3	45.8	**138.4**	**171.1**
Shetland FPO Ltd	16.6	32.2	76.4	51.4	0.8	2.6	**93.8**	**86.2**
Lunar Group	2.8	5.1	66.7	35.4	..	..	**69.6**	**40.5**
Klondyke	-	-	45.8	29.5	-	-	**45.8**	**29.5**
Interfish	0.6	2.3	42.8	30.7	..	1.0	**43.7**	**34.0**
North Atlantic FPO Ltd	..	0.8	39.6	25.3	..	..	**40.0**	**26.1**
Anglo Northern Irish FPO Ltd	0.8	1.1	21.8	18.6	3.1	7.5	**25.7**	**27.3**
South Western FPO Ltd	4.5	15.2	4.3	1.3	14.8	33.9	**23.6**	**50.4**
The FPO Ltd	23.1	38.2	..	..	..	..	**23.3**	**38.6**
Northern Ireland FPO Ltd	5.4	8.9	4.5	3.0	8.5	21.6	**18.4**	**33.5**
Cornish FPO Ltd	11.1	27.4	2.5	0.8	4.7	15.2	**18.3**	**43.4**
North East of Scotland FO Ltd	13.0	23.8	..	..	1.6	5.9	**14.7**	**29.7**
Eastern England FPO Ltd	10.1	19.0	..	..	1.2	3.6	**11.3**	**22.6**
Fife FPO Ltd	5.4	8.6	..	..	4.9	12.5	**10.5**	**21.3**
Fleetwood FPO Ltd	8.7	20.3	..	..	..	..	**9.1**	**20.6**
North Sea FPO Ltd	7.0	11.6	..	..	1.4	4.0	**8.5**	**15.5**
Aberdeen FPO	7.0	12.7	..	..	..	1.3	**7.4**	**14.1**
Anglo Scottish FPO Ltd	4.6	7.4	..	..	2.3	6.8	**6.9**	**14.2**
Northern Producers Organisation Ltd	4.5	7.7	..	..	1.2	3.1	**5.9**	**10.9**
Lowestoft FPO Ltd	4.4	8.0	..	..	..	0.6	**4.7**	**8.7**
Orkney FPO Ltd	3.0	5.9	-	-	1.6	3.7	**4.6**	**9.6**
West of Scotland FPO Ltd	..	..	1.5	..	2.4	7.9	**4.2**	**8.7**
Wales and West Coast FPO Ltd	4.0	11.8	-	-	..	..	**4.1**	**12.0**
Isle of Man Non-Sector	..	..	-	-	2.4	4.7	**2.4**	**4.7**
Non-sector vessels	0.5	1.3	..	..	46.6	97.4	**47.2**	**98.7**
10m and under pool	5.3	17.1	2.9	2.9	33.9	88.2	**42.2**	**108.3**
Commercial non-vessel landings	-	-	-	-	-	-	**-**	**-**
Total All Sectors	**182.3**	**354.7**	**394.8**	**257.2**	**147.2**	**368.1**	**724.3**	**980.1**

Source: Fisheries Administrations in the UK

(a) Landings by vessels 10 metres and under with membership of a producer organisation are attributed to that organisation and not the 10m and under pool

Vessels 10 metres and under in length without producer organisation membership (the '10m and under pool') also landed relatively small quantities of demersal and pelagic species. Four fifths of their catch is shellfish. The fishing methods used by this sector and the different species targeted mean that they typically gain higher than average prices for their catch.

Landings by the UK fleet by vessel length

Seventy four per cent of the quantity of landings by the UK fleet in 2017 was caught by vessels over 24 metres in length (see Table 3.10). At the end of 2017, these vessels constituted just 4 per cent of the UK fleet by number, yet their landings of pelagic species formed 97 per cent of the annual total for the UK fleet.

Ninety three per cent of all landings of demersal species by the UK fleet were by vessels over 18 metres in length. In contrast, landings of shellfish are much more evenly distributed across the fleet, with vessels 10 metres and under in length (including those in producer organisations) accounting for 24 per cent of the quantity of landings.

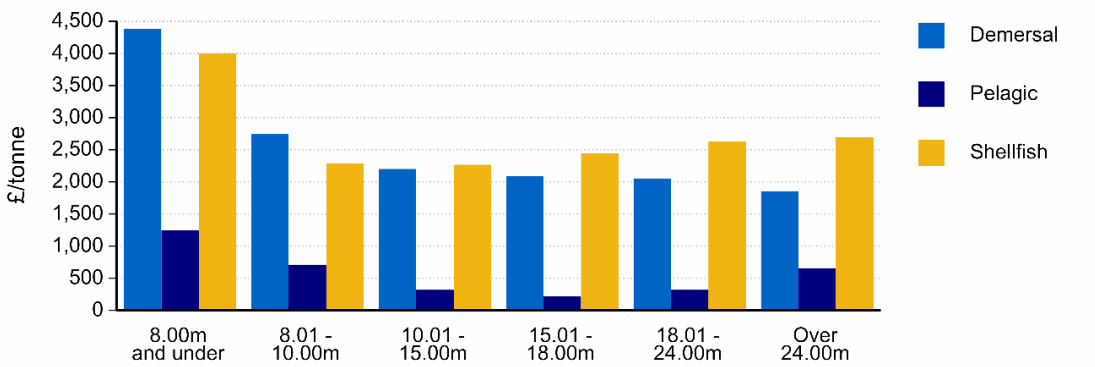
TABLE 3.10 Landings into the UK and abroad by UK vessels by vessel length: 2017

Overall Length	Demersal		Pelagic		Shellfish		Total	
	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)
8.00m and under	1.4	6.2	1.6	2.0	6.5	25.9	**9.5**	**34.1**
8.01 - 10.00m	4.1	11.1	1.4	1.0	29.4	67.4	**34.9**	**79.5**
10.01 - 15.00m	4.7	10.2	9.2	2.9	41.6	94.2	**55.5**	**107.4**
15.01 - 18.00m	3.3	7.0	1.2	..	17.9	43.7	**22.4**	**50.9**
18.01 - 24.00m	34.9	71.7	..	..	30.8	80.8	**66.1**	**152.7**
Over 24.00m	133.9	248.5	381.1	250.9	20.9	56.1	**536.0**	**555.5**
Total	**182.3**	**354.7**	**394.8**	**257.2**	**147.2**	**368.1**	**724.3**	**980.1**

Source: Fisheries Administrations in the UK

Although on average longer vessels land much greater quantities of fish than their smaller counterparts, they typically achieve a lower average price for the fish landed (Chart 3.21). For example, the average price of demersal fish landed by vessels over 24 metres is £1.86 per kilo, while for the 8 metre and under fleet it is £4.38 per kilo. Differences, albeit less marked, apply for shellfish, with an average price of £3.99 per kilo for landings by the 8 metre and under fleet, compared with £2.68 per kilo for the over 24 metre fleet. The difference in prices is partly due to differences in species targeted, fishing methods used and choice of markets.

Chart 3.21: Average price of landings into the UK and abroad by UK vessels by vessel length: 2017



Landings by the UK fleet by gear used

Eighty eight per cent of fish landed by UK vessels in 2017 was captured using mobile gears, such as beam trawls, demersal trawls and seines, pelagic seines and dredges (see Table 3.11). Almost all landings of pelagic fish and 90 per cent of all demersal fish were caught using mobile gears. Passive gears such as pots and traps were used to catch 43 per cent of the shellfish landed by the UK fleet.

A large majority of demersal and pelagic fish landed by UK vessels in 2017 were caught using demersal trawls and seines. This broad category includes otter, nephrops, shrimp and pair trawls, and all demersal seines. Pots and traps accounted for 42 per cent of shellfish landings, with demersal trawl/seine and dredges catching 28 per cent and 24 per cent respectively.

The type of gear used can make a difference to the average price of fish. For demersal species, the average price of fish captured using passive gears is £2.46 per kilo compared with £1.89 per kilo for mobile gears. Price differentials are also observed between different gears of the same class. For example, shellfish caught using dredges were sold at an average price of £2.12 per kilo, while shellfish caught using demersal trawls and seines were sold at an average price of £3.10 per kilo.

This variation in prices partly reflects the different species caught by different gears. For example, demersal trawls and seines capture the majority of the nephrops landed by the UK fleet, while the bulk of the landings from dredges are scallops, which sell at a lower average price. However, there can also be a premium attached to the method by which the fish are captured.

TABLE 3.11 Landings into the UK and abroad by UK vessels by gear used: 2017

	Demersal		Pelagic		Shellfish		Total	
	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)	Quantity ('000t)	Value (£ million)
Beam trawl	14.4	38.8	..	..	5.1	17.8	**19.5**	**56.6**
Demersal trawl/seine [(a)]	150.0	271.5	375.1	242.0	40.9	126.7	**566.0**	**640.1**
Dredge	..	0.7	..	..	35.6	75.6	**35.8**	**76.3**
Pelagic seine	-	-	14.8	11.7	..	..	**14.8**	**11.7**
Other mobile gears	..	..	-	-	2.0	0.9	**2.1**	**0.9**
Total Mobile Gears	**164.5**	**311.0**	**389.9**	**253.7**	**83.7**	**221.0**	**638.2**	**785.7**
Drift and fixed nets	8.7	21.5	2.5	0.9	..	1.2	**11.6**	**23.6**
Gears using hooks	9.0	21.2	2.3	2.6	..	..	**11.3**	**23.9**
Pots and traps	..	1.0	..	..	61.7	140.5	**61.9**	**141.6**
Other passive gears	..	..	..	..	1.3	5.3	**1.3**	**5.3**
Total Passive Gears	**17.8**	**43.7**	**4.9**	**3.6**	**63.5**	**147.1**	**86.1**	**194.4**
Total All Sectors	**182.3**	**354.7**	**394.8**	**257.2**	**147.2**	**368.1**	**724.3**	**980.1**

Source: Fisheries Administrations in the UK

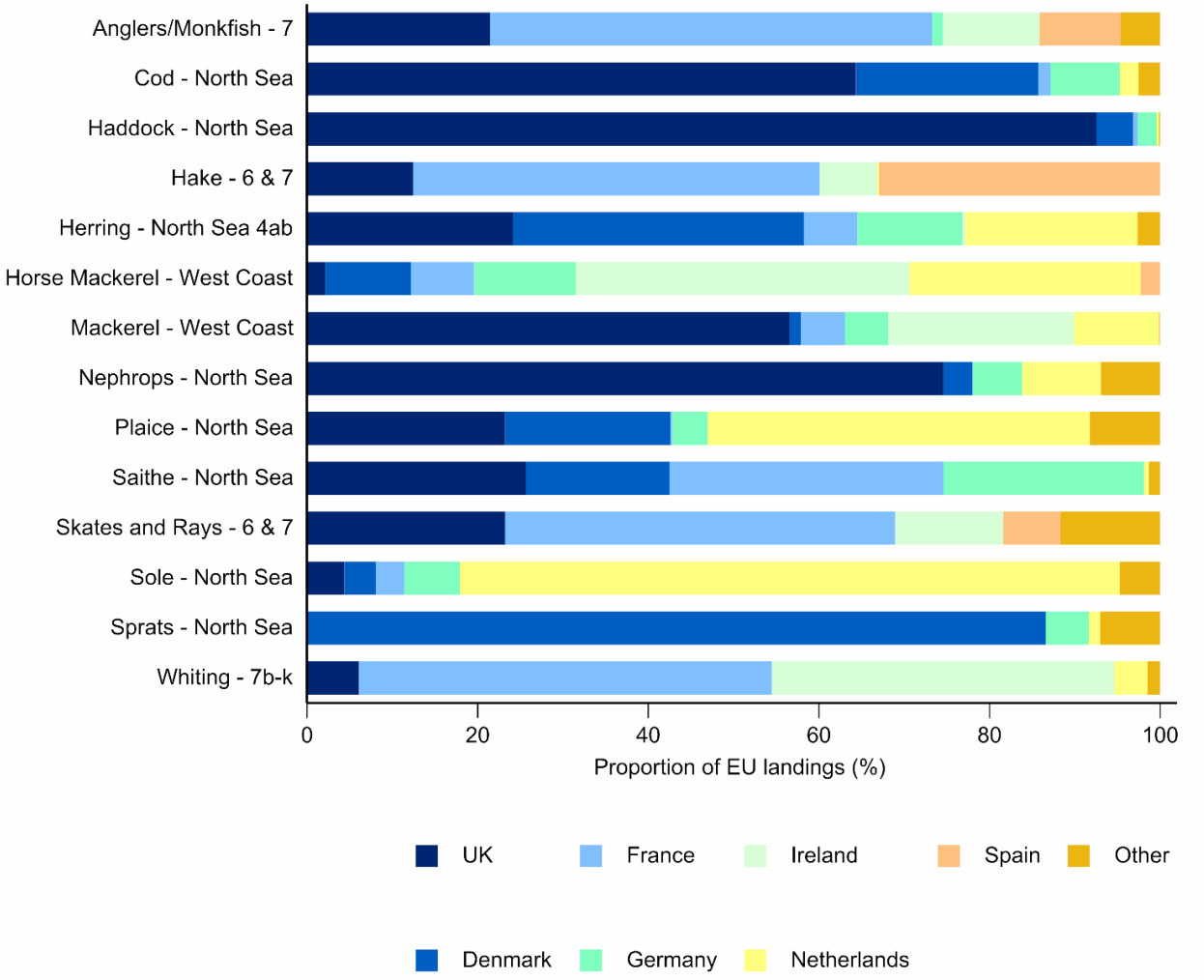
(a) includes midwater trawl gears (for example otter and pair trawls) which, depending on the mesh size, are used to target both demersal and pelagic species.

Uptake of quotas by EU member states

Table 3.12 shows the quota held by EU member states at the end of 2017 (after international quota transfers) for each stock, together with landings by each member state during 2017. The shares of the quota held by each member state vary considerably across stocks, with different countries landing different quantities of each stock as a consequence.

Chart 3.22 illustrates the difference in landings by member states for stocks of major importance to the UK and other EU countries. In 2017, the UK landed 93 per cent of all North Sea haddock (25 thousand tonnes) and 75 per cent of all North Sea nephrops (12 thousand tonnes). This dominance is not seen across all stocks. For example, Danish vessels landed 87 per cent of all North Sea sprats, Dutch vessels landed 77 per cent of all North Sea sole and French vessels landed 52 per cent of Anglers in area 7.

Chart 3.22: Share of landings of key stocks by EU member states: 2017



Note: The data in this chart are official statistics and not subject to National Statistics accreditation.

The figures here are derived from reports to the European Commission by each member state. These had to be submitted to the Commission by 15 February 2018. The landings data for the UK may therefore differ from those reported earlier in this chapter, which are based on more recent figures.

TABLE 3.12 Quota, catch and uptake by EU Member States: 2017

Tonnes

Species	Area		UK	Denmark	France	Germany	Ireland	Netherlands	Spain	Other	Total
Albacore	**Northern**	Quota	240	-	6,771	-	2,499	-	13,961	2,333	**25,804**
	Atlantic ocean, north	Catch	..	-	4,172	-	2,491	-	13,940	2,564	**23,167**
	of latitude 05° N	Uptake %	..	-	62	-	100	-	100	110	**90**
Alfonsinos	**3-10, 12 & 14**	Quota	9	-	19	-	-	-	79	183	**290**
	III, IV, V, VI, VII, VIII, IX,	Catch	..	-	10	-	-	-	75	186	**272**
	X, XII, XIV (EC & Int)	Uptake %	5	-	55	-	-	-	95	102	**94**
Anglers / Monkfish	**North Sea**	Quota	11,173	1,450	106	549	-	127	-	385	**13,790**
	IIa (EC), IV (EC)	Catch	10,504	1,381	95	512	-	110	-	170	**12,771**
		Uptake %	94	95	89	93	-	87	-	44	**93**
	4 (Norwegian waters)	Quota	125	1,266	1	31	-	78	-	-	**1,500**
	IV (Norway)	Catch	109	1,186	..	26	-	78	-	-	**1,399**
		Uptake %	87	94	46	83	-	100	-	-	**93**
	West of Scotland	Quota	3,057	-	3,020	297	855	92	331	-	**7,650**
	Vb (EC), VI, XII, XIV	Catch	2,758	-	1,898	246	798	-	290	-	**5,991**
		Uptake %	90	-	63	83	93	-	88	-	**78**
	7	Quota	7,643	-	19,651	371	3,485	141	2,980	2,423	**36,695**
	VII	Catch	6,473	-	15,656	365	3,422	1	2,862	1,409	**30,188**
		Uptake %	85	-	80	98	98	..	96	58	**82**
Black Scabbard Fish	**5-7 & 12**	Quota	197	-	2,759	24	..	..	334	-	**3,315**
	V,VI, VII and XII (EC	Catch	101	-	1,775	-	-	..	238	-	**2,114**
	and International)	Uptake %	51	-	64	-	-	134	71	-	**64**
Blue Ling	**2 & 4**	Quota	14	4	27	4	-	-	-	-	**49**
	II and IV (EC and	Catch	8	..	9	-	-	-	-	-	**17**
	International)	Uptake %	58	1	33	-	-	-	-	-	**35**
	6 & 7	Quota	2,230	-	8,690	101	33	-	400	19	**11,473**
	VI and VII (EC and	Catch	645	-	1,020	-	-	-	117	-	**1,781**
	International)	Uptake %	29	-	12	-	-	-	29	-	**16**
Blue Whiting	**Northern**	Quota	73,711	67,768	13,724	50,598	49,510	86,978	25,620	23,746	**391,657**
	I,II,III,IV,V,VII,VIIIabde,	Catch	66,386	60,928	13,102	45,448	44,560	80,930	17	21,328	**332,699**
	XII,XIV (EC and Int)	Uptake %	90	90	95	90	90	93	..	90	**85**
Boarfish	**6-8**	Quota	2,045	7,904	-	6	22,039	199	-	-	**32,193**
	VI, VII and VIII (EC and	Catch	..	548	-	1	15,485	199	-	-	**16,233**
	International)	Uptake %	..	7	-	18	70	100	-	-	**50**
Cod	**1 & 2 (Norwegian waters)**	Quota	6,951	-	3,288	2,202	3	-	5,728	4,830	**23,002**
	I, II (Norway)	Catch	6,903	..	3,026	2,149	3	-	5,696	4,579	**22,358**
		Uptake %	99	n/a	92	98	100	-	99	95	**97**
	1 & 2b	Quota	9,638	-	5,178	3,820	-	-	9,419	4,478	**32,533**
	I, IIb	Catch	9,609	-	5,037	3,820	-	-	8,629	5,057	**32,153**
		Uptake %	100	-	97	100	-	-	92	113	**99**
	North Sea	Quota	20,274	7,363	1,074	2,880	-	800	-	943	**33,334**
	IIa (EC), IV	Catch	18,411	6,119	412	2,330	-	618	-	729	**28,618**
		Uptake %	91	83	38	81	-	77	-	77	**86**
	West of Scotland	Quota	50	-	13	..	18	-	-	-	**81**
	VIb, XII, XIV	Catch	38	-	-	-	17	-	-	-	**54**
		Uptake %	76	-	-	-	91	-	-	-	**67**
	7a	Quota	56	-	7	-	81	-	-	5	**149**
	VIIa	Catch	41	-	..	-	54	-	-	5	**101**
		Uptake %	74	-	3	-	67	-	-	96	**68**
	7d	Quota	259	-	1,860	-	-	56	-	96	**2,272**
	VIId	Catch	48	-	92	-	-	20	-	17	**177**
		Uptake %	18	-	5	-	-	36	-	18	**8**
	7b-c, e-k	Quota	252	-	2,181	-	801	..	-	110	**3,344**
	VII (ex VIIa, VIId),VIII, IX,	Catch	185	-	1,386	-	642	..	..	82	**2,295**
	X; CECAF 34.1.1 (EC)	Uptake %	73	-	64	-	80	61	n/a	75	**69**
	Greenland waters	Quota	1,759	-	-	441	-	-	-	-	**2,200**
	NAFO 1F and XIV	Catch	1,733	-	-	441	-	-	-	-	**2,174**
	(Greenland)	Uptake %	99	-	-	100	-	-	-	-	**99**
	NAFO 3M	Quota	1,148	-	-	-	-	-	902	6,522	**8,571**
	3M (NAFO)	Catch	1,148	-	-	-	-	-	899	6,518	**8,565**
		Uptake %	100	-	-	-	-	-	100	100	**100**
Cod and Haddock	**5b (Faroese waters)**	Quota	817	-	114	19	-	-	-	-	**950**
	Vb (Faroes)	Catch	491	-	-	-	-	-	-	-	**491**
		Uptake %	60	-	-	-	-	-	-	-	**52**
Flatfish	**5b (Faroese waters)**	Quota	68	-	14	18	-	-	-	-	**100**
	Vb (Faroes)	Catch	9	-	..	-	-	-	-	-	**9**
		Uptake %	14	-	1	-	-	-	-	-	**9**
Greater Forkbeard	**1-4**	Quota	15	-	10	9	-	-	-	-	**34**
	I, II, III, IV (EC and	Catch	9	..	2	..	-	-	-	-	**11**
	International)	Uptake %	63	n/a	16	1	-	-	-	-	**33**

Source: European Commission

Appendix ND.3.2

TABLE 3.12 Quota, catch and uptake by EU Member States: 2017 (cont.)

Tonnes

Species	Area		UK	Denmark	France	Germany	Ireland	Netherlands	Spain	Other	Total
Greater Forkbeard (cont.)	**5-7** *V, VI, VII (EC and International)*	Quota	897	-	729	11	85	..	712	-	**2,434**
		Catch	100	-	435	-	6	-	404	-	**946**
		Uptake %	11	-	60	-	7	-	57	-	**39**
Greenland Halibut	**1 & 2 (Norwegian waters)** *I, II (Norway)*	Quota	24	-	-	2	-	-	19	5	**50**
		Catch	21	-	7	1	-	-	36	5	**71**
		Uptake %	91	-	n/a	52	-	-	188	98	**141**
	2a, 4 & 6 *IIa (EC), IV, VI (EC* and International)	Quota	964	18	474	24	1	2	70	2	**1,556**
		Catch	148	-	232	..	-	..	39	-	**419**
		Uptake %	15	-	49	..	-	23	56	-	**27**
Haddock	**1 & 2 (Norwegian waters)** *I, II (Norway)*	Quota	377	-	146	160	-	-	180	338	**1,200**
		Catch	316	..	100	137	-	-	103	314	**970**
		Uptake %	84	n/a	69	85	-	-	57	93	**81**
	North Sea *IIa (EC), IV*	Quota	27,924	1,395	831	809	-	135	1	397	**31,493**
		Catch	25,476	1,185	143	611	-	73	-	43	**27,531**
		Uptake %	91	85	17	75	-	54	-	11	**87**
	West of Scotland 5b & 6a *Vb (EC), VIa*	Quota	3,349	3	245	6	712	31	40	1	**4,388**
		Catch	2,464	2	68	-	641	31	28	-	**3,234**
		Uptake %	74	60	28	-	90	100	71	-	**74**
	West of Scotland 6b *VIb, XII, XIV*	Quota	3,995	-	404	38	555	-	-	1	**4,994**
		Catch	3,886	-	-	-	500	-	-	-	**4,386**
		Uptake %	97	-	-	-	90	-	-	-	**88**
	7a *VIIa*	Quota	1,315	-	198	-	1,220	-	-	37	**2,770**
		Catch	1,222	-	5	-	1,120	-	-	5	**2,352**
		Uptake %	93	-	3	-	92	-	-	12	**85**
	7b-k *VII (ex VIIa),VIII, IX, X; CECAF 34.1.1 (EC)*	Quota	771	-	5,345	-	1,732	12	-	116	**7,976**
		Catch	690	..	5,029	-	1,684	12	..	111	**7,526**
		Uptake %	89	n/a	94	-	97	93	n/a	96	**94**
Hake	**North Sea** *IIa (EC), IV*	Quota	6,797	2,511	2,736	418	-	55	-	55	**12,572**
		Catch	6,129	2,023	2,458	239	..	51	-	35	**10,935**
		Uptake %	90	81	90	57	n/a	93	-	64	**87**
	6 & 7 *Vb (EC), VI, VII, XII, XIV*	Quota	8,649	1	31,276	20	3,861	303	23,181	266	**67,556**
		Catch	6,417	1	24,569	7	3,485	124	16,939	46	**51,588**
		Uptake %	74	63	79	37	90	41	73	17	**76**
Herring	**Atlanto Scandian** *I, II*	Quota	4,561	20,929	-	5,194	3,797	6,262	34	1,322	**42,101**
		Catch	4,422	19,037	-	5,166	3,495	6,046	-	1,205	**39,371**
		Uptake %	97	91	-	99	92	97	-	91	**94**
	North Sea 4ab *IV (EC and Norway North of 53° 30'N)*	Quota	68,719	100,839	18,569	34,950	999	56,886	-	7,498	**288,461**
		Catch	67,818	95,849	17,674	34,667	868	56,751	-	7,497	**281,123**
		Uptake %	99	95	95	99	87	100	-	100	**97**
	4c & 7d *IVc (exB/W), VIId*	Quota	4,303	1,205	12,364	9,016	-	26,595	-	118	**53,600**
		Catch	4,278	-	11,127	9,016	-	25,628	-	13	**50,062**
		Uptake %	99	-	90	100	-	96	-	11	**93**
	West Coast *Vb (EC), VIa (North of 56° 30' N), VIb*	Quota	3,607	1	6	17	198	898	-	-	**4,726**
		Catch	3,356	..	-	-	9	815	-	-	**4,180**
		Uptake %	93	26	-	-	4	91	-	-	**88**
	7a (Manx and Mourne) *VIIa (Manx & Mourne)*	Quota	4,091	-	-	-	243	-	-	-	**4,334**
		Catch	3,696	-	-	-	184	-	-	-	**3,880**
		Uptake %	90	-	-	-	76	-	-	-	**90**
	7ef *VIIe, f*	Quota	522	-	511	-	-	-	-	-	**1,032**
		Catch	50	-	..	-	-	-	-	-	**50**
		Uptake %	10	-	..	-	-	-	-	-	**5**
	7ghjk *VIIg, h, j, k*	Quota	381	..	553	307	14,287	911	-	-	**16,439**
		Catch	67	-	..	307	10,017	634	-	-	**11,025**
		Uptake %	18	-	..	100	70	70	-	-	**67**
Horse Mackerel	**North Sea** *IVb, IVc, VIId*	Quota	5,139	2,102	1,955	1,263	-	5,307	-	181	**15,947**
		Catch	4,133	283	1,741	963	-	4,083	-	67	**11,270**
		Uptake %	80	13	89	76	-	77	-	37	**71**
	West Coast *IIa (EC), IVa, Vb (EC), VI, VII (ex VIId),VIIIabde, XII, XIV*	Quota	3,792	9,560	6,666	13,567	26,543	26,027	7,956	511	**94,621**
		Catch	1,321	6,124	4,544	7,315	23,920	16,618	1,408	..	**61,251**
		Uptake %	35	64	68	54	90	64	18	..	**65**
Lemon Sole and Witches	**North Sea** *IIa (EC), IV (EC)*	Quota	3,780	898	261	122	-	723	-	607	**6,391**
		Catch	1,858	417	4	42	-	291	-	355	**2,967**
		Uptake %	49	46	2	35	-	40	-	58	**46**
Ling	**Deep Sea 1 & 2** *I, II*	Quota	9	9	14	4	-	-	-	-	**36**
		Catch	..	-	13	-	-	-	-	-	**13**
		Uptake %	2	-	95	-	-	-	-	-	**38**
	4 (EC waters) *IV (EC)*	Quota	2,823	321	315	64	-	..	20	12	**3,555**
		Catch	2,728	320	298	57	-	-	-	9	**3,412**
		Uptake %	97	100	94	89	-	-	-	80	**96**

Source: European Commission

Appendix ND.3.2

TABLE 3.12 Quota, catch and uptake by EU Member States: 2017 (cont.)

Tonnes

Species	Area		UK	Denmark	France	Germany	Ireland	Netherlands	Spain	Other	Total
Ling (continued)	**4 (Norwegian waters)**	Quota	136	1,116	13	83	-	2	-	-	**1,350**
	IV (Norway S of 62°N)	Catch	120	753	2	72	-	..	-	-	**947**
		Uptake %	88	67	17	87	-	6	-	-	**70**
	5 (EC and International waters)	Quota	6	6	6	6	-	-	-	9	**33**
		Catch	6	-	4	-	-	-	-	-	**10**
	V (EC and International)	Uptake %	106	-	60	-	-	-	-	-	**30**
	6-10, 12 & 14	Quota	5,084	10	4,570	177	1,071	-	3,819	69	**14,800**
	VI, VII, VIII, IX, X,	Catch	2,756	-	1,529	2	657	..	1,762	21	**6,728**
	XII, XIV (EC)	Uptake %	54	-	33	1	61	n/a	46	31	**45**
Ling and Blue Ling	**5b (Faroese waters)**	Quota	114	-	1,300	586	-	-	-	-	**2,000**
	Vb (Faroes)	Catch	58	-	-	-	-	-	-	-	**58**
		Uptake %	51	-	-	-	-	-	-	-	**3**
Mackerel	**North Sea**	Quota	3,991	17,526	2,379	3,601	-	2,740	-	4,039	**34,277**
	IIa (EC), IV	Catch	3,923	17,993	2,142	3,601	-	2,447	-	4,002	**34,106**
		Uptake %	98	103	90	100	-	89	-	99	**100**
	West Coast	Quota	222,116	5,342	22,983	20,021	86,320	41,027	528	23	**398,361**
	II (ex EC),Vb (EC),VI,	Catch	224,289	5,343	20,588	19,964	86,521	39,479	475	21	**396,679**
	VII, VIIIabde, XII,XIV	Uptake %	101	100	90	100	100	96	90	92	**100**
Megrims	**North Sea**	Quota	2,744	98	40	8	-	25	-	12	**2,926**
	IIa (EC), IV (EC)	Catch	1,174	48	39	..	-	4	-	..	**1,265**
		Uptake %	43	49	98	4	-	14	-	..	**43**
	West of Scotland	Quota	1,959	-	2,769	-	794	-	710	-	**6,234**
	Vb (EC), VI, XII, XIV	Catch	755	-	133	-	694	-	336	-	**1,917**
		Uptake %	39	-	5	-	87	-	47	-	**31**
	7	Quota	3,060	-	5,723	-	2,789	-	3,746	391	**15,709**
	VII	Catch	2,664	-	4,341	-	2,512	-	2,920	361	**12,799**
		Uptake %	87	-	76	-	90	-	78	92	**81**
Nephrops	**North Sea**	Quota	16,153	1,128	48	1,217	-	1,650	-	1,401	**21,598**
	IIa (EC), IV (EC)	Catch	11,950	539	15	925	-	1,475	-	1,114	**16,019**
		Uptake %	74	48	31	76	-	89	-	80	**74**
	West of Scotland	Quota	17,475	-	148	-	246	-	350	-	**18,218**
	Vb (EC), VI	Catch	11,581	-	-	-	122	-	-	-	**11,703**
		Uptake %	66	-	-	-	50	-	-	-	**64**
	7	Quota	9,483	-	6,689	-	10,119	-	1,406	18	**27,714**
	VII	Catch	6,631	-	417	-	8,055	-	74	1	**15,177**
		Uptake %	70	-	6	-	80	-	5	6	**55**
Northern Prawn	**North Sea**	Quota	514	2,020	-	-	-	102	-	81	**2,718**
	IIa (EC), IV (EC)	Catch	7	19	-	-	-	-	-	-	**26**
		Uptake %	1	1	-	-	-	-	-	-	**1**
	Greenland waters	Quota	75	387	575	-	-	-	-	125	**1,162**
	V and XIV (Greenland)	Catch	11	153	-	-	-	-	-	10	**174**
		Uptake %	14	40	-	-	-	-	-	8	**15**
Plaice	**North Sea**	Quota	32,214	26,764	1,551	7,831	-	57,585	-	8,410	**134,354**
	IIa (EC), IV	Catch	14,962	12,518	151	2,655	-	28,919	-	5,319	**64,524**
		Uptake %	46	47	10	34	-	50	-	63	**48**
	West of Scotland	Quota	427	-	10	-	287	-	-	-	**724**
	Vb (EC), VI, XII, XIV	Catch	112	-	..	-	18	-	-	-	**130**
		Uptake %	26	-	..	-	6	-	-	-	**18**
	7a	Quota	311	-	13	-	796	10	-	90	**1,220**
	VIIa	Catch	62	-	..	-	446	-	-	77	**584**
		Uptake %	20	-	..	-	56	-	-	85	**48**
	7de	Quota	2,741	-	5,846	-	1	89	-	2,573	**11,250**
	VIId, e	Catch	2,407	-	1,640	-	1	82	-	2,342	**6,472**
		Uptake %	88	-	28	-	98	92	-	91	**58**
	7fg	Quota	44	-	122	-	65	-	-	190	**421**
	VIIf, g	Catch	38	-	108	-	63	-	-	180	**388**
		Uptake %	85	-	89	-	97	-	-	95	**92**
	7hjk	Quota	13	-	64	-	48	6	-	11	**141**
	VIIh, j, k	Catch	9	-	54	-	43	-	-	11	**116**
		Uptake %	74	-	84	-	90	-	-	97	**83**
Pollack	**West of Scotland**	Quota	145	-	190	-	56	-	6	-	**397**
	Vb (EC), VI, XII, XIV	Catch	14	-	..	-	32	-	-	-	**46**
		Uptake %	10	-	..	-	57	-	-	-	**12**
	7	Quota	2,067	-	8,700	-	927	-	75	378	**12,146**
	VII	Catch	1,392	-	942	-	897	-	12	19	**3,261**
		Uptake %	67	-	11	-	97	-	16	5	**27**
Redfishes	**1 & 2 (Norwegian waters)**	Quota	592	-	69	26	-	-	267	500	**1,454**
		Catch	591	-	18	19	-	-	257	472	**1,357**
	I, II (Norway)	Uptake %	100	-	26	74	-	-	96	94	**93**

Source: European Commission

Appendix ND.3.2

TABLE 3.12 Quota, catch and uptake by EU Member States: 2017 (cont.)

Tonnes

Species	Area		UK	Denmark	France	Germany	Ireland	Netherlands	Spain	Other	Total
Redfishes (continued)	**5b (Faroese waters)**	Quota	7	-	25	368	-	-	-	-	**400**
	Vb (Faroes)	Catch	3	-	-	-	-	-	-	-	**3**
		Uptake %	41	-	-	-	-	-	-	-	**1**
	NAFO 3M	Quota	7	-	-	-	-	-	2,237	7,457	**9,700**
	3M (NAFO)	Catch	6	-	-	-	-	-	2,017	4,356	**6,380**
		Uptake %	100	-	-	-	-	-	90	58	**66**
Red Seabream	**6-8**	Quota	2	-	19	-	..	-	126	-	**148**
	VI, VII and VIII (EC and International)	Catch	1	-	16	-	..	..	112	-	**129**
		Uptake %	65	-	84	-	100	n/a	88	-	**87**
Roundnose and Roughead Grenadier	**5b, 6 & 7**	Quota	171	-	2,907	6	173	-	257	1	**3,515**
	Vb, VI, VII	Catch	11	-	123	-	..	-	231	-	**365**
		Uptake %	6	-	4	-	..	-	90	-	**10**
Saithe	**1 & 2 (Norwegian waters)**	Quota	353	-	311	1,195	14	-	87	590	**2,550**
	I, II (Norway)	Catch	353	10	143	1,154	14	-	88	590	**2,351**
		Uptake %	100	n/a	46	97	100	-	102	100	**92**
	North Sea	Quota	11,005	6,526	20,535	10,203	-	210	-	620	**49,099**
	IIa (EC), IV	Catch	8,674	5,689	10,872	7,953	-	189	-	452	**33,829**
		Uptake %	79	87	53	78	-	90	-	73	**69**
	West of Scotland	Quota	3,259	6	6,042	18	377	4	163	-	**9,867**
	Vb (EC), VI, XII, XIV	Catch	2,641	5	4,008	..	171	3	4	-	**6,833**
		Uptake %	81	86	66	..	45	96	2	-	**69**
	5b (Faroese waters)	Quota	670	-	1,691	347	-	56	-	36	**2,800**
	Vb (Faroes)	Catch	291	-	..	-	-	-	-	-	**292**
		Uptake %	44	-	..	-	-	-	-	-	**10**
	7	Quota	477	-	1,360	-	1,640	-	10	7	**3,494**
	VII, VIII, IX, X; COPACE 34.1.1(EC)	Catch	62	-	94	-	601	-	..	1	**758**
		Uptake %	13	-	7	-	37	-	2	9	**22**
Sandeels	**North Sea**	Quota	5,087	440,250	-	8,202	-	-	-	41,970	**495,508**
	IIa (EC), IIIa (EC), IV (EC)	Catch	3,324	353,933	-	6,550	-	-	-	41,641	**405,448**
		Uptake %	65	80	-	80	-	-	-	99	**82**
Skates and Rays	**North Sea**	Quota	770	9	46	44	-	255	-	254	**1,378**
	IIa (EC), IV (EC)	Catch	695	6	37	42	-	256	-	194	**1,230**
		Uptake %	90	71	80	96	-	100	-	76	**89**
	7d	Quota	160	-	698	-	-	5	-	91	**955**
	VIId	Catch	160	-	625	-	-	5	-	96	**886**
		Uptake %	100	-	90	-	-	98	-	105	**93**
	6 & 7	Quota	2,019	-	3,890	1	1,000	3	528	911	**8,351**
	VI (EC), VII (EC) (ex VIId)	Catch	1,824	-	3,594	-	996	1	525	919	**7,859**
		Uptake %	90	-	92	-	100	26	100	101	**94**
Sole	**North Sea**	Quota	940	671	734	1,097	-	12,591	-	1,494	**17,527**
	II, IV	Catch	511	432	393	761	-	9,064	-	557	**11,718**
		Uptake %	54	64	54	69	-	72	-	37	**67**
	West of Scotland	Quota	12	-	-	-	51	-	-	-	**63**
	Vb (EC), VI, XII, XIV	Catch	2	-	-	-	12	-	-	-	**14**
		Uptake %	17	-	-	-	24	-	-	-	**22**
	7a	Quota	10	-	1	-	17	-	-	14	**42**
	VIIa	Catch	4	-	..	-	14	-	-	14	**32**
		Uptake %	40	-	9	-	81	-	-	100	**75**
	7d	Quota	394	-	1,806	-	-	-	-	890	**3,090**
	VIId	Catch	343	-	1,178	-	-	-	-	697	**2,218**
		Uptake %	87	-	65	-	-	-	-	78	**72**
	7e	Quota	805	-	375	-	..	-	-	57	**1,238**
	VIIe	Catch	738	-	198	-	..	-	-	56	**992**
		Uptake %	92	-	53	-	108	-	-	98	**80**
	7fg	Quota	172	-	59	-	30	-	-	578	**840**
	VIIf, g	Catch	149	-	49	-	28	-	-	554	**780**
		Uptake %	87	-	82	-	93	-	-	96	**93**
	7hjk	Quota	50	-	105	-	153	22	-	94	**424**
	VIIh, j, k	Catch	39	-	81	-	86	-	-	74	**280**
		Uptake %	77	-	77	-	56	-	-	79	**66**
Sprats	**North Sea**	Quota	5,417	162,526	2,181	6,826	-	2,251	-	11,495	**190,695**
	IIa (EC), IV (EC)	Catch	48	102,767	..	5,971	-	1,580	-	8,351	**118,718**
		Uptake %	1	63	..	87	-	70	-	73	**62**
	7de	Quota	3,474	291	328	34	-	314	-	4	**4,444**
	VIId, e	Catch	2,498	-	..	34	-	232	-	..	**2,764**
		Uptake %	72	-	..	100	-	74	-	1	**62**
Spurdog	**West Coast**	Quota	100	-	83	4	53	-	10	20	**270**
	I, V, VI, VII, VIII, XII and XIV (EC and Int)	Catch	35	-	-	-	-	-	..	-	**36**
		Uptake %	35	-	-	-	-	-	3	-	**13**

Source: European Commission

Appendix ND.3.2

TABLE 3.12 Quota, catch and uptake by EU Member States: 2017 (cont.)

Tonnes

Species	Area		UK	Denmark	France	Germany	Ireland	Netherlands	Spain	Other	Total
Turbot and Brill	**North Sea**	Quota	752	732	109	348	-	3,176	-	566	**5,682**
	IIa (EC), IV (EC)	Catch	495	411	47	328	-	2,827	-	474	**4,582**
		Uptake %	66	56	43	94	-	89	-	84	**81**
Tusk	**1, 2 & 14**	Quota	7	-	7	7	-	-	-	-	**20**
	I, II, XIV (EC	Catch	1	-	4	-	-	-	-	-	**5**
	and International)	Uptake %	16	-	55	-	-	-	-	-	**24**
	4 (EC waters)	Quota	107	71	49	21	-	-	-	7	**254**
	IV (EC and	Catch	39	3	5	2	-	-	-	..	**49**
	International)	Uptake %	36	4	10	9	-	-	-	..	**19**
	4 (Norwegian	Quota	4	165	-	1	-	-	-	-	**170**
	waters)	Catch	3	35	..	..	-	-	-	-	**38**
	IV (Norway S of 62°N)	Uptake %	64	21	n/a	45	-	-	-	-	**22**
	5-7	Quota	288	-	609	13	59	-	58	-	**1,027**
	V, VI, VII (EC and	Catch	68	-	154	-	2	-	38	-	**262**
	International)	Uptake %	24	-	25	-	4	-	65	-	**25**
Whiting	**North Sea**	Quota	10,578	1,013	2,207	216	-	841	1	144	**15,000**
	IIa (EC), IV	Catch	9,216	254	953	89	..	662	-	76	**11,250**
		Uptake %	87	25	43	41	n/a	79	-	53	**75**
	West of Scotland	Quota	125	-	29	1	67	-	..	-	**222**
	Vb (EC), VI, XII, XIV	Catch	125	-	3	-	60	19	-	-	**207**
		Uptake %	100	-	12	-	89	n/a	-	-	**93**
	7a	Quota	37	-	3	-	46	-	-	2	**88**
	VIIa	Catch	16	-	..	-	33	-	-	2	**51**
		Uptake %	44	-	1	-	72	-	-	95	**58**
	7b-k	Quota	2,116	-	18,265	-	8,013	682	-	418	**29,494**
	VII (ex VIIa)	Catch	960	-	7,633	-	6,335	613	-	231	**15,773**
		Uptake %	45	-	42	-	79	90	-	55	**53**
Other Species	**1 & 2 (Norwegian**	Quota	170	-	55	42	-	-	50	33	**350**
	waters)	Catch	98	10	47	34	-	-	47	-	**236**
	I, II (Norway)	Uptake %	58	n/a	85	81	-	-	95	-	**67**
	4 (Norwegian	Quota	3,102	5,069	220	980	-	130	-	-	**9,500**
	waters)	Catch	2,685	4,232	8	789	-	-	-	101	**7,815**
	IV (Norway S of 62°N)	Uptake %	87	83	4	81	-	-	-	n/a	**82**
	5b (Faroese waters)	Quota	204	-	289	307	-	-	-	-	**800**
	Vb (Faroes)	Catch	145	-	4	-	-	-	-	-	**150**
		Uptake %	71	-	2	-	-	-	-	-	**19**

Source: European Commission

Appendix ND.3.2

Appendix ND.3.2

4 Supplies, overseas trade and marketing

Introduction

In 2017, the UK imported 705 thousand tonnes of fish (excluding fish products), with a value of £3,199 million. It exported 460 thousand tonnes, leaving a trade gap of 245 thousand tonnes. Landed prices of fish rose by an average of 6 per cent on 2016 and the fish component of the retail price index rose by 8 per cent. Fishing accounted for 6.5 per cent of gross value added for agriculture, hunting, forestry and fishing, compared with 6.3 per cent in 2016.

This chapter brings together information on:

- Imports and exports of fish and fish products
- Household expenditure on fish and inflation of fish prices
- The contribution of fishing to GDP

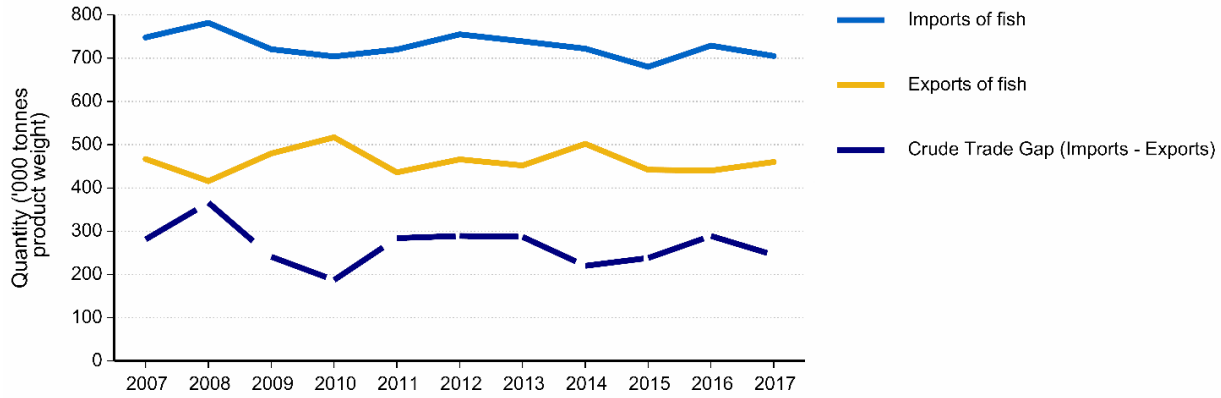
The data on imports, exports, household consumption and GDP include information on fish from freshwater fisheries and aquaculture, as well as from sea fisheries. This differs from the rest of the publication, which focuses exclusively on sea fisheries. Note that in this chapter, landings data are given in terms of landed weight for comparison with the trade data, which are shown in terms of actual product weight.

All tables presented here are available to download as spreadsheets from the MMO website. Supplementary tables showing more detail can also be found on the website.

Imports and Exports

The UK is a net importer of fish, with imports exceeding exports. In 2017, imports fell by 25 thousand tonnes while exports increased by 20 thousand tonnes. This resulted in the crude trade gap (imports minus exports) narrowing by 45 thousand tonnes to 245 thousand tonnes.

Chart 4.1: International trade of fish: 2007 to 2017



In addition to imports from abroad, supplies of fish to the UK include aquaculture, catches from inland fisheries, and landings by UK vessels from sea fisheries. Data on aquaculture and catches from freshwater fisheries are not included in this publication and hence total UK supplies of fish are not estimated.

Landings by UK vessels into the UK (based on landed weight) fell by 11 thousand tonnes in 2017 (see Table 4.1). Combining this with the 45 thousand tonne fall in the crude trade gap results in a reduction of 56 thousand tonnes of fish available for use in 2017 (646 thousand tonnes in 2017 compared with 702 thousand tonnes in 2016).

TABLE 4.1 Fish trade flows for the UK: 2007 to 2017

		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Imports [a]	('000 tonnes)	748	782	721	704	720	755	739	722	680	729 [R]	705
	(£ million)	1,994	2,210	2,177	2,255	2,559	2,570	2,757	2,738	2,672	3,069 [R]	3,199
Exports [a]	('000 tonnes)	467	416	480	517	436	466	452	502	442	440 [R]	460
	(£ million)	982	1,009	1,166	1,346	1,464	1,344	1,460	1,566	1,337	1,638 [R]	1,906
Crude trade gap	('000 tonnes)	**281**	**366**	**241**	**187**	**284**	**289**	**287**	**220**	**238**	**289** [R]	**245**
Landings by UK vessels into the UK [b] [c]												
	('000 tonnes)	407	375	360	379	372	366	379	422	390	413 [R]	402
	(£ million)	532	517	520	548	621	568	549	615	553	693 [R]	721

(a) Excludes fish products
(b) Landings are given in terms of landed weight equivalent (i.e. head on, gutted for most species).
(c) Landings include transhipments of mackerel.

More detailed landings data (based on live weight) are in Chapter 3.

Tables 4.2 and 4.3 present information on imports and exports by species. Note that while imports typically include landings into the UK by foreign-registered vessels, there may be cases where imports are less than the landings shown in Table 3.3; see Appendix 4 (UK fisheries statistics methodology) for further details.

There were 705 thousand tonnes of fish (excluding fish products) imported into the UK in 2017. This is down 3 per cent on 2016. Imports of key species (tuna, cod, salmon and shrimps and prawns) all fell. Imports total 809 thousand tonnes when fish products, such as fish meal and oils, are included.

2017 exports of fish rose by 5 per cent to 460 thousand tonnes. There was large increases in exports for salmon (11 thousand tonnes) and the ‘other fish’ category (23 thousand tonnes). Mackerel exports fell by 7 per cent (6 thousand tonnes). Including fish products gives total exports of 504 thousand tonnes.

Appendix ND.3.2

TABLE 4.2 Imports of fish, fish preparations, meals, flours and oils into the UK: 2013 to 2017 [a]

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Fish (excluding Shellfish)										
Bass	9.5	6.8	8.5	8.5	8.9	34.9	28.5	35.5	38.4 R	37.4
Blue Whiting	5.1	..	..	..	0.3	1.1	..	0.1	0.1	0.1
Cod	116.3	116.4	115.4	120.5 R	110.0	400.4	410.0	440.1	491.1 R	493.6
Haddock	44.9	35.9	41.0	44.9	47.0	124.5	111.1	119.9	113.7 R	130.0
Hake	3.2	4.7	3.2	3.5	2.5	8.8	11.1	9.4	10.4	8.2
Halibut	1.5	1.3	1.0	1.0	1.2	8.3	7.2	6.1	6.8	7.5
Herring	12.0	11.9	9.4	10.2	7.0	17.2	15.2	15.1	15.4	13.3
Ling	1.1	1.2	0.9	1.5	1.0	1.6	1.2	1.3	2.1	1.6
Mackerel	29.9	33.2	19.0	19.0	26.5	57.5	53.2	38.9	42.9	52.4
Megrim	..	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.4
Monks or Anglerfish	1.7	1.7	1.1	1.7 R	1.7	6.6	6.3	3.5	5.6 R	6.0
Plaice	4.6	4.2	4.4	4.2 R	4.5	13.6	12.9	12.4	12.4 R	15.2
Pollack	39.0	38.3	29.3	31.1	29.8	74.4	71.8	57.8	66.1	63.4
Saithe	2.7	3.2	2.0	2.9	2.6	8.1	9.5	6.6	9.2	7.2
Salmon [b]	74.5	78.3	71.8	85.8 R	74.1	379.0	393.1	345.8	488.7 R	489.8
Sardines	12.9	12.9	12.9	13.5	13.8	36.3	33.8	30.6	34.4	34.7
Sole	0.3	0.2	0.4	0.5	0.3	1.2	0.8	2.8	3.8	2.2
Trout [b]	8.6	11.4	10.4	12.2 R	12.0	45.5	60.8	55.4	66.2	81.4
Tuna	97.0	91.8	119.0	122.7	114.1	350.9	287.8	357.4	390.8 R	428.7
Whiting	1.7	3.3	2.6	3.9	4.4	1.3	2.6	2.2	3.3	4.3
Other Fish [c]	155.4	146.3	117.7	123.0 R	128.8	509.6	460.3	368.3	421.7 R	453.2
Total	**621.9**	**603.1**	**570.2**	**610.9** R	**591.0**	**2,080.7**	**1,977.2**	**1,909.5**	**2,223.3** R	**2,330.5**
Shellfish (Crustaceans and Molluscs)										
Crabs	2.5	3.9	2.2	2.8	2.9	17.3	23.3	18.4	19.9	21.0
Lobsters	2.6	2.3	3.0	2.7	2.1	23.4	23.4	35.9	37.6	30.8
Mussels	5.7	6.0	5.1	5.5	4.3	13.6	15.1	13.9	15.3 R	14.6
Nephrops	1.9	3.7	3.0	3.0 R	2.6	6.3	15.7	10.6	10.3 R	10.1
Scallops	1.9	2.1	2.4	3.7	1.3	20.8	24.4	27.6	41.4	20.3
Shrimps and Prawns	85.1	82.3	77.4	81.8	81.0	537.2	593.8	593.6	644.5 R	684.0
Squid	8.2	7.0	6.3	6.0	9.3	17.5	13.9	14.0	19.8	39.7
Other Crustaceans	2.6	3.6	3.0	2.3	1.5	17.7	27.8	23.0	20.9	14.7
Other Molluscs	7.0	7.9	8.0	10.5	8.6	22.4	23.2	25.1	36.3	32.8
Total	**117.5**	**118.8**	**110.3**	**118.3** R	**113.7**	**676.3**	**760.6**	**762.1**	**845.9** R	**868.0**
Total Imports of Fish	**739.4**	**721.9**	**680.4**	**729.2** R	**704.6**	**2,757.0**	**2,737.8**	**2,671.6**	**3,069.3** R	**3,198.6**
Fish Products										
Meals and Flours	66.1	71.1	63.4	77.5 R	83.2	77.5	77.7	70.5	97.8 R	95.9
Oils	16.0	13.3	29.0	22.4 R	21.3	30.1	28.5	41.1	47.8 R	38.7
Total	**82.1**	**84.4**	**92.4**	**99.9** R	**104.5**	**107.6**	**106.2**	**111.7**	**145.6** R	**134.6**
Total Imports (inc. fish products)	**821.5**	**806.3**	**772.8**	**829.1** R	**809.1**	**2,864.6**	**2,844.0**	**2,783.3**	**3,214.8** R	**3,333.2**

Source: H.M. Revenue and Customs

(a) 2017 data are provisional.
(b) Freshwater species.
(c) Includes other freshwater species.

Note: Additional data on UK imports by exporting country are available from the MMO website as supplementary Table 4.2a.

TABLE 4.3 Exports of fish, fish preparations, meals, flours and oils from the UK: 2013 to 2017 [a]

	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Fish (excluding Shellfish)										
Bass	0.4	0.4	0.4	0.3	0.3	2.8	3.0	2.6	3.1	2.6
Blue Whiting	18.7	4.4	1.8	2.7	0.4	6.1	1.2	0.6	1.0	0.2
Cod	16.7	15.5	16.0	17.2	16.8	55.6	52.7	53.1	58.9 R	63.3
Haddock	1.0	1.0	0.9	1.2	1.2	3.0	2.6	2.5	3.7	3.5
Hake	2.4	3.9	5.0	7.6	8.1	7.1	13.1	17.4	25.1	33.2
Halibut	0.5	0.5	0.4	0.4	0.3	2.1	2.0	1.5	1.3	1.3
Herring	52.9	63.5	64.8	44.1	41.6	36.9	40.7	35.6	38.4	37.3
Ling	2.7	2.3	2.0	2.1	2.3	6.0	4.7	4.2	4.8 R	5.9
Mackerel	80.8	120.3	80.3	83.7 R	77.6	99.7	128.5	67.7	81.0 R	87.4
Megrim	3.7	3.5	3.3	3.6 R	3.8	13.3	13.7	12.6	15.2	16.6
Monks or Anglerfish	1.8	2.8	3.1	4.2	4.5	9.7	14.2	15.9	24.4	31.0
Plaice	0.5	0.3	0.4	1.1	1.6	0.6	0.5	0.6	1.6	3.0
Pollack	3.9	3.9	3.6	2.0	2.1	11.8	10.4	7.6	6.0	6.9
Saithe	5.0	4.7	4.8	5.4	5.5	8.6	8.6	9.2	12.8	13.6
Salmon [b]	112.1	124.8	113.7	105.3 R	116.2	578.7	625.9	493.6	580.7 R	726.2
Sardines	4.5	3.9	4.5	7.6	7.3	8.8	7.1	7.6	9.4	9.8
Sole	1.0	0.9	0.6	0.9	0.9	7.3	7.2	4.8	7.8	8.9
Trout [b]	2.2	2.8	4.0	7.8	8.4	9.7	11.2	18.3	48.4	52.2
Tuna	5.4	5.1	5.3	5.9	4.8	17.9	18.7	19.2	22.6 R	20.1
Whiting	0.8	1.6	0.3	0.5	0.4	1.6	1.2	0.6	0.8	0.8
Other Fish [c]	46.9	51.5	45.7	46.9 R	70.0	122.4	134.7	120.5	134.6 R	179.7
Total	**363.8**	**417.6**	**361.2**	**350.5 R**	**374.1**	**1,009.8**	**1,101.8**	**895.8**	**1,081.3 R**	**1,303.3**
Shellfish (Crustaceans and Molluscs)										
Crabs	14.2	15.5	14.5	16.7	15.3	50.7	56.7	48.5	65.9 R	71.9
Lobsters	7.4	3.8	3.2	3.9	4.9	74.8	40.5	35.2	47.3	62.2
Mussels	8.8	4.8	5.2	3.6	3.6	9.4	5.3	4.2	3.3	5.0
Nephrops	9.2	14.8	13.0	13.9	13.4	58.4	107.3	93.2	113.4 R	120.1
Scallops	11.7	11.1	11.7	12.9	8.2	93.4	91.7	100.2	127.7 R	101.6
Shrimps and Prawns	16.1	13.5	11.7	12.6	14.2	85.3	75.5	71.4	86.5 R	106.6
Squid	3.0	2.9	3.3	3.1	10.6	9.0	10.2	14.5	13.8	48.9
Other Crustaceans	3.7	2.9	1.9	2.3	2.0	15.2	16.5	13.3	17.9	14.8
Other Molluscs	14.2	14.9	16.4	20.4	13.7	54.4	60.7	60.4	81.4 R	71.3
Total	**88.3**	**84.2**	**80.8**	**89.4 R**	**85.9**	**450.5**	**464.5**	**440.9**	**557.2 R**	**602.4**
Total Exports of Fish	**452.1**	**501.8**	**442.0**	**439.9 R**	**460.0**	**1,460.3**	**1,566.3**	**1,336.7**	**1,638.4 R**	**1,905.8**
Fish Products										
Meals and Flours	24.1	37.9	45.4	47.2	31.4	30.7	45.2	55.3	60.7	40.9
Oils	8.1	6.4	10.8	10.8 R	12.4	20.0	17.0	19.3	26.4	33.5
Total	**32.2**	**44.3**	**56.2**	**58.0**	**43.8**	**50.8**	**62.1**	**74.6**	**87.2**	**74.4**
Total Exports (inc. fish products)	**484.4**	**546.1**	**498.3**	**497.9 R**	**503.8**	**1,511.1**	**1,628.4**	**1,411.3**	**1,725.6 R**	**1,980.1**

Source: H.M. Revenue and Customs

(a) 2017 data are provisional.
(b) Freshwater species.
(c) Includes other freshwater species.

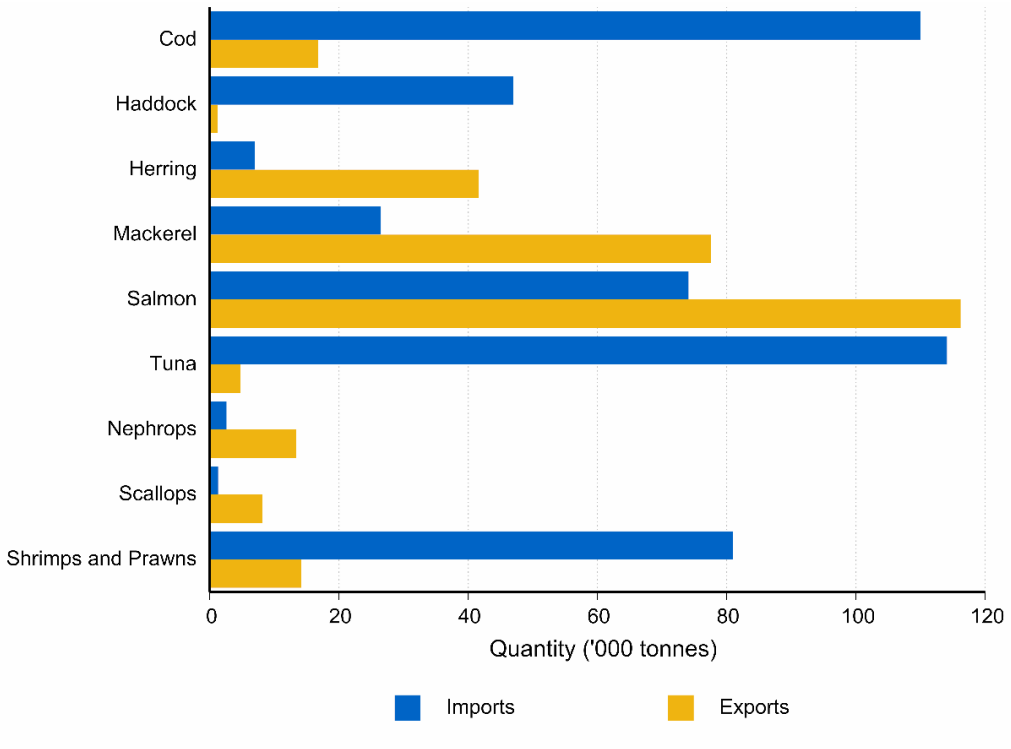
Note: Additional data on UK exports by importing country are available from the MMO website as supplementary Table 4.3a.

Imports and exports by species

Fish (excluding shellfish) accounted for 73 per cent of fish imports (including fish products) by weight in 2017, a total of 591 thousand tonnes. Shellfish (molluscs and crustaceans) accounted for 14 per cent of imports by weight and 26 per cent by value. The share of fish products is 13 per cent. These are relatively low priced and so account for just 4 per cent of the value of all imports.

The UK exported 374 thousand tonnes of fish (excluding shellfish) in 2017, up 7 per cent on 2016. In addition, 86 thousand tonnes of shellfish were exported from the UK. Fish (excluding shellfish) account for 74 per cent of all exports, a similar share to imports. Shellfish account for 17 per cent of all exports. Exports of fish products, which fell significantly compared with last year, account for 9 per cent.

Chart 4.2: UK imports and exports by key species: 2017



In 2017, tuna remained the highest imported fish by weight - 114 thousand tonnes, albeit 7 per cent down on 2016 – closely followed by cod at 110 thousand tonnes. Shrimps and prawns moved into third place (81 thousand tonnes), overtaking salmon (74 thousand tonnes).

Exports were highest for salmon at 116 thousand tonnes, a rise of 10 per cent. This was followed by mackerel, with 78 thousand tonnes exported in 2017. This is a drop of more than a third in three years and is likely to be down to lower mackerel catches following reductions in mackerel quota from the 2014 peak. 42 thousand tonnes of herring were also exported.

Cod

The UK is a net importer of cod. Imports of cod in 2017 stood at 110 thousand tonnes, down 11 thousand tonnes in the year, while 17 thousand tonnes were exported, little change on last year. Landings of cod by UK vessels into the UK rose by 1 thousand tonnes to 17 thousand tonnes in 2017. As a result, the amount of cod available for domestic use fell by 9 thousand tonnes. Excluded from these figures is a small but growing amount of cod sourced from UK aquaculture.

TABLE 4.4a Balance sheet for cod for the UK: 2013 to 2017

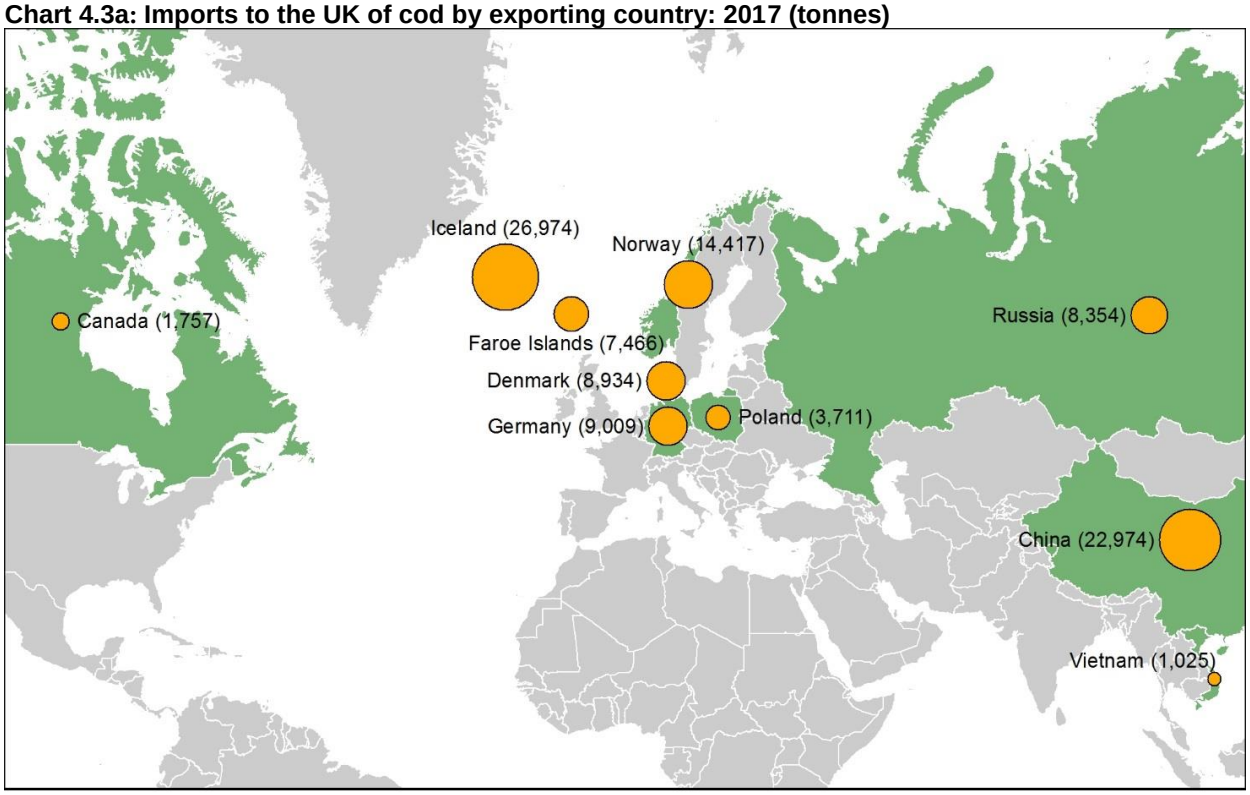
	Quantity ('000 tonnes)					Value (£ million)				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Landings by UK vessels into the UK [a]	11.2	12.0	13.2	16.0	17.0	25.8	27.8	29.5	41.7 R	48.0
Imports [b]	116.3	116.4	115.4	120.5 R	110.0	400.4	410.0	440.1	491.1 R	493.6
Total supplies [c]	**127.5**	**128.4**	**128.5**	**136.6**	**127.0**	**426.2**	**437.8**	**469.7**	**532.7 R**	**541.6**
Exports [b]	16.7	15.5	16.0	17.2	16.8	55.6	52.7	53.1	58.9 R	63.3
Total available for domestic use [c]	**110.9**	**112.9**	**112.5**	**119.4**	**110.2**	**370.5**	**385.2**	**416.6**	**473.9 R**	**478.3**

Source: H.M. Revenue and Customs and Fisheries Administrations in the UK

(a) Landings are given in terms of landed weight.
(b) Excludes fish products.
(c) Excludes sources of fish other than imports and landings into the UK by UK vessels from sea fisheries.

The largest exporter of cod to the UK is Iceland (27 thousand tonnes), followed by China (23 thousand tonnes) and Norway (14 thousand tonnes). EU member states accounted for 23 per cent of all cod imported to the UK in 2017.

Chart 4.3a: Imports to the UK of cod by exporting country: 2017 (tonnes)



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Note: Only countries from which the UK imported more than 1,000 tonnes of cod are shown.

Haddock

As with cod, the UK is heavily reliant on imports of haddock to meet consumer demand. Imports accounted for 61 per cent of the supply, although this is lower than the 87 per cent share for cod. Very little is exported. In 2017, the amount available for domestic use was 76 thousand tonnes.

TABLE 4.4b Balance sheet for haddock for the UK: 2013 to 2017

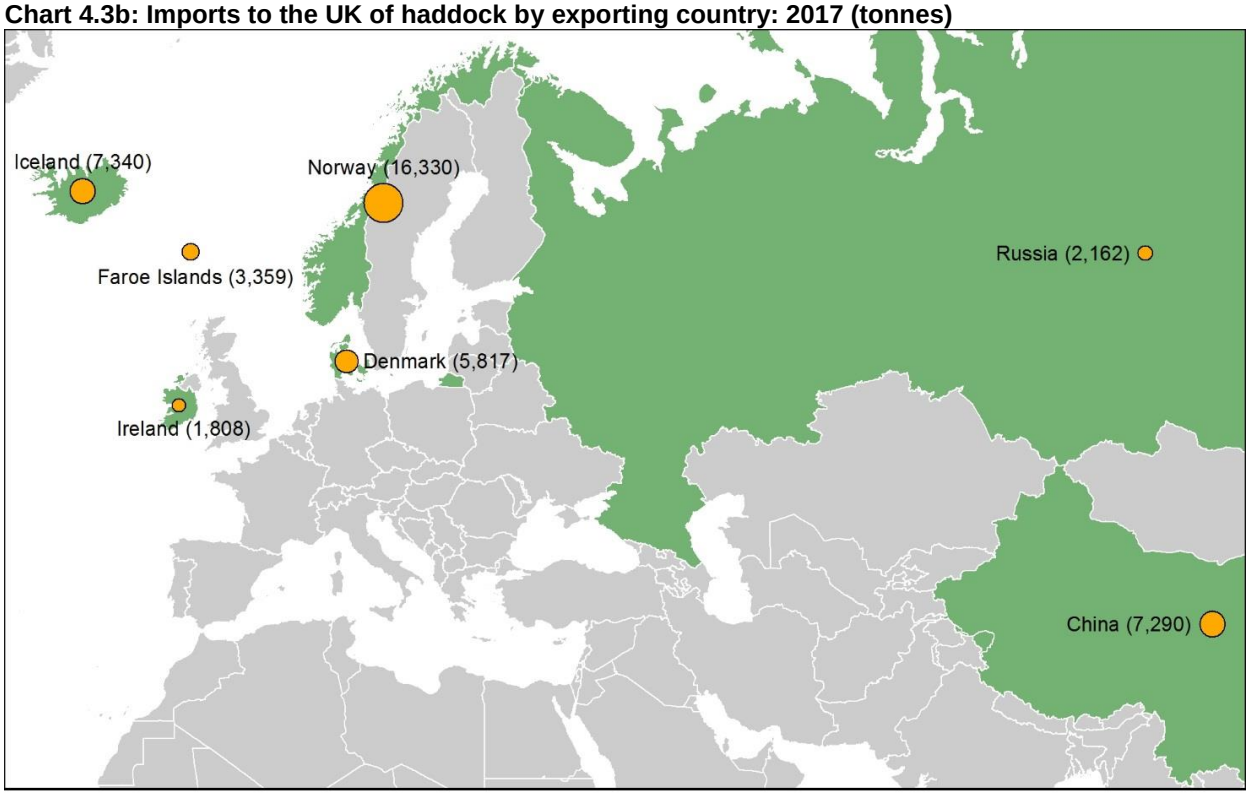
	Quantity ('000 tonnes)					Value (£ million)				
	2013	**2014**	**2015**	**2016**	**2017**	**2013**	**2014**	**2015**	**2016**	**2017**
Landings by UK vessels into the UK [(a)]	34.5	31.5	28.6	29.1	29.7	43.5	49.3	44.2	44.0 [R]	50.7
Imports [(b)]	44.9	35.9	41.0	44.9	47.0	124.5	111.1	119.9	113.7 [R]	130.0
Total supplies [(c)]	**79.4**	**67.4**	**69.6**	**74.0**	**76.7**	**168.0**	**160.4**	**164.1**	**157.7**	**180.7**
Exports [(b)]	1.0	1.0	0.9	1.2	1.2	3.0	2.6	2.5	3.7	3.5
Total available for domestic use [(c)]	**78.4**	**66.4**	**68.7**	**72.8**	**75.5**	**165.0**	**157.9**	**161.6**	**154.1** [R]	**177.2**

Source: H.M. Revenue and Customs and Fisheries Administrations in the UK

(a) Landings are given in terms of landed weight.
(b) Excludes fish products.
(c) Excludes sources of fish other than imports and landings into the UK by UK vessels from sea fisheries.

In 2017, half of all haddock imported into the UK came from Norway and Iceland (16 and 7 thousand tonnes respectively). China also exported 7,000 tonnes of haddock to the UK.

Chart 4.3b: Imports to the UK of haddock by exporting country: 2017 (tonnes)



Contains Collins Bartholomew data. © Collins Bartholomew copyright and database right 2017.
Note: Only countries from which the UK imported more than 1,000 tonnes of haddock are shown.

Shrimps and prawns

UK vessels land only small amounts of shrimps and prawns into the UK: 600 tonnes in 2017. The vast majority of shrimps and prawns available for domestic use are imported. In 2017, 81 thousand tonnes of shrimps and prawns were imported into the UK, although 14 thousand tonnes are then exported.

TABLE 4.4c Balance sheet for shrimps and prawns for the UK: 2013 to 2017

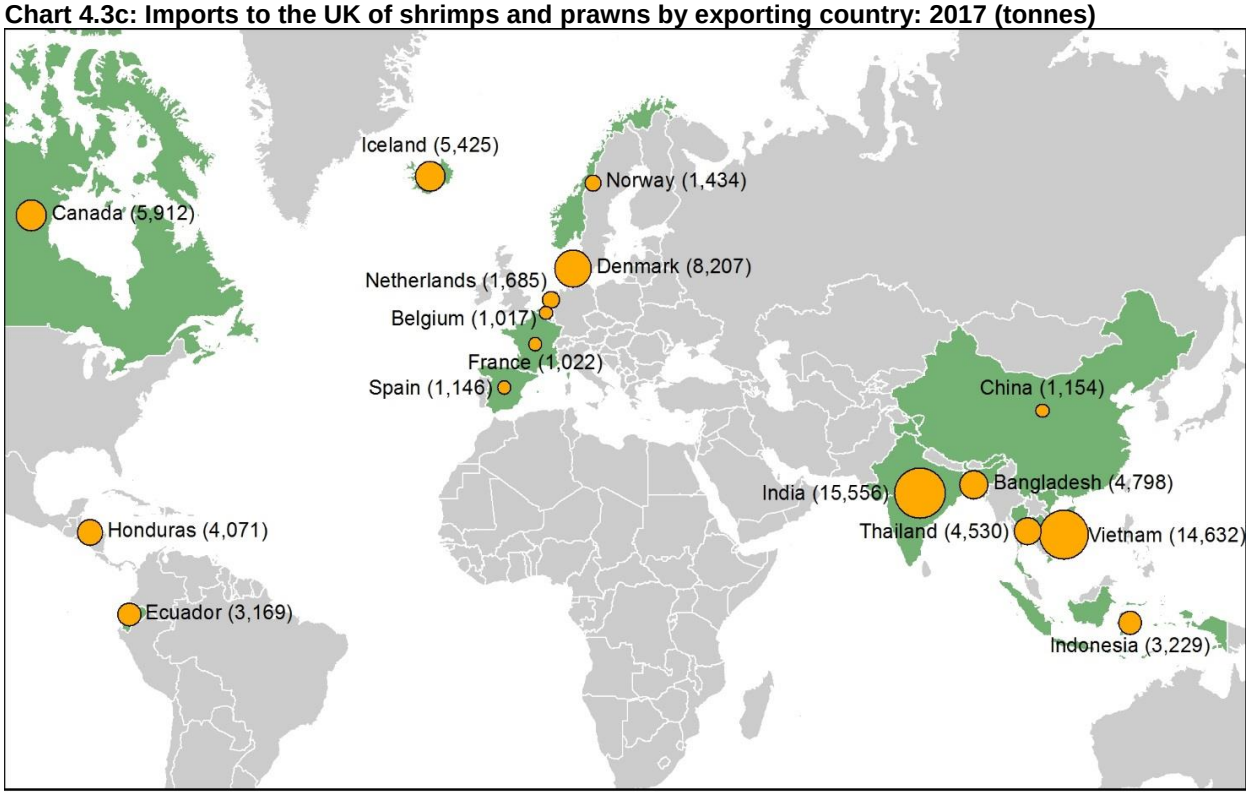
	Quantity ('000 tonnes)					Value (£ million)				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Landings by UK vessels into the UK [a]	0.9	0.6	0.3	0.8	0.6	2.4	1.4	0.8	3.0	2.6
Imports [b]	85.1	82.3	77.4	81.8	81.0	537.2	593.8	593.6	644.5 R	684.0
Total supplies [c]	**86.0**	**82.9**	**77.7**	**82.6**	**81.6**	**539.6**	**595.2**	**594.4**	**647.5 R**	**686.5**
Exports [b]	16.1	13.5	11.7	12.6	14.2	85.3	75.5	71.4	86.5 R	106.6
Total available for domestic use [c]	**69.9**	**69.5**	**66.0**	**70.0**	**67.4**	**454.3**	**519.7**	**523.0**	**561.0 R**	**579.9**

Source: H.M. Revenue and Customs and Fisheries Administrations in the UK

(a) Landings are given in terms of landed weight.
(b) Excludes fish products.
(c) Excludes sources of fish other than imports and landings into the UK by UK vessels from sea fisheries.

Over half the shrimps and prawns imported into the UK were from Asia. In 2017, the largest exporters of shrimps and prawns to the UK were India (16 thousand tonnes) and Vietnam (15 thousand tonnes). Denmark was next largest, with exports of 8 thousand tonnes.

Chart 4.3c: Imports to the UK of shrimps and prawns by exporting country: 2017 (tonnes)



Contains Collins Bartholomew data. © Collins Bartholomew copyright and database right 2017.

Note: Only countries from which the UK imported more than 1,000 tonnes of shrimps and prawns are shown.

Tuna

Virtually all tuna available for use in the UK is from abroad. In 2017, the UK imported 114 thousand tonnes of tuna of which 5 thousand tonnes were re-exported. This left 109 thousand tonnes available for domestic use, which is more or less the same as the amount for cod.

TABLE 4.4d Balance sheet for tuna for the UK: 2013 to 2017

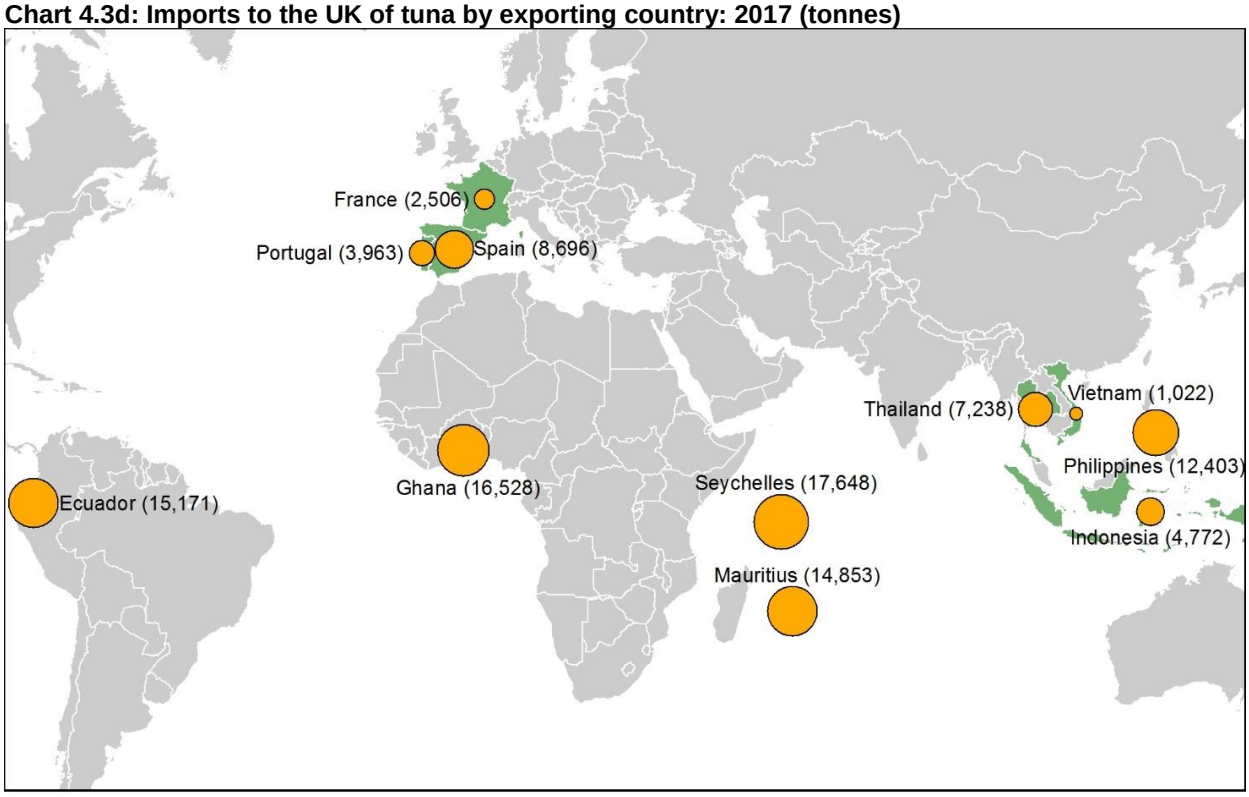
	Quantity ('000 tonnes)					Value (£ million)				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Landings by UK vessels into the UK [a]	..	..	..	..	..	..	..	..	..	..
Imports [b]	97.0	91.8	119.0	122.7	114.1	350.9	287.8	357.4	390.8	428.7
Total supplies [c]	**97.0**	**91.8**	**119.0**	**122.7**	**114.1**	**350.9**	**287.8**	**357.4**	**390.8**	**428.7**
Exports [b]	5.4	5.1	5.3	5.9	4.8	17.9	18.7	19.2	22.6	20.1
Total available for domestic use [c]	**91.6**	**86.7**	**113.6**	**116.8**	**109.3**	**332.9**	**269.1**	**338.2**	**368.2**	**408.7**

Source: H.M. Revenue and Customs and Fisheries Administrations in the UK

(a) Landings are given in terms of landed weight.
(b) Excludes fish products.
(c) Excludes sources of fish other than imports and landings into the UK by UK vessels from sea fisheries.

In 2017, the largest tuna exporters to the UK were the Seychelles (18 thousand tonnes), followed by Ghana (17 thousand tonnes) and Ecuador (15 thousand tonnes). Most imported tuna from Europe came from Spain (9 thousand tonnes).

Chart 4.3d: Imports to the UK of tuna by exporting country: 2017 (tonnes)



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Note: Only countries from which the UK imported more than 1,000 tonnes of tuna are shown.

Mackerel

The UK is a net exporter of mackerel. UK vessels landed 95 thousand tonnes of mackerel into the UK in 2017. Mackerel imports increased to 26 thousand tonnes and exports fell to 78 thousand tonnes. The amount available for domestic use rose to 44 thousand tonnes. This means that just over a third of the supply of mackerel remains in the UK.

TABLE 4.4e Balance sheet for mackerel for the UK: 2013 to 2017

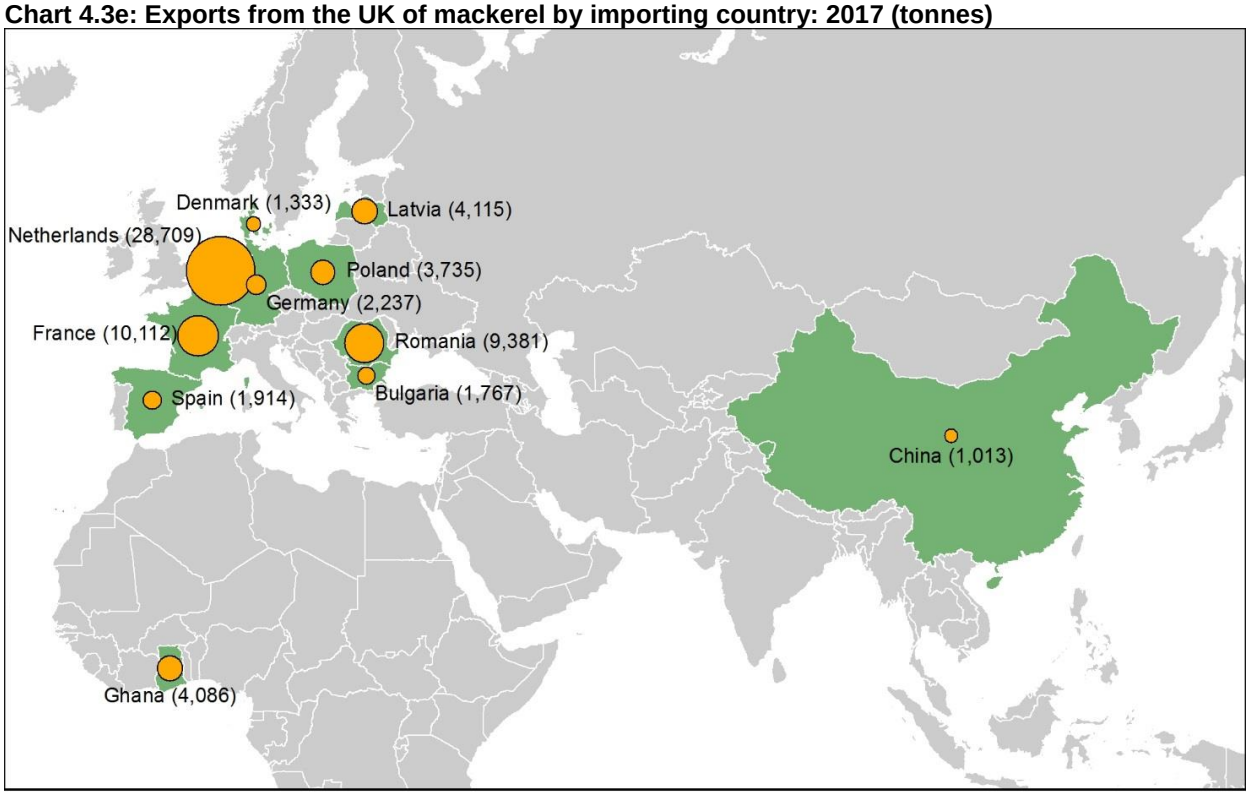
	Quantity ('000 tonnes)					Value (£ million)				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Landings by UK vessels into the UK [a]	78.2	126.2	94.8	103.9	95.5	70.1	104.1	60.6	88.8	86.4
Imports [b]	29.9	33.2	19.0	19.0	26.5	57.5	53.2	38.9	42.9	52.4
Total supplies [c]	**108.1**	**159.4**	**113.8**	**122.9**	**121.9**	**127.6**	**157.3**	**99.4**	**131.7**	**138.9**
Exports [b]	80.8	120.3	80.3	83.7 R	77.6	99.7	128.5	67.7	81.0 R	87.4
Total available for domestic use [c]	**27.3**	**39.1**	**33.6**	**39.1**	**44.3**	**27.8**	**28.8**	**31.7**	**50.7 R**	**51.5**

Source: H.M. Revenue and Customs and Fisheries Administrations in the UK

(a) Landings are given in terms of landed weight.
(b) Excludes fish products.
(c) Excludes sources of fish other than imports and landings into the UK by UK vessels from sea fisheries.

The largest share of mackerel exports in 2017 went to the Netherlands (29 thousand tonnes), partly for Dutch consumption but also for processing for African customers. France received 10 thousand tonnes and Romania 9 thousand tonnes. Exports to Nigeria fell from 13 thousand tonnes in 2016 to 500 tonnes in 2017.

Chart 4.3e: Exports from the UK of mackerel by importing country: 2017 (tonnes)



Contains Collins Bartholomew data. © Collins Bartholomew copyright and database right 2017.

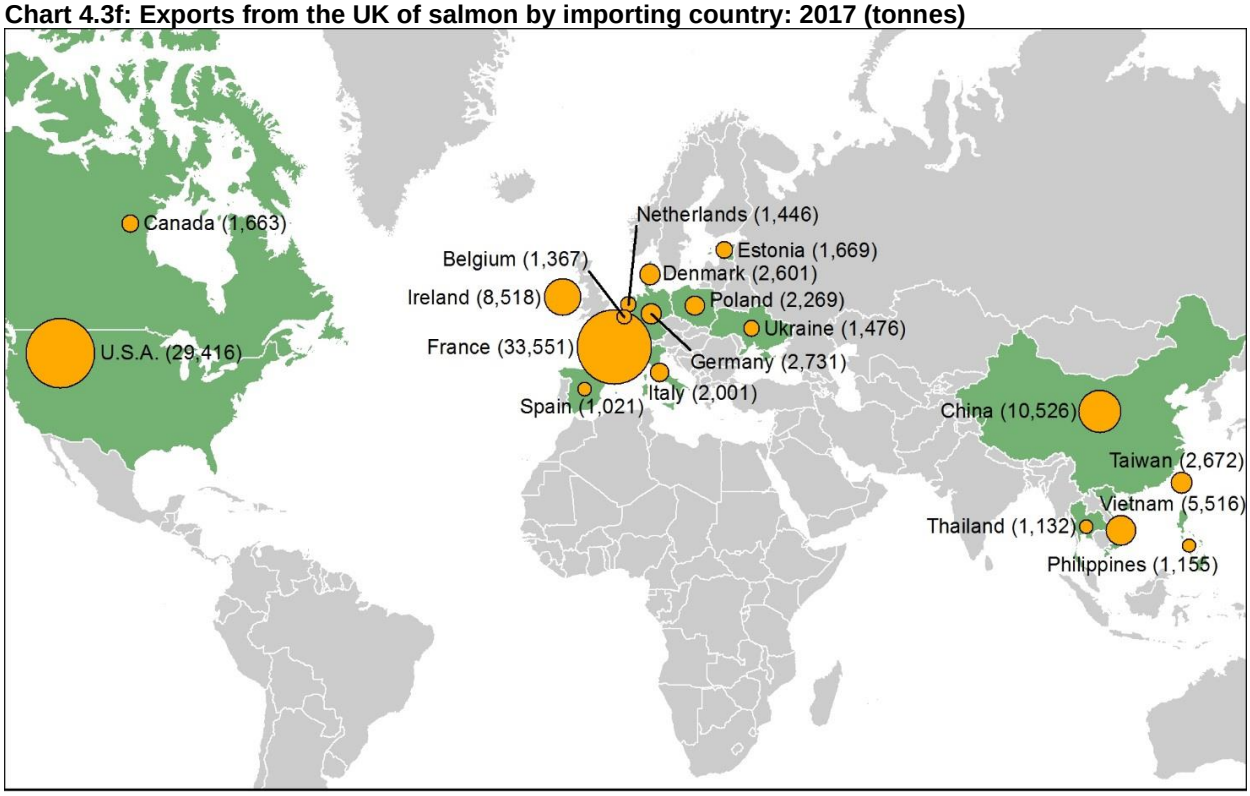
Note: Only countries to which the UK exported more than 1,000 tonnes of mackerel are shown.

Salmon

In 2017, the UK exported 116 thousand tonnes of salmon. This freshwater species is sourced from UK aquaculture and inland fisheries, as well as from imports. The UK imported 74 thousand tonnes of salmon from abroad in 2017, making the UK a net exporter.

In 2017, half of all salmon exports went to EU member states, in particular France, which imported 34 thousand tonnes. The USA was the second largest importer (29 thousand tonnes), followed by China (11 thousand tonnes).

Chart 4.3f: Exports from the UK of salmon by importing country: 2017 (tonnes)



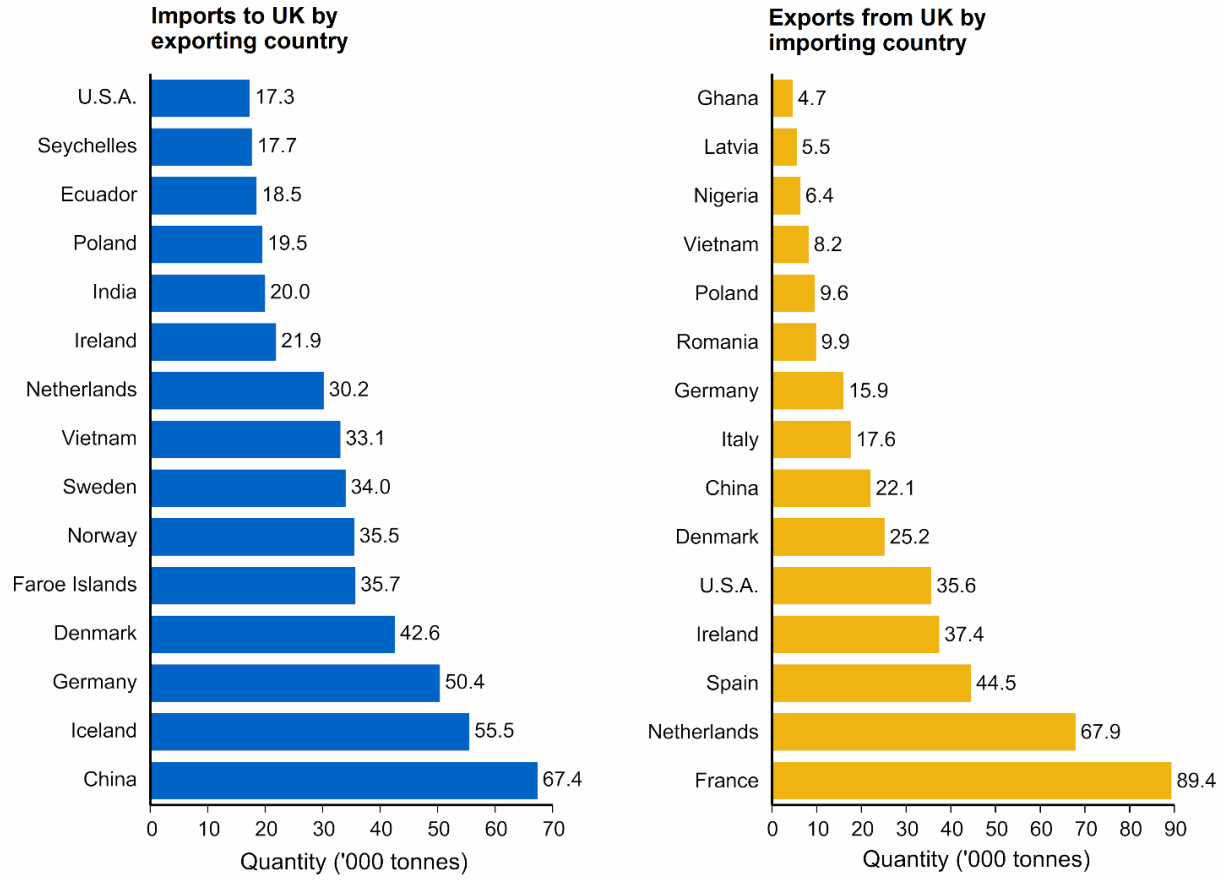
Contains Collins Bartholomew data. © Collins Bartholomew copyright and database right 2017.
Note: Only countries to which the UK exported more than 1,000 tonnes of salmon are shown.

Imports and exports by country

The largest exporters to the UK in 2017 were China (67 thousand tonnes) and Iceland (56 thousand tonnes). They were followed by Germany (50 thousand tonnes), Denmark (43 thousand tonnes) and the Faroe Islands (36 thousand tonnes).

The UK exported the largest amounts to France (89 thousand tonnes), the Netherlands (68 thousand tonnes), Spain (45 thousand tonnes), Ireland (37 thousand tonnes) and the USA (36 thousand tonnes).

Chart 4.4: Imports and exports by country: 2017



Household consumption and inflation

Household consumption of fish fell by 5 per cent to 467 thousand tonnes in 2016. Consumer expenditure on fish fell by 4 per cent to £4.3 billion. Household expenditure on fish as a proportion of overall expenditure on food fell from 5.6 per cent in 2015 to 5.3 per cent in 2016.

TABLE 4.5 Household consumption and inflation: 2007 to 2017

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Household consumption											
('000 tonnes)	515	510	501	483	472	467	481	479	490	467	nd
Population ('000 persons) [a]	59,737	60,816	60,907	61,464	61,528	61,946	63,421	63,879	64,188	65,648	nd
Consumers expenditure											
on fish (£ million)	3,599	3,650	3,711	3,742	3,866	3,998	4,271	4,309	4,512	4,317	nd
on food (£ million) [b]	77,716	67,635	70,143	72,587	73,744	77,523	81,291	80,669	79,964	81,783	nd
Fish as a % of food [b]	*4.6%*	*5.4%*	*5.3%*	*5.2%*	*5.2%*	*5.2%*	*5.3%*	*5.3%*	5.6%	5.3%	nd
Landed Price Index [c]	136.2	141.1	141.7	152.2	163.7	153.9	149.3	150.8	146.5	171.9	182.9
Retail Price Index [d]	115.7	123.9	130.3	138.2	151.0	157.4	163.4	168.2	163.2	159.9	173.2
Consumer Price Index [e]	120.8	126.8	131.5	140.1	153.0	158.5	163.6	167.8	161.9	158.2	172.2

Source: Fisheries Administrations in the UK, Expenditure and Food Survey, Office for National Statistics

(a) The population estimates have been updated to be consistent with the Living Costs and Food Survey figures, which provide the basis for the household consumption and consumers' expenditure figures given in this table.

(b) Including non-alcoholic beverages.

(c) The landed price index has been calculated on an annual basis with 2000 = 100.

(d) The fish component of the RPI which includes canned and processed fish. The index has been re-based such that 2000 = 100.

(e) The fish component of the CPI which includes canned and processed fish. The index has been re-based such that 2000 = 100.

Note: Additional data on household purchases are available from the MMO website as supplementary Tables 4.5a and 4.5b.

The landed price index (LPI) measures the average change in the prices of fish landed by UK vessels into the UK at first sale. It provides a measure of domestic inflation in the price of fish landed by UK vessels into the UK. The LPI rose by 6 per cent in 2017.

The consumer price index (CPI) measures the average change in the prices of goods and services bought for the purpose of consumption in the UK. It includes a component for prices of fish, based on a 'basket' of six items: fresh white fish fillets, fresh salmon fillets, frozen prawns, canned tuna, fish fingers, and frozen breaded/battered white fish. The retail price index (RPI) is a similar inflation measure, calculated according to a different formula (see Appendix 4, UK fisheries statistics methodology). The RPI uses the same 'basket' of items for fish.

In 2017, the fish components of the RPI and CPI rose by 8 and 9 per cent respectively compared with 2016.

GDP for fishing

The gross value added (GVA) for fishing has fluctuated in recent years. GVA for fishing now stands at £795 million, an increase of 11 per cent in the year.

There has been some fluctuation in the GVA in the wider agriculture, forestry and fishing sector over the past decade, with fishing forming 6.5 per cent of GVA in this sector in 2017, the highest in over a decade.

UK gross domestic product increased in each of the last eight years and stood at £1,840 billion in 2017.

TABLE 4.6 GDP for fishing: 2007 to 2017

£ million (unless otherwise specified)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP for Fishing [a][b]											
Current price gross value added at basic prices (KK37)	469	452	466	577	490	539	491	581	569	718	795
Output index (chain volume measures) (L2KO) (2016=100)	90.5	86.1	88.1	91.0	91.4	91.3	91.0	103.3	99.9	100.0	97.3
GDP for Agriculture, Forestry and Fishing [b]											
Current price gross value added at basic prices (KKD5)	8,737	9,961	8,467	10,469	10,015	10,233	11,554	11,820	11,177	11,448	12,250
Output index (chain volume measures) (L2KL) (2016=100)	90.2	96.4	90.6	90.2	100.0	93.1	93.5	104.9	106.0	100.0	102.9
GDP at Market Prices [b]											
Current price GDP at market prices (KKP5) (£ billion)	1,388	1,430	1,400	1,430	1,468	1,515	1,573	1,646	1,692	1,756	1,840
Chain volume measures index (YBEZ) (2016=100)	91.3	91.0	87.1	88.6	90.1	91.4	93.2	96.0	98.2	100.0	101.7
Percentage contribution of GVA from fishing to GVA for agriculture, hunting, forestry and fishing											
Current prices (%)	*5.4%*	*4.5%*	*5.5%*	*5.5%*	*4.9%*	*5.3%*	*4.2%*	*4.9%*	*5.1%*	*6.3%*	*6.5%*

Source: Office for National Statistics

(a) GDP for fishing includes landings abroad and aquaculture, according to the KK37 index.

(b) GDP figures compiled in line with ESA2010 since September 2014. All values have been recalculated since the last publication.

5 Main stocks and their level of exploitation

Commentary provided by Dr Carl M. O'Brien CBE, Defra Chief Fisheries Science Adviser

The management of stocks

Fisheries are managed using a Total Allowable Catch or TAC (corresponding to a particular harvesting rate), and technical measures (mainly mesh sizes and minimum landing sizes, but sometimes closed areas, which determine the smallest fish that can be caught and landed) based on scientific advice.

In the EU, the TAC is set each year by the Council of Ministers following negotiations on catch options that are provided by the Advisory Committee (ACOM) of the International Council for the Exploration of the Sea (ICES), an independent scientific body. For the main North Sea stocks these options take into account the terms of a management agreement between the EU and Norway. Once a TAC is agreed for each stock and fishing area, it is allocated as quotas to Member States in accordance with fixed percentages based on historic fishing rights.

In past years, some seriously depleted stocks have become the subject of emergency measures and recovery plan proposals. Since 2003, the TAC and fishing mortality for some of these stocks have been linked to effort control measures that restrict the number of fishing days at sea per annum permitted for fleets capturing recovery species.

Scientific assessment and advice

ICES advice is based on stock assessments carried out at international working groups, where fishery scientists from the UK and the other nations compile fisheries data, biological data and survey data for use in fisheries science models. The age structure of a stock (the relative proportion of the different age groups) is largely determined by the fishing rate and by the numbers of young fish that enter the stock each year. When information on age structure is combined with data on landings, fishing effort, and the results of standardised stock surveys carried out by research vessels, the models are able to estimate the historical trend in fishing rate and stock abundance, up to the last full year of data. The assessment is then used to forecast the expected catch in an upcoming TAC year for a range of fishing rate options, taking into account the number of young fish that are expected to enter the stock, based either on survey data, or a recent historic average.

This chapter summarises the present state of the main stocks based on advice from ACOM released during 2017, which evaluated stock assessments using fisheries data for years up to and including 2016, and survey data up to and including 2017. The 2017 ACOM advice formed the basis for the EU proposals that led to the TACs and other measures agreed for 2018 by the EU Council of Ministers.

Details are contained within Council Regulation (EU) No 2018/120 of 23 January 2018 fixing for 2018 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in Union waters and, for Union vessels, in certain non-Union waters, and amending Regulation (EU) 2017/127. Subsequently, changes may be made during 2018.

The fisheries zones used to base ICES stock assessments on are sometimes different from those used to allocate TACs. Table 5.1 below shows the generic title of each fishing zone and the specific areas included for ICES stock assessments and EU TAC allocations.

TABLE 5.1 Fishing areas used for ICES stock assessments and EU TAC allocations

Species	Title	Fishing areas included in: ICES Stock Assessments	EU TAC/Quota allocations
Cod	North Sea	IV, VIId, IIIa	IIa (EC), IV [(a)]
	West of Scotland	VIa	Vb (EC), VIa
	Irish Sea	VIIa	VIIa
	Celtic Sea	VIIe-k	VII (ex VIIa, VIId), VIII, IX, X; CECAF 34.1.1 (EC)
Haddock	North Sea, Skagerrak and West of Scotland	IV, IIIa, VIa	IIa (EC), IV Vb (EC), VIa
Plaice	North Sea	IV	IIa (EC), IV
	Irish Sea	VIIa	VIIa
Sole	North Sea	IV	II, IV
	Irish Sea	VIIa	VIIa
	Eastern Channel	VIId	VIId
	Western Channel	VIIe	VIIe
Herring	North Sea	IV, VIId, IIIa	IV (EC and Norway North of 53º 30'N) [(a)]
Mackerel	North East Atlantic	All ICES sub-areas	II (ex EC), Vb (EC), VI, VII, VIIIabde, XII, XIV [(a)]

Source: ICES and the European Commission

(a) Only largest stock shown. TACs have been set for other fishing areas covered by the stock assessment.

Summary stock presentation

For the main fish stocks, a summary of ICES data and assessments, where available, has been provided. These comprise four charts (a to d) showing total removals or landings, fishing mortality rates (F), recruitment and spawning stock biomass (SSB) since 1997 and exceptionally, since 1996. The data are official statistics and not subject to National Statistics accreditation. ICES' stock assessments since 2007 for each of these fisheries are also shown, with the exception of the recently combined stock North Sea, Skagerrak and West of Scotland haddock whose assessments begin in 2014. The location of the relevant areas for each stock is shown in Appendix 3.

It is important to note that the figures shown are, for each stock, the time series of estimates of abundance and fishing mortality provided by ICES in 2017. These are based on fishery and survey data collected up to the most recent year, unless otherwise commented upon in the narrative provided.

Total removals or landings - Chart a

Total removals equals total reported fish landings plus an estimate for discards and may include estimates of non-attributive losses. Landings are used where total removal figures are not available and charts are headed accordingly.

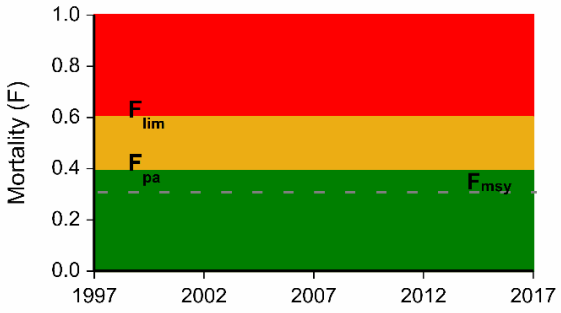
Fishing Mortality (F) - Chart b

Fishing mortality rate (F) is a measure of the proportion of fish taken from a stock each year by fishing activity. Fishing mortality rates are calculated from mathematical models used to assess fish stocks. An F value of 1 indicates that approximately 60 per cent of a stock is removed by fishing activity.

ICES provides fisheries advice that is consistent with the broad international policy norms of the precautionary approach, maximum sustainable yield (MSY), and an ecosystem approach while at the same time responding to the specific needs of the management bodies requesting advice.

Since 1999 the ICES' advice has identified which catch options meet precautionary criteria. These criteria aim to ensure sustainability by keeping the fishing rate below a **maximum precautionary** level, F_{pa} (set low enough to allow a margin of error sufficient to keep F below an **upper limit** level, F_{lim}). The nature of ICES' fisheries advice is evolving and that evolution includes options for a transition process to attain full implementation of the MSY approach by 2015 where possible and, on a progressive, incremental basis at the latest by 2020. Ecosystem limitations on fisheries have typically not yet been identified in management policies in the ICES' area. However, as the EU Marine Strategy Framework Directive (MSFD) is implemented, such limits will be recognized to achieve environmental objectives, especially regarding biodiversity, sea floor integrity, and food webs. In advance of this, ICES continues to strive towards providing advice that includes a greater range of information on fisheries and the marine ecosystem. For the first time in 2012, and then subsequently in the following years to date, ICES presented options that incorporate technical interactions for mixed demersal fisheries in the North Sea – options are given as scenarios based on single-stock assessments combined with knowledge on the species composition of catches in North Sea fisheries. In this way, for example, harvests may be further limited in consideration of potential fishery impacts on marine ecosystems beyond the impact on target fish stocks. Additionally, ICES now provides similar options for mixed demersal fisheries in the Celtic Sea.

For each of the main stocks a time series of F will be plotted against a colour coded background highlighting the precautionary levels set by ICES as shown below, for example. In addition, the value of F_{MSY}, presented as a grey line, is shown when available.



Green: Harvested sustainably - where F is below F_{pa} the stock is deemed to be fished in a sustainable way and fishing pressure is below the level recommended by ICES.

Amber: At risk of being harvested unsustainably - where F is above F_{pa} and below F_{lim} then fishing pressure is higher than the maximum level recommended by ICES. If it is not reduced it could lead to depletion of the stock in the future.

Red: Harvested unsustainably - where F is above F_{lim} fishing pressure is much higher than the maximum level recommended by ICES and if continued is likely to deplete the stock, if it has not done so already.

For some stocks ICES may only given a level for F_{pa}. In these cases, no amber region will appear on the chart. Additionally, in exceptional stock cases, ICES may review the data and modelling approaches for which the previously adopted precautionary fishing rates (F_{pa} and F_{lim}) are no longer

appropriate, for example. In such cases, no coloured regions will appear on the chart; but this is not the case for any stock this year's update.

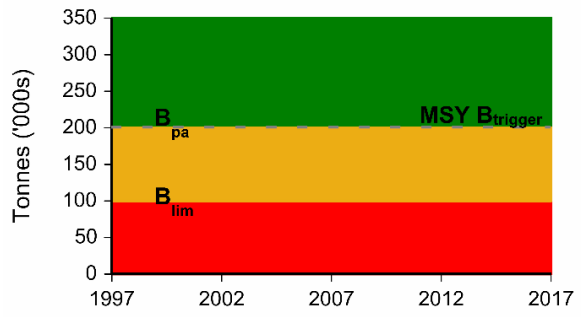
Recruitment - Chart c

Recruitment is the number of fish becoming available to a fishery stock in a year.

Spawning Stock Biomass (SSB) - Chart d

Spawning Stock Biomass (SSB) is the total estimated weight of all sexually mature fish in a stock. Since 1999 the ICES advice has identified which catch options meet precautionary criteria. These criteria aim to ensure sustainability by keeping SSB above a **minimum precautionary** level, B_{pa} (set high enough to allow a margin of error sufficient to keep SSB above a **lower limit** level, B_{lim}).

For each of the main stocks a time series of SSB will be plotted against a colour coded background highlighting the precautionary levels set by ICES as shown below. In addition, the value of MSY $B_{trigger}$, presented as a grey line, is shown when available. MSY $B_{trigger}$ is a biomass reference point that triggers a cautious response to reduce fishing mortality and is intended to safeguard against a low SSB when fishing at F_{MSY}.".



Green: Full reproductive capacity - where SSB is above B_{pa} the fish stock is deemed to be in a healthy state and above the minimum level recommended by ICES.

Amber: At risk of suffering reduced reproductive capacity - where SSB is below B_{pa} but above B_{lim} the stock has been classified as not being so low that it could be classed as being depleted. However, the amount of adult fish has fallen to a level where there is a risk that production is likely to be reduced.

Red: Reduced reproductive capacity - where SSB is below B_{lim} the stock has been classified as depleted and the stock is unlikely to be as productive as it could be. This indicates that fishing pressure needs to be reduced in order to give the stock a chance to rebuild.

For some stocks ICES has only supplied a level for B_{pa}. In these cases no amber region will appear on the chart.

Further information

More information on ICES' precautionary levels and the details of F_{MSY} and MSY $B_{trigger}$ can be found on the ICES web site www.ices.dk.

ICES stock assessments

The fish stock assessments presented here are derived from annual ACOM reports, and are categorized according to the ICES' definition of the state of the stock. The ICES' advice on the state of stocks is based on assessments carried out using the most up to date data available in that year. **It is important to note that assessments for previous years have not been updated using more recent data**. The comparison of SSB with B_{pa} is done using the value of SSB at the beginning of the

year in which the assessment was carried out. Where no B_{pa} value exists, the stock is treated as unknown.

Code	Assessment description
	Indicates stocks which are suffering reduced reproductive capacity
	Indicates stocks which are at risk of suffering reduced reproductive capacity
	Indicates stocks which are at full reproductive capacity but are either at risk of being harvested unsustainably or are being harvested unsustainably
	Indicates stocks which are at full reproductive capacity and are being harvested sustainably
	Indicates stocks where the current stock status is unknown

North Sea Cod – in ICES Sub-area IV (North Sea), ICES Division VIId (Eastern Channel) and ICES Division IIIa (Skagerrak)

The international fishing rate has been high since the 1980s, and has shown a decline since 2000. The number of young cod (recruitment) has been low since 1987, and even lower since 1998, causing serious concern. Since 2000, ICES advised that the TAC should be very low, or zero, and the EU reduced the TAC from 81,000 tonnes in 2000 to 48,600 tonnes in 2001, 49,300 tonnes in 2002, and 27,300 tonnes in 2003, 2004 and 2005. The minimum mesh size in the directed fisheries for cod was also increased to 120 mm in 2003. Agreement was reached in 2004 within the EU on a formal recovery plan that was operational during the TAC and management decision processes of 2004, effectively rendering the plan operational in 2005. Subsequently, this was repealed and replaced by Council Regulation (EC) No 1342/2008 to establish a long-term plan for cod stocks. The 2017 ICES' assessment indicates that fishing mortality has been declining since 2000 and that SSB has significantly increased from the historic low in 2006. However, the assessment in 2017 necessitated the re-calculation of reference points due to the revision of maturity estimates. The TAC for 2018 is 43,156 tonnes, compared with 39,220 tonnes in 2017 and 33,651 tonnes in 2016.

Chart 5.1a: Total removals

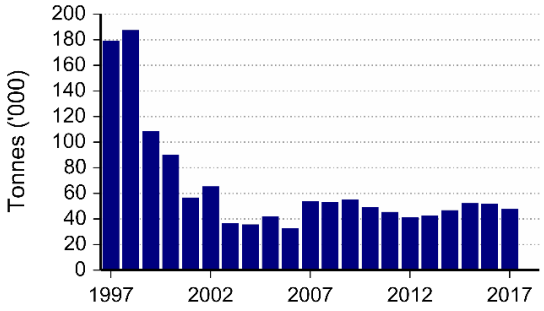


Chart 5.1b: Fishing mortality (F) – ages 2 - 4

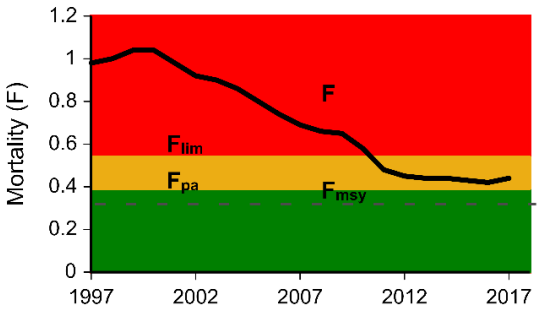


Chart 5.1c: Recruitment - age 1

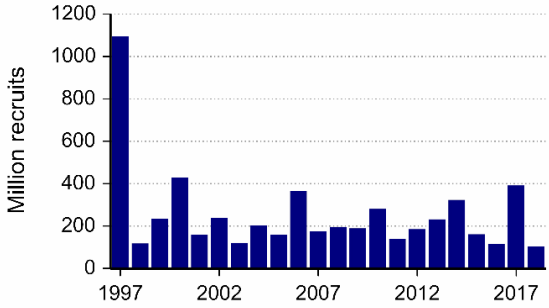
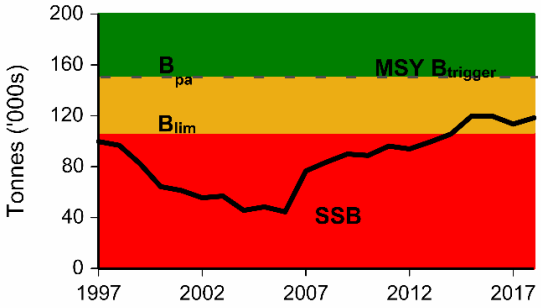


Chart 5.1d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: North Sea Cod

The cod stock in the North Sea has been assessed as suffering reduced reproductive capacity by ICES since 2007. The spawning stock biomass has increased from the historic low in 2006 and is now above B_{lim} in the vicinity of MSY $B_{trigger}$. In 2015 and 2016, it was assessed as at risk of suffering reduced reproductive capacity; whilst in 2017 the stock was assessed as being at full reproductive capacity and being harvested sustainably.



West of Scotland Cod – in ICES Division VIa

Previously, the cod stocks west of Scotland have been assessed as heavily over-exploited with respect to the rate that would lead to high long-term yields (F_{MSY}). SSB has increased slowly from an all time low in 2006 but remains well below B_{lim}. ICES called for a recovery plan in 2000, with low or zero catches, and the EU has since cut the cod TACs significantly, implemented two small closed areas, and in 2003 increased the main whitefish mesh size to 120 mm in line with the North Sea. Subsequently, the European Commission enacted Council Regulation (EC) No 423/2004 that established measures for the recovery of cod stocks; this was repealed and replaced by Council Regulation (EC) No 1342/2008 to establish a long-term plan for cod stocks which includes a west of Scotland management line that follows the 200 m depth contour. The TAC for 2018 is a by-catch provision only, the same as in the six previous years since 2012.

Chart 5.2a: Total removals

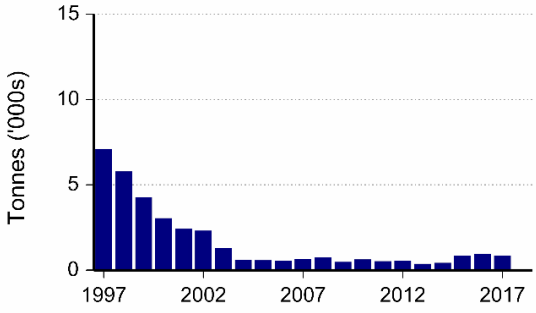


Chart 5.2b: Total mortality – ages 2 - 5

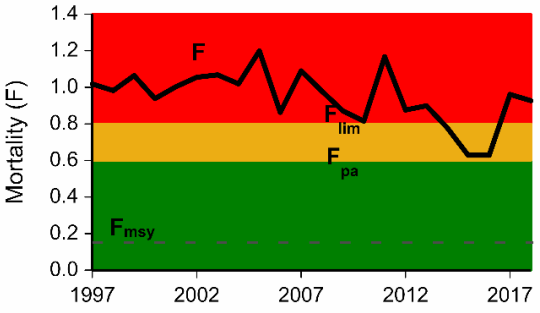


Chart 5.2c: Recruitment - age 1

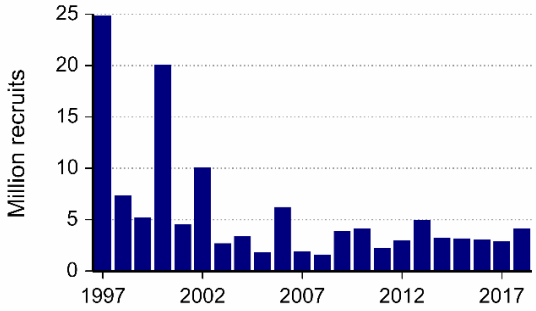
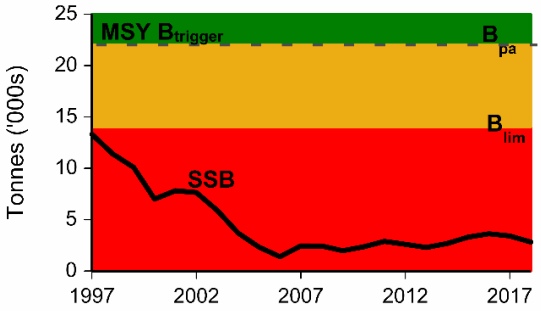


Chart 5.2d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: West of Scotland Cod

Cod stocks in the West of Scotland have been assessed as suffering reduced reproductive capacity from 2007 to 2017.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Stock Assessments	(a,b)	(a,b)	(a,b)	(a,b)	(a,b)						

(a) Total mortality cannot be accurately partitioned into F and M.

(b) Status uncertain in terms of F relative to F_{pa}, but suffering reduced reproductive capacity.

Irish Sea Cod - in ICES Division VIIa (Irish Sea)

The cod stocks in the Irish Sea are seriously depleted, and landings fell rapidly during the 1980s and 1990s. Historically, the fishing rate has been very high, spawning stocks have fallen below both the precautionary and the lower limit level, and the abundance of young cod has been in decline since 1990. After 2000, the EU significantly reduced the cod TAC, closed the cod spawning area in the western Irish Sea during the spawning season, and increased the main whitefish mesh size to 100 mm. The European Commission enacted a Council Regulation (EC) No 423/2004 that established measures for the recovery of cod stocks which was repealed and replaced by Council Regulation (EC) No 1342/2008 to establish a long-term plan for cod stocks. The assessment in 2017 was benchmarked by ICES and provides a significant change in perception showing that the fishing mortality rate has been below F_{MSY} since 2013. The cod TAC agreed for 2018 is 695 tonnes, compared with 146 tonnes in both 2017 and 2016.

Chart 5.3a: Total landings

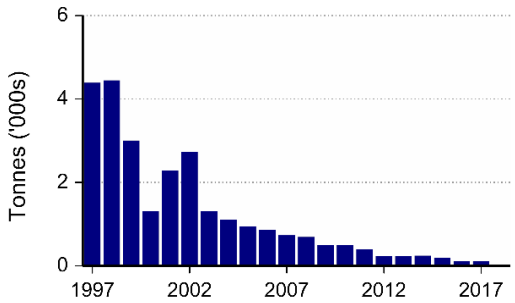


Chart 5.3b: Fishing mortality (F) – ages 2 - 4

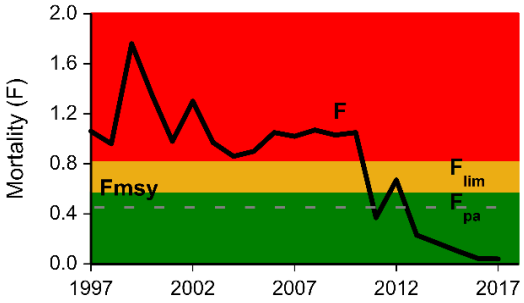


Chart 5.3c: Recruitment - age 0

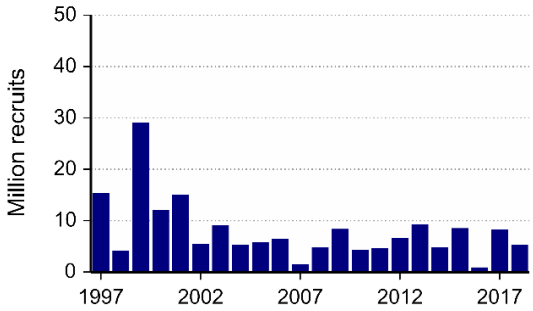
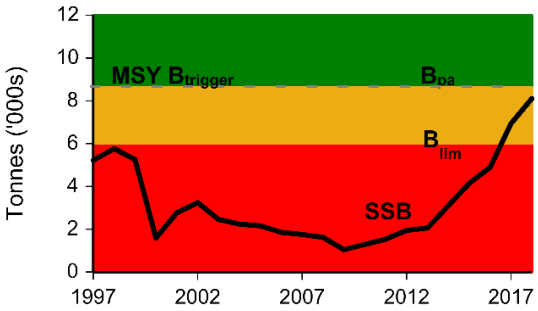


Chart 5.3d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: Irish Sea Cod

Irish Sea cod has been assessed to be suffering reduced reproductive capacity between 2007 and 2016; whilst in 2017 the stock was assessed as being at full reproductive capacity and being harvested sustainably.



Celtic Sea Cod – in ICES Divisions VIIe-k

Internationally, cod in ICES Divisions VIIe-k is caught in a range of fisheries including gadoid trawlers, *Nephrops* trawlers, otter trawlers, beam trawlers and gill-netters. This species is managed within a wider area; namely, ICES Divisions VIIb-k (excluding ICES Division VIId from 2009), ICES Sub-areas VIII, IX, X and CECAF 34.1.1, but ICES advice applies only to ICES Divisions VIIe-k. The Celtic Sea cod stock was excluded from the EU's 2004 cod recovery plan. In 2012 the ICES' cod assessment revised the time series estimates of fishing rate, spawning stock and recruitment, following a review of data and modelling approaches for which the previously adopted precautionary fishing rates (F_{pa} and F_{lim}) were no longer appropriate. In 2015 the ICES' cod assessment revised the precautionary fishing rates and the assessment in 2017 shows that the fishing mortality has been decreasing since 2014 but remains above F_{MSY}.

Chart 5.4a: Total landings

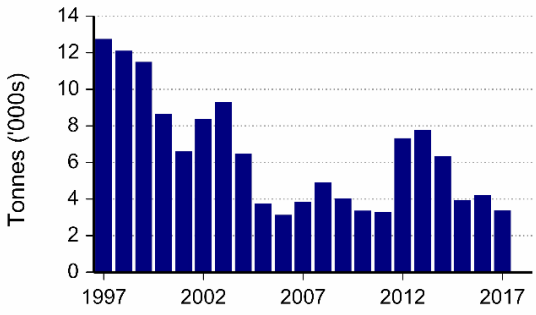


Chart 5.4b: Fishing mortality (F) – ages 2 - 5

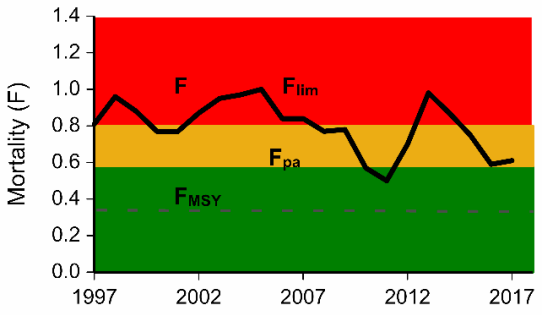


Chart 5.4c: Recruitment - age 1

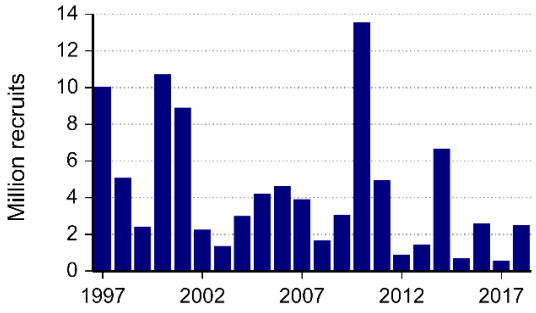
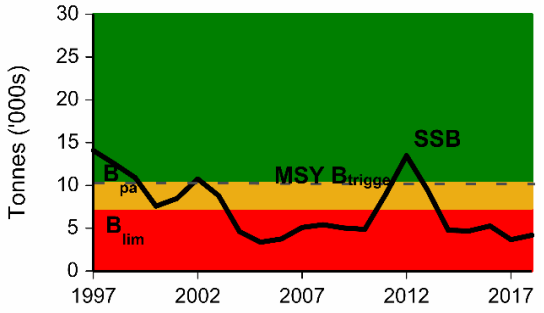


Chart 5.4d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: Celtic Sea Cod

In 2007 cod in the Celtic Sea has been assessed as suffering reduced reproductive capacity. In 2008, cod in the Celtic Sea was assessed as at risk of suffering reduced reproductive capacity and in 2009 and 2010 an assessment was unable to be made. Subsequently in 2011, cod in the Celtic Sea was assessed as being at full reproductive capacity and being harvested sustainably, and in 2012, 2013 and 2014 it was assessed as remaining at full reproductive capacity but with fishing rate unknown with respect to precautionary values F_{pa} and F_{lim}. In 2015 and 2016, it was assessed as at risk of suffering reduced reproductive capacity; whilst in 2017 the stock was assessed as suffering reduced reproductive capacity.



North Sea, Skagerrak and West of Scotland Haddock – in ICES Sub-area IV (North Sea) and ICES Divisions IIIa (Skagerrak – Kattegat) and VIa (West of Scotland)

The haddock stock in the North Sea and Skagerrak is managed under an EU-Norway long-term management plan which is intended to constrain harvesting within safe biological limits and to provide for sustainable fisheries. Recruitment has been characterized by occasional large year-classes, the last of which was the strong 1999 year-class. Since the 2014 assessment, this haddock stock has been combined with haddock in the Northern Shelf and assessed as a single stock by ICES.

The 2017 assessment shows that the fishing mortality rate has been fluctuating above F_{MSY} for most of the time series and that SSB has been mostly above MSY $B_{trigger}$ since 2002; and that apart from the relatively strong 2005 and 2009 year-classes recent recruitment has been poor.

In the North Sea, the haddock TAC was set at 61,933 tonnes for 2016, 33,643 tonnes in 2017 and 41,767 tonnes in 2018.

In the West of Scotland, the TAC for 2018 is 4,654 tonnes, compared with 3,697 tonnes in 2017 and 6,462 tonnes in 2016.

Chart 5.5a: Total removals

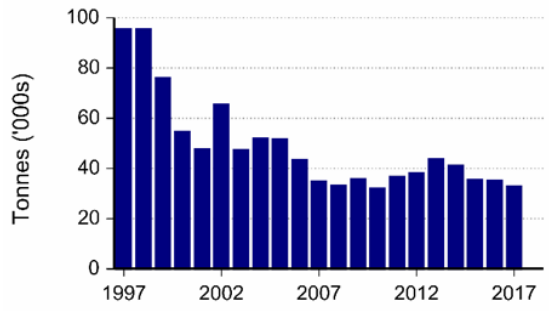


Chart 5.5b: Fishing mortality (F) – ages 2 - 4

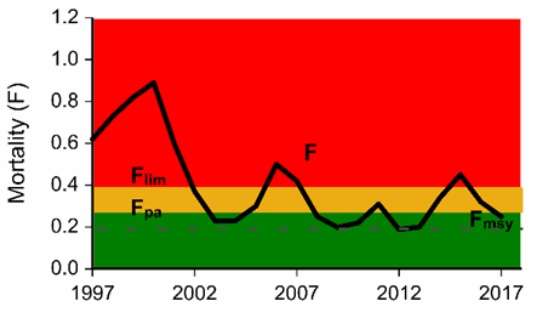


Chart 5.5c: Recruitment - age 0

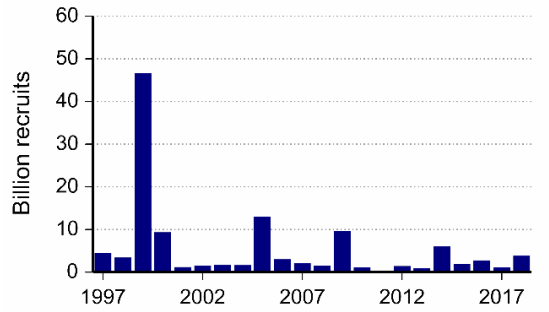
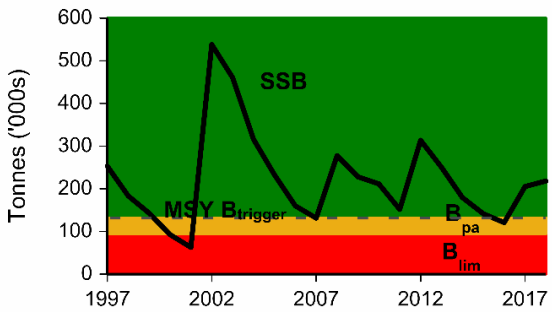


Chart 5.5d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: North Sea, Skagerrak and West of Scotland

In 2014 and 2015, ICES has assessed the new combined area haddock stock as being at full reproductive capacity and being harvested sustainably. In 2016, however, it was assessed as at risk of suffering reduced reproductive capacity; whilst in 2017 the stock was again assessed as being at full reproductive capacity and being harvested sustainably.



North Sea Plaice – in ICES Sub-area IV (North Sea)

The plaice assessments have included estimates of discards since 2004. This has changed the perception of the plaice stock relative to precautionary values. It shows landings and SSB falling steeply after 1990 as the fishing rate increased to a peak in 1997, with SSB currently well above MSY $B_{trigger}$, and with the fishing rate estimated to have decreased to below F_{pa} and consistent with high long-term yields (F_{MSY}). A long-term management plan for North Sea plaice and sole has been under development within the European Commission – final details are contained within Council Regulation (EC) No 676/2007 of 11 June 2007. The TAC for 2018 is 112,643 tonnes, compared with 129,917 tonnes in 2017 and 131,714 tonnes in 2016.

Chart 5.6a: Total removals

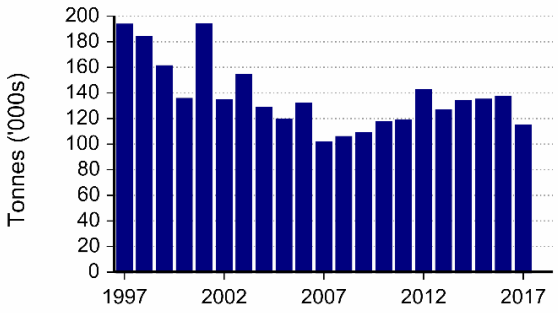


Chart 5.6b: Fishing mortality (F) – ages 2 - 6

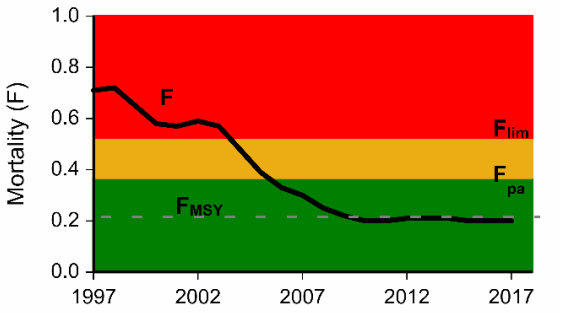


Chart 5.6c: Recruitment - age 1

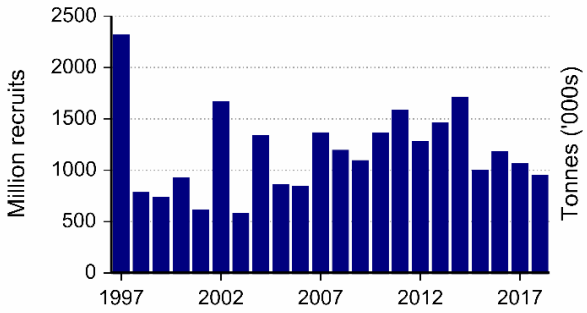
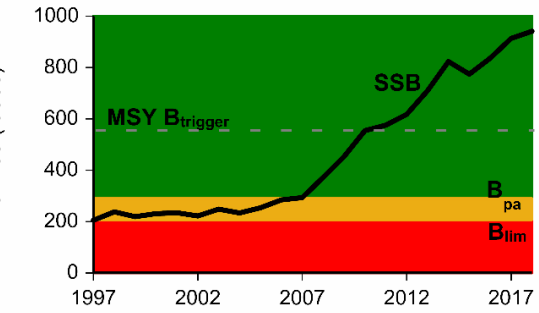


Chart 5.6d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: North Sea Plaice

The North Sea plaice assessment in 2007 was that the stock was at risk of suffering reduced reproductive capacity. Subsequent assessments have improved and since 2008 the stock is assessed to be at full reproductive capacity and being harvested sustainably.



Irish Sea Plaice - in ICES Division VIIa (Irish Sea)

The fishing rate on Irish Sea plaice has shown a declining trend since the early 1990s and the SSB trend show an increase in stock size since the mid-1990s. Discards are included in the ICES assessment; together with discard survivability estimates. The assessment in 2017 was benchmarked by ICES and precautionary boundaries provided; together with values for F_{MSY} and MSY $B_{trigger}$. The plaice TAC agreed for 2018 is 1,793 tonnes, compared with 1,098 tonnes in the three previous years (2017, 2016 and 2015).

Chart 5.7a: Total landings

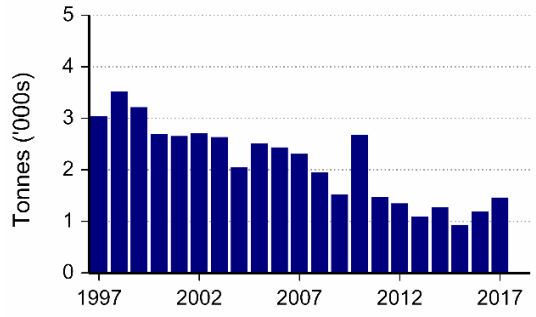


Chart 5.7b: Fishing mortality (F) – ages 3 – 6

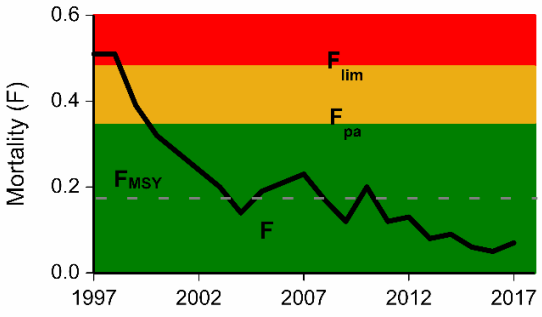


Chart 5.7c: Recruitment - age 2

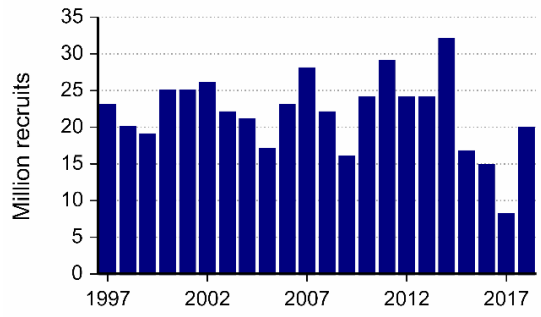
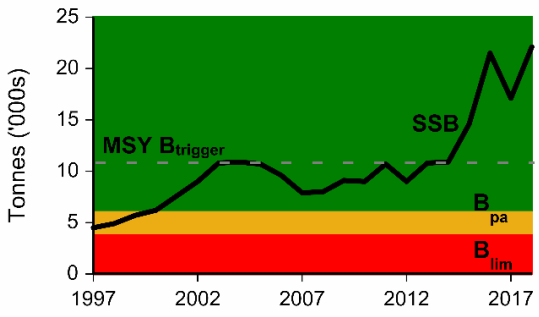


Chart 5.7d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: Irish Sea Plaice

Between 2007 and 2009 Irish Sea plaice has been assessed as being at full reproductive capacity and being harvested sustainably. Since 2010 the available information has been inadequate to determine stock status relative to precautionary boundaries until 2017 when the stock was again assessed as being at full reproductive capacity and being harvested sustainably.



North Sea Sole – in ICES Sub-area IV (North Sea)

The fishing rate for North Sea sole has fluctuated above the precautionary level in the past, falling below this since 2008. Periodic good year-classes have raised SSB above the precautionary level from time to time. SSB has fluctuated around the precautionary reference points during the last decade and has been increasing since 2007 and has been estimated at above MSY $B_{trigger}$ since 2012; and the fishing rate has declined since 1997 and is close to the rate that would lead to high long-term yields (F_{MSY}). The TAC agreed for 2018 is 15,694 tonnes, compared with 16,123 tonnes in 2017 and 13,262 tonnes in 2016.

Chart 5.8a: Total landings

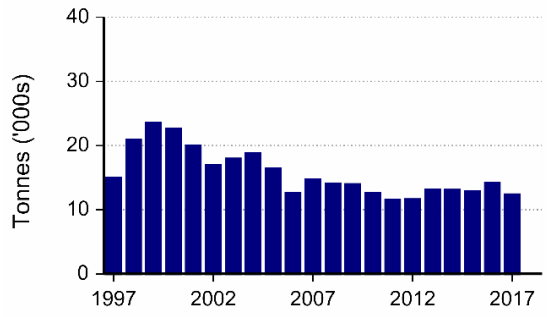


Chart 5.8b: Fishing mortality (F) – ages 2 - 6

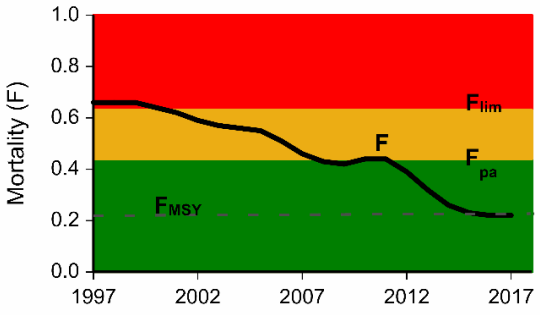


Chart 5.8c: Recruitment - age 1

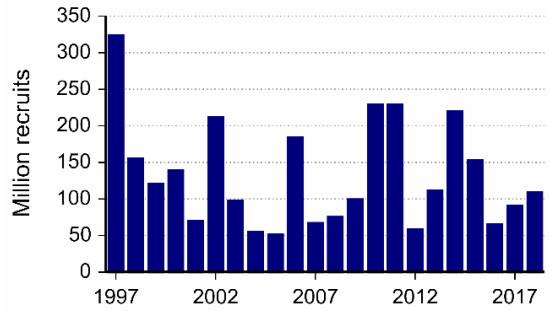
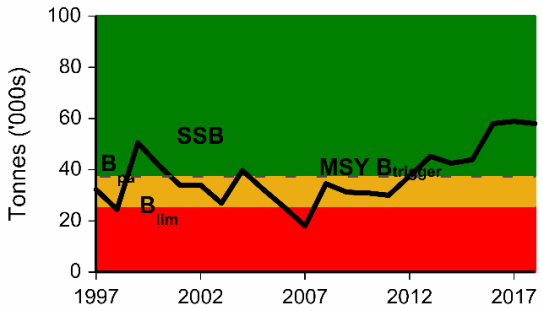


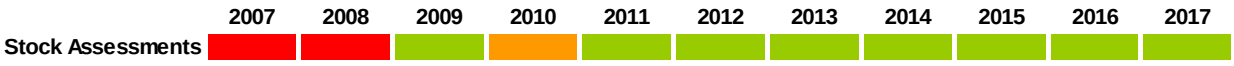
Chart 5.8d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: North Sea Sole

North Sea sole assessments have varied widely since 2007. However, since 2011 North Sea sole has been assessed as being at full reproductive capacity and being harvested sustainably.



Irish Sea Sole - in ICES Division VIIa (Irish Sea)

The Irish Sea sole fishing rate is just above the rate that would lead to high long-term yields (F_{MSY}). SSB has declined since 2001 to low levels and has been below B_{lim} since 2004. The sole TAC agreed for 2018 is 40 tonnes, the same as in the two previous years (2017 and 2016).

Chart 5.9a: Total landings

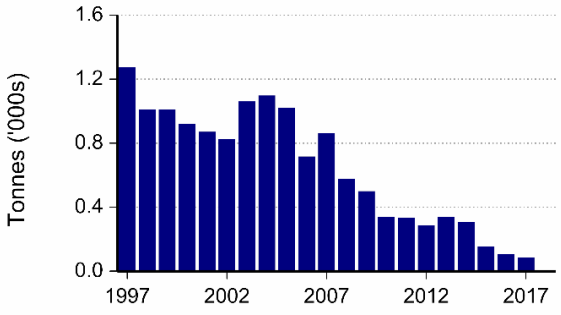


Chart 5.9b: Fishing mortality (F) – ages 4 - 7

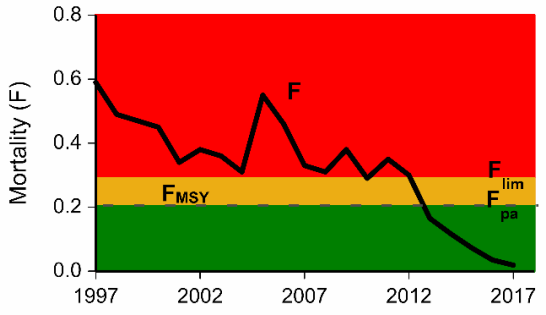


Chart 5.9c: Recruitment - age 2

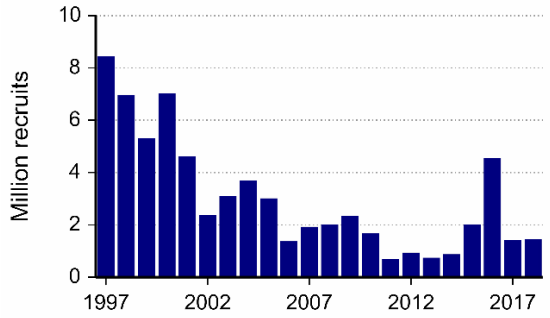
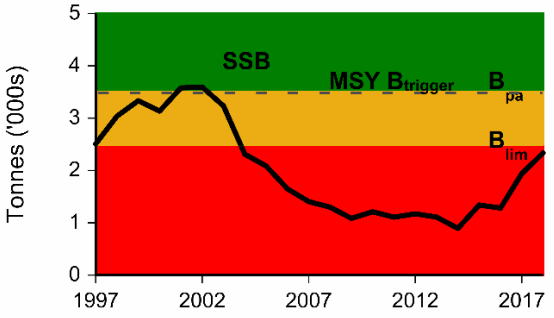


Chart 5.9d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: Irish Sea Sole

Since 2007 the stock has been assessed as suffering reduced reproductive capacity.



Eastern Channel Sole – in ICES Division VIId (Eastern Channel)

Sole stocks in the Eastern and Western Channel are biologically discrete stocks that are assessed and managed separately. In the larger, Eastern Channel stock, the assessed fishing rate has generally been above F_{MSY} throughout the time series but has recently been decreasing, and SSB has fluctuated without trend between B_{lim} and MSY $B_{trigger}$. The TAC for 2018 is 3,405 tonnes, compared with 2,769 tonnes in 2017 and 3,258 tonnes in 2016.

Chart 5.10a: Total landings

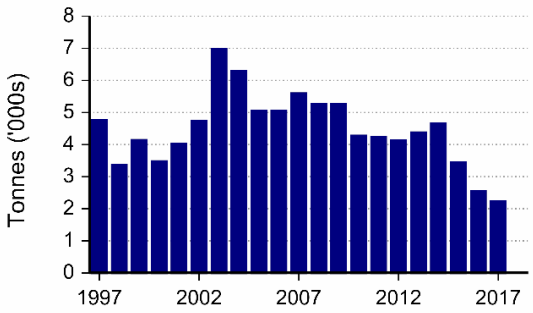


Chart 5.10b: Fishing mortality (F) – ages 3 - 8

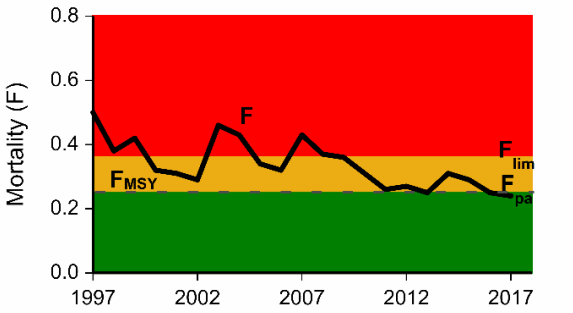


Chart 5.10c: Recruitment - age 1

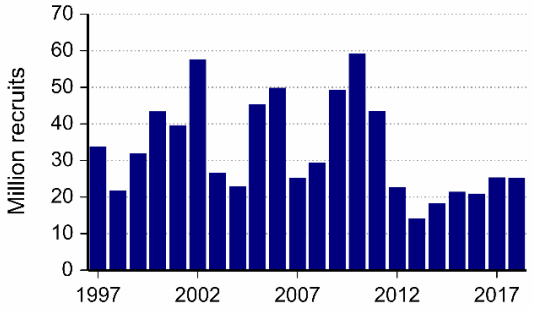
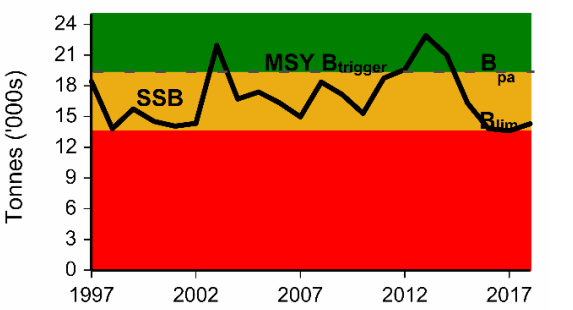


Chart 5.10d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: Eastern Channel Sole

The Eastern Channel sole stock had consistently been assessed at full reproductive capacity since 2007. However, from 2008 to 2015 the stock was judged to be at risk of being harvested unsustainably. In 2016 and 2017 the stock was assessed at risk of suffering reduced reproductive capacity.



Western Channel Sole – in ICES Division VIIe (Western Channel)

Sole stocks in the Eastern and Western Channel are biologically discrete stocks that are assessed and managed separately. In the smaller, Western Channel stock, the accepted assessment in 2008 indicated that the assessed fishing rate has been above F_{pa} since 1979, and that SSB has declined since 1980 to an historic low. The assessment in 2009 was merely indicative of trends, while in 2010 an analytical assessment was provided but one for which it was not possible to determine current stock status relative to precautionary boundaries. Since 2012 an analytical assessment has been provided but one for which it was not possible to determine stock status relative to precautionary boundaries as these were withdrawn by ICES for this stock until 2015. Fishing mortality is estimated to have been below F_{MSY} since 2009 and SSB has been above MSY $B_{trigger}$ since 1999. The TAC for 2018 is 1,202 tonnes, compared with 1,178 tonnes in 2017 and 979 tonnes in 2016.

Chart 5.11a: Total landings

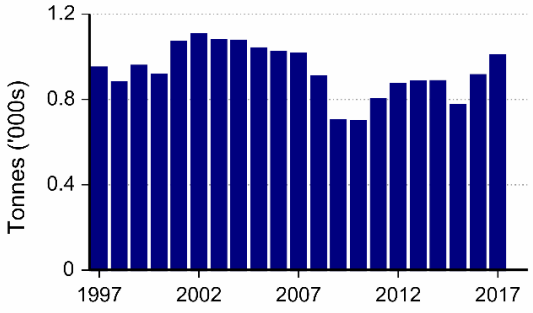


Chart 5.11b: Fishing mortality (F) – ages 3 - 7

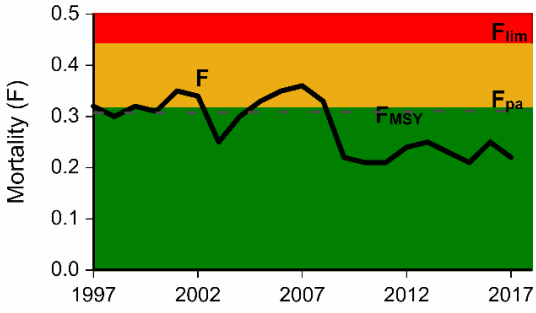


Chart 5.11c: Recruitment - age 1

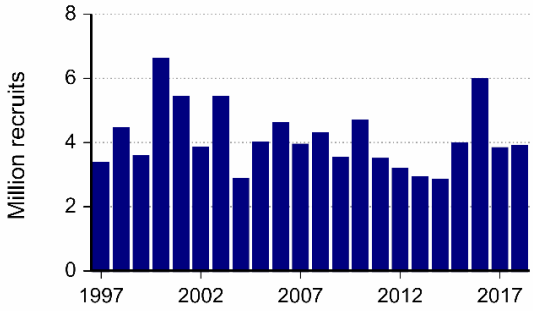
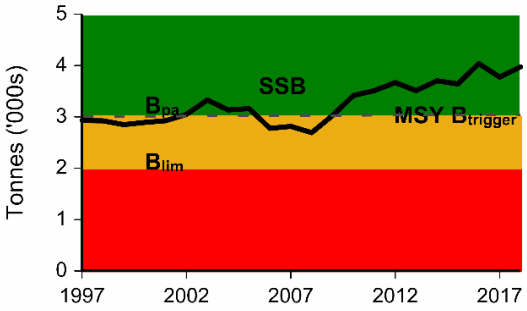


Chart 5.11d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: Western Channel Sole

In 2007 and 2008, VIIe sole has been assessed as a stock at risk of suffering reduced reproductive capacity. Assessments were unable to be made in 2009 and 2010 while in 2011 an assessment was undertaken but the precautionary reference points were withdrawn by ICES. The same situation is the case in 2012, 2013 and 2014. In 2015, 2016 and 2017, it was assessed as being at full reproductive capacity and being harvested sustainably.



North Sea Herring – in ICES Sub-area IV (North Sea), ICES Division VIId (Eastern Channel) and ICES Division IIIa (Skagerrak – Kattegat)

The North Sea herring stock, which collapsed in the 1970s and was closed to fishing for several years, subsequently recovered, and although it fell back in the mid-1990s, it has again been rehabilitated. In 2017, SSB was above the precautionary level with a moderate fishing rate on both juvenile and adult herring. Recruitment was below average between 2003 and 2013, stronger in 2014 but then returning to lower values in recent years. The TAC in 2018 is 600,588 tonnes, compared with 481,608 tonnes in 2017 and 518,242 tonnes in 2016.

Chart 5.12a: Total landings

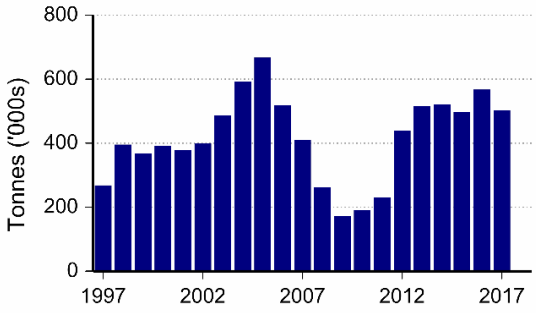


Chart 5.12b: Fishing mortality (F) – ages 2 - 6

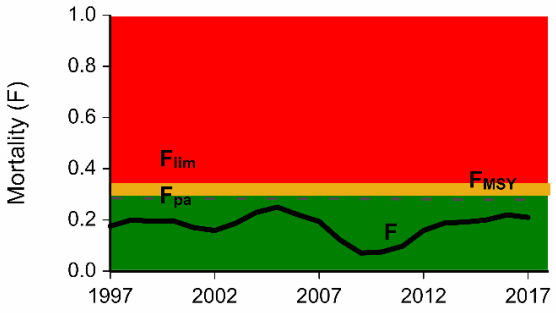


Chart 5.12c: Recruitment - age 0

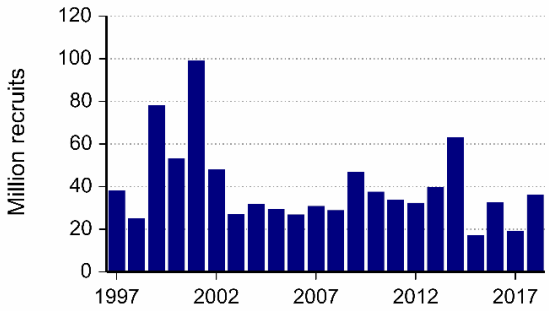
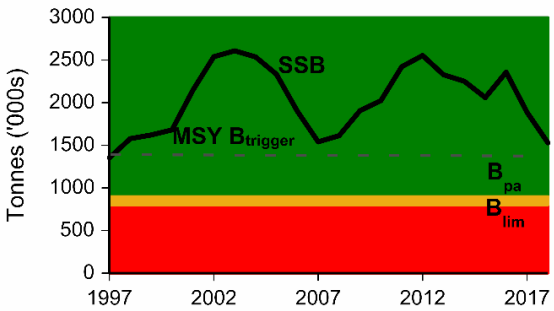


Chart 5.12d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: North Sea Herring

North Sea herring was assessed as a stock at risk of suffering reduced reproductive capacity for the years 2007 to 2010, inclusive. Since 2011, North Sea herring has been assessed as being at full reproductive capacity and being harvested sustainably below the rate that would lead to high long-term yields.



North East Atlantic Mackerel – combined Southern, Western and North Sea spawning components

Mackerel is assessed as the single North East Atlantic (NEA) stock which combines the Southern, Western and North Sea spawning components. SSB has increased considerably since the early 2000s and remains high above MSY $B_{trigger}$. There has been a succession of strong year-classes since the early 2000s. New management measures adopted from 2009 led to an increase of almost 33 per cent in the 2009 TAC in the NEA for mackerel, while maintaining measures to protect the North Sea spawning component. A TAC of 816,797 tonnes was agreed for 2018, with shares to be allocated in line with the 2014-2018 arrangement for the stock; compared with 1,020,996 tonnes in 2017. For reference, the TAC was not agreed for the years 2011 to 2016, inclusive.

Chart 5.13a: Total removals

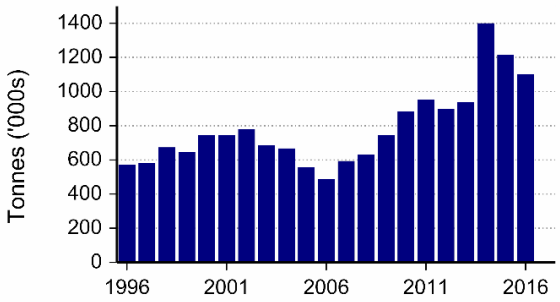


Chart 5.13b: Fishing mortality (F) – ages 4 – 8

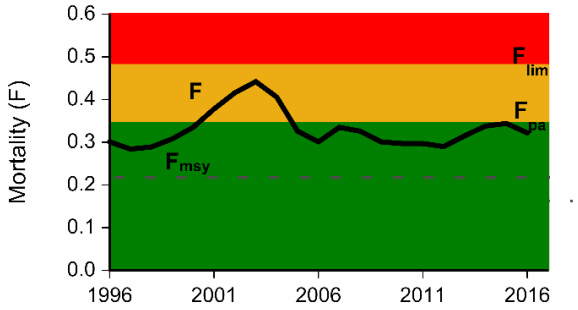


Chart 5.13c: Recruitment - age 0

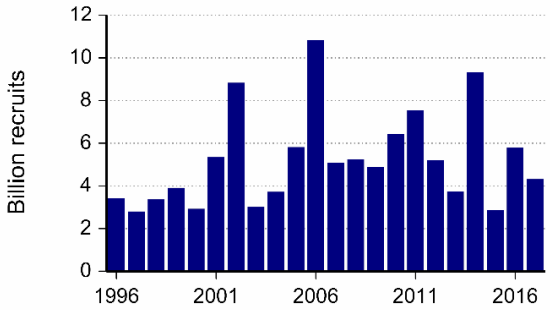
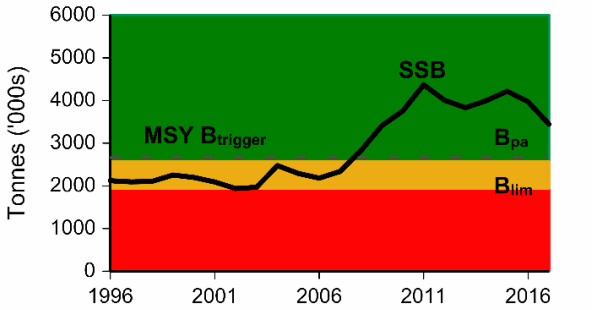


Chart 5.13d: Spawning stock biomass (SSB)



Note: The data in these charts are official statistics and not subject to National Statistics accreditation.

ICES stock assessment: North East Atlantic Mackerel

From 2007 to 2012 North East Atlantic mackerel has been assessed as being at full reproductive capacity but either at risk of or being harvested unsustainably. Between 2013 and 2015, the stock has been assessed as being at full reproductive capacity and being harvested sustainably. In 2016 North East Atlantic mackerel was judged to be at risk of being harvested unsustainably, although assessed as being at full reproductive capacity; whilst in 2017 the stock was again assessed as being at full reproductive capacity and being harvested sustainably.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Stock Assessments	(a)					(a)					

(a) Status uncertain in terms of SSB relative to B_{pa}; but harvested unsustainably

6 Overview of the world fishing industry

Introduction

The world catch data presented in this chapter have been extracted from the most recently available data from the Food and Agricultural Organisation (FAO) of the United Nations. The tables present annual statistics of nominal catches (see Appendix 2, Glossary of terms). The data are official statistics and are not subject to National Statistics accreditation. The FAO updates historic data frequently. Revisions have not been highlighted in the following tables.

World catch

Table 6.1 shows that in 2016, the world catch from marine fishing was 79.3 million tonnes, 2 per cent lower than in 2015. Catches by the Central and South American fleet fell by 12 per cent while African fleet landings rose by 8 per cent. Vessels from Asia and the Middle East caught 54 per cent of the world total compared with 49 per cent ten years earlier. European vessels accounted for 17 per cent of world catch.

TABLE 6.1 World catch by continent: 2006 to 2016

Figures refer to Marine Fishing Areas unless otherwise specified (Million tonnes)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Europe	13.2	13.1	12.8	13.0	13.5	13.0	12.7	13.1	13.4	13.7	13.3
Africa	4.5	4.5	4.6	4.8	5.0	4.9	5.6	5.4	5.7	5.8	6.3
North America	6.1	6.0	5.5	5.3	5.5	6.1	6.1	6.2	6.1	6.1	6.0
Central & S. America[(a)]	15.9	15.8	16.0	15.2	11.5	15.8	11.8	12.0	10.3	10.9	9.7
Asia[(b)]	39.2	39.6	39.2	39.2	40.0	40.3	40.9	41.4	43.2	43.3	42.6
Oceania	1.3	1.4	1.2	1.2	1.2	1.2	1.3	1.2	1.3	1.4	1.4
Other nei[(c)]	..	..	..	..	..	..	..	..	..	..	..
Total Marine Areas	**80.3**	**80.4**	**79.3**	**78.9**	**76.8**	**81.5**	**78.4**	**79.4**	**79.9**	**81.2**	**79.3**

Source: FAO

(a) Central & S.America includes the Caribbean.
(b) Asia includes the Middle East.
(c) Not elsewhere included.

Note: The data in this table are official statistics and are not subject to National Statistics accreditation.

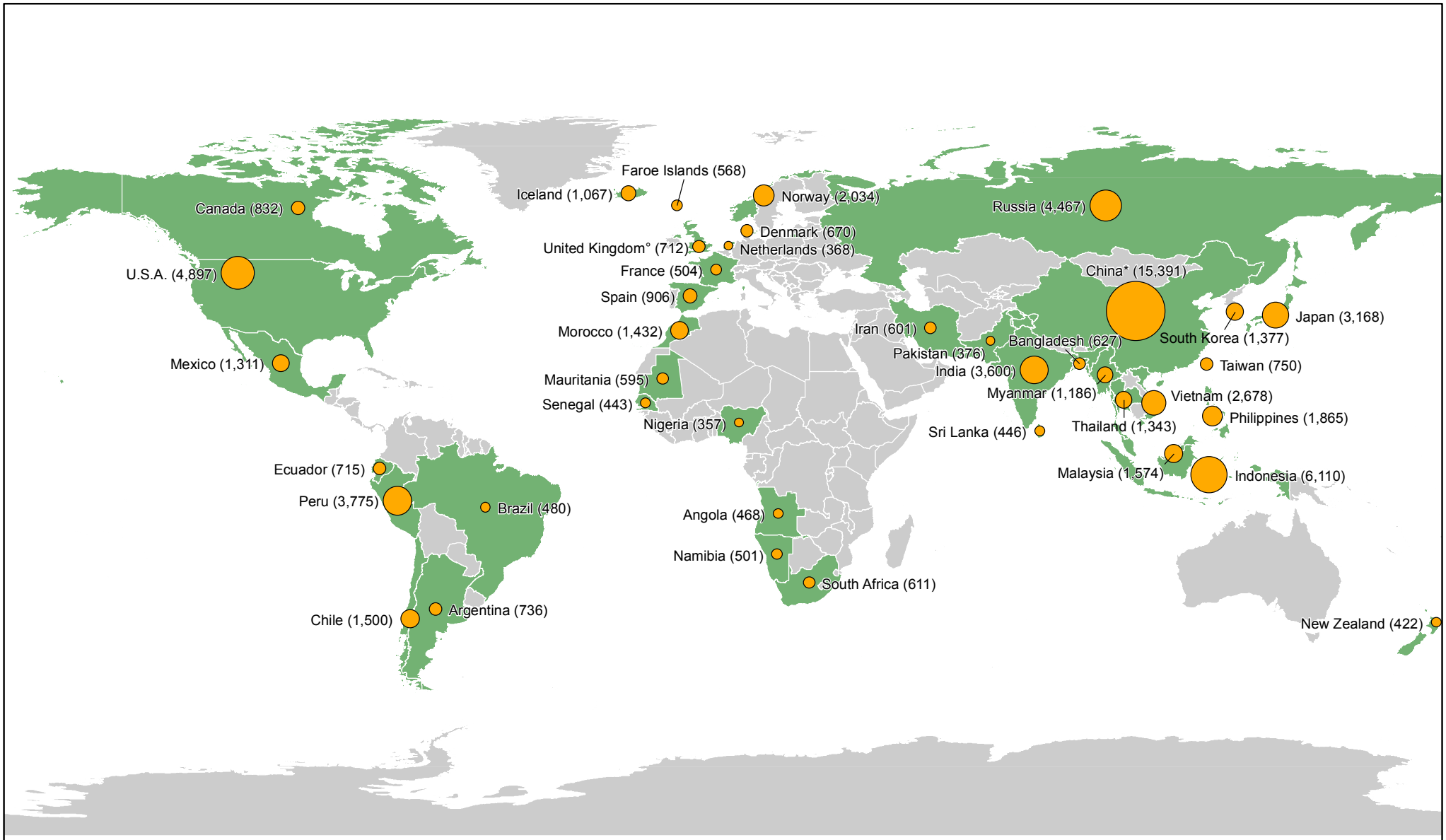
Note: Additional data on world catch by nationality of vessel are available from the MMO website as supplementary Table 6.1a.

Chart 6.1 shows the total catch by major fishing nations in terms of quantity caught in 2016.

In 2016, China (including Hong Kong and Macao SAR) caught the largest amount of fish, 15.4 million tonnes. Indonesia had the second largest catch of 6.1 million tonnes, followed by the United States of America (4.9 million tonnes), the Russian Federation (4.5 million tonnes) and Peru (3.8 million tonnes).

In 2016, Spain caught 906 thousand tonnes, the highest of any country in the European Union. FAO figures show a UK catch of 712 thousand tonnes in 2016 (including 10 thousand tonnes by the Isle of Man and the Channel Islands). Note this is different from the more recent figure of 701 thousand tonnes shown in Table 3.1 of Chapter 3. This will exclude some landings by the Channel Islands' fleet but insufficient amounts to account for the full difference. It may be that FAO has mistakenly included landings for the Isle of Man and Channel Islands in separate figures for the UK.

Chart 6.1: World catch by nationality of vessel, major catchers of fish: 2016 ('000 tonnes)



* Catch for China includes Hong Kong SAR and Macao SAR.
° Catch for UK includes Channel Islands and Isle of Man.

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Appendix ND.3.2

FAO fishing areas are shown in Chart 6.2. Of the 79.3 million tonnes of fish caught in 2016, 59 per cent were caught in the Pacific Ocean, 27 per cent in the Atlantic Ocean and 14 per cent in the Indian Ocean (see Table 6.2).

In 2016, landings from the Indian Ocean were up by 2 cent but down in the Pacific and Atlantic by 2 and 5 per cent respectively. Landings from the North East Atlantic – the seas which are fished by the European fleet – were down by 9 per cent.

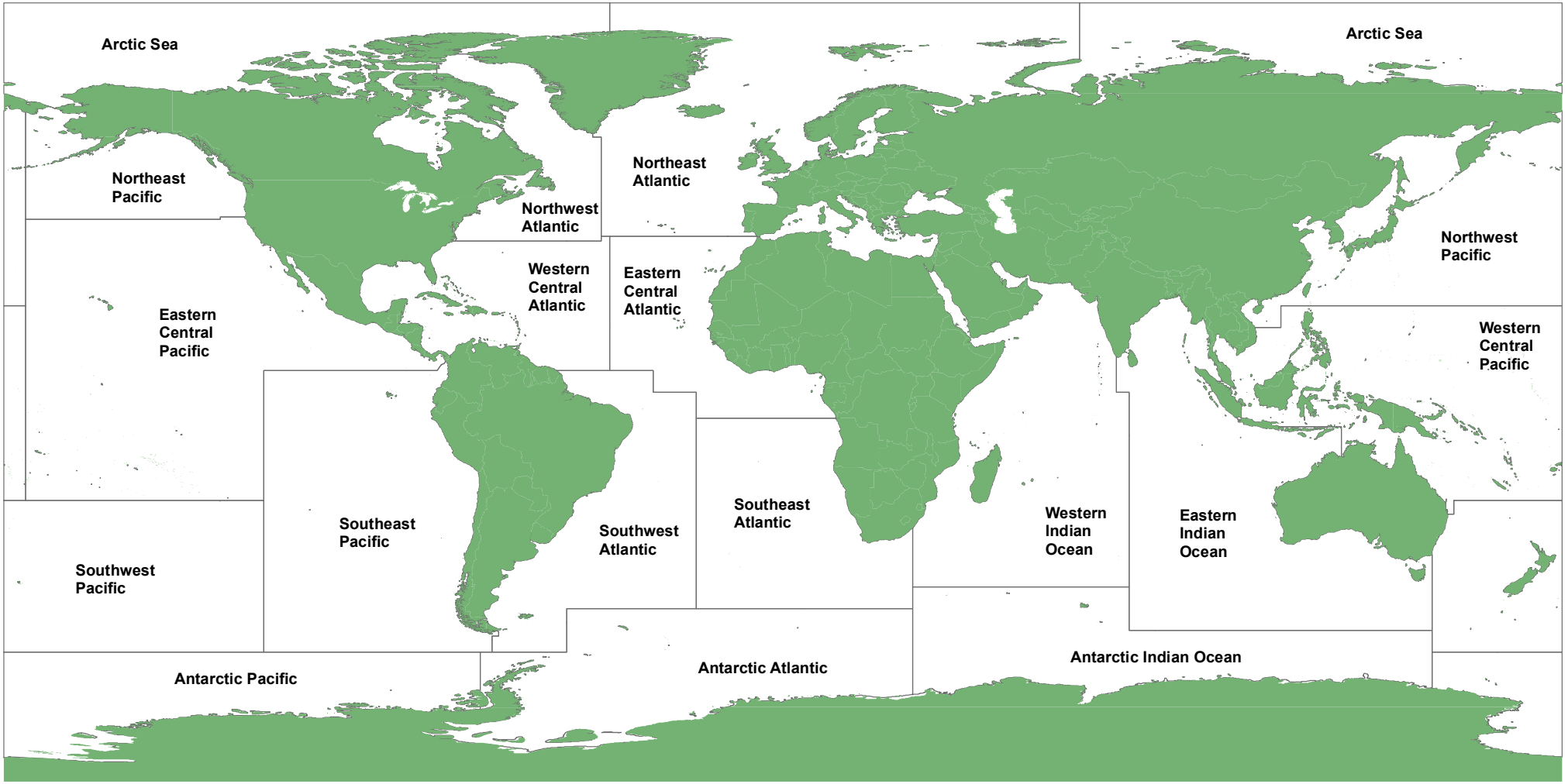
TABLE 6.2 World catch by sea area: 2006 to 2016

Figures refer to Marine Fishing Areas only (Million tonnes)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Atlantic Ocean											
Arctic Sea	-	..	..	-	..	..	..	..	..	..	..
Northwest Atlantic	2.2	2.2	2.1	2.1	2.1	2.0	2.0	1.9	1.8	1.8	1.8
Northeast Atlantic	9.1	8.9	8.5	8.5	8.7	8.0	8.0	8.5	8.7	9.1	8.3
Western Central Atlantic	1.4	1.4	1.3	1.4	1.2	1.4	1.4	1.3	1.2	1.4	1.6
Eastern Central Atlantic	3.6	3.6	3.9	4.2	4.5	4.4	4.2	4.3	4.5	4.4	4.8
Mediterranean and Black Sea	1.6	1.7	1.5	1.5	1.4	1.4	1.3	1.2	1.1	1.3	1.2
Southwest Atlantic	2.4	2.5	2.4	1.9	1.8	1.7	1.9	2.0	2.4	2.4	1.6
Southeast Atlantic	1.4	1.4	1.4	1.2	1.4	1.3	1.7	1.4	1.6	1.7	1.7
Antarctic Atlantic	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.3
Total Atlantic Ocean	**21.7**	**21.8**	**21.2**	**20.8**	**21.3**	**20.6**	**20.6**	**20.7**	**21.5**	**22.4**	**21.2**
India Ocean											
Western Indian Ocean	4.5	4.2	4.1	4.2	4.3	4.2	4.5	4.6	4.8	4.7	4.9
Eastern Indian Ocean	5.7	5.7	5.8	6.0	6.0	6.2	6.1	6.2	6.3	6.4	6.4
Antarctic Indian Ocean	..	..	..	..	..	..	..	..	..	..	..
Total Indian Ocean	**10.2**	**9.9**	**10.0**	**10.2**	**10.2**	**10.4**	**10.7**	**10.8**	**11.1**	**11.1**	**11.3**
Pacific Ocean											
Northwest Pacific	19.7	19.9	20.1	20.5	20.9	21.4	21.4	21.4	22.0	22.1	22.4
Northeast Pacific	3.1	2.9	2.6	2.3	2.4	3.0	2.9	3.2	3.1	3.2	3.1
Western Central Pacific	11.1	11.3	10.8	11.1	11.5	11.4	11.9	12.1	12.7	12.6	12.7
Eastern Central Pacific	1.7	1.8	1.9	2.0	1.9	1.9	2.0	2.0	1.9	1.7	1.7
Southwest Pacific	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5
Southeast Pacific	12.3	12.1	12.2	11.5	7.8	12.3	8.3	8.5	6.9	7.7	6.3
Antarctic Pacific	..	..	..	..	..	..	..	..	..	..	..
Total Pacific Ocean	**48.4**	**48.6**	**48.2**	**47.9**	**45.2**	**50.5**	**47.1**	**47.9**	**47.2**	**47.8**	**46.7**
World Total	**80.3**	**80.4**	**79.3**	**78.9**	**76.8**	**81.5**	**78.4**	**79.4**	**79.9**	**81.2**	**79.3**

Source: FAO

Chart 6.2: FAO marine fishing areas



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Appendix 1: Supplementary charts showing landings and effort by UK vessels by ICES rectangle: 2017

Chart A1.1: Cod landings by UK vessels by ICES rectangle: 2017

Chart A1.1a: Quantity of landings by ICES rectangle

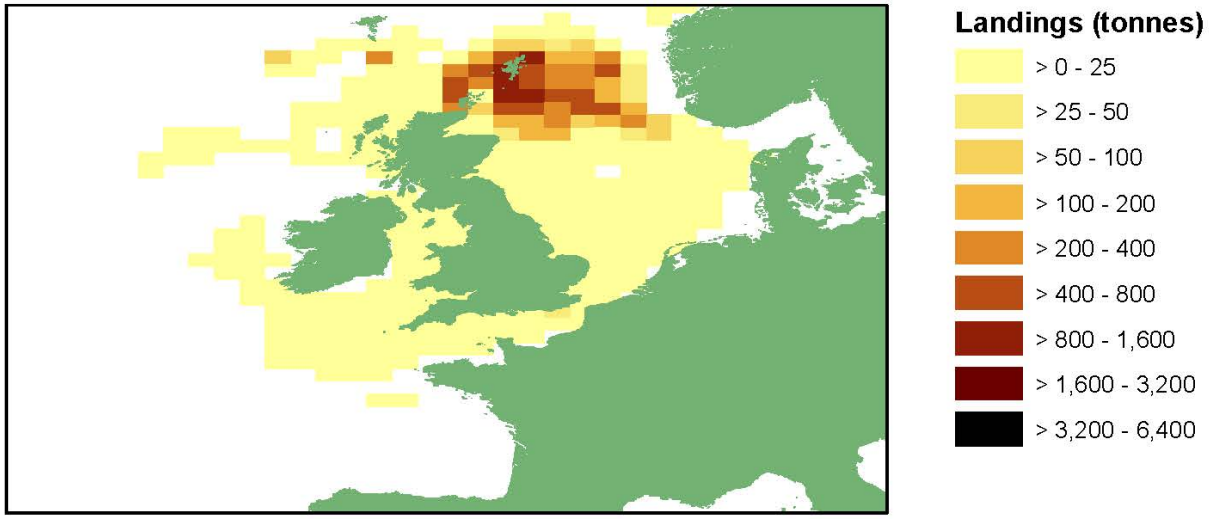


Chart A1.1b: Value of landings by ICES rectangle

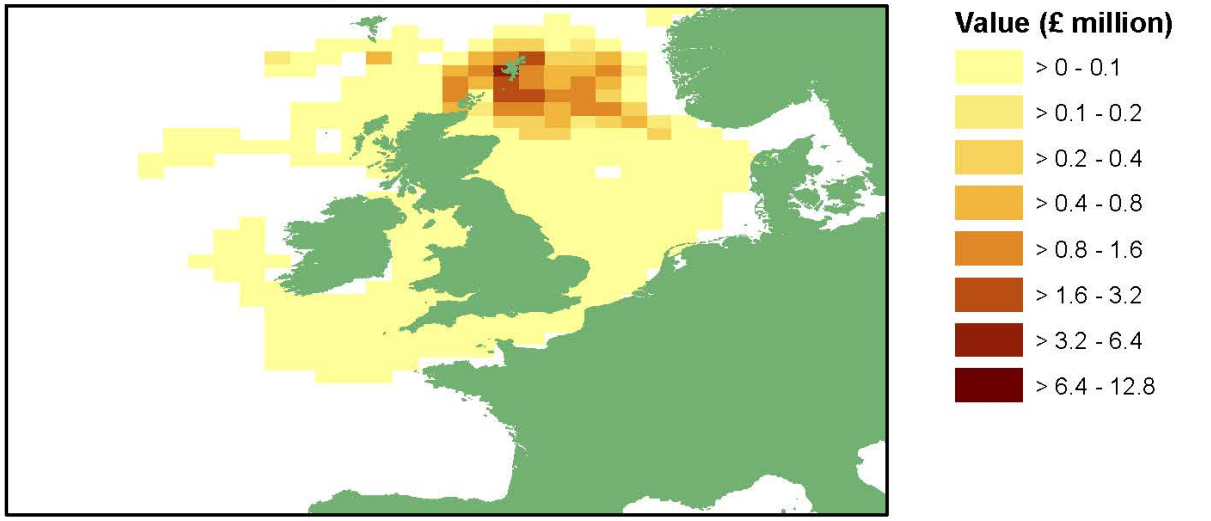
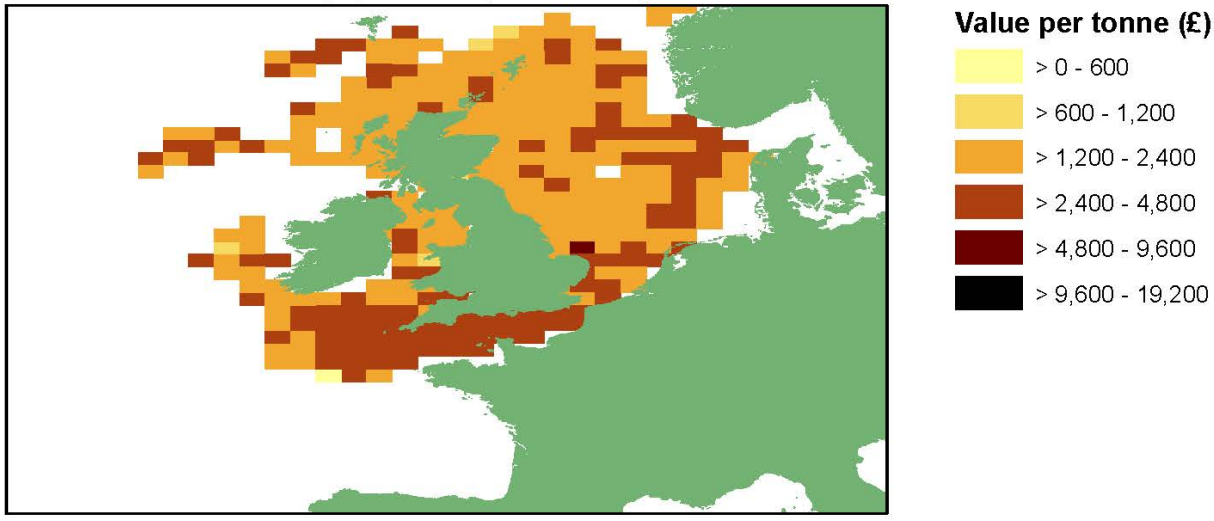


Chart A1.1c: Value of landings per tonne by ICES rectangle



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Chart A1.2: Haddock landings by UK vessels by ICES rectangle: 2017

Chart A1.2a: Quantity of landings by ICES rectangle

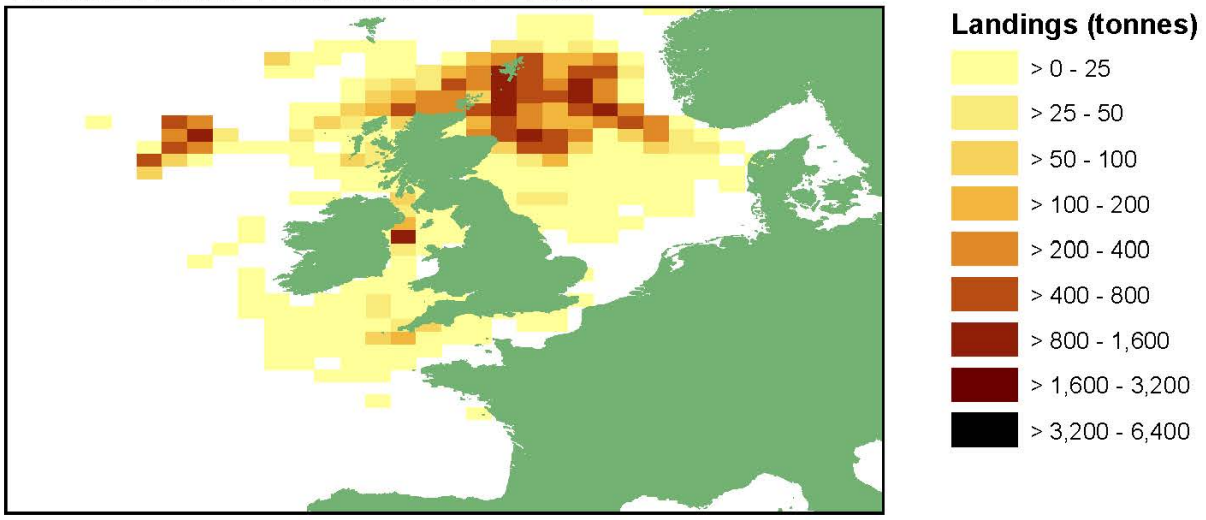


Chart A1.2b: Value of landings by ICES rectangle

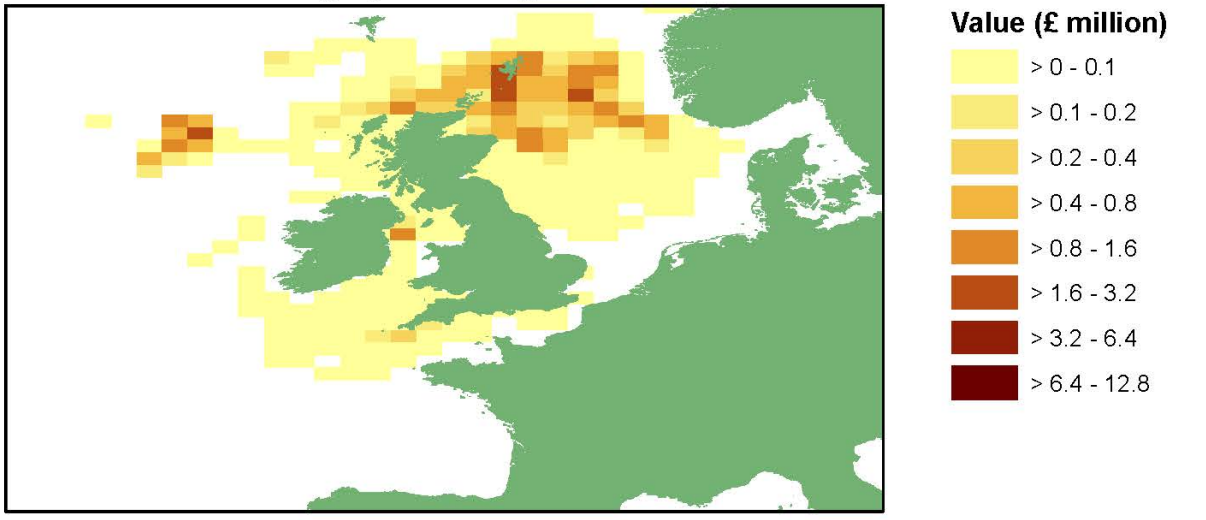
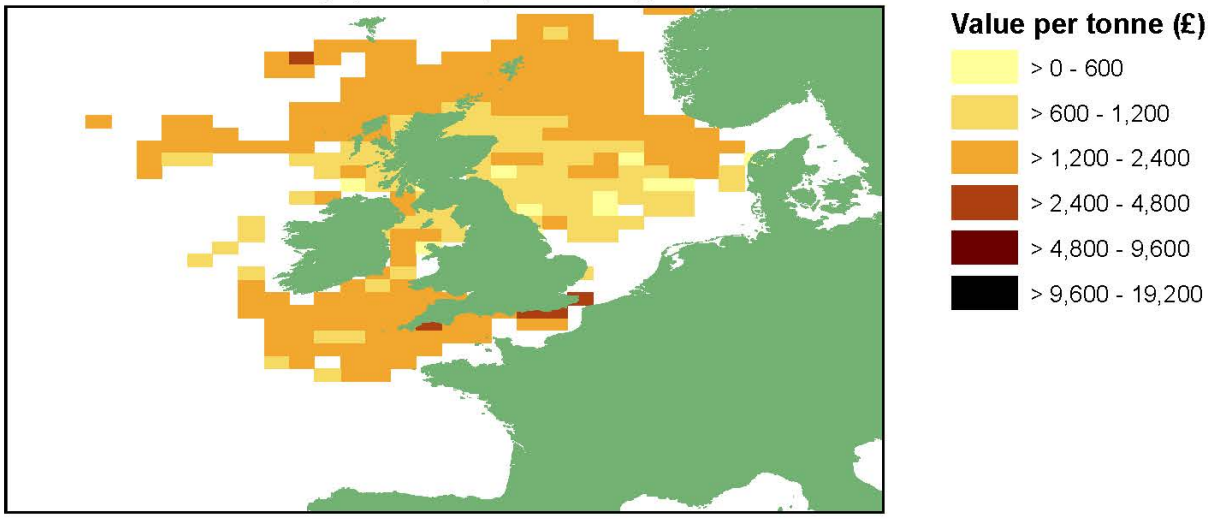


Chart A1.2c: Value of landings per tonne by ICES rectangle



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Chart A1.3: Monk or Angler landings by UK vessels by ICES rectangle: 2017

Chart A1.3a: Quantity of landings by ICES rectangle

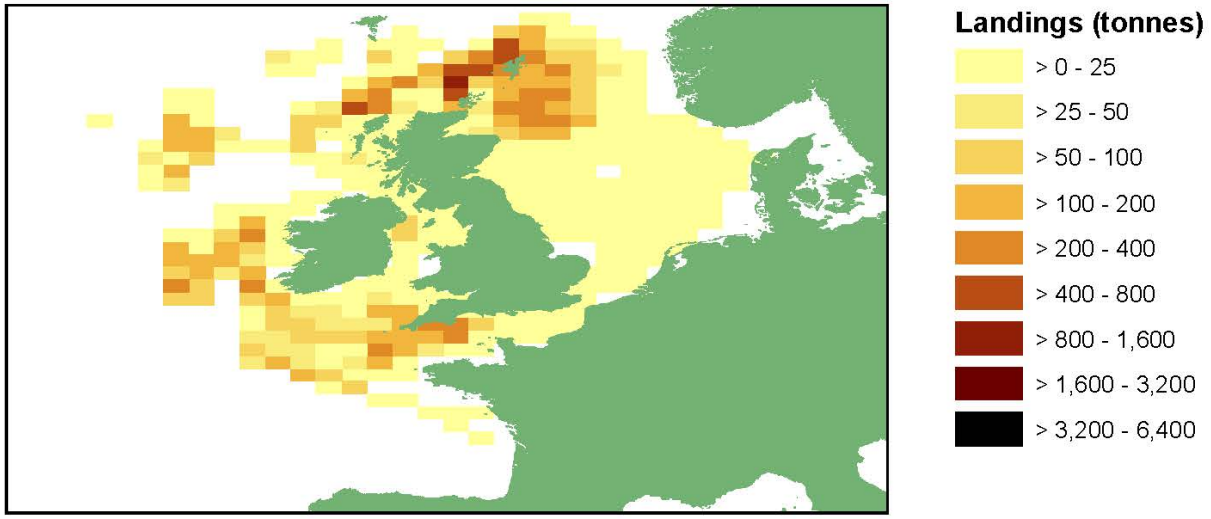


Chart A1.3b: Value of landings by ICES rectangle

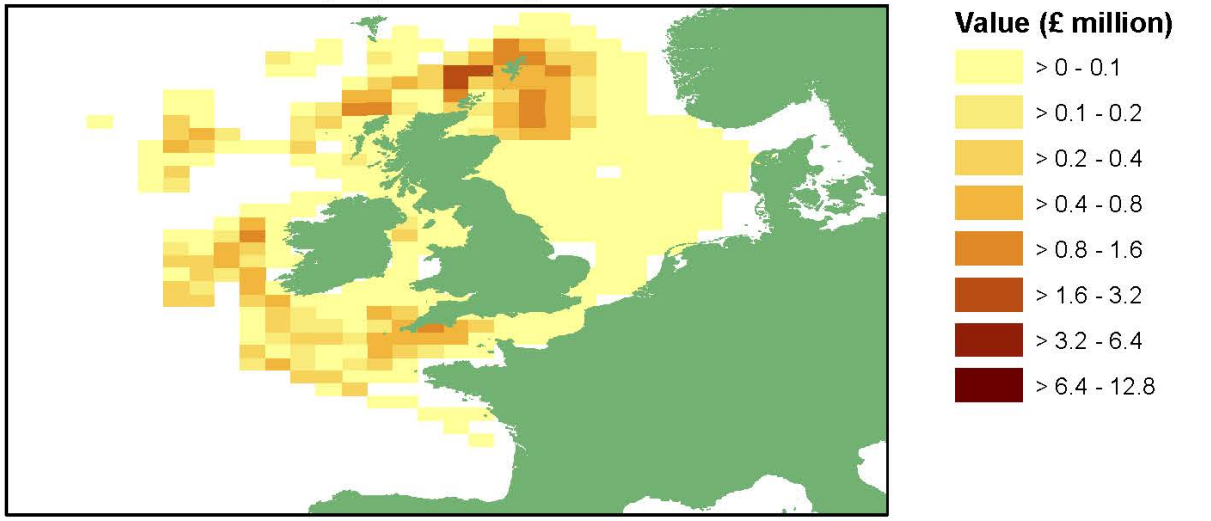
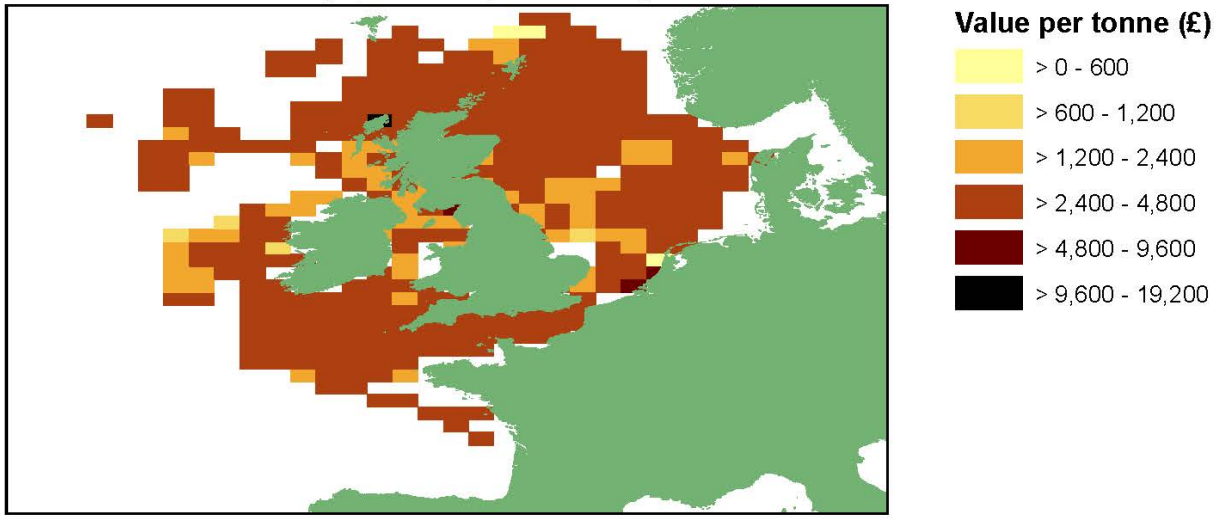


Chart A1.3c: Value of landings per tonne by ICES rectangle



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Chart A1.4: Plaice landings by UK vessels by ICES rectangle: 2017

Chart A1.4a: Quantity of landings by ICES rectangle

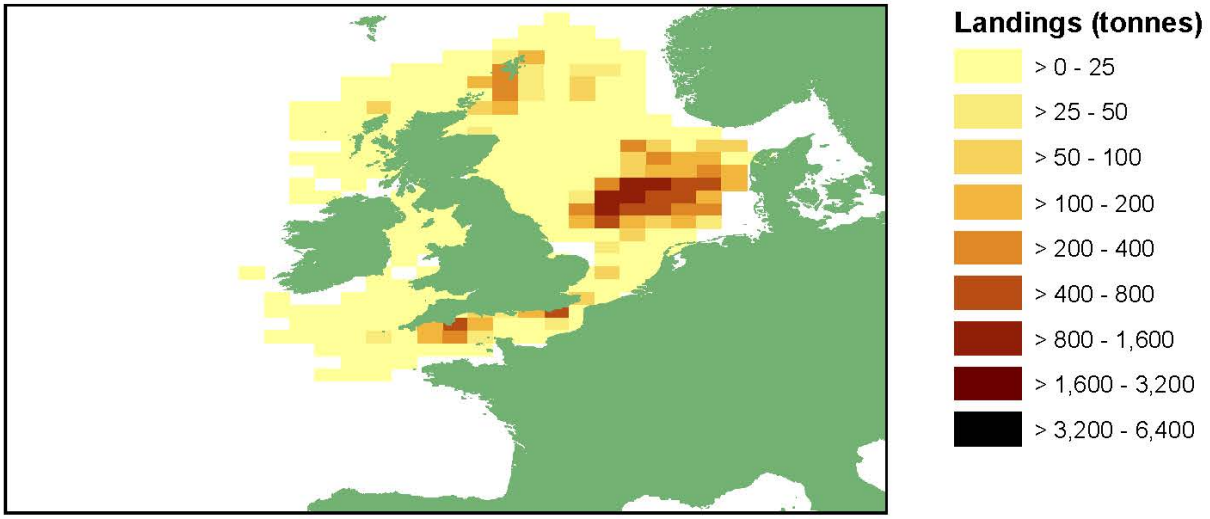


Chart A1.4b: Value of landings by ICES rectangle

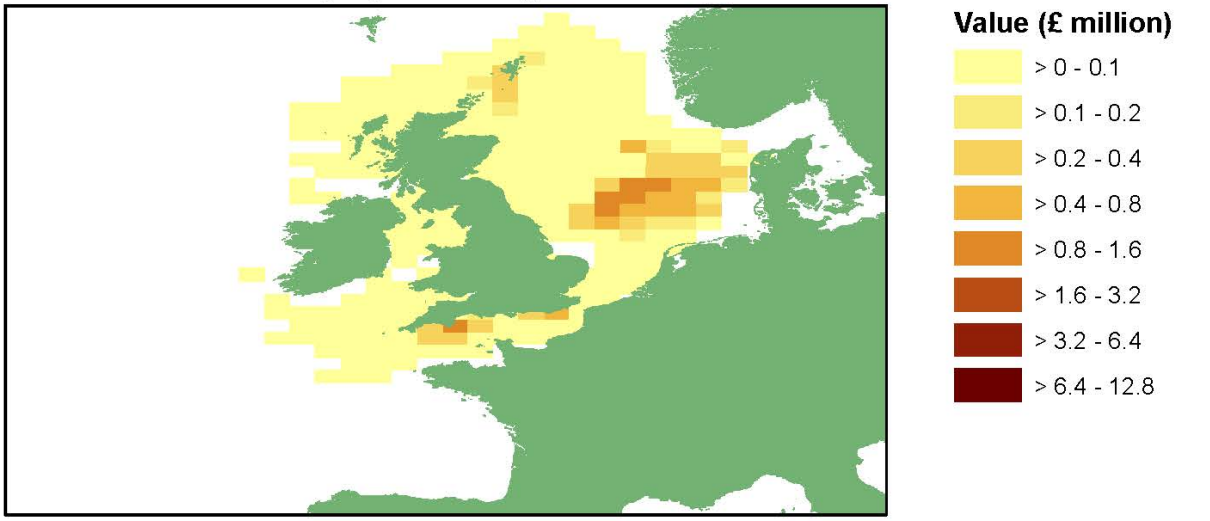
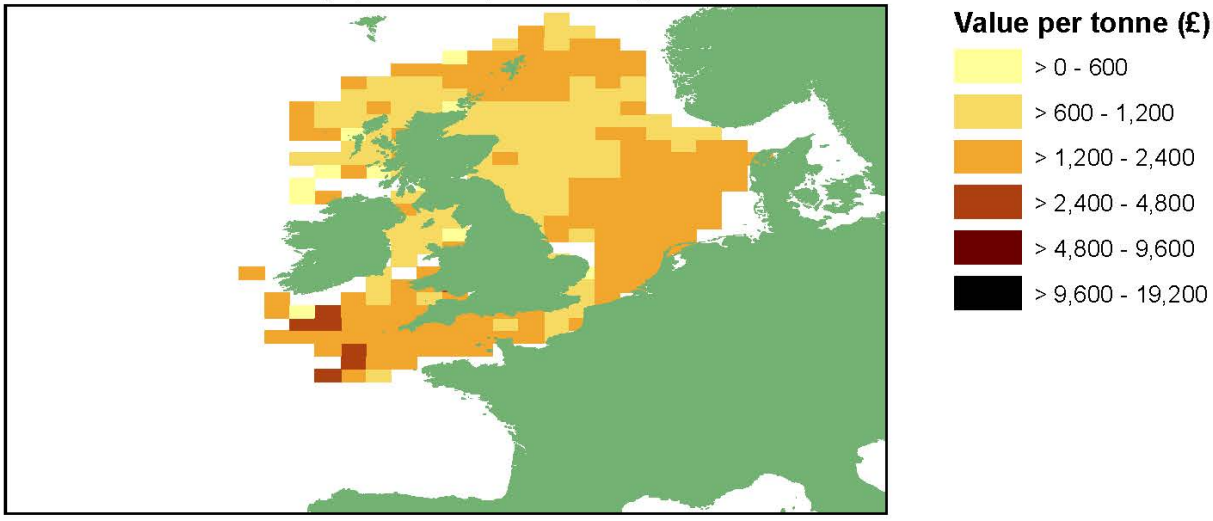


Chart A1.4c: Value of landings per tonne by ICES rectangle



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Chart A1.5: Sole landings by UK vessels by ICES rectangle: 2017

Chart A1.5a: Quantity of landings by ICES rectangle

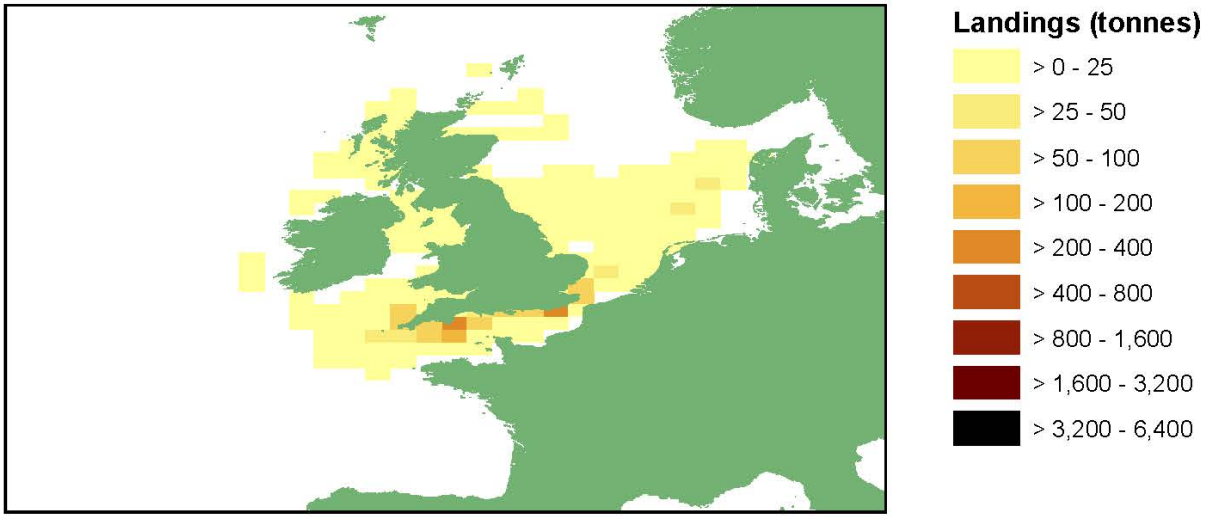


Chart A1.5b: Value of landings by ICES rectangle

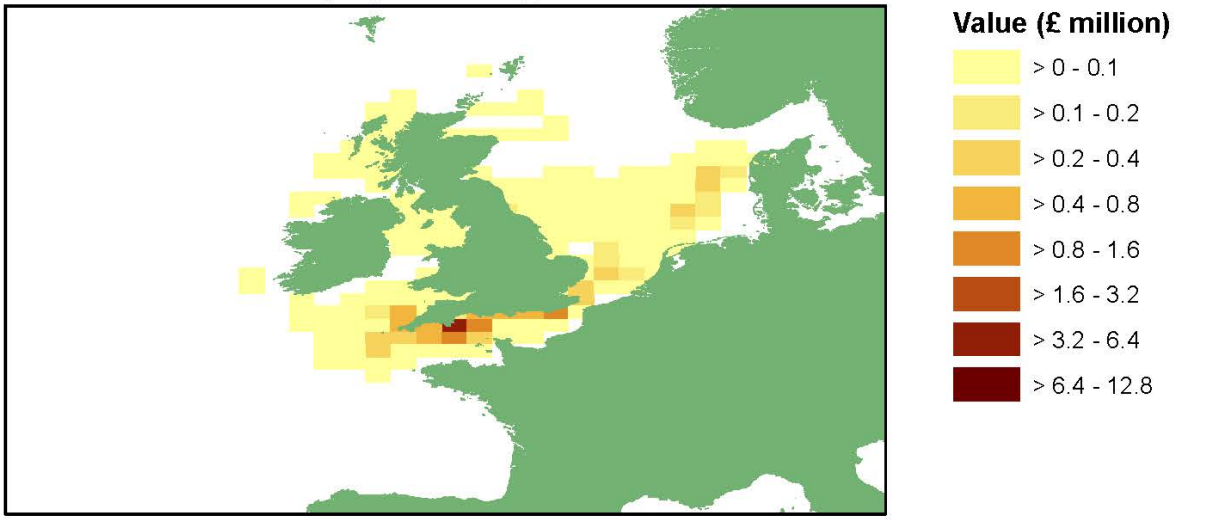
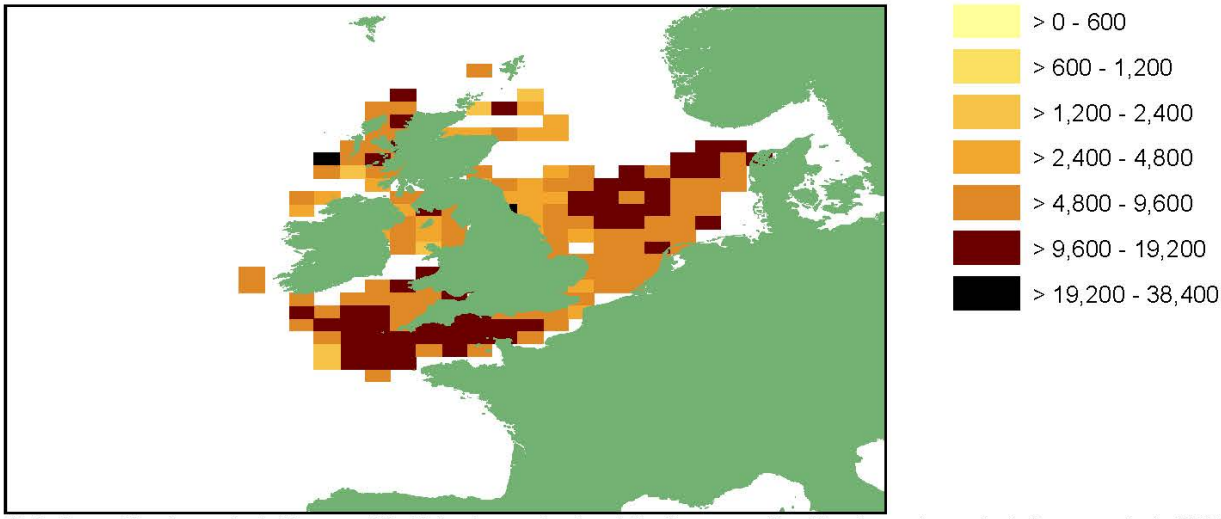


Chart A1.5c: Value of landings per tonne by ICES rectangle



*Note: Legend has been adapted to account for high values and so is not directly comparable with value per tonne charts for years prior to 2017.

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Chart A1.6: Herring landings by UK vessels by ICES rectangle: 2017

Chart A1.6a: Quantity of landings by ICES rectangle

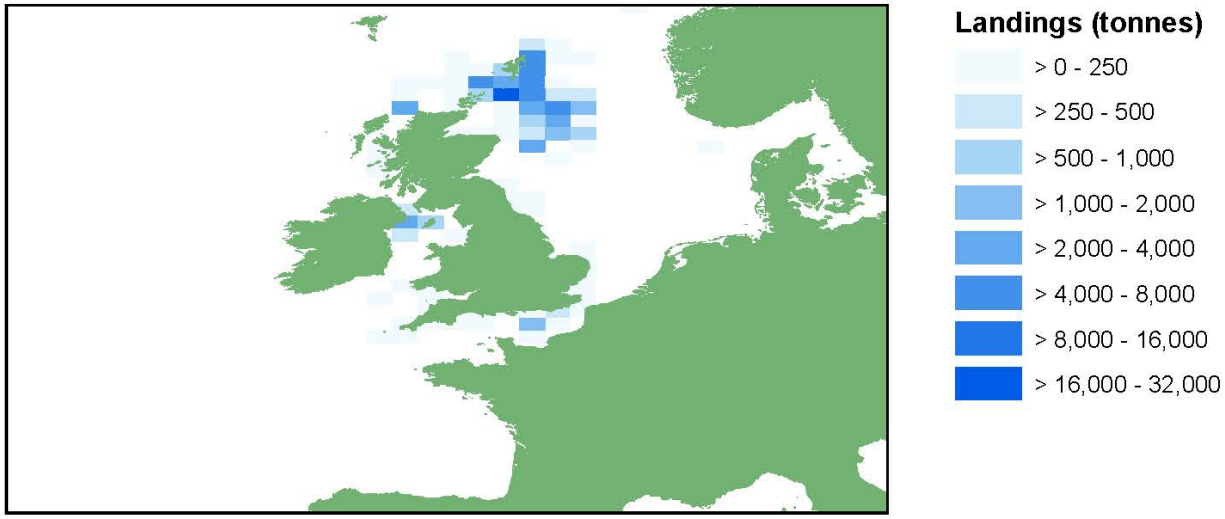


Chart A1.6b: Value of landings by ICES rectangle

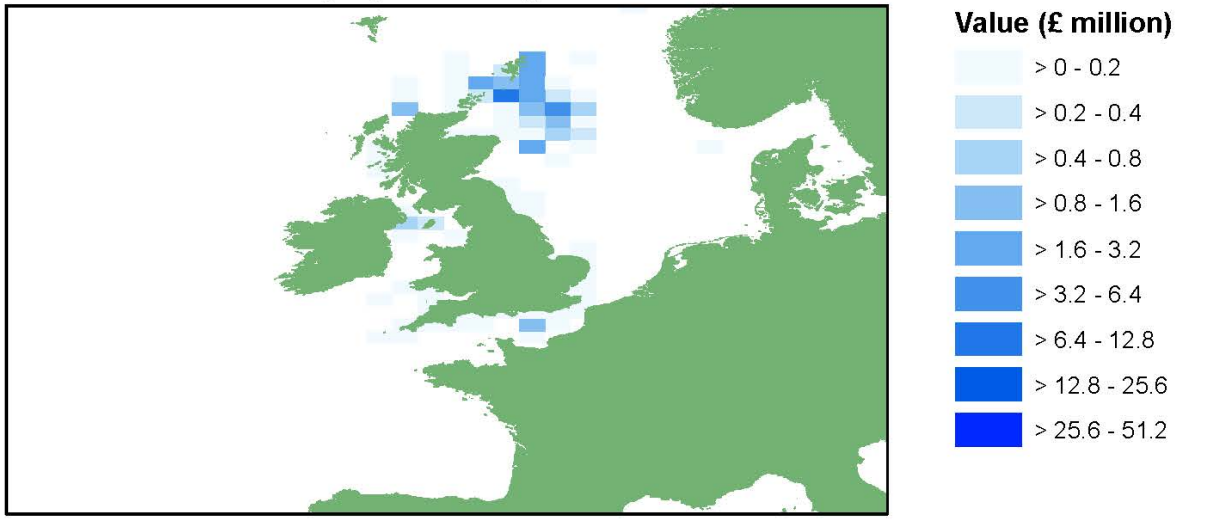
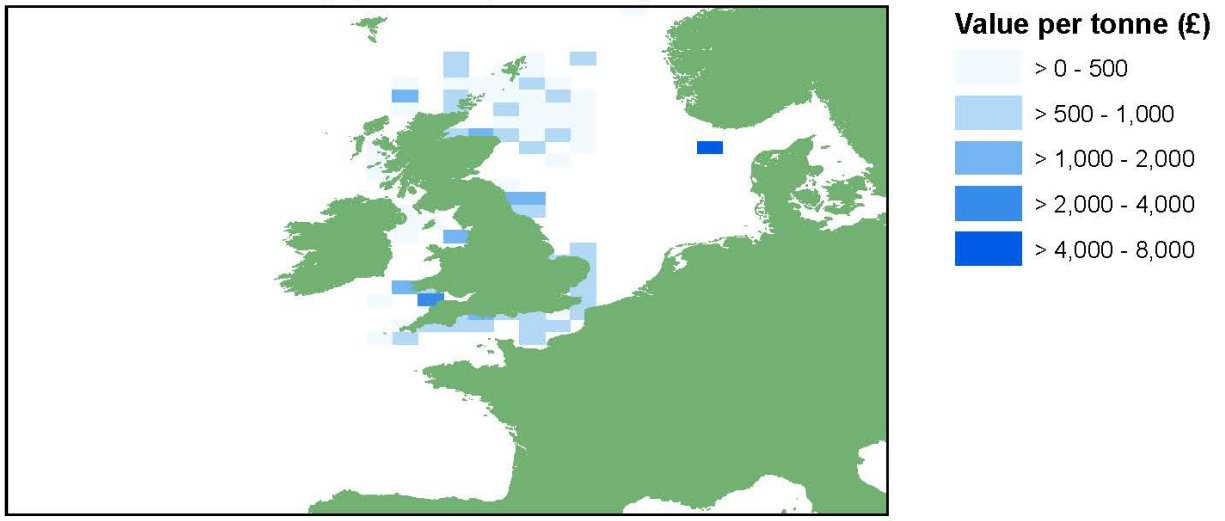


Chart A1.6c: Value of landings per tonne by ICES rectangle



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Chart A1.7: Mackerel landings by UK vessels by ICES rectangle: 2017

Chart A1.7a: Quantity of landings by ICES rectangle

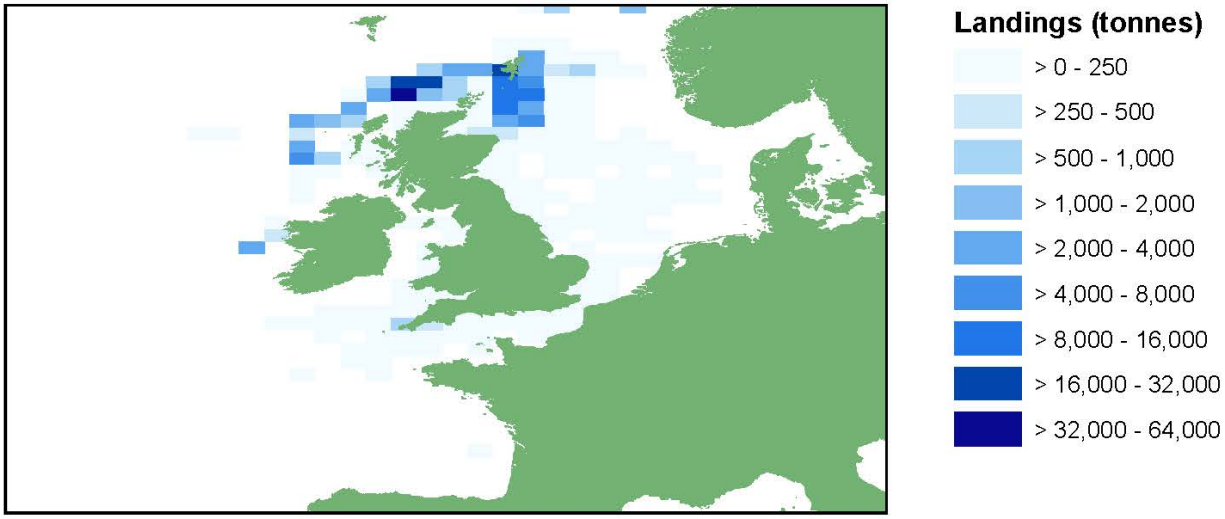


Chart A1.7b: Value of landings by ICES rectangle

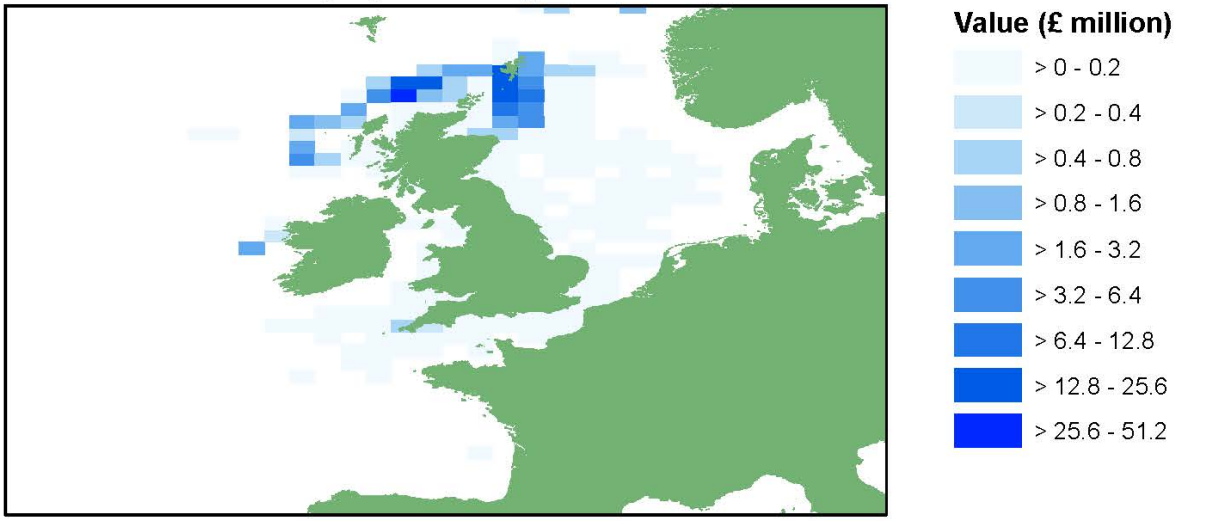
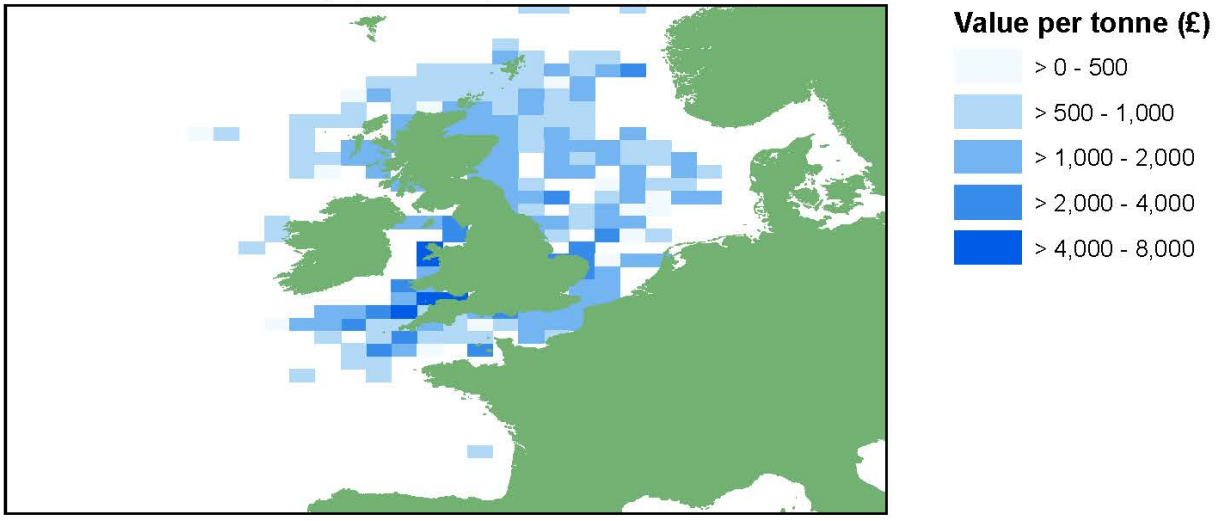


Chart A1.7c: Value of landings per tonne by ICES rectangle



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Chart A1.8: Crab landings by UK vessels by ICES rectangle: 2017

Chart A1.8a: Quantity of landings by ICES rectangle

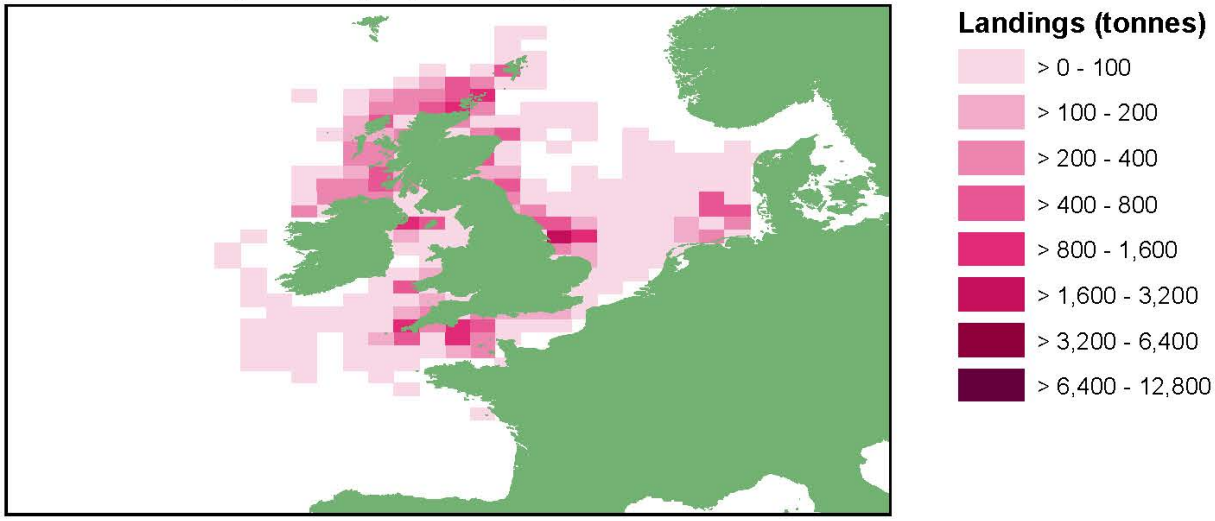


Chart A1.8b: Value of landings by ICES rectangle

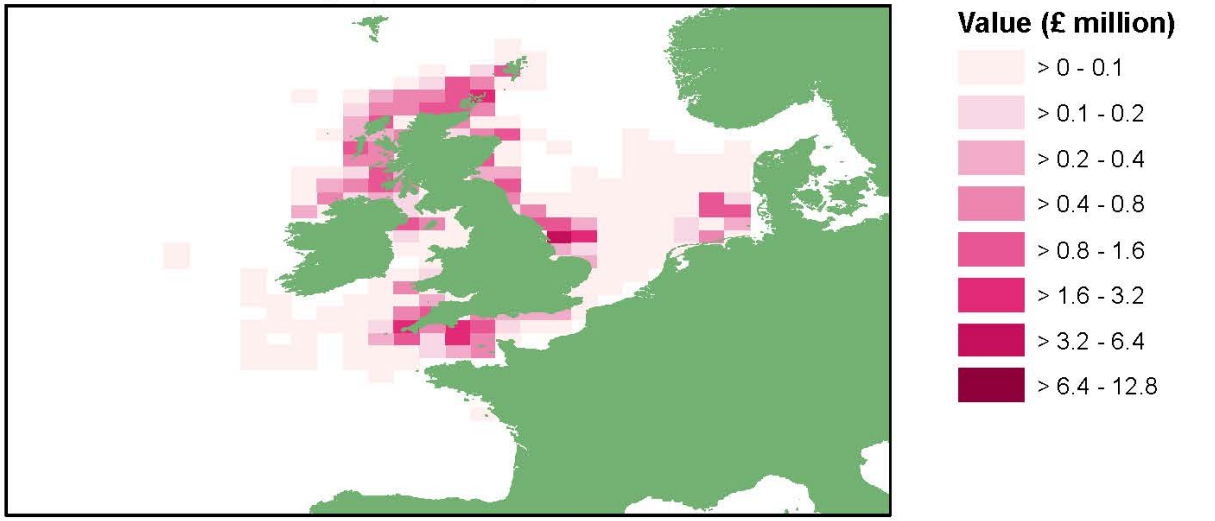
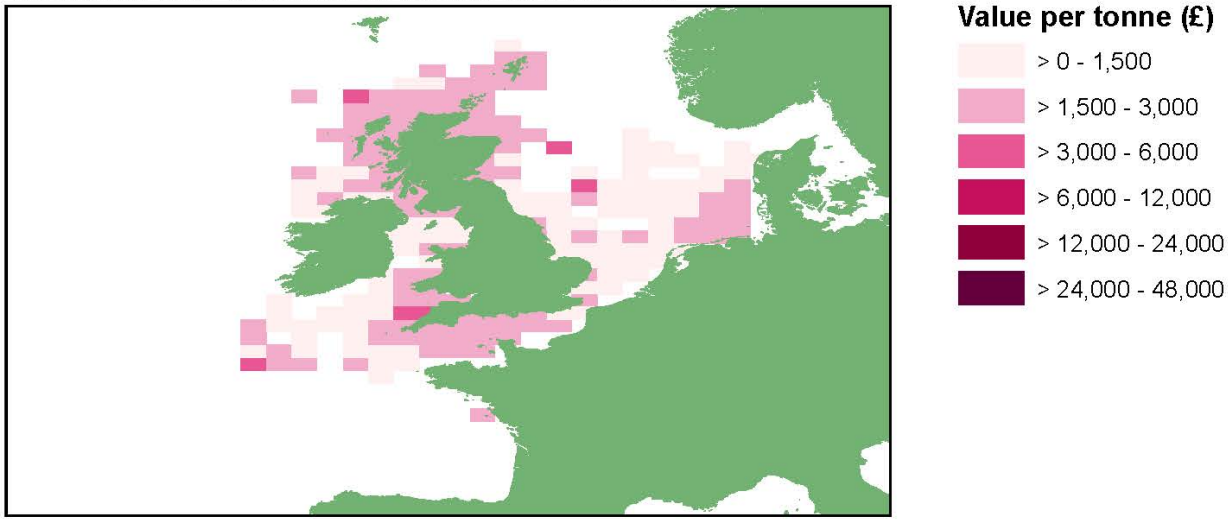


Chart A1.8c: Value of landings per tonne by ICES rectangle



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Chart A1.9: Lobster landings by UK vessels by ICES rectangle: 2017

Chart A1.9a: Quantity of landings by ICES rectangle

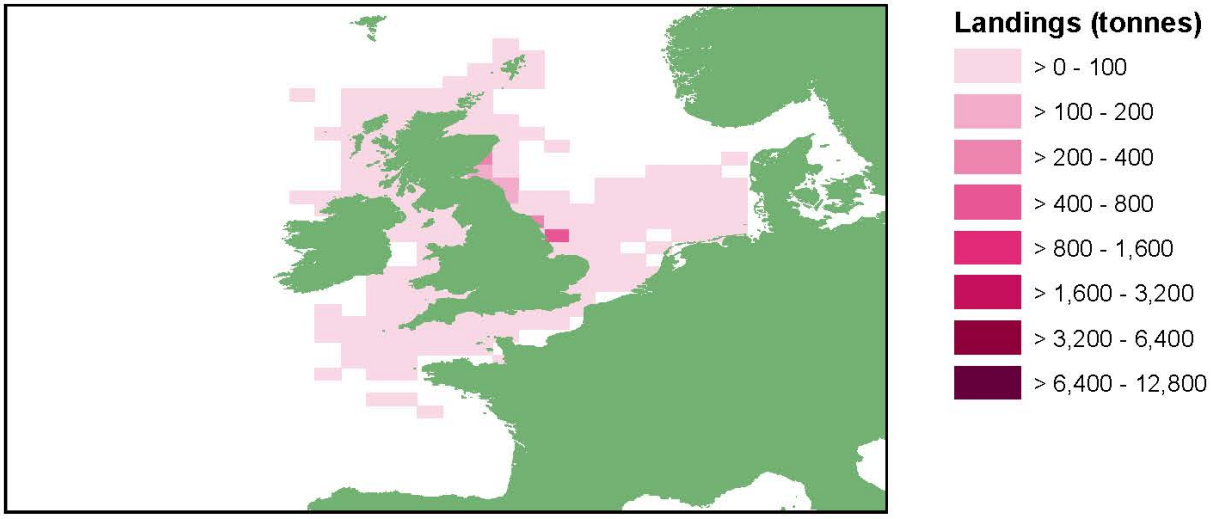


Chart A1.9b: Value of landings by ICES rectangle

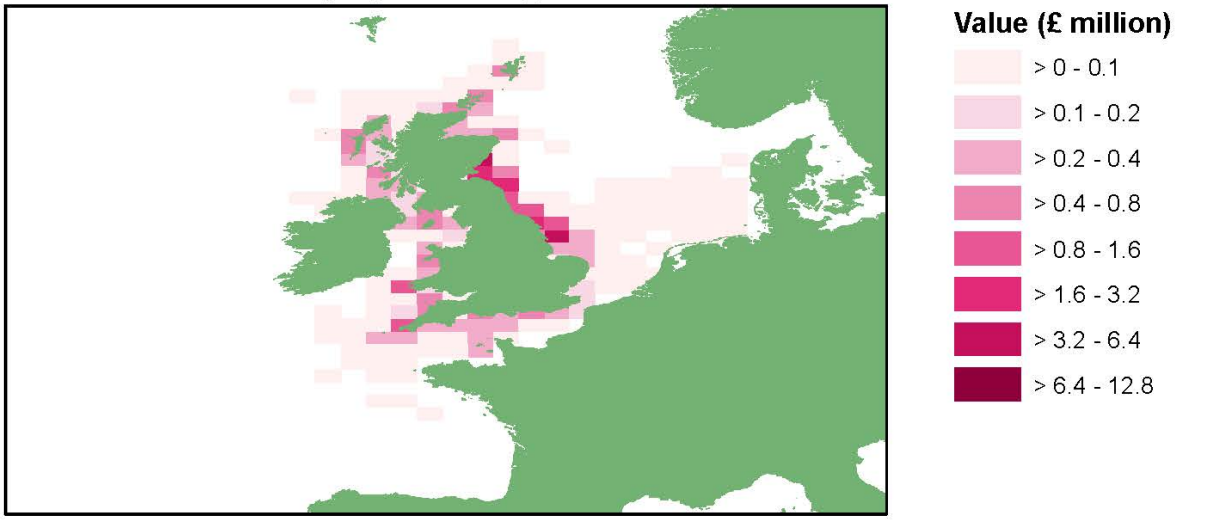
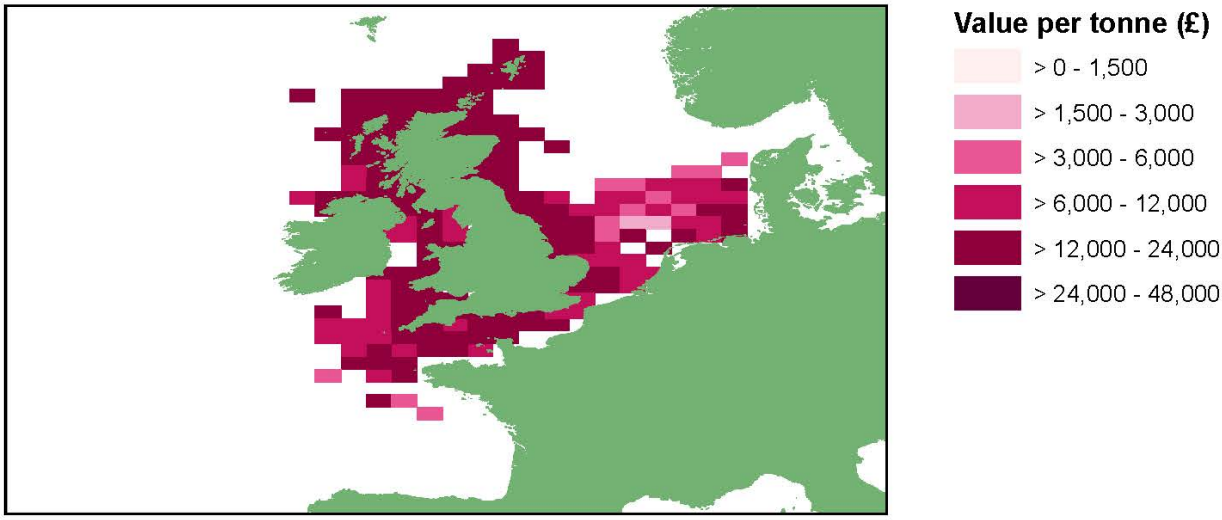


Chart A1.9c: Value of landings per tonne by ICES rectangle



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Chart A1.10: Nephrops landings by UK vessels by ICES rectangle: 2017

Chart A1.10a: Quantity of landings by ICES rectangle

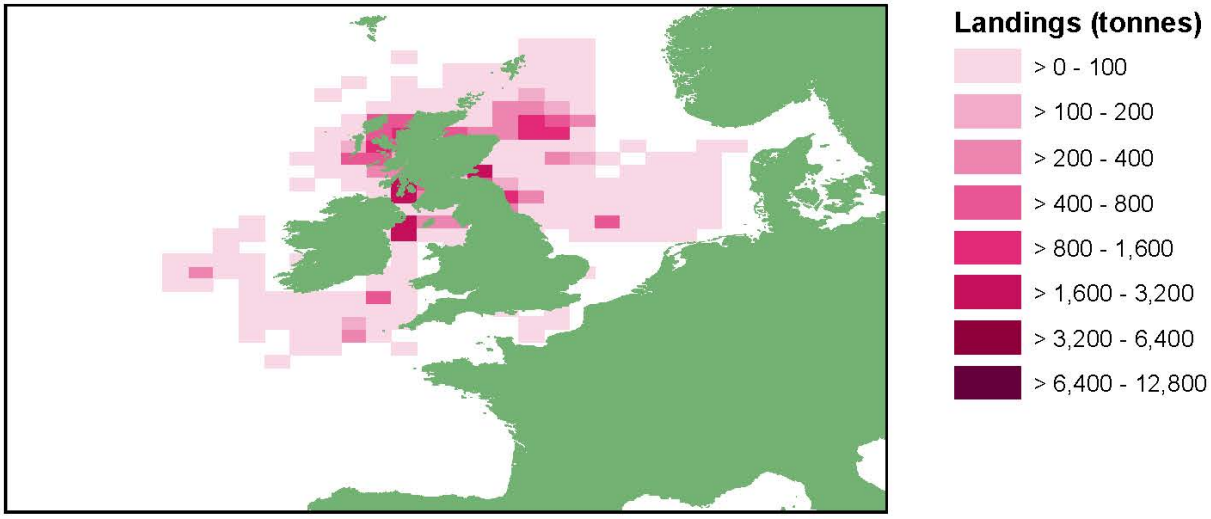


Chart A1.10b: Value of landings by ICES rectangle

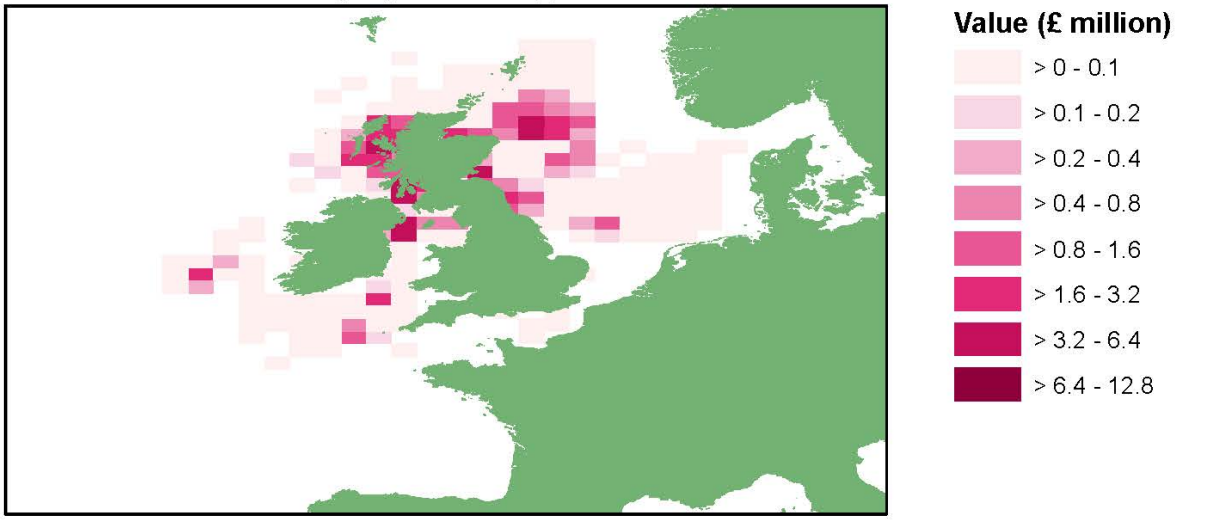
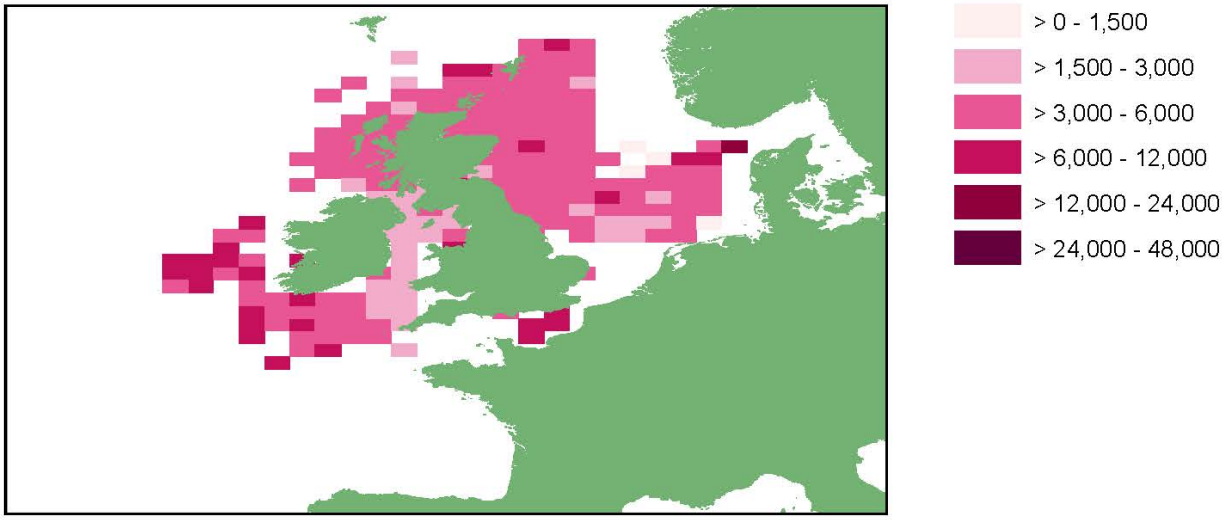


Chart A1.10c: Value of landings per tonne by ICES rectangle



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Chart A1.11: Scallop landings by UK vessels by ICES rectangle: 2017

Chart A1.11a: Quantity of landings by ICES rectangle

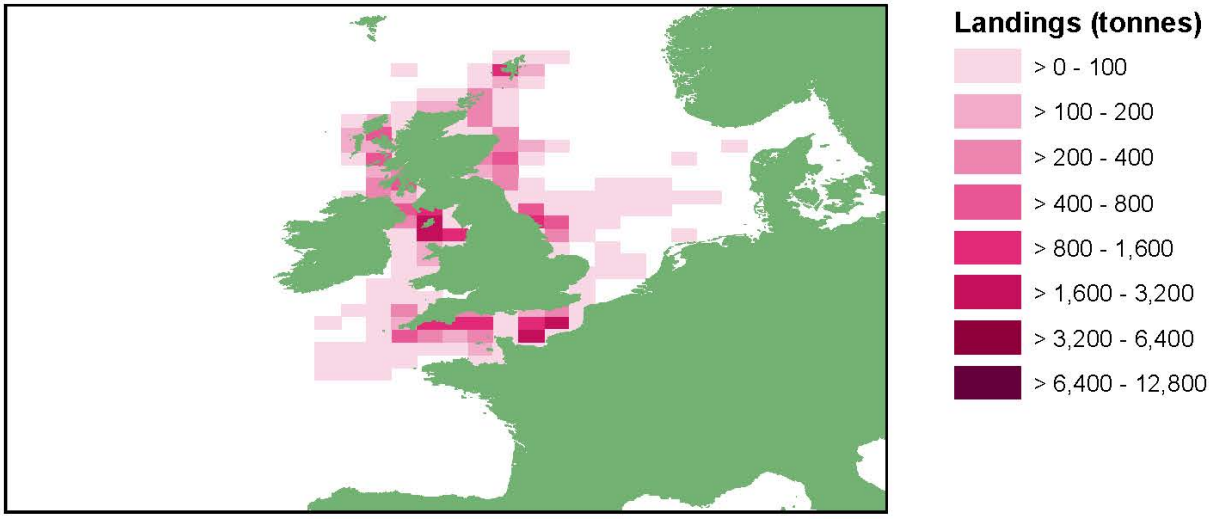


Chart A1.11b: Value of landings by ICES rectangle

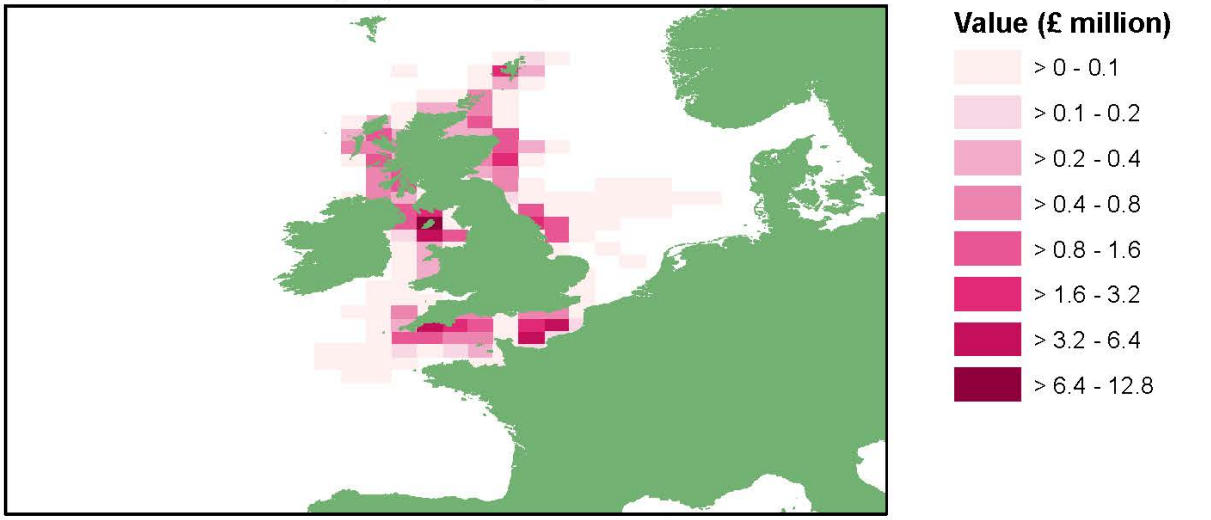
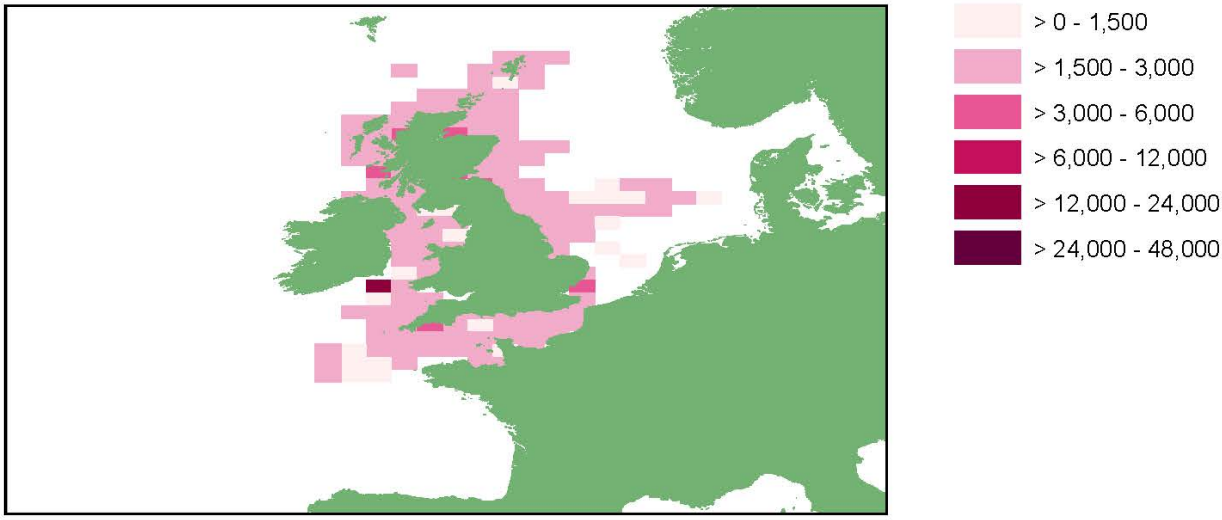


Chart A1.11c: Value of landings per tonne by ICES rectangle



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Chart A1.12: Beam trawl effort by UK 10m and over vessels by ICES rectangle: 2017

Chart A1.12a: Number of vessels by ICES rectangle

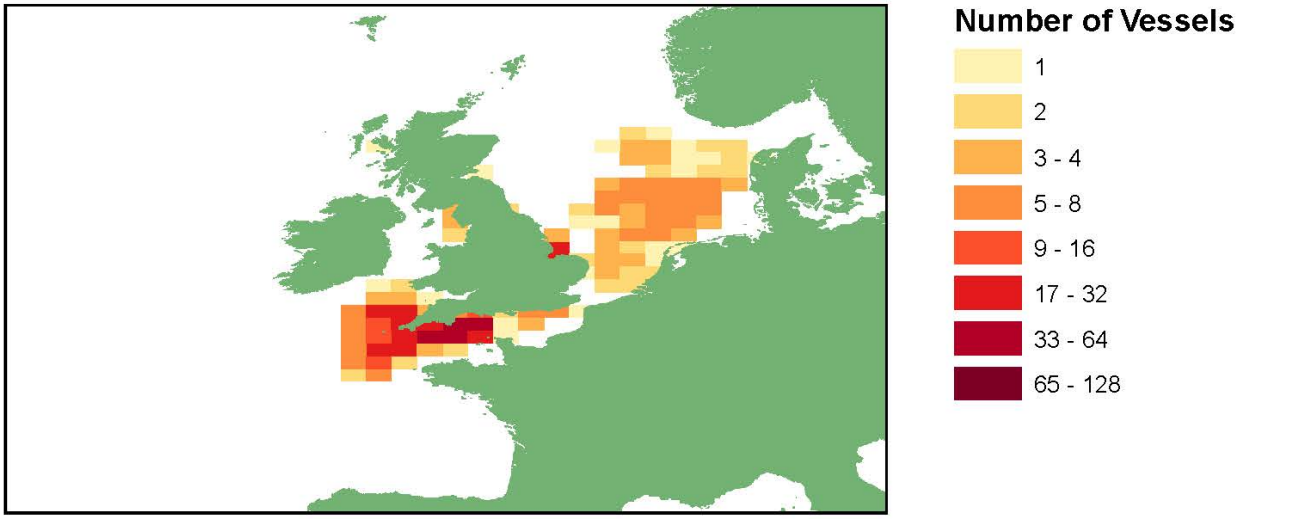


Chart A1.12b: Number of days at sea by ICES rectangle

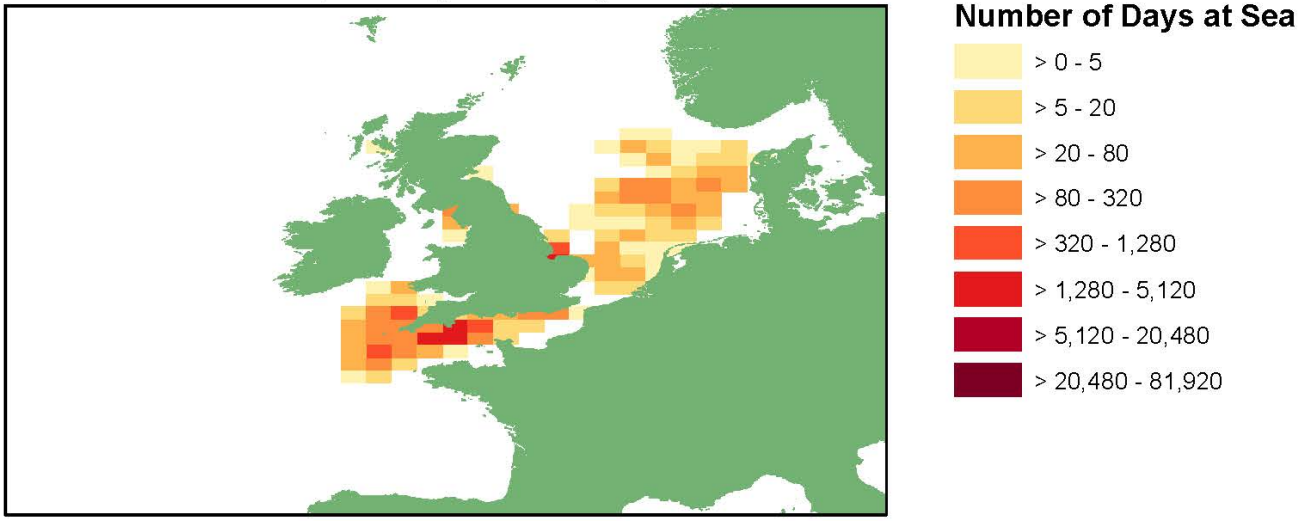
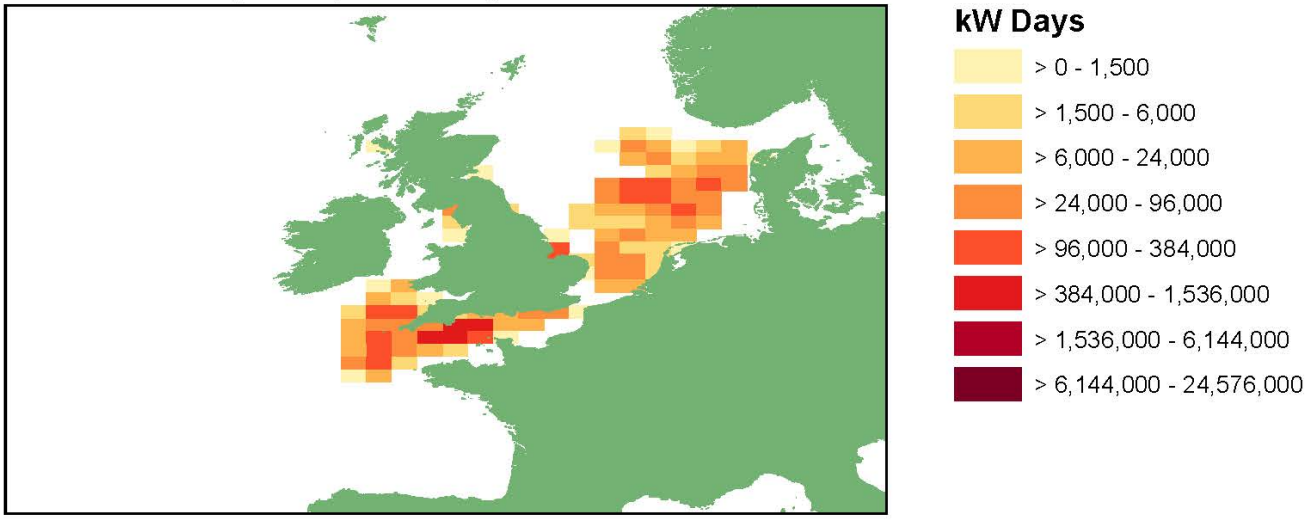


Chart A1.12c: kW day units by ICES rectangle



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Chart A1.13: Demersal trawl and seine effort by UK 10m and over vessels by ICES rectangle: 2017

Chart A1.13a: Number of vessels by ICES rectangle

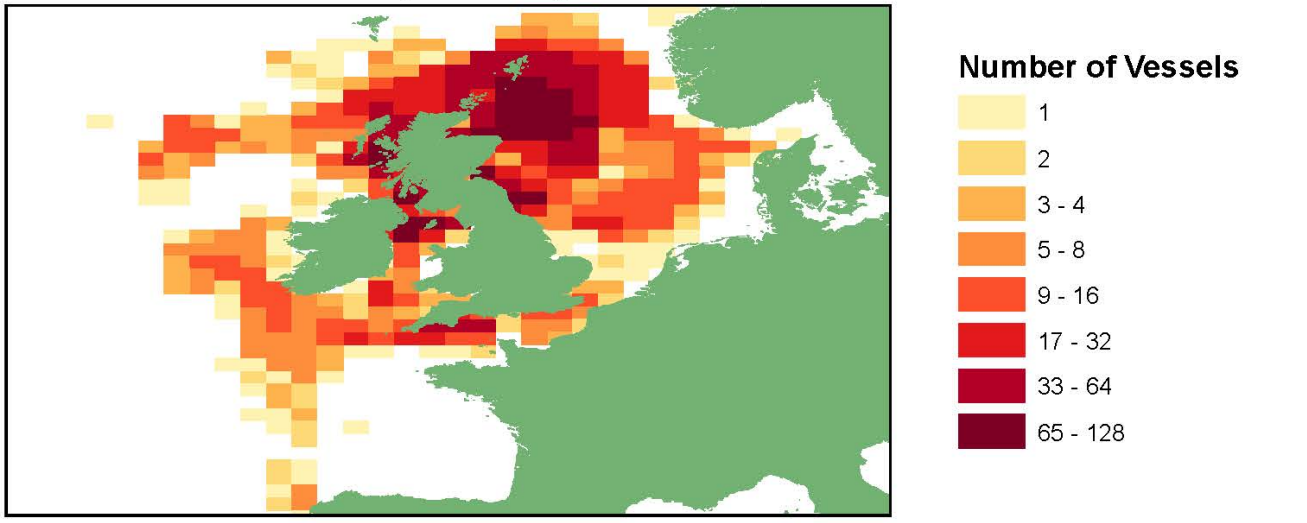


Chart A1.13b: Number of days at sea by ICES rectangle

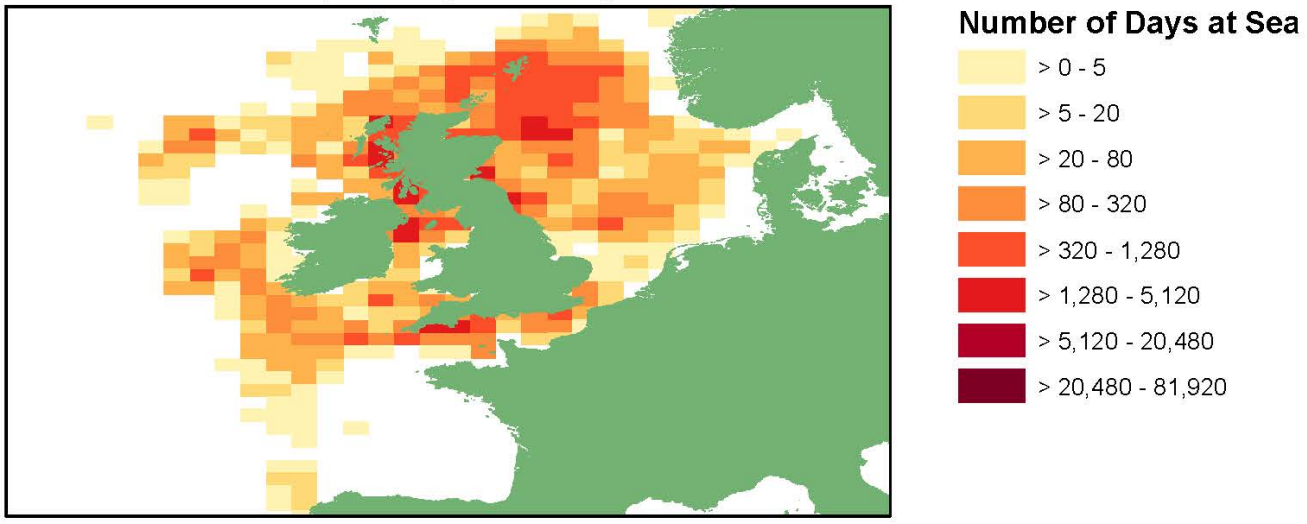
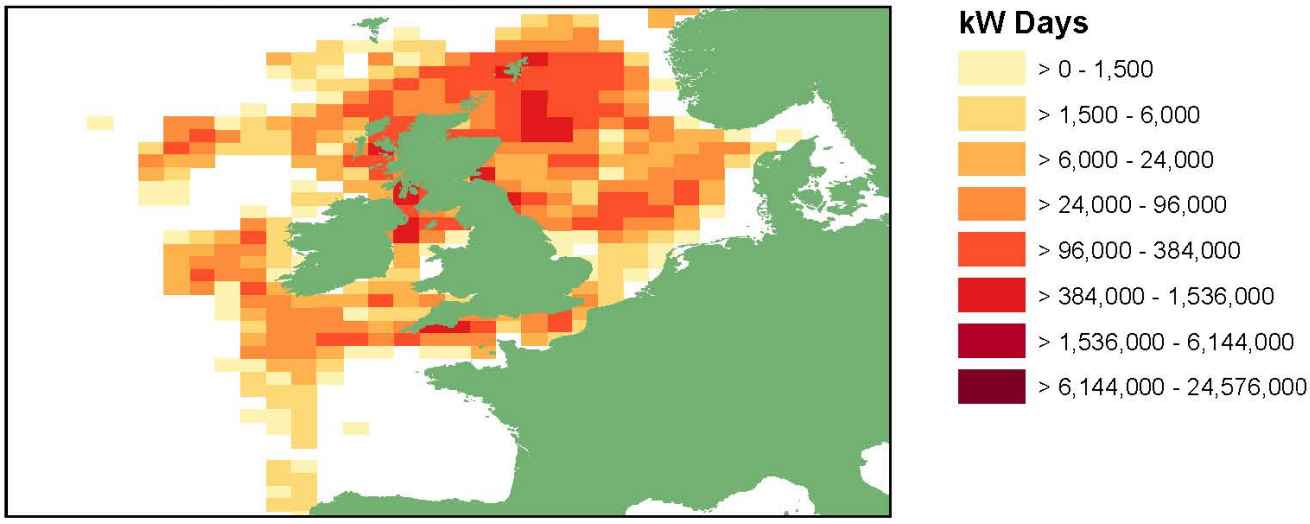


Chart A1.13c: kW day units by ICES rectangle



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Chart A1.14: Dredges effort by UK 10m and over vessels by ICES rectangle: 2017

Chart A1.14a: Number of vessels by ICES rectangle

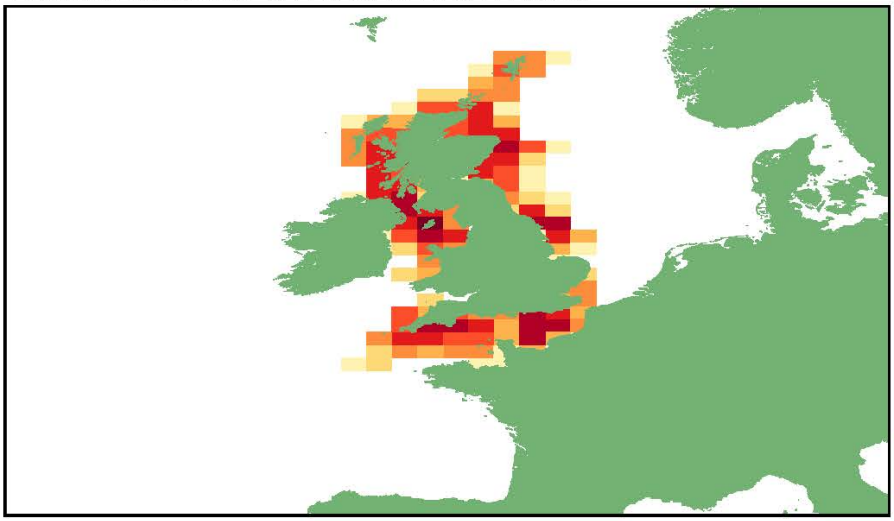


Chart A1.14b: Number of days at sea by ICES rectangle

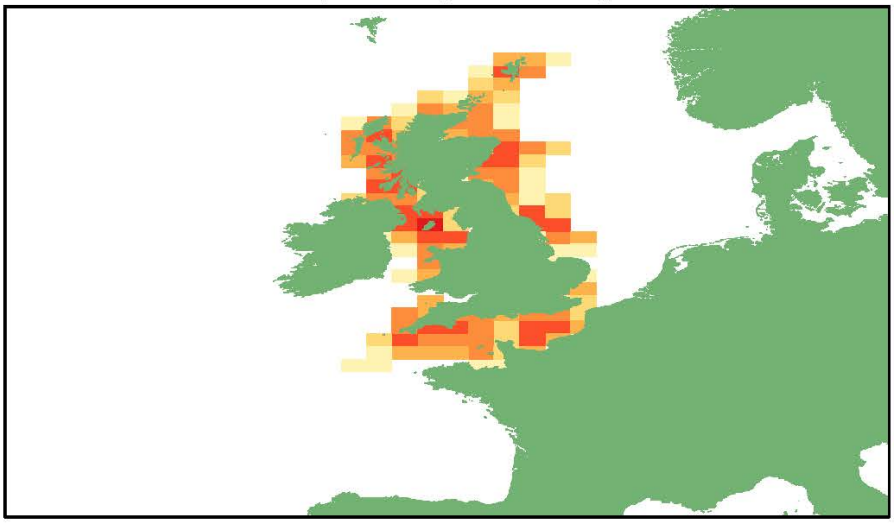
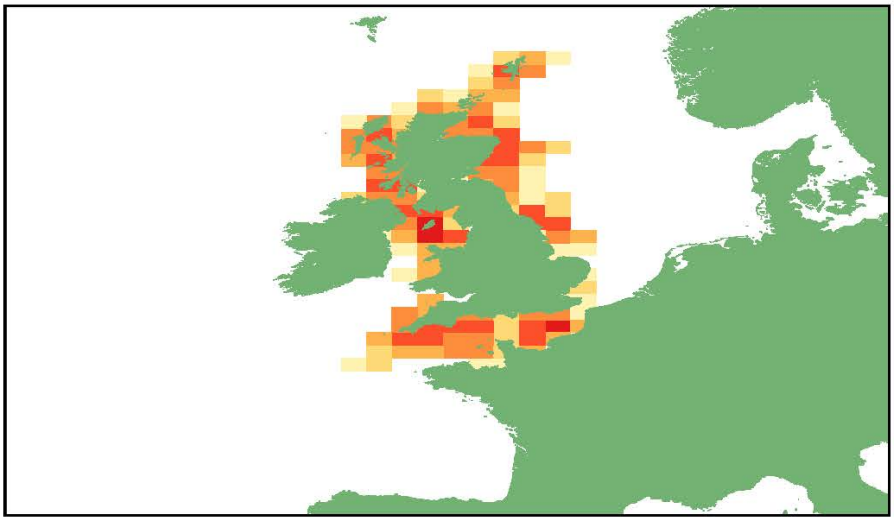


Chart A1.14c: kW day units by ICES rectangle



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Chart A1.15: Drift and fixed nets effort by UK 10m and over vessels by ICES rectangle: 2017

Chart A1.15a: Number of vessels by ICES rectangle

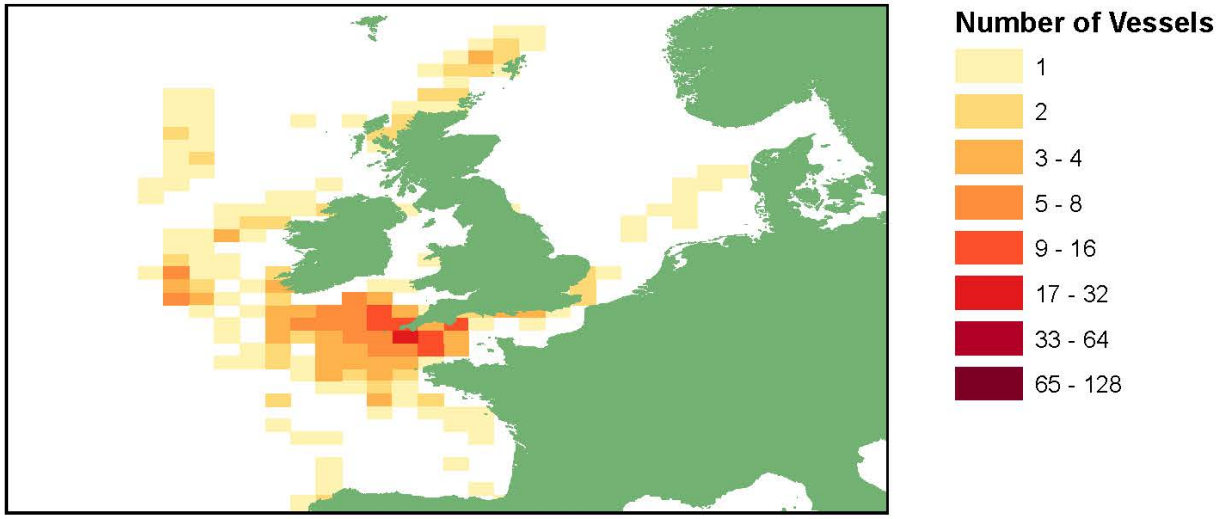


Chart A1.15b: Number of days at sea by ICES rectangle

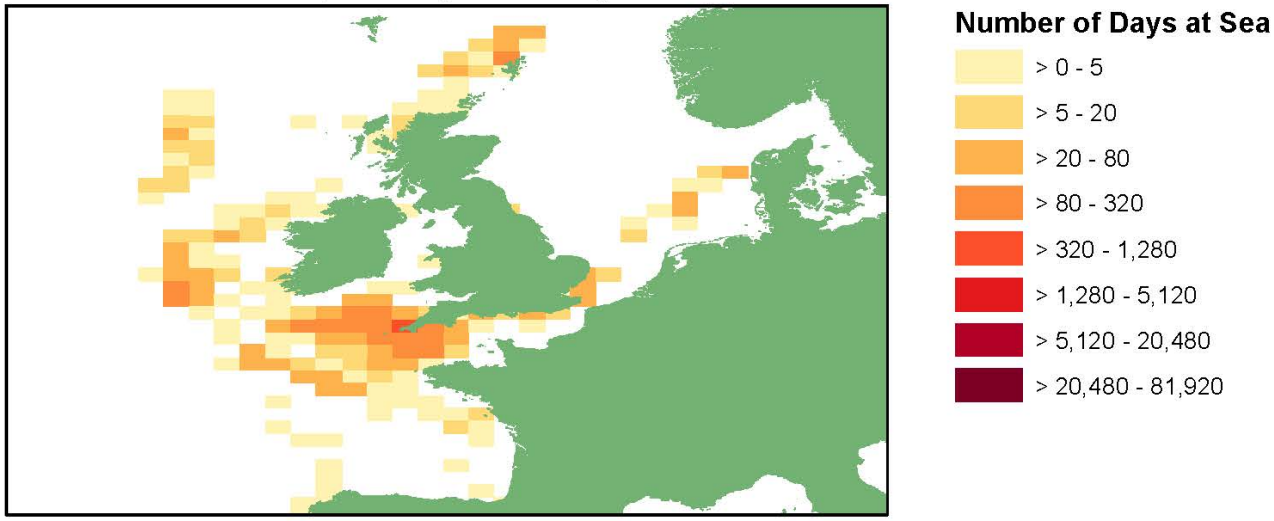
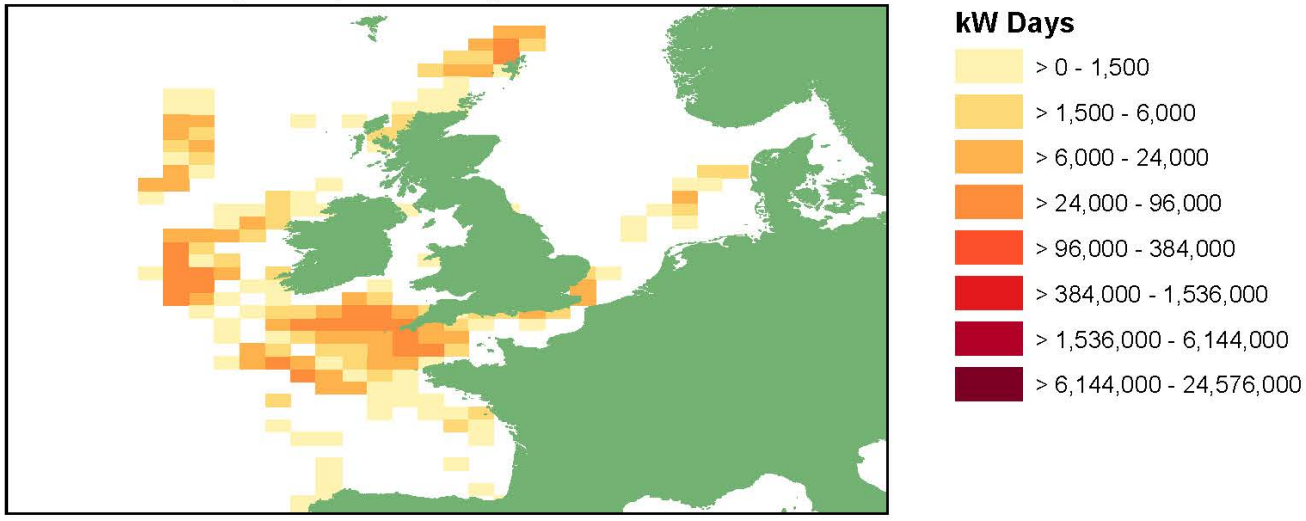


Chart A1.15c: kW day units by ICES rectangle



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Chart A1.16: Gears using hooks effort by UK 10m and over vessels by ICES rectangle: 2017

Chart A1.16a: Number of vessels by ICES rectangle

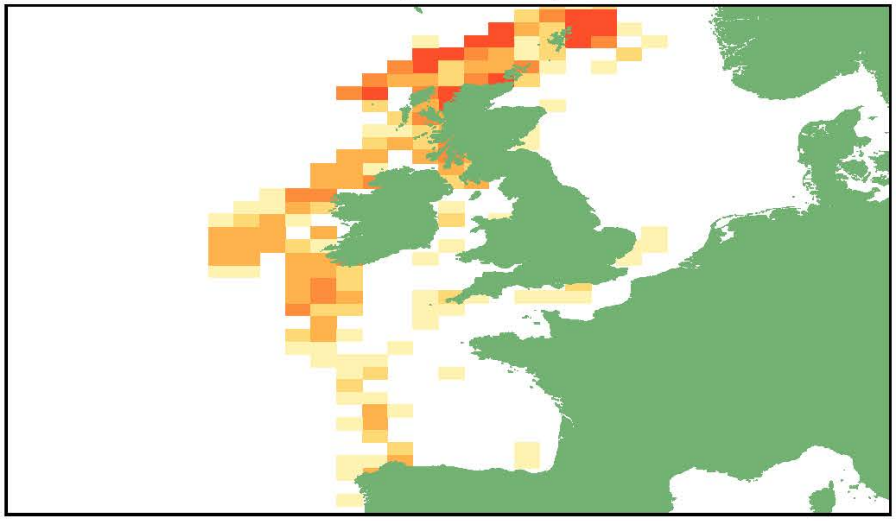


Chart A1.16b: Number of days at sea by ICES rectangle

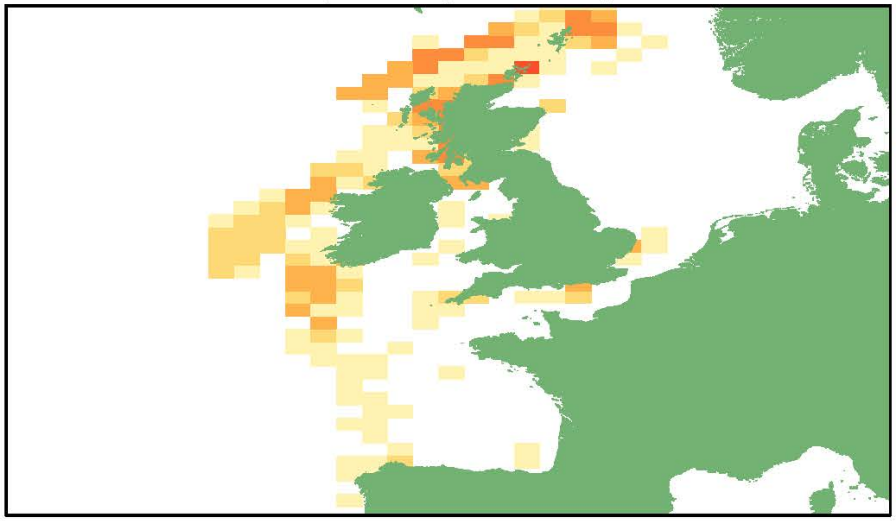
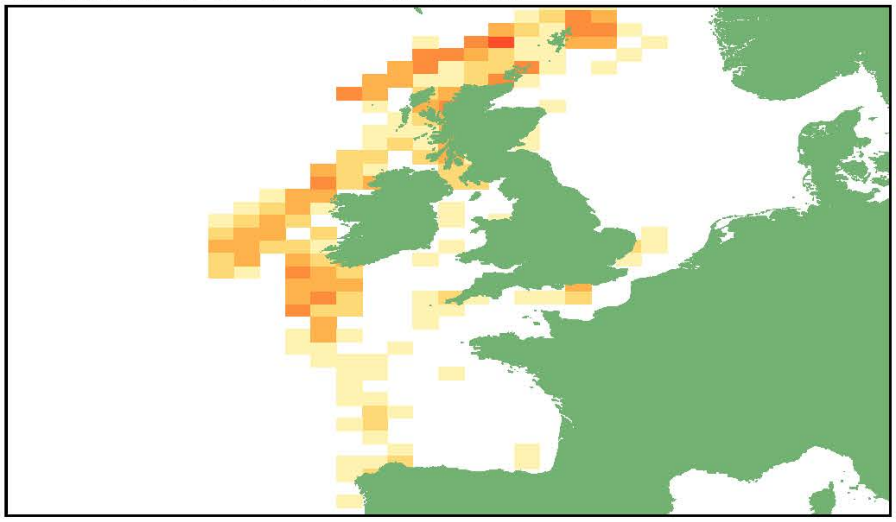


Chart A1.16c: kW day units by ICES rectangle



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Chart A1.17: Pelagic purse seine & trawl effort by UK 10m and over vessels by ICES rectangle: 2017

Chart A1.17a: Number of vessels by ICES rectangle

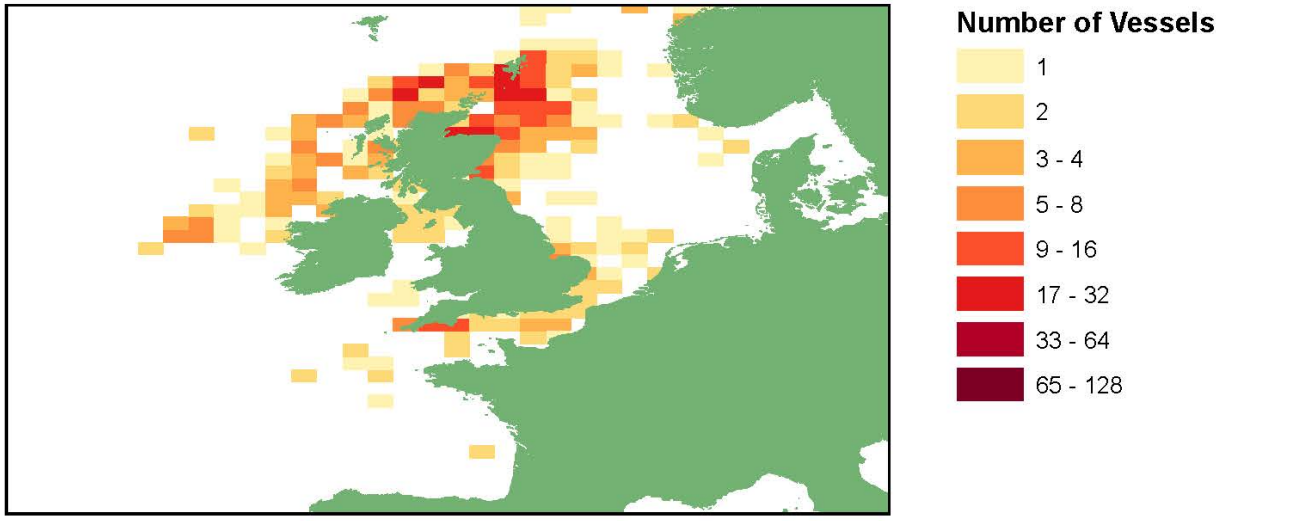


Chart A1.17b: Number of days at sea by ICES rectangle

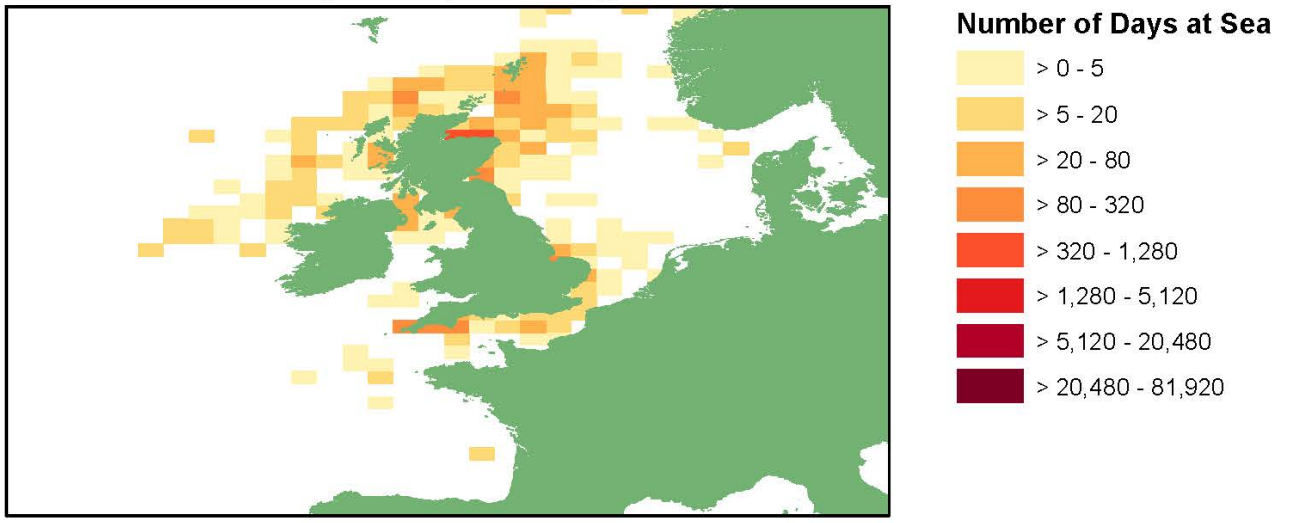
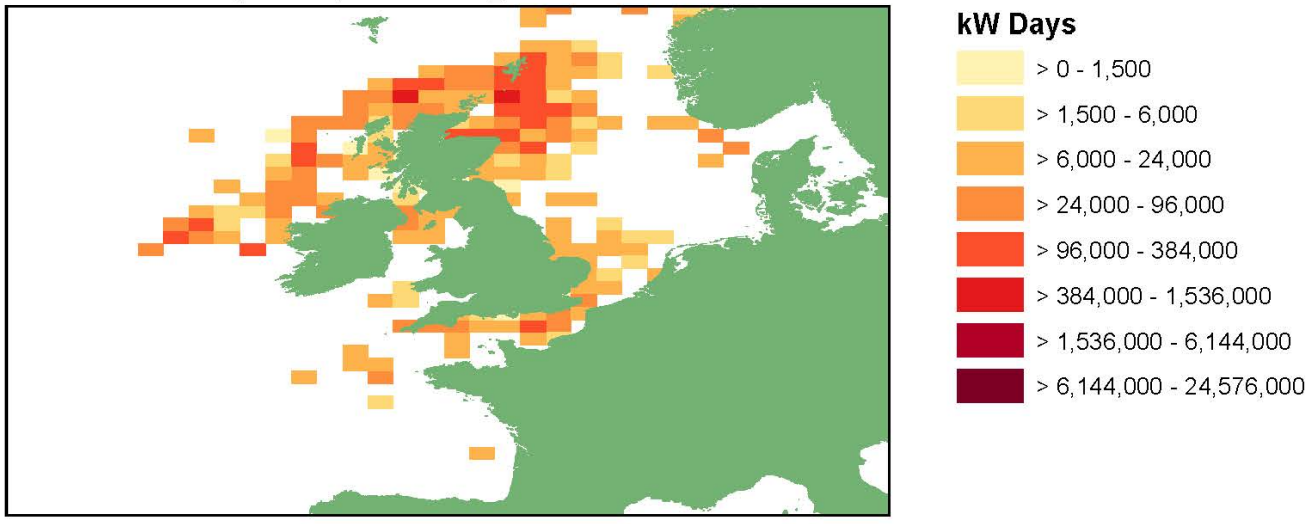


Chart A1.17c: kW day units by ICES rectangle



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Chart A1.18: Pots and traps effort by UK 10m and over vessels by ICES rectangle: 2017

Chart A1.18a: Number of vessels by ICES rectangle

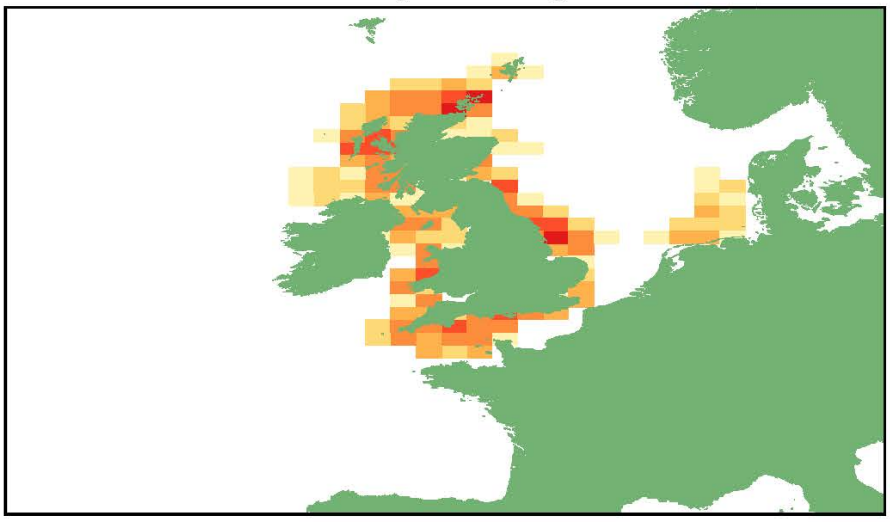


Chart A1.18b: Number of days at sea by ICES rectangle

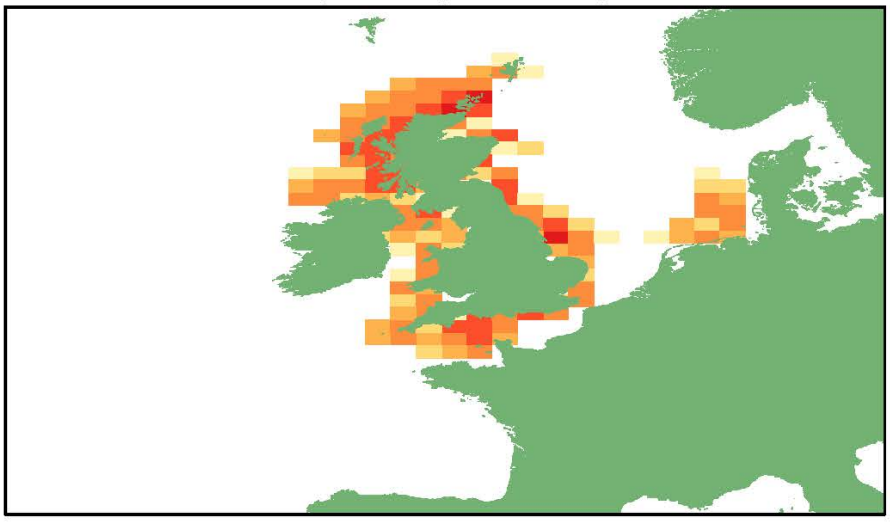
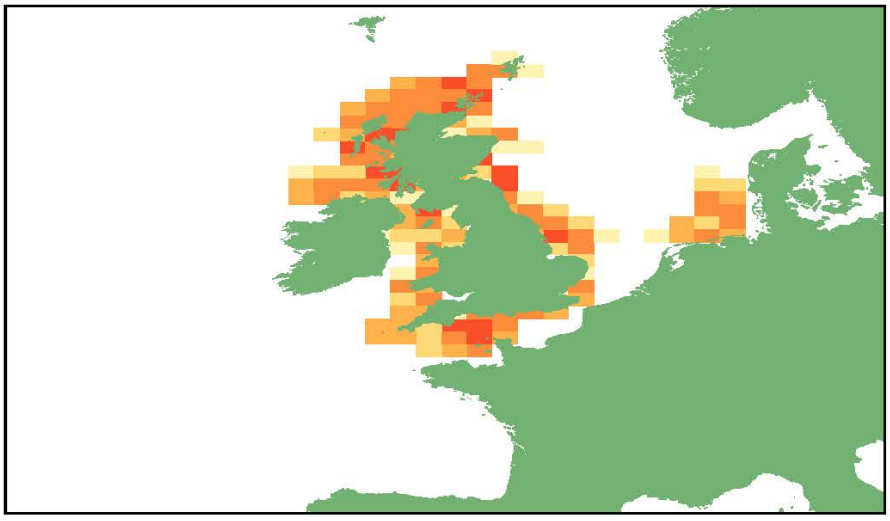


Chart A1.18c: kW day units by ICES rectangle



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Appendix ND.3.2

Appendix 2: Glossary of terms

Administration port

Administration ports are responsible for issuing fishing vessel licences. The coastal office designated as a vessel's administration port is typically the responsible office closest in proximity to a vessel's operational base. A vessel's administration port may differ from its registration port.

Biologically Sensitive Area (BSA)

The Biologically Sensitive Area is a sea area in which restrictions exist on fishing effort by vessels 10 metres or over targeting certain species. The region is defined in Article 6 of Council Regulation (EC) No 1954/2003. It lies within ICES sub-area VII and constitutes part of the Western Waters.

Chain volume measure

A chain volume measure is an index number from a chain index of quantity (a chain index is an index constructed by linking two or more index series of different base periods or different weights). The index number for the reference period of the index may be set equal to 100 or to the estimated monetary value of the item in the reference period.

Cod Recovery Zone (CRZ)

The Cod Recovery Zone (CRZ) is a group of sea areas in which restrictions exist on fishing effort by vessels 10 metres or over using certain regulated gears. The CRZ comprises four areas: Kattegat, Irish Sea (ICES division VIIa), North Sea (ICES division IIIa excluding Kattegat; ICES sub-area IV; EU waters of ICES division IIa; ICES division VIId) and West of Scotland (ICES division VIa and EU waters of ICES division Vb).

The regulated gears are:

- Beam trawls of mesh:
  - equal to or larger than 120 mm (BT1)
  - equal to or larger than 80 mm and less than 120 mm (BT2)
- Gill nets, entangling nets (GN1)
- Trammel nets (GT1)
- Longlines (LL1)
- Bottom trawls and seines of mesh:
  - equal to or larger than 100 mm (TR1)
  - equal to or larger than 70 mm and less than 100 mm (TR2)
  - equal to or larger than 16 mm and less than 32 mm (TR3)

Consumer Price Index (CPI)

The Consumer Price Index (CPI) measures the average change in the prices of goods and services bought for the purpose of consumption in the UK. It is calculated according to a different formula than the Retail Price Index (RPI), and has narrower commodity coverage. The RPI excludes very high and low income households and hence the CPI has wider population coverage than the RPI.

Demersal

The term demersal fish covers species living on or near the sea bed.

Engine power

Engine power refers to a measure of the power of a fishing vessel's engine (in kW). Where an engine has been permanently de-rated

	and this has been declared to the Register of Shipping and Seamen (RSS), this is the de-rated engine power; otherwise, it is the maximum continuous engine power (MCEP) declared to the RSS. Where neither of these are available the registered engine power is used.
Exports	Exports consist of the outward movement of goods produced by businesses in the UK, plus goods, which after importation, move outward from bonded warehouses or free zones without having been transformed i.e. both exports and re-exports. Export statistics exclude fish caught by domestic fishing craft, whether or not processed on board, landed in foreign ports. In UK export statistics, domestic fishing vessels are defined as vessels in UK economic ownership; these may differ from vessels registered in the UK.
Fishing areas	Fishing areas are defined by international convention. The immediate waters around the UK are subdivided into ICES sub-areas IV (North Sea), VI (West of Scotland) and VII and its divisions the Irish Sea, VIIa; Celtic Sea, VIIg,h; Bristol Channel, VIIf; and the English Channel, VIId,e. See Appendix 3.
Fishing capacity	Fishing capacity is the physical dimension of fishing vessels measured in gross tonnage (GT), or – in engine power terms – kilowatts (kW). See definitions in this glossary.
Fishing effort	Fishing effort is an aggregate measure of the activity of fishing vessels in a given sea area. It may be measured as the total time spent at sea (in hours or days), as the sum of the products of fishing capacity and time at sea for each vessel (in GT days) or as the sum of the products of engine power and time at sea for each vessel (in kW days).
Fishing mortality	Fishing mortality is the proportion of a stock killed/dying each year as a result of fishing activity.
Fish flour	Fish flour is powdered fish meal.
Fish meal	Fish meal is dried, ground fish (chiefly fish offal). It provides a dry, storable product that is frequently used in animal feeds.
Fish oil	Fish oils are oils extracted from fish, typically pelagic species such as herring and mackerel.
Fish preparations	Fish preparations refer to fish that have been prepared using one of the following techniques: fresh or chilled, frozen, salted, in brine, dried or smoked, prepared or preserved.
Fish producer organisation (FPO)	Fish producer organisations are institutions set up in accordance with EC regulations to improve the market for their members' catches. FPOs may also be granted responsibility by Fisheries Administrations for the management of fish quotas in addition to this function.
Fish products	Food products manufactured from fish such as fish meal, fish flour and fish oil.
Fixed gears	Fixed gears are mainly used for demersal species. They are normally vertically hung curtains of netting which enmesh or entangle the fish, fixed to the seabed with anchors or weights and held upright with floats.

Gross Domestic Product (GDP)	Gross Domestic Product (GDP) is a key indicator of the state of the whole economy. It is related to Gross Value Added (GVA) by adding the taxes on products and subtracting the subsidies from GVA. GDP is available at a whole economy level only, whereas GVA is available by industry sector.
Gross Registered Tonnage (GRT)	Gross Registered Tonnage (GRT) is a general term applied to a range of volumetric measures of vessel capacity.
Gross Tonnage (GT)	Gross Tonnage (GT) is a volumetric measurement of vessel capacity under the rules of the ITC69 (International Tonnage Convention). By the end of 2003 all UK fishing vessels over 15m overall length were required to have their tonnage measured on this basis.
Gross Value Added (GVA)	Gross Value Added (GVA) measures the contribution to the economy of each individual producer, industry or sector in the United Kingdom. GVA is used in the estimation of Gross Domestic Product (GDP), a key indicator of the state of the whole economy. Adding the taxes on products and subtracting the subsidies from GVA gives GDP. GDP is available at a whole economy level only, whereas GVA is available by industry sector.
The International Council for the Exploration of the Sea (ICES)	The International Council for the Exploration of the Sea (ICES) coordinates and promotes marine research on oceanography, the marine environment, the marine ecosystem, and on living marine resources in the North Atlantic. See also: Fishing areas.
Imports	Imports consist of all goods moving into a country, including goods for domestic consumption and goods into bonded warehouses or free zones. In accordance with the internationally recommended practice, import statistics include fish caught by foreign fishing craft, whether or not processed on board, landed in domestic ports. In UK import statistics, foreign fishing vessels are defined as vessels in foreign economic ownership; these may differ from vessels registered abroad. Only goods for which the final destination is the UK are included in import statistics.
Landed Price Index (LPI)	The Landed Price Index measures the average change in the prices at first sale of fish landed by UK vessels into the UK.
Landed weight	Mass (or weight) of a product at the time of landing, regardless of the state in which it has been landed. Landed fish may be whole, gutted and headed or filleted.
Live weight	The mass or weight of a product, when removed from the water.
National Statistics	'National Statistics' are a subset of official statistics which have been assessed and certified by the UK Statistics Authority as compliant with its Code of Practice for Official Statistics. The label currently comprise three basic types: • legacy 'National Statistics' – those statistical products which obtained their designation as 'National Statistics' before April 2008, but which have not yet been formally re-assessed. • re-assessed 'National Statistics' – those retaining their status after a formal re-assessment. • new 'National Statistics' – any statistical product which has been proposed by ministers as a candidate 'National Statistics' and

assessed and granted accreditation.

UK Sea Fisheries Statistics and its associated data sets are designated as National Statistics. They retained this designation following an assessment by the UK Statistics Authority in 2011. For more information see the UK Statistics Authority website at www.statisticsauthority.gov.uk/national-statistician/types-of-official-statistics.

Nominal catches

Nominal catches refer to landings converted to a live weight basis. A nominal catch consists of fish, crustaceans, molluscs and other aquatic animals, taken for all purposes (commercial, industrial and subsistence) except recreational, operating in inshore, offshore and high seas fishing areas (marine fishing areas). Inland waters, both fresh and brackish, are excluded. The data on the landings of such species and products require conversion by accurate yield rates (conversion factors) to establish the live weight equivalents at their time of capture.

Official statistics

The Statistics and Registration Service Act 2007 defines 'official statistics' as all those statistical outputs produced by the Office for National Statistics, central Government departments and agencies, devolved administrations and other Crown and certain non-Crown Bodies.

For more information see the UK Statistics Authority website at www.statisticsauthority.gov.uk/national-statistician/types-of-official-statistics.

Pelagic

The term pelagic fish covers species found mainly in shoals in midwater or near the surface of the sea.

Quota

A share in a total allowable catch (TAC) held by an EU member state. EU TACs are divided on the basis of a number of factors, including the member state's past catch record. Shares are awarded according to a principle of 'relative stability', namely that each member state should enjoy a fixed percentage share of the fishing opportunities for commercial species across time. See also: Total allowable catch.

Recruits

Recruits are the young fish in the year class which is entering the fishery.

Registration port

A registration port is a port chosen by the owner of a vessel as the port that forms part of the external markings of a fishing vessel – the Port Letters and Numbers painted on the bow of the vessel. The owner chooses this as part of the process of registering a commercial fishing vessel with the Register of Shipping and Seamen, part of the Maritime and Coastguard Agency. A fishing vessel's registration port defines its nationality but does not necessarily coincide with its administration port and may not be located close to the vessel's operational base.

Retail Price Index (RPI)

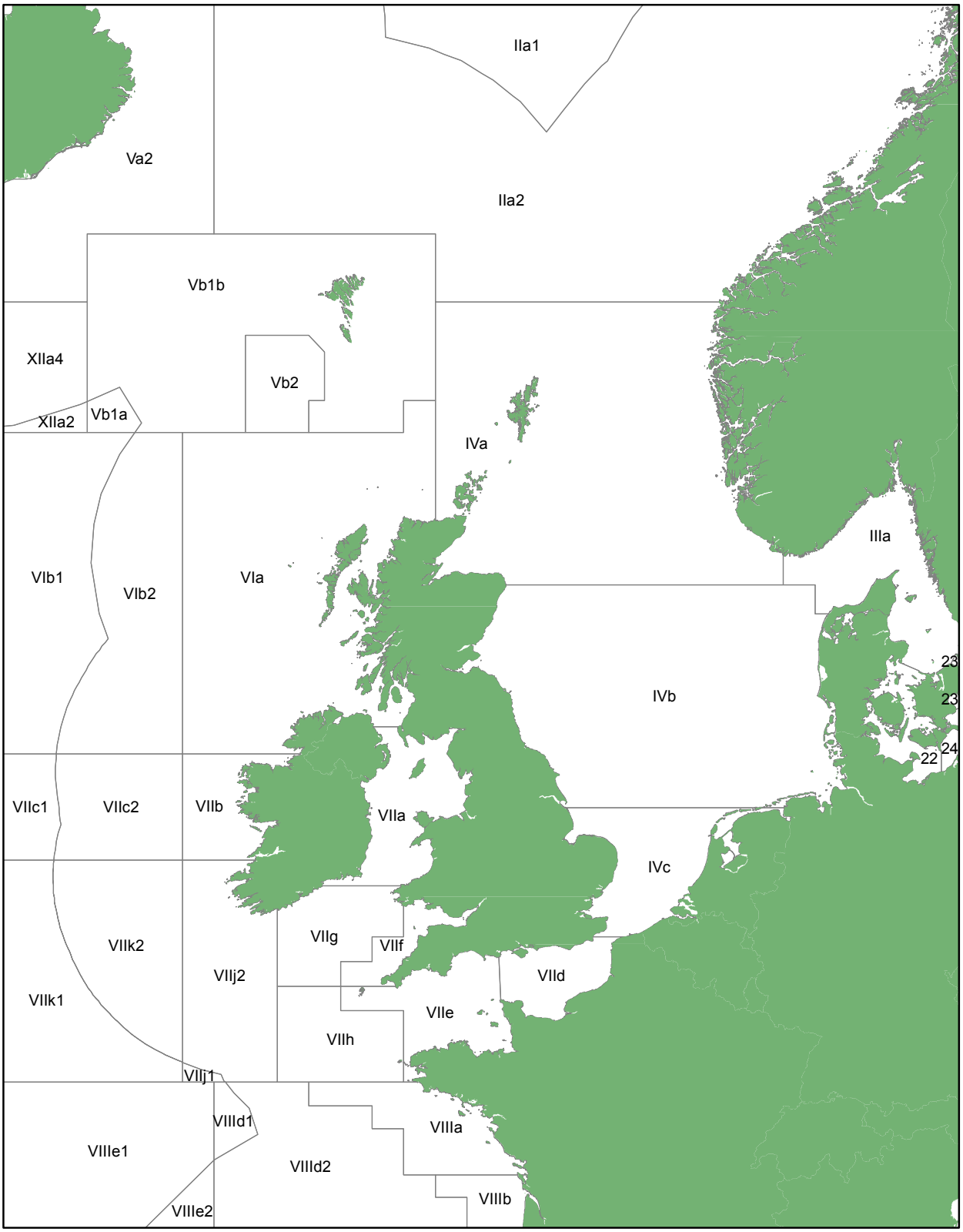
The Retail Price Index (RPI) is the most long standing general purpose domestic measure of inflation in the United Kingdom. It is calculated according to a different formula than the Consumer Price Index (CPI), and has wider commodity coverage. The RPI excludes very high and low income households and hence the CPI has wider population coverage than the RPI.

Seining	Seining is a method used exclusively for demersal fishing. The net, lighter than for trawling, is set on very long ropes designed to herd or contain the fish for capture in the net. After the fish have been surrounded by the ropes, the net is slowly hauled back to the vessel.
Shellfish	The term shellfish covers all crustaceans and molluscs.
Sole Recovery Zone (SRZ)	The Sole Recovery Zone (SRZ) corresponds to the Western Channel (ICES division VIIe), in which restrictions exist on fishing effort by vessels 10 metres or over using regulated gears. In the SRZ, regulated gears are beam trawls of mesh size equal to or greater than 80mm and static nets, including gill-nets, trammel-nets and tangle-nets, with mesh size less than 220mm.
Spawning stock biomass (SSB)	The spawning stock biomass (SSB) is the total weight of a species population capable of reproducing.
Stock	A stock is that part of a species population exploited in a defined fishing area.
Total allowable catch (TAC)	A total allowable catch (TAC) is a catch limit set by EU fisheries ministers for a particular stock. TACs are fixed on an annual basis on the basis of scientific research by national and international organisations, including ICES and the European Commission's Scientific, Technical and Economic Committee for Fisheries (STECF). TACs are usually expressed in tonnes live weight. See also: Quota.
Transhipment	The transfer from one conveyance to another for shipment. In this case, transhipments usually take place in coastal waters.
Trawling	Trawling may be used either for bottom-dwelling (demersal) or mid-water (pelagic) species, the net being of a basic funnel-shaped construction and towed behind a vessel or between two vessels (pair trawling).
Western Waters	The Western Waters are a group of sea areas in which restrictions exist on fishing effort by vessels 15 metres or over on trips with certain target species. The Western Waters comprise nine areas, of which UK registered vessels are permitted to deploy effort in four: ICES sub-areas V and VI, ICES sub-area VII, ICES sub-area VIII and the Biologically Sensitive Area. Target species are demersal species (excluding those covered by Council Regulation (EEC) No 2347/2002), scallops and edible crab and spider crab. In the Biologically Sensitive Area, restrictions exist on fishing effort by vessels 10 metres or over on trips with these target species.
Year class	A year class is the young of any one annual spawning.

Appendix ND.3.2

Appendix ND.3.2

Appendix 3: ICES divisions



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Appendix ND.3.2

Appendix 4: UK fisheries statistics methodology

Fleet size and composition

Statistics on the UK fishing fleet since 1990 have been based on the fleet of fishing vessels as registered with the Register of Shipping and Seamen, part of the Maritime and Coastguard Agency which is an executive agency of the Department for Transport. Information provided by the Register includes the length (overall and registered), breadth, gross tonnage, power, age and material of construction. Information on the fishing fleets of the Isle of Man, Guernsey and Jersey are supplied by the respective registering authorities. Prior to 1990, the statistics were based on fishing vessels known by Administrative Departments to be active.

Statistics on the size of the UK fishing fleet are complicated by the fact that the European Union (EU) has progressively revised the methodology used to determine vessel tonnage for the fishing fleet from various national and international standards, previously collectively called Gross Registered Tonnage (GRT), to a common standard based on the International Tonnage Convention 1969 (ITC69) and known as Gross Tonnage (GT). A phased programme of re-measurement was introduced in the UK in 1996 which was completed by the early part of 2004.

Licensing of vessels first applied in 1977 and covered only fishing vessels over 40 feet (12.14 metres) in certain fisheries. Following the adoption of the European Union's Common Fisheries Policy, the UK designated a number of fish stocks as pressure stocks and introduced a restrictive licensing scheme for vessels fishing those stocks. The licensing regime initially only covered vessels over 10 metres registered length, but its coverage has been progressively extended over the years.

- In February 1990 the licensing regime was extended to vessels of over 10 metres overall length fishing for quota stocks.
- Later in 1990 restrictive licensing was extended to cover all fishing by vessels over 10 metres overall length with the exception of those fishing for salmon and migratory trout which were covered by a separate regime.
- From May 1993 licensing was extended to vessels of 10 metres and under overall length.

Statistics on the UK fishing fleet in this publication are based on the fleet of fishing vessels as registered with the Register of Shipping and Seamen. To this is added details of fishing vessels as registered with the Crown Dependencies (Isle of Man and the Channel Islands) to form the full UK fleet, details of which are reported to the European Commission on a regular basis and recorded as part of the EU Community Fleet Register.

The UK fleet has been broken down for analysis by individual country based on the administration ports where vessels were licensed as at the end of 2017. Vessels which are registered but do not have an administration port at this time are not counted against any country.

Fish Producer Organisation membership

Fish producer organisations are institutions set up in accordance with EU regulations to improve the market for their members' catches. In the UK, FPOs are also granted responsibility by Fisheries Administrations for the management of fish quotas for vessels in their membership.

Vessel owners notify UK Fisheries Administrations when transferring between FPOs for the purposes of quota management. A comprehensive database of membership of FPOs is maintained which augments the vessel data provided by the Register of Shipping and Seamen.

Fishermen numbers

Data on fishermen numbers are collected separately by the Marine Management Organisation (MMO) for England, Marine Scotland, the Department of Agriculture, Environment and Rural Affairs for Northern Ireland (DAERA) and the Welsh Assembly Government (WAG). The Departments in Jersey, Guernsey and the Isle of Man do not contribute data on fishermen numbers.

In Scotland and Northern Ireland, staff in coastal offices are issued with a census of all vessels in their responsibility and asked to provide data on the number of part-time and regular fishermen on each vessel. Marine Scotland and DAERA process and compile these data to provide estimates of fishermen numbers on vessels at each port of administration.

In England and Wales, a census of fishing vessels over 10 metres in overall length is performed. For the large number of fishing vessels 10 metres and under in length, a stratified sample of vessels is taken, with strata defined by administration port, vessel length and gross tonnage. A 20 per cent sample is drawn from each stratum. As in Scotland and Northern Ireland, staff in coastal offices provide data on the number of part-time and regular fishermen on each vessel in their administration based on enquiries and local knowledge. All staff are provided with clear guidance on how to complete the survey.

From 2010, revised guidance was issued to staff on how to complete the survey. For the purposes of the survey, a fisherman is defined as a person working at sea on a commercial fishing vessel, such as skippers or crew members. The definition excludes persons not working at sea, such as administrators and land-based processing staff. Fishermen are classified as regular or part-time according to whether commercial fishing is their main occupation.

Data collected for England and Wales are processed by the MMO. Checks are made on the quality and reliability of data returned and every effort is made to minimise non-response. In the 2017 survey, fishermen numbers were collected for 1,108 of the 1,128 vessels surveyed, i.e. 98.2 per cent. Where no data were available on fishermen numbers for a vessel the value was assumed to be the average number of fishermen on vessels in the same stratum, such that no bias was caused by non-response. Estimates from the survey for England and Wales are combined with those supplied by Marine Scotland and DAERA to provide overall UK estimates.

Activity and landings

Statistics on fishing effort and landings are calculated using data collected and processed by officials of the various Fisheries Administrations in the UK, namely the MMO, Marine Scotland, DAERA, WAG and Departments in Jersey, Guernsey and the Isle of Man.

The main legislation used to collect these data is:

(i) the EU fisheries legislation on keeping and submitting logbooks and providing landing declarations and sales notes, primarily Council Regulation (EC) No. 1224/2009 (the 'Control Regulation').

(ii) general powers under the Sea Fisheries (Conservation) Act 1967 under which Ministers granting a licence can require the master, owner or charterer of the vessel named in the licence to provide such statistical information as required. These powers were widened in the Sea Fish (Conservation) Act 1992 to cover other types of information and the form in which it is to be supplied.

The method of data collection depends on the length of the vessel.

Data collection for vessels over 10 metres in overall length

Data collected on fishing effort by over 10 metre vessels come primarily from the fishing logbook. Two additional sources are used to collect data on landings by over 10 metre vessels: landing declarations and sales notes.

The fishing logbook captures data on fishing activity by individual vessels by trip, and for each day of activity within a trip. This includes details of the catch, by species, in terms of the presentation and quantity of fish retained on board. Information is also collected on the fishing gear used and the ICES division, rectangle and zone for the activity. Supply of logbook data is mandated by legislation for all vessels over 10 metres overall length in respect of catches of all species. Logbook data for UK vessels must be submitted within 48 hours of landing to UK authorities; this includes landings into foreign ports.

Landing declarations provide information on the weight and presentation of fish landed by species. As with logbooks, landing declarations must be submitted to authorities within 48 hours of completion of the landing.

Sales notes are required in respect of first sales of fish and fishery products. For paper declarations, sales notes for first sales of fish must be submitted to UK Fisheries Administrations within 48 hours of sale by the registered buyer of the fish, except at designated auction centres where the registered seller has responsibility. This reduces to 24 hours if they are required to report sales notes electronically (see information below in the section “Requirements to report fishing activity data electronically").

Requirements set out in EU legislation to require the submission of logbook and landing declaration data electronically have in recent years been phased so that now virtually all UK vessels 12 metres and over in overall length are required to report their activity data by electronic means only. This phasing out of paper reporting was introduced on a vessel by vessel basis as on-board systems were installed, checked and tested through a period of double-running before vessels switched over to electronic-only reporting. Additionally, from 1 January 2009, buyers and sellers with an annual turnover of first sale fish of more than 400,000 euro have been required to submit sales notes electronically; this threshold was reduced to 200,000 euro from 1 January 2011. A UK Electronic Reporting Systems (ERS) Hub has been set-up to collect, process, and store these electronic data.

Data collection for vessels 10 metres and under in overall length

For 10 metre and under vessels, there is no statutory requirement under either EU or national legislation for fishermen to declare their catches. Historically, information for this sector has been collected with the co-operation of the industry: it comprised log sheets and landing declarations voluntarily supplied by fishermen as well as sales notes and assessments of landings collected from market sources and by correspondents located in the ports. This collection of data has now been replaced after the introduction in September 2005 of a scheme of registration for buyers and sellers of first sale fish (see above). Sales notes are now used in addition to the voluntary information from fishermen.

During 2005 and 2006, UK Fisheries Administrations introduced a system of restrictive licensing for activity targeted at shellfish. As part of this system, new reporting requirements were introduced involving a requirement for fishermen fishing with under 10 metre vessels to complete diaries of their daily activity which needed to be submitted on a monthly basis. Summary information from these diaries is in use in Northern Ireland and it is used alongside other data in other parts of the UK, but the main source of activity data in the rest of the UK is the sales notes data. This helps to ensure consistency with the activity data for other types of fishing activity that are also derived from the sales notes data. The diaries of activity are however an important source of information for the scientific assessment of the state of the local shellfish fisheries around the coast and as such the

data in them are entered, collated and analysed by scientists at the fisheries laboratories around the UK.

Coverage

Data collection for vessels over 10 metres overall length aims to achieve full coverage of activity by this sector of the fleet. For the sector 10 metres or under in overall length, landings are only reported where the fish are sold or data have been provided voluntarily, leading to reduced coverage[1].

The reliability of the data collected is dependent on the information provided by fishermen. Inspectors at port offices carry out a mix of manual and automatic checks on the information provided by vessel operators. These include a check between logbook information and that given in the sales notes or observed as landed as well as checks against other sources of information (e.g. satellite position reports, information from aerial and at-sea surveillance and inspection activity carried out by UK enforcement officers).

Despite legal obligations for fishermen to declare their catches, a proportion of fishing activity remains unreported. This chiefly affects landings data and the effects on statistics on fishing effort are considered to be small. A 2009 study[2] jointly funded by the Department for Environment, Food and Rural Affairs and the Department for International Development estimated that between 2000 and 2003, illegal fishing in the northeast Atlantic amounted to between 5 and 13 per cent of reported catches of species studied.

The extent of illegal and unreported fishing by UK vessels is uncertain and varies across stocks. However, it is considered that the overall level of unreported fishing has been reduced in recent years following the introduction of a scheme of registration for buyers and sellers of first sale fish, and the implementation of Commission Regulation (EC) No. 1005/2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing.

It should be noted that landings do not typically equate to total catches, as fish may be returned to the sea through a practice known as discarding. The degree of discarding varies by stock, and by the sector of the fleet involved. The figures presented in this publication should not be interpreted as total removals from the sea. However, with the implementation of the Landing Obligation whereby discarding of fish is prohibited, the amount of discards will clearly fall. The obligation began in 2015 for pelagic species and is currently being phased in for other species in anticipation of a full discard ban in 2019 (Commission Delegated Regulations (EU) 2018/45, 2018/46, 2018/189 and 2018/190).

Data processing

Information from log sheets, landing declarations, sales notes and other sources is keyed into computers connected to the main databases by government staff at port offices, or is transferred electronically from the UK ERS Hub. Details of the areas fished are taken from the logbooks and entered as codes for the ICES divisions and statistical rectangles. Where a statistical rectangle is split into different areas (e.g. part is in EU waters and part in Norwegian waters) an additional code is used to indicate the zone fished. Where a vessel fishes in more than one area in a single trip, the total amounts for the trip of each species, as given in the sales notes and landing declarations

[1] 2011 data showed an increase in reported landings into the Isle of Man. From 1 January 2011 the Isle of Man authorities became fully integrated with the data collection and recording systems operated by mainland fisheries administrations, enabling the inclusion of activity that was previously not available.

[2] Agnew DJ, Pearce J, Pramod G, Peatman T, Watson R, et al. (2009) Estimating the Worldwide Extent of Illegal Fishing. PLoS ONE 4(2): e4570.

are allocated to the areas in proportion to the estimated quantities of the species taken from each area, as recorded in the logbook.

In many cases only the weight of fish landed is provided, as it is impractical to record the weight of fish at the time of capture due to working conditions. The landed weight may differ significantly from the weight of the fish as it was taken from the sea, in large part due to the processing of the catch on board the vessel (e.g. gutting, filleting, etc). To render these data comparable, the landed weights are converted to a live weight equivalent using standard conversion factors according to the species landed and its presentation (e.g. gutted, skinned, etc).

The complete fishing records are transmitted to the central computer systems where further checks are carried out on the data before they are reflected in the main landings databases. Activity and landings data for the UK are compiled in a central database containing key information from systems run by the MMO and Marine Scotland. The former holds information on all landings into England, Wales and Northern Ireland and the Isle of Man by UK vessels and of landings abroad by vessels administered by the MMO, WAG, DAERA and Isle of Man Department of Environment, Food and Agriculture. The latter provides figures for landings into Scotland by all UK vessels and landings abroad by Scottish administered vessels.

Regular checks are made on the quality of the data and unusual records referred to staff in coastal offices to confirm or correct as necessary. In addition, prior to publication of these data, amendments are made to records with extreme prices for the weight of fish sold and values imputed based on average prices for the same species.

The sale value of transhipped landings is also imputed using an average price. These are instances where fish may be landed in the UK, but it is transported (usually by road and ferry) out of the UK before it is sold. This usually happens to allow vessel owners to take advantage of higher market prices for some species of fish when sold at continental markets rather than in the UK. Note that this differs from transhipment at sea. This involves transferring fish between vessels before landing, which is banned within community waters.

Effort statistics for the UK are calculated using trip data from the fishing logbook to determine the time spent at sea with each gear in each ICES sub-division and rectangle. This is combined with information from the Register of Shipping and Seamen on the capacity and engine power of vessels in order to calculate fishing effort exerted in GT days or kW days. These data are aggregated for different sea areas and gear types to produce the statistics shown.

In some instances the spatial resolution of the data is not sufficient to permit exact attribution of time spent at sea to recovery areas defined by EU legislation. In the Cod Recovery Zone, it is assumed that all effort deployed in ICES sub-division IIIa occurs outside of Kattegat. In the Western Waters, it is assumed that effort occurring within ICES rectangles transected by the boundaries of the Biologically Sensitive Area (BSA) occurs within the BSA itself. In this way measures of effort in the North Sea and BSA may be overestimates.

Effort deployed in the Western Waters is classified according to the target species of the trip. This is determined using a decision tree approved by the Scientific, Technical and Economic Committee for Fisheries (STECF) of the European Commission. The target species is assigned on the basis of the gears used and the species composition of the vessel's landings.

Changes in processing for UK Sea Fisheries Statistics 2012 onwards

All mussel landings with a zero landings value, since 2008, have been removed from the dataset used to create all the tables in Chapter 3. These landings were identified to be landings of mussel seed which, rather than being sold for human consumption at this point are re-laid for aquaculture. They are then harvested and sold at a later stage. As these landings are not sold at the point of initial dredging they have been removed and the data recalculated.

Appendix ND.3.2

In the calculation of average prices throughout Chapter 3, landings with a zero value have not been included in the calculation as inclusion would result in a lower average price. There are various reasons why landings may have a zero value. There are some fish which cannot be sold and therefore have a zero value e.g. undersize fish landed as part of catch quota work, or scientific dispensation landings which cannot be sold but have to be recorded in sales notes to allow cross checks with landings declarations. There are also instances where fish are not offered for sale or are intended for sale at a later date, and so are subject to takeover declarations. For the 2017 edition of Sea Fisheries Statistics, many of the takeover declarations – largely relating to landings into Grimsby – have had values imputed based on vessel agents' price data. Other zero value landings into the UK have also had values added to better reflect the true value of fishing to the economy.

EU reporting requirements on fishing activity data

As part of the EU legislation that established controls on fishing activity, limits are set in two key areas:

(i) Fish quotas – limits on the level of fish that can be caught and landed related to the species of fish and sea area of activity.

(ii) Fishing effort – limits in terms of the total fishing effort that can be exerted, usually in terms of the days spent at sea by vessels combined with a measure of their catching capacity such as engine power.

The legislation that sets out control limits in these two areas also includes requirements on Member States to report data on the uptake by their fishing fleets against these levels. However, the information reported to the Commission has to be collated in line with two conflicting requirements, that is to report accurate data that are available as at the time of submission, as well as meet the tight reporting deadlines for providing information to the Commission after the end of a period. For example, information for end year quota and effort uptake has to be reported by the 15th calendar day after the end of the period in question.

Following the reporting of data to the Commission, there are additional processes that need to occur to allow the "close-down" of a year for quota and effort management purposes, such as additional checks with the Commission and other Member States on data, the agreement of end year quota and effort swaps, and the agreement on banking and borrowing of fish quotas between years. This close-down is a necessary element within the management of fishing activity as it allows for the level of any overfishes for the previous year to be determined and penalties needed for the current year to be set. This needs to be done as early in the year as possible to ensure that both national administrations and the fishing industry know the levels of quota and effort they have to operate with, so that any detrimental effect on management of activity within the current year is avoided.

As part of ensuring the close-down process takes place as early as possible, the Commission sets out operational requirements related to reporting amendments to data. After initial submissions by 15 January, final data for the previous year's quota and fishing effort uptake have to be submitted to the Commission by 15 February. There are, however, lags in the reporting of data on activity by fishermen that include:

- The legislative requirement on fishermen is to submit the reports on their operations within 48 hours of a landing taking place. This does not guarantee that fishing administrations receive this information within 48 hours, and we frequently experience significant delays in receiving documentation.

- Processing of documentation takes time as there is a significant amount of information reported on the logbook on the activity of vessels. The EU logbook system used for the

vessels over 10 metres in length covers many different reporting obligations, thus the volume and complexity of data involved can lead to delays in data entry.

- The information received is thoroughly checked and validated before reporting to the Commission. This can delay the use of data.

In previous years a consequence of the early reporting deadline and the required close-down of a year has been that there were data entered and validated after the reports were submitted to the Commission. For the final reports on UK landings of quota species and fishing effort for 2013 onwards, a revised approach was taken which combines pre-validated data (from electronic logbooks and VMS systems) with fully validated data that have gone through the array of cross checks required under the EU Regulations. Additional validation processes were put in place to quality assure the pre-validated data prior to submission. By definition it was not possible to include any estimates for landings where no information to inform authorities that a landing or fishing activity had taken place had been received.

The desire to reduce the impact of these lags in information is one of the key drivers for larger fishing vessels to move to electronic reporting of data on activity both in terms of the activity carried out by fishermen at sea and also in terms of the land-based activity in terms of the sales notes associated with the first sale of the fish after landing, and so the requirements to report data electronically have been expanded over recent years. By the first half of 2015, all UK vessels 12 metres and over in length were submitting activity data electronically - vessels 12 metres and over in length accounted for 91 per cent of the total quantity of fish landed by UK vessels in 2017. In terms of the sales notes, these are usually reported by the merchants buying the fish, and for these first sales of fish within the UK in 2016, around 90 per cent of the tonnage of fish reported as sold from UK vessels were reported via electronic sales notes rather than paper documents. The electronic reporting of activity has helped to significantly reduce the lags in the monitoring and reporting of activity.

Data are prepared for the annual statistics publication at a point significantly after the close-down date for EU reporting systems. The publication is prepared to meet a wide range of uses. Apart from Tables 2.10 and 3.12, the data included incorporate the full picture of data held on UK fisheries administrations systems including information on any landing that is received after the EU close-down date and also all data that have passed through the complete checking and validation processes. This means that the publication gives as complete a picture as possible of total UK vessel activity in quantity and value terms. We therefore report on all landings and effort data, including that related to non-quota species (such as shellfish) which are of economic importance to the UK industry. See Appendix 5 for details of our policy with regards to data revisions.

Requirements to report fishing activity data electronically

Requirements to report data on fishing activity through electronic reporting systems rather than by using the paper community logbook were first introduced by Council Regulation (EU) 1996/2006. A phased approach to the introduction of requirements to report data electronically was planned to cover all vessels over 15m overall length. These requirements were subsequently revised by Council Regulation (EU) No. 1224/2009 that introduced an extended deadline for the change-over as well as extending the requirements so that all EU fishing vessels over 12m overall length would eventually be required to report data by electronic means. The full requirements of the electronic reporting system are in Commission Implementing Regulation (EU) No. 404/2011. This sets out the various elements of activity during a fishing trip that must be reported – these cover all possible events and activities from the vessel leaving port to its return to land fish. More details on these requirements can be found on the MMO internet site and that of the European Commission via the links given below:

https://www.gov.uk/government/publications/how-to-report-fishing-activities-using-an-electronic-logbook-software-system

http://ec.europa.eu/fisheries/cfp/control/technologies/ers/index_en.htm

As stated earlier, by the first half of 2015, all active UK fishing vessels of 12 metres and over in length were reporting their data electronically. Both data reported electronically and on paper declarations go through extensive validation checks, with the system used for electronic returns extended to cover the differences in structure and the additional elements required within it. The validation system also covers checks mandated by EU legislation that must take place on all landings data received via electronic or paper declarations. These checks are set out in Article 109 of Council Regulation (EU) No. 1224/2009, and require the data reported on fishing activity in logbooks, landing declarations and sales notes to be cross-checked for consistency and accuracy. Activity data reported in these documents are also compared with other sources of information, such as satellite surveillance information from vessels where available.

The fishing activity data reported to the European Commission under the various sets of EU legislation have all gone through these checks before inclusion in the reports, with any discrepancies identified going through investigation to identify the causes in case further action is required. The investigation of discrepancies involves a significant degree of resources in all four UK fisheries administrations, but the complex nature of these checks does lead to instances where there can be a lag in time between the activity taking place and it being included in the data reports. The change-over to electronic reporting systems has increased the length of the validation process in some cases as vessel operators have had to become used to their new role as data reporters using the new electronic systems.

Imports and exports

HM Revenue & Customs (HMRC) is responsible for collecting the UK's international trade in goods data. The data are compiled from trade declarations made using commodity codes from the UN Tariff (HS Nomenclature) and its EU derivative the Intrastat Classification Nomenclature (ICN). These data are sent annually to the MMO, who process the data for this publication.

Landings of fish into the UK by foreign vessels are typically included in import statistics; however, statistics on imports and landings by foreign registered vessels may not strictly be comparable. Arrivals of fish should be reported where the economic owner of the vessel is outside the UK. In some cases, the countries of vessel registration and economic ownership may differ. A further complication is that import statistics do not include fish landed into the UK by foreign vessels which have a final destination outside the UK. Lastly, in some cases there exists a value threshold for declaration of imports. For these reasons it is possible that imports of fish may be below the quantity of landings reported for foreign registered vessels.

Exports include dispatches of fish by UK economically owned vessels when landing outside the UK. For similar reasons to those for imports, these are not directly comparable with landings by UK registered vessels abroad.

Household consumption and expenditure

Data on household purchases are sourced from the Living Costs and Food Survey run by the Office for National Statistics. The Family Food module of the survey collects detailed quantity and expenditure information on household and eating out purchases of food and drink for use by the Department for Environment, Food and Rural Affairs (Defra).

The survey is an annual voluntary sample survey of private households. The survey is continuous, with interviews being spread evenly over the year to ensure that seasonal effects are covered. Each report details the number of people and households that completed a diary during the reporting year.

Each individual aged 16 and over in the household is asked to keep diary records of daily expenditure for two weeks. Information about regular expenditure, such as rent and mortgage payments, is obtained from a household interview along with retrospective information on certain large, infrequent expenditures such as those on vehicles. Simplified diaries are kept by children aged between 7 and 15.

Prior to 2008, the Living Costs and Food Survey was named the Expenditure and Food Survey. In 2001-2002 this replaced the National Food Survey and the Family Expenditure Survey. More detailed methodological information for all four surveys is available from Defra and the Office for National Statistics.

Inflation

The Retail Price Index (RPI) and Consumer Price Index (CPI) measures of inflation are produced by the Office for National Statistics. The Landed Price Index (LPI) is produced by the MMO.

Only the components of the RPI and CPI for fish prices are included in this publication. These were based on a 'basket' of six items: fresh white fish fillets, fresh salmon fillets, frozen prawns, canned tuna, fish fingers, and frozen breaded/battered white fish. These two price indices differ in three main ways:

- population base – the RPI excludes very high and low income households and hence the CPI has a wider population coverage than the RPI.

- formulae used to combine prices – the CPI uses a combination of geometric means and arithmetic means, whereas the RPI only uses arithmetic means.

- commodity coverage – the CPI excludes owner occupiers' housing costs and hence the RPI has wider commodity coverage than the CPI. The fish components of these indices have the same commodity coverage.

Further methodological details for the RPI and CPI are available from the Office for National Statistics.

The LPI is a simple price index used to assess the change in prices at first sale of fish landed into the UK by UK vessels. It is calculated using the average annual prices of 46 categories of fish species, using data collected on all landings into the UK by UK vessels. The prices are aggregated using a weighted mean, with weights chosen as the quantities landed (in live weight equivalent) of each species category into the UK in 2000.

GDP for fishing

The Office for National Statistics produces data on gross value added (GVA), gross domestic product (GDP) and output indices. GVA measures the contribution to the economy of each individual producer, industry or sector in the United Kingdom. It is used in the estimation of GDP, a key indicator of the state of the whole economy. In the UK, three theoretical approaches are used to estimate GDP: 'production', 'income' and 'expenditure'. When using the production or income approaches, the contribution to the economy of each industry or sector is measured using GVA.

The production approach to estimating GDP looks at the contribution of each economic unit by estimating the value of an output (goods or services) less the value of inputs used in that output's production process. The income approach to estimating GDP measures the incomes earned by individuals (e.g. wages) and corporations (e.g. profits) in the production of outputs (goods or services).

The link between GVA and GDP can be defined as: GVA (available by industry only) plus taxes on products (available at whole economy level only), less subsidies on products (available at whole economy level only) equals GDP (available at whole economy level only). In summary:

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GVA + taxes on products - subsidies on products = GDP

Further methodological details on GDP and GVA are available from the Office for National Statistics.

Other data sources

EU fishing vessels

The European Commission collects and publishes data on the characteristics of EU fishing vessels in the EU Fleet Register. Each Member State provides the Commission with a complete snapshot of their national register to the EU Fleet Register on the first working day of March, June, September and December each year, as required by Commission Regulation (EC) No 26/2004. Validation checks are performed to confirm the consistency of data submitted before the data are published in an online database.

Accidents, lost vessels and fatalities

Data on accidents involving UK fishing vessels are collected and compiled by the Marine Accident Investigation Branch (MAIB), a separate branch within the Department for Transport. MAIB inspectors examine and investigate all types of marine accidents involving UK vessels worldwide, and other vessels in UK territorial waters.

EU landings

EU member states exchange information on landings of quota species via the Fisheries Language for Universal Exchange (FLUX). Data on the quantity landed of each stock subject to quotas are submitted to meet monthly reporting deadlines set out in EU legislation, in particular Council Regulation (EC) No. 1224/2009. These reporting deadlines are often shortly after the close of the fishing period; data lags mean that the figures reported are typically slight underestimates of the true quantity landed. Each member state reports the landings into their own country by vessels registered in other member states, leading to occasional differences with figures reported by the UK on landings by UK vessels abroad. The figures are compiled by the European Commission to give an overall picture of the landings by each member state.

Stock assessments

Stock assessments are provided by the International Council for the Exploration of the Seas (ICES) using data supplied by national administrations. In the UK, the Centre for Environment, Fisheries, and Aquaculture Science (Cefas), an executive agency of Defra, provides expert advice on fisheries assessment.

The world fishing industry

Data on the world fishing industry are compiled by the Fisheries and Aquaculture Department of the Food and Agriculture Organisation of the United Nations (FAO). Data on landings by UK vessels are supplied by the MMO on an annual basis; separate figures for the Isle of Man and the Channel Islands are sent directly by their Fisheries Departments. FAO figures are not directly comparable with landings figures in Chapter 3 owing to differences in time of production.

Appendix ND.3.2

Appendix 5: Revisions policy

Where possible, the Marine Management Organisation produces revised figures each year to ensure that users have access to the latest data available. Revisions typically affect fishing effort, catches and trade data, where data from logbooks, landing declarations, sales notes and trade declarations may occasionally be received or amended several months after the event. The magnitude of revisions to tables is typically larger for more recent years although the size of revisions is usually very small. Any revised data presented in this publication will be clearly marked with an 'R' against the relevant entries.

There are a number of causes of the revisions made in this publication:

i) **Receipt of additional data**. Despite strict data reporting requirements, some data are not received or entered at the time of publication. This typically affects data for more recent years.

ii) **Revisions to data sources**. Corrections are made to database entries throughout the year where these are found to be incorrect. In addition, for landings data systematic corrections are made to implausible quantities and values prior to production of the publication to reduce the influence of outliers.

iii) **Rectification of data processing errors**. Where data are found to have been incorrectly processed for a previous publication, these errors are corrected as soon as possible.

Users should always refer to the latest figures published by the Marine Management Organisation. Previous editions of all publications are made available online on the Marine Management Organisation website should users wish to examine the effect of revisions in further detail.

The Marine Management Organisation adheres to the Department for the Environment, Food and Rural Affairs' policy on revisions and errors. Further information can be found in the *Statement on Revisions and Errors* at

https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs/about/statistics#corporate-procedures-and-standards.

Structure and activity of the UK fishing industry

Several tables in Chapter 2 are revised annually as follows:

Table	Title
2.7	Number of accidents, lost vessels and fatalities involving UK vessels: 2007 to 2017 (revised by the Marine Accident Investigation Branch)
2.8	Beam trawl activity in the Sole Recovery Zone: 2002 to 2017
2.11	Days at sea for the over 10m UK fishing fleet: 2002 to 2017 (supplementary table)

Landings

Tables in Chapter 3 are revised annually for the preceding four years to reflect information received since the previous publication. The following table shows the effect of revisions to landings data published in *UK Sea Fisheries Statistics 2016*:

Figures published in *UK Sea Fisheries Statistics 2017* as a proportion of figures previously published in *UK Sea Fisheries Statistics 2016*

	Quantity				Value			
	2013	2014	2015	2016	2013	2014	2015	2016
Landings into the UK by UK vessels:								
Demersal	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	101.5%
Pelagic	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Shellfish	100.0%	100.0%	100.0%	99.1%	100.0%	100.0%	100.0%	100.1%
Total	100.0%	100.0%	100.0%	99.7%	100.0%	100.0%	100.0%	100.6%
Landings into the UK by foreign vessels:								
Demersal	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pelagic	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Shellfish	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Landings abroad by UK vessels:								
Demersal	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	107.1%
Pelagic	100.0%	100.0%	100.0%	100.2%	100.0%	100.0%	100.0%	100.2%
Shellfish	100.0%	100.0%	101.6%	105.0%	100.0%	100.0%	101.0%	101.1%
Total	100.0%	100.0%	100.0%	100.3%	100.0%	100.0%	100.1%	102.7%

Source: Fisheries Administrations in the UK

There have been some relatively large percentage increases in the 2016 value of the UK fleet's demersal landings into both the UK and abroad. These relate to a small number of cod landings which previously did not have a value assigned. The revision to shellfish landings abroad is relatively very high (an increase of 5 per cent) although this relates to a relatively small adjustment in crabs of 400 tonnes.

Revisions to more detailed landings figures may differ in magnitude to the above indicative proportions.

Supplies, overseas trade and marketing

All tables in Chapter 4 are revised annually as follows:

i) Landings data (Tables 4.1, 4.4a-e, 4.5) are revised annually for the preceding four years, in keeping with conventions used in Chapter 3.

ii) Trade data (Tables 4.1, 4.2, 4.2a, 4.3, 4.3a, 4.4a-e) are revised annually for the preceding year. The current year's data are provisional.

iii) Household consumption, RPI, CPI and GDP data are revised for all previous years using data received from the Department for Environment, Food and Rural Affairs and the Office for National Statistics.

The following table shows the effect of revisions to trade data published in *UK Sea Fisheries Statistics 2016*:

Trade data published in *UK Sea Fisheries Statistics 2017* as a proportion of figures previously published in *UK Sea Fisheries Statistics 2016*

	Imports (2016)		Exports (2016)	
	Quantity	Value	Quantity	Value
Fish (excluding Shellfish)	99.8%	99.9%	99.9%	99.9%
Shellfish (Crustaceans and Molluscs)	99.8%	99.9%	99.8%	99.8%
Fish Products	99.9%	99.8%	100.0%	100.0%
Total	99.8%	99.9%	99.9%	99.9%

Source: H.M. Revenue and Customs

Main stocks and their level of exploitation

The time series estimates of abundance and fishing mortality are revised each year using the data provided by the International Council for the Exploration of the Seas (ICES). Stock assessments for previous years are as provided in annual ICES reports and are not updated using more recent data.

Overview of the world fishing industry

All tables in Chapter 6 are revised annually for all previous years using data received from the United Nations Food and Agriculture Organisation (FAO).

Appendix ND.3.2

Appendix 6: Further information

Official publications

Other official publications on sea fisheries statistics include:

MMO / DEFRA	UK Fishing Vessel List. List of registered and licensed vessels of over 10 metres overall length. Published monthly. Monthly UK Sea Fisheries Statistics. Summary publication of landings into England and Wales. Published monthly. Available from https://www.gov.uk/government/organisations/marine-management-organisation/about/statistics or by writing to Marine Management Organisation, 1st floor, Seacole Block, 2 Marsham Street, London, SW1 4DF. Tel: 0300 123 1032; accesstoinformation@marinemanagement.org.uk.
Marine Scotland	Scottish Fisheries Statistics 2016. Tel: 0131 244 6437. Available online from http://www.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/PubFisheries
DAERA	Report on the sea and inland fisheries of Northern Ireland. Available from DARDNI Fisheries division, Tel: 028 9056 9262 https://www.daera-ni.gov.uk/topics/fisheries
FAO	FAO Yearbook of Fishery and Aquaculture Statistics 2016. Available from http://www.fao.org/fishery/publications/yearbooks/en
Eurostat	Agriculture, Forestry and Fisheries Statistics: 2016. Available from http://ec.europa.eu/eurostat/en/web/products-statistical-books/-/KS-FK-16-001

The statistics in this release are derived from the same sources as the above publications in many cases. However, discrepancies may exist between these publications owing to differences in dates and methods of data extraction and compilation.

Useful websites

Marine Management Organisation	www.gov.uk/mmo
Defra	https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs
Marine Scotland	www.gov.scot/About/People/Directorates/marinescotland
DAERA	www.daera-ni.gov.uk
Welsh Assembly Government	https://gov.wales/?lang=en
National Statistics	www.statistics.gov.uk
Sea Fish Industry Authority	http://www.seafish.org/
Maritime and Coastguard Agency	www.dft.gov.uk/mca

Marine Accident Investigation Branch	www.maib.gov.uk
Centre for Environment, Fisheries and Aquaculture Science	www.cefas.defra.gov.uk
European Commission - Fisheries	www.ec.europa.eu/fisheries
Eurostat	www.ec.europa.eu/eurostat
EU Fleet Register	www.ec.europa.eu/fisheries/fleet
FAO Fisheries Department	www.fao.org/fishery
ICES	www.ices.dk

Additional information on management of UK fish quotas

Limits are set each year on the levels of quota available to Member States in a range of fisheries – there are limits on the quantity of different species of fish that can be caught and landed from different combinations of sea areas set for each Member State. More information on the management of quotas in the UK can be obtained from the MMO at:
https://www.gov.uk/government/publications/quota-management-rules

A key element of managing fish quotas in the UK is the delegation of management responsibilities to various parts of the UK industry. Allocations are made each year to Producer Organisations (POs) within the UK based on the holdings of Fixed Quota Allocation units (FQAs). More information on the process is available from the source listed above. In addition a publicly accessible register of holdings of these FQA units is available on line. This includes details of the holdings of FQA units related to individual vessels and as held by POs collectively on behalf of their member vessels. More information on these holdings is available at: https://www.fqaregister.service.gov.uk/

The MMO and other UK fisheries administrations continually monitor the activity of UK fishing vessels in terms of landings of quota species during each year. Weekly reports are released which give the latest picture of landings by UK vessels against the annual quotas available. These are available from the MMO at:
https://www.gov.uk/government/statistical-data-sets/quota-use-statistics

Appendix ND.3.2

Cold chain challenges and opportunities for air transportation

April 21, 2018

Cold Chain, Food, Food Case Studies, Food Services, News, Seafood, Timestrip News

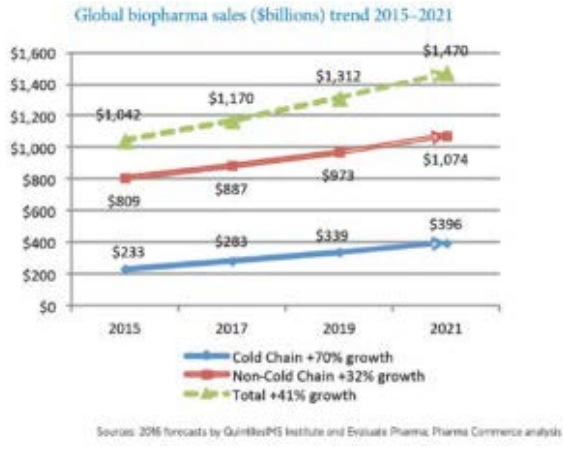
Whether it's Chilean blueberries for breakfasts in London, French-made polio vaccines for use in Malawi, or Mauritian sea bass for restaurants in the Big Apple, the chances are that all these cold chain perishables have been transported by air.

Indeed, thanks to our increasingly connected world and rising incomes in developing nations, consumers across the globe are opting for perishables produced far from where they will be consumed. Since 2010 in India for instance, rising per capita incomes have led to an increase in the consumption of frozen food, meat, fish, canned and instant food items, as well as a greater acceptance of frozen vegetables.

Similar trends have been noted in China, where in increasing numbers more affluent consumers are opting for imported foodstuffs, especially seafood.

Appendix ND3.3

Strong growth for cold chain logistics



For cold chain pharma products, the figures are startling. In its annual Biopharma Cold Chain Sourcebook, Pharmaceutical Commerce estimates the global volume of 2017 cold chain products at $283 billion, out of a total market of $1.17 trillion, and growing at approximately twice the rate of the overall pharma market.

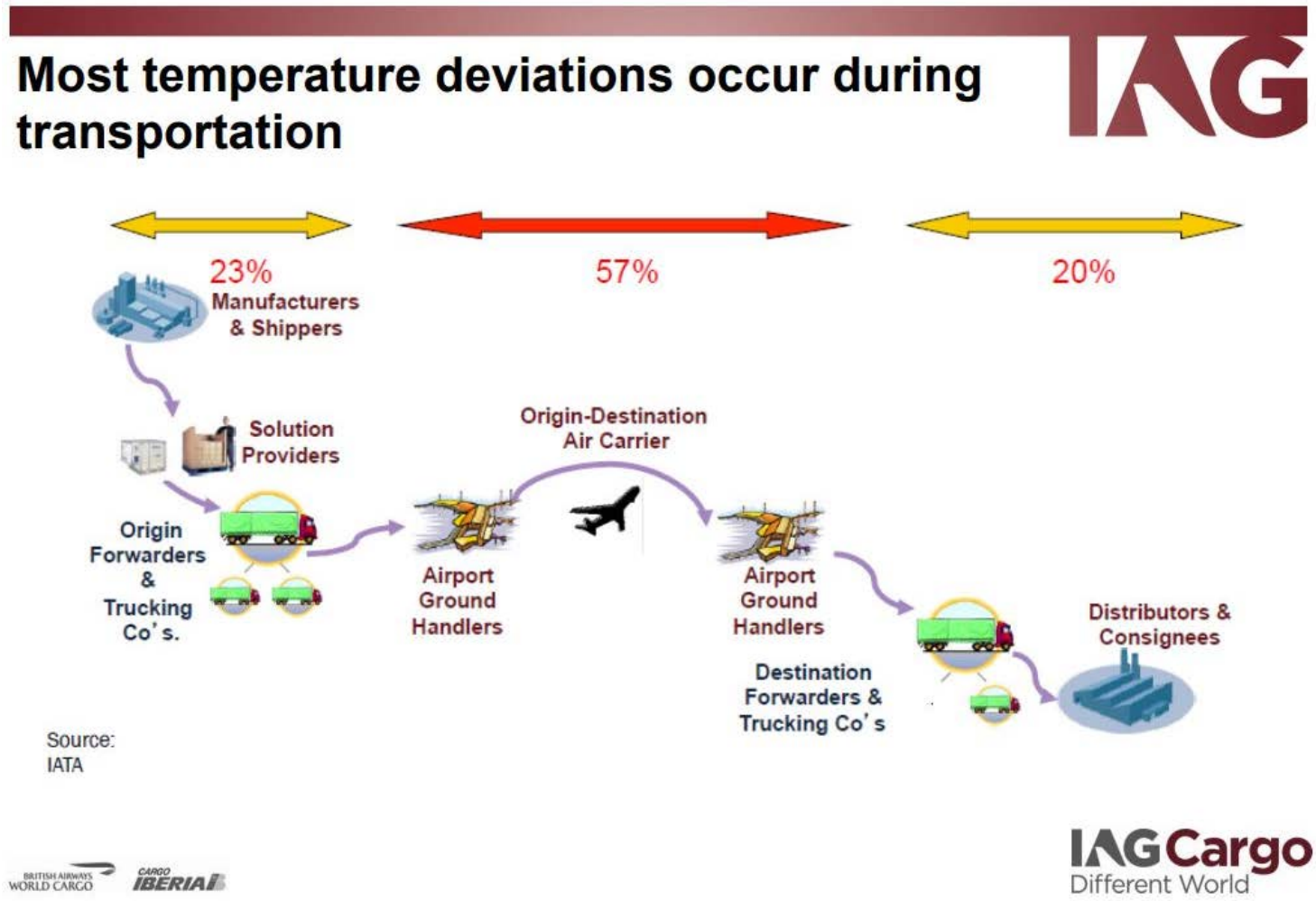
The International Air Transport Association (IATA), which supports aviation with global standards for airline safety, security, efficiency and sustainability, estimates that immunization prevents 2.5 million deaths every year and sees air cargo as critical for flying short shelf-life vaccines to their destination in time to be effective.

Air transportation is also critical to the economy of many regions, notably fruit and vegetable producing countries in Africa that ship most of their produce to developed markets.

Time and Temperature Indicators (TTIs) play a key role in this process, by providing clear and unambiguous data as to whether any cold chain breaches have occurred during transit, and if so, how long they lasted. Moreover their use with certain products in certain markets are mandated by regulatory authorities, such as by the FDA for seafood imports into the US.

Managing complex logistics

That said, the transportation of cold chain perishables by air is highly complex and prone to numerous situations where temperature breaches can occur. In a study for the air transporter IAG Cargo, researchers found that over half of all temperature deviations occurred during transportation.



This data is supported by findings of the World Health Organisation (WHO), which says: “The greatest and most frequent vulnerability to temperature exposure occurs on the airport tarmac when goods are exposed to the elements before aircraft loading, or during unloading.”

Research however points to cold chain logistics managing these situations effectively for some time now. A 2012 study of Icelandic fish exported to the UK and France showed that despite poor temperature control during storage and ground operations at the airports before and after the flights, relatively a moderate increase in the temperature of the fish were recorded: the pallets of food were subjected to ambient temperatures above 10°C as well as solar radiation for several hours, but the temperature of the fish rose by less than 2°C. This was explained by the transportation of the fish inside polystyrene boxes, which were kept cool with ice inside the boxes.

It’s important to stress though that in these sorts of situations it’s only the use of temperature monitoring tools such as irreversible TTIs inside the boxes on the transported items themselves that a stakeholder can know whether potentially damaging temperature breaches have occurred.

Food loss epidemic

Nevertheless, despite much progress and professionalisation in cold chain logistics, certain problems remain difficult to resolve. One of the main costs with the transportation of perishable products such as fruit and vegetables is wastage due to spoilage related to inadequate temperature management during transit. Estimates vary as to what this amounts to, but most data suggests it is in the region of 33%.

According to the United Nations' Food and Agriculture Organization (FAO), this wastage should be viewed as a "food loss epidemic", which it values at about $1 trillion each year. Added to this are related environmental costs: wasted water used to produce food that is never eaten equal to the water needs of Africa, and CO2 emissions equivalent to removing every car off the road across the world.

It is hard to imagine any industry would tolerate 30-40% inefficiency.

Food bacteria grow best between 5°C and 60°C, which explains why keeping perishable products cool, cold, frozen or deep frozen is the only way to guarantee product quality and shelf-life as it arrives at the end of a transportation process.



Customers of air transport providers for perishables are well aware of this. In a survey of their various concerns, the three greatest were recorded as:

- the expertise of handling personnel
- appropriate temperature monitoring
- traceability

What is remarkable about these concerns is how they very much match those of the healthcare sector and it would seem that moving forward, it will be the lessons learnt from transporting pharma products, that could help avoid the massive cost of food spoilage during transit.

In a conference in Dallas, Texas, last year organised by the Netherlands-based Cool Chain Association, chairman Stavros Evangelakakis suggested applying healthcare industry standards to perishables would lead to wastage being "dramatically lowered".

A post conference statement went on to stress the need to "treat perishable cargo with the same care, respect and transparency as pharma", adding that this would be "crucial" for new and emerging markets such as South American and Africa.

Appendix ND3.3

Potential “quadruple win” for cold chain logistics

A recent study reported on in The Guardian highlights the huge benefits proper cold chain management can bring to the transport of perishable foods.

A carrier in India field tested cold chain equipment with a local grower for the transport of fruits in refrigerated trucks from Punjab to Bangalore, a 1,600 mile-trip over rough roads in high temperatures.

The results were significant:

- a one-week shelf life increased to two months
- profit increases by up to 23% for all the supply chain actors
- post-harvest food loss reduced by 76%
- greenhouse gas emissions reduced by 16%, excluding the significant reduction of emissions from food loss

“ Blueberries in January



One of the massive economic benefits of effective cold chain management is how it enables the creation of new markets.

In most countries, blueberries used to be only available at specific times of the year. The situation changed dramatically in the 1980s, with Chile harvesting blueberries from October until late March and exporting these to the US.

Today thanks to climate-controlled storage and transport technologies, the fruit is available year-round in many regions, buoyed on by the rebranding of the fruit as a “super-food”.

Today, the US is the world's largest producer of blueberries, followed by Canada, Poland and France. Meanwhile in the UK, 2010 was the year blueberries overtook raspberries as the country's favourite soft fruit after strawberries.

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Appendix ND3.3

Freight demand will triple by 2050 – new report

Mike King | Thursday, 23 May 2019

OECD report predicts air cargo will see the most rapid growth by mode, and all transport lanes will face major challenges

Global freight demand is set to surge in the coming decades but will also be subject to multiple disruptive factors, according to a major new OECD report.

ITF Transport Outlook 2019 outlines a range of transport demand scenarios through to 2050 and concludes global freight demand will triple between 2015 and 2050, based on current demand growth rates.

"The projected compound annual growth rate of freight through 2030 is 3.1%," said the report. "Freight demand will grow faster over the longer term, at 3.4% through 2050."

However, the report noted that as well as being subject to the vagaries of economic growth and international trade activity, "burgeoning trade conflicts" and a number of disruptive factors including climate, new technologies, infrastructure development, new regulations, digitalisation and the growth of e-commerce rendered any demand projections for freight transport "particularly uncertain".

It said projected demand could shift as a result of increased protectionism or a global economic downturn, but also due to improvements in freight transport capacity in countries or regions with significant growth potential. "In Asia, for instance, capacity will need to increase to accommodate future freight transport demand," said the report.

Based on mid-range scenarios for freight demand, the authors said that the current demand pathway will see maritime freight transport grow at a compound annual growth rate of 3.6% through 2050, a near tripling of maritime trade volumes compared to now.

"The economic value of freight flows in the North Pacific and Indian Oceans will increase nearly four-fold between 2015 and 2050," it noted. "Approximately one third of all maritime freight movements in 2050 will take place in these two regions.

"The North Atlantic Ocean will remain the third-busiest maritime corridor, with 15% of maritime freight movements in 2050, equalling 38 trillion tonne-kilometres."

The relocation of factories inland in China in a bid to cut production costs could hurt demand for maritime shipping to Europe, however. "This may impact mode choice for Eurasian freight flows if these relocations significantly increase the time and cost of maritime shipments relative to inland modes," it added.

Air freight demand is expected to have the highest compound annual growth rate of all modes through 2050, while more than three-quarters of all freight will continue to be carried by ships in 2050, with the remaining goods transported by road (17%) and rail (7%).

"Air freight, while representing a marginal share of total freight transport, will have the highest compound annual growth rate of all modes through 2030 (5.5%) and 2050 (4.5%)," said the report. Air cargo volumes growth will be driven by surging e-commerce volumes and larger shares of high-value goods being flown, most notably from China.

"Aviation has become central to e-commerce," added the report, noting that nearly 90% of business-to-consumer ecommerce goods were transported by air in 2017, a pattern predicted to continue but at increased volume levels as more manufacturers and e-tailers sold direct to buyers.

However, the report warned that more air freight infrastructure investment was needed to keep pace with demand, while the industry also must do more to align with the digital world.

"Aviation infrastructure is not developing at the pace needed to respond to growing demand for air freight," it added. "This could pose a critical problem in the future since infrastructure

expansion requires long-term planning and air freight demand is predicted to grow very fast, reaching 4.7 times the 2017 level by 2050."

Global surface freight movements via road, rail and inland waterways are projected to grow 175% between 2015 and 2050. Together they will carry 82 trillion tonne km or 24% of total freight demand.

"Surface freight flows in China and India taken together made up 37% of total surface freight flows in 2015," said the report. "By 2050, Asia, including China and India, will be responsible for over 54% of global surface freight demand.

"Africa will see the fastest growth in road and rail tonne-kilometres, with an increase of+393% by 2050 compared to 2015, followed by the Asian continent with an increase of +254%."

Jet Fuel Daily Price

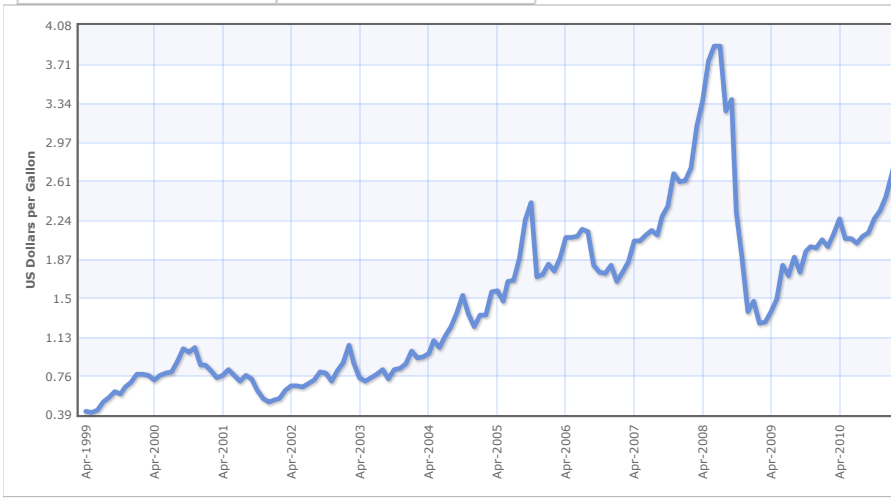
1.97

U.S. Gulf Coast Kerosene-Type Jet Fuel Spot Price FOB, US$ per gallon
As of: Monday, May 13, 2019
Source: US Energy Information Administration

Jet Fuel Monthly Price - US Dollars per Gallon

Range

6m (?commodity=jet-fuel) | 1y (?commodity=jet-fuel&months=12) | 5y (?commodity=jet-fuel&months=60)
10y (?commodity=jet-fuel&months=120) | 15y (?commodity=jet-fuel&months=180) | 20y
25y (?commodity=jet-fuel&months=300) | 30y (?commodity=jet-fuel&months=360)



Description: U.S. Gulf Coast Kerosene-Type Jet Fuel Spot Price FOB

Unit: US Dollars per Gallon

Currency: US Dollar

Compare to: Nothing

Source: Energy Information Administration (http://www.eia.gov/dnav/pet/pet_pri_spt_s1_m.htm)

See also: Energy production and consumption statistics (../energy/)

See also: Top commodity suppliers (suppliers/#jet-fuel)

See also: Commodities glossary (glossary/) - Definitions of terms used in commodity trading

Month	Price	Change
Apr 1999	.43	-
May 1999	.42	-3.49 %
Jun 1999	.44	6.02 %
Jul 1999	.51	16.36 %
Aug 1999	.56	10.16 %
Sep 1999	.61	8.87 %
Oct 1999	.60	-3.09 %
Nov 1999	.66	11.09 %
Dec 1999	.70	6.05 %
Jan 2000	.78	11.41 %
Feb 2000	.78	-0.13 %
Mar 2000	.77	-1.15 %
Apr 2000	.72	-6.74 %
May 2000	.76	5.98 %
Jun 2000	.79	3.02 %
Jul 2000	.80	1.40 %
Aug 2000	.90	13.07 %
Sep 2000	1.02	13.00 %
Oct 2000	.98	-3.44 %
Nov 2000	1.03	4.68 %
Dec 2000	.86	-16.05 %
Jan 2001	.87	0.81 %
Feb 2001	.82	-6.32 %
Mar 2001	.75	-8.22 %
Apr 2001	.77	2.94 %
May 2001	.82	6.62 %

Appendix ND.3.13

Jun 2001	.77	-6.58 %
Jul 2001	.71	-7.30 %
Aug 2001	.76	7.45 %
Sep 2001	.74	-3.40 %
Oct 2001	.62	-15.72 %
Nov 2001	.54	-12.70 %
Dec 2001	.52	-5.16 %
Jan 2002	.53	3.50 %
Feb 2002	.55	3.38 %
Mar 2002	.63	14.34 %
Apr 2002	.67	6.19 %
May 2002	.67	-0.45 %
Jun 2002	.65	-1.95 %
Jul 2002	.69	5.82 %
Aug 2002	.72	4.49 %
Sep 2002	.80	10.80 %
Oct 2002	.79	-1.25 %
Nov 2002	.71	-10.38 %
Dec 2002	.81	14.55 %
Jan 2003	.89	9.37 %
Feb 2003	1.06	18.94 %
Mar 2003	.89	-15.36 %
Apr 2003	.74	-16.80 %
May 2003	.71	-3.90 %
Jun 2003	.75	4.76 %
Jul 2003	.78	4.28 %
Aug 2003	.82	5.51 %
Sep 2003	.74	-10.33 %
Oct 2003	.82	11.11 %
Nov 2003	.83	1.34 %
Dec 2003	.88	5.42 %
Jan 2004	1.00	13.93 %
Feb 2004	.93	-6.51 %
Mar 2004	.95	1.50 %
Apr 2004	.97	2.75 %
May 2004	1.09	12.23 %
Jun 2004	1.03	-5.49 %
Jul 2004	1.15	10.95 %
Aug 2004	1.23	7.16 %
Sep 2004	1.36	11.00 %
Oct 2004	1.52	11.60 %
Nov 2004	1.35	-11.38 %
Dec 2004	1.22	-9.21 %
Jan 2005	1.33	9.08 %
Feb 2005	1.33	0.00 %
Mar 2005	1.56	17.09 %
Apr 2005	1.57	0.70 %
May 2005	1.47	-6.48 %
Jun 2005	1.65	12.44 %
Jul 2005	1.67	0.67 %
Aug 2005	1.87	12.55 %
Sep 2005	2.23	19.10 %
Oct 2005	2.40	7.44 %
Nov 2005	1.70	-29.19 %
Dec 2005	1.73	1.71 %
Jan 2006	1.82	5.15 %
Feb 2006	1.75	-3.41 %
Mar 2006	1.88	6.90 %
Apr 2006	2.07	10.61 %
May 2006	2.07	-0.19 %
Jun 2006	2.08	0.53 %
Jul 2006	2.15	3.51 %
Aug 2006	2.13	-0.97 %
Sep 2006	1.81	-15.14 %
Oct 2006	1.74	-3.92 %
Nov 2006	1.73	-0.35 %

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Dec 2006	1.81	4.44 %
Jan 2007	1.65	-8.62 %
Feb 2007	1.74	5.20 %
Mar 2007	1.85	6.09 %
Apr 2007	2.04	10.29 %
May 2007	2.04	0.39 %
Jun 2007	2.10	2.69 %
Jul 2007	2.14	1.81 %
Aug 2007	2.09	-2.11 %
Sep 2007	2.27	8.27 %
Oct 2007	2.37	4.72 %
Nov 2007	2.67	12.69 %
Dec 2007	2.60	-2.69 %
Jan 2008	2.61	0.15 %
Feb 2008	2.73	4.72 %
Mar 2008	3.12	14.52 %
Apr 2008	3.37	7.71 %
May 2008	3.74	11.08 %
Jun 2008	3.88	3.75 %
Jul 2008	3.89	0.21 %
Aug 2008	3.27	-15.83 %
Sep 2008	3.38	3.18 %
Oct 2008	2.32	-31.41 %
Nov 2008	1.88	-18.79 %
Dec 2008	1.38	-26.86 %
Jan 2009	1.47	6.84 %
Feb 2009	1.26	-14.30 %
Mar 2009	1.27	0.71 %
Apr 2009	1.37	7.97 %
May 2009	1.49	8.69 %
Jun 2009	1.81	21.30 %
Jul 2009	1.71	-5.15 %
Aug 2009	1.89	10.11 %
Sep 2009	1.75	-7.21 %
Oct 2009	1.94	11.03 %
Nov 2009	1.99	2.27 %
Dec 2009	1.98	-0.35 %
Jan 2010	2.05	3.69 %
Feb 2010	1.99	-3.07 %
Mar 2010	2.11	5.98 %
Apr 2010	2.24	6.40 %
May 2010	2.06	-8.02 %
Jun 2010	2.06	-0.24 %
Jul 2010	2.02	-1.90 %
Aug 2010	2.08	3.17 %
Sep 2010	2.11	1.49 %
Oct 2010	2.25	6.34 %
Nov 2010	2.32	3.34 %
Dec 2010	2.45	5.60 %
Jan 2011	2.62	6.77 %
Feb 2011	2.84	8.40 %
Mar 2011	3.13	10.07 %
Apr 2011	3.27	4.54 %
May 2011	3.09	-5.57 %
Jun 2011	3.05	-1.23 %
Jul 2011	3.13	2.76 %
Aug 2011	3.01	-3.93 %
Sep 2011	2.95	-1.99 %
Oct 2011	2.97	0.61 %
Nov 2011	3.05	2.70 %
Dec 2011	2.87	-5.68 %
Jan 2012	3.09	7.45 %
Feb 2012	3.21	3.89 %
Mar 2012	3.26	1.53 %
Apr 2012	3.23	-0.92 %
May 2012	2.97	-7.81 %

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Jun 2012	2.68	-9.89 %
Jul 2012	2.89	7.91 %
Aug 2012	3.16	9.13 %
Sep 2012	3.19	1.11 %
Oct 2012	3.11	-2.63 %
Nov 2012	2.96	-4.73 %
Dec 2012	2.94	-0.68 %
Jan 2013	3.09	5.14 %
Feb 2013	3.22	4.11 %
Mar 2013	2.97	-7.74 %
Apr 2013	2.81	-5.42 %
May 2013	2.73	-2.96 %
Jun 2013	2.77	1.61 %
Jul 2013	2.89	4.51 %
Aug 2013	3.00	3.77 %
Sep 2013	2.93	-2.30 %
Oct 2013	2.89	-1.67 %
Nov 2013	2.83	-1.91 %
Dec 2013	2.96	4.42 %
Jan 2014	2.92	-1.15 %
Feb 2014	2.97	1.51 %
Mar 2014	2.89	-2.53 %
Apr 2014	2.89	-0.07 %
May 2014	2.87	-0.69 %
Jun 2014	2.88	0.52 %
Jul 2014	2.82	-2.29 %
Aug 2014	2.84	0.78 %
Sep 2014	2.73	-3.87 %
Oct 2014	2.46	-9.86 %
Nov 2014	2.30	-6.63 %
Dec 2014	1.80	-21.59 %
Jan 2015	1.50	-16.94 %
Feb 2015	1.77	18.05 %
Mar 2015	1.63	-7.76 %
Apr 2015	1.70	4.48 %
May 2015	1.85	8.64 %
Jun 2015	1.73	-6.33 %
Jul 2015	1.55	-10.57 %
Aug 2015	1.39	-10.33 %
Sep 2015	1.40	0.43 %
Oct 2015	1.39	-0.29 %
Nov 2015	1.33	-4.67 %
Dec 2015	1.08	-18.40 %
Jan 2016	.93	-14.05 %
Feb 2016	.97	4.62 %
Mar 2016	1.07	9.87 %
Apr 2016	1.15	7.30 %
May 2016	1.30	13.25 %
Jun 2016	1.38	6.39 %
Jul 2016	1.27	-7.96 %
Aug 2016	1.30	1.81 %
Sep 2016	1.32	1.85 %
Oct 2016	1.46	10.46 %
Nov 2016	1.36	-6.93 %
Dec 2016	1.49	9.96 %
Jan 2017	1.51	1.54 %
Feb 2017	1.55	2.18 %
Mar 2017	1.45	-6.59 %
Apr 2017	1.51	4.50 %
May 2017	1.41	-6.49 %
Jun 2017	1.30	-8.29 %
Jul 2017	1.42	9.42 %
Aug 2017	1.56	10.16 %
Sep 2017	1.80	15.31 %
Oct 2017	1.66	-7.83 %
Nov 2017	1.76	6.09 %

Appendix ND.3.13

Dec 2017	1.82	3.24 %
Jan 2018	1.95	7.43 %
Feb 2018	1.85	-5.28 %
Mar 2018	1.86	0.49 %
Apr 2018	2.02	8.45 %
May 2018	2.16	6.95 %
Jun 2018	2.09	-3.02 %
Jul 2018	2.10	0.38 %
Aug 2018	2.12	0.95 %
Sep 2018	2.19	3.35 %
Oct 2018	2.25	2.74 %
Nov 2018	1.95	-13.52 %
Dec 2018	1.70	-12.80 %
Jan 2019	1.78	5.19 %
Feb 2019	1.91	7.29 %
Mar 2019	1.90	-0.63 %
Apr 2019	1.98	3.94 %

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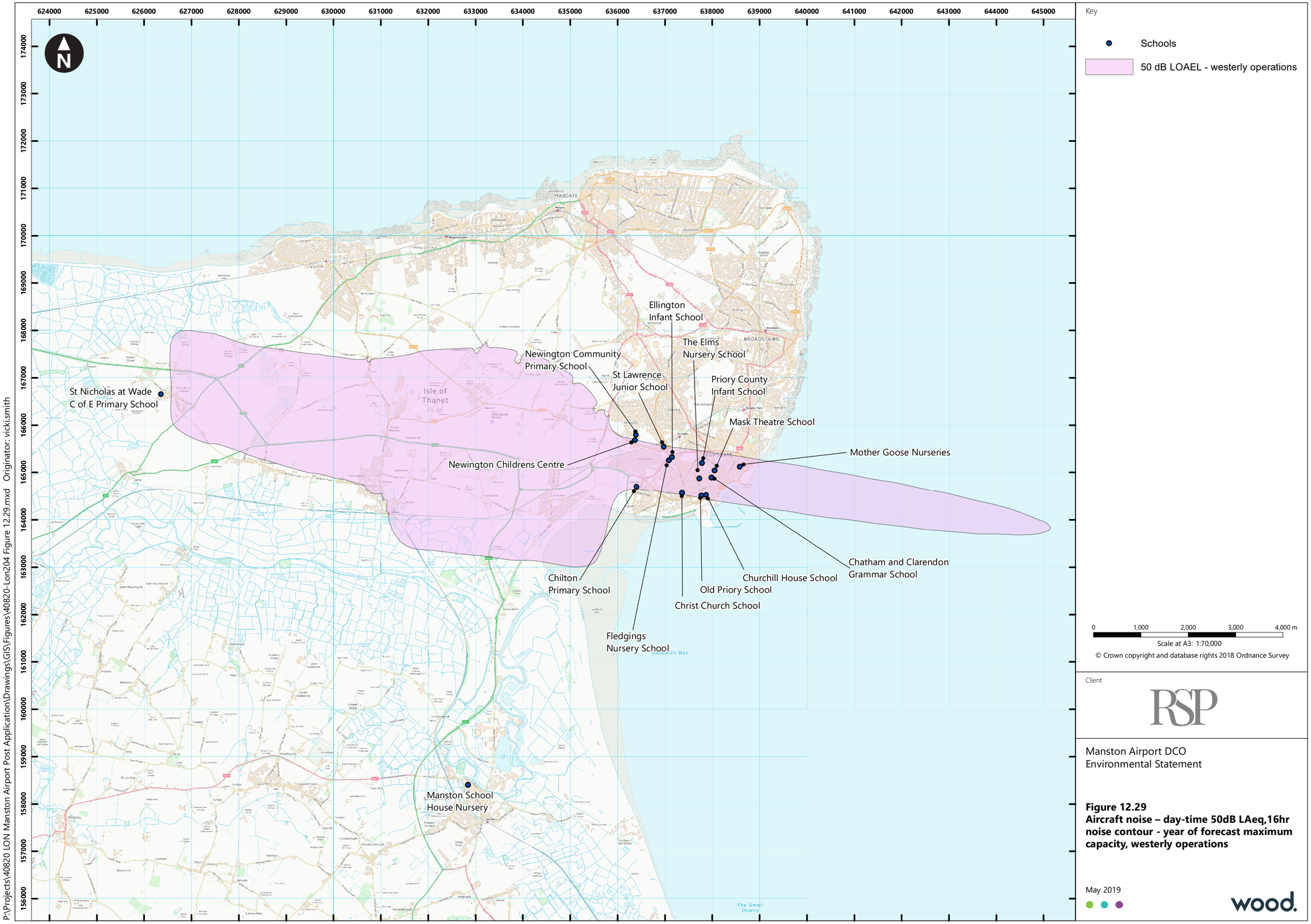
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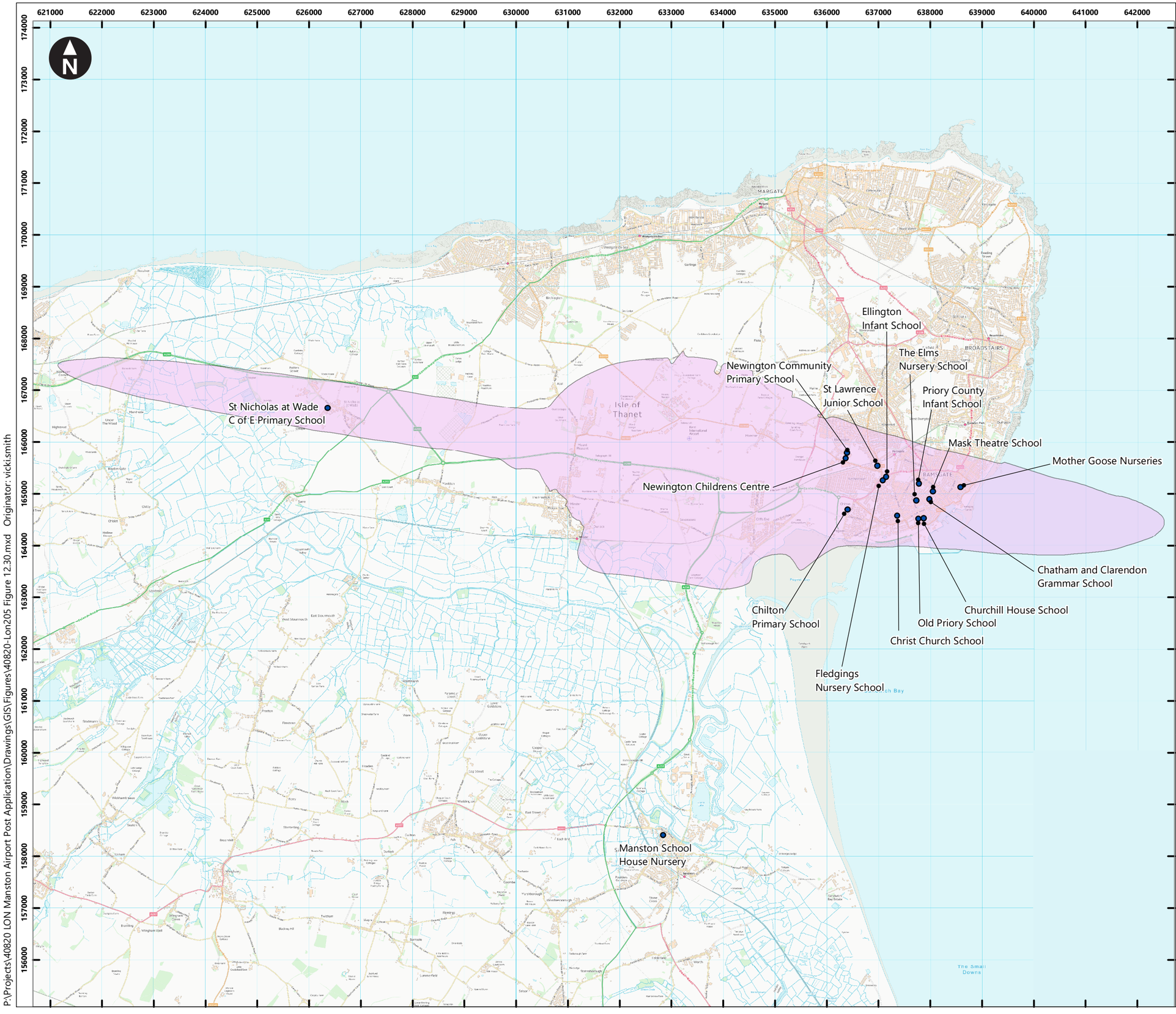
Appendix Ns3.2

Appendix NS.3.2



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Manston Airport DCO
Environmental Statement

Figure 12.30
Aircraft noise – day-time 50dB LAeq,16hr noise contour - year of forecast maximum capacity, easterly operations

May 2019

wood.

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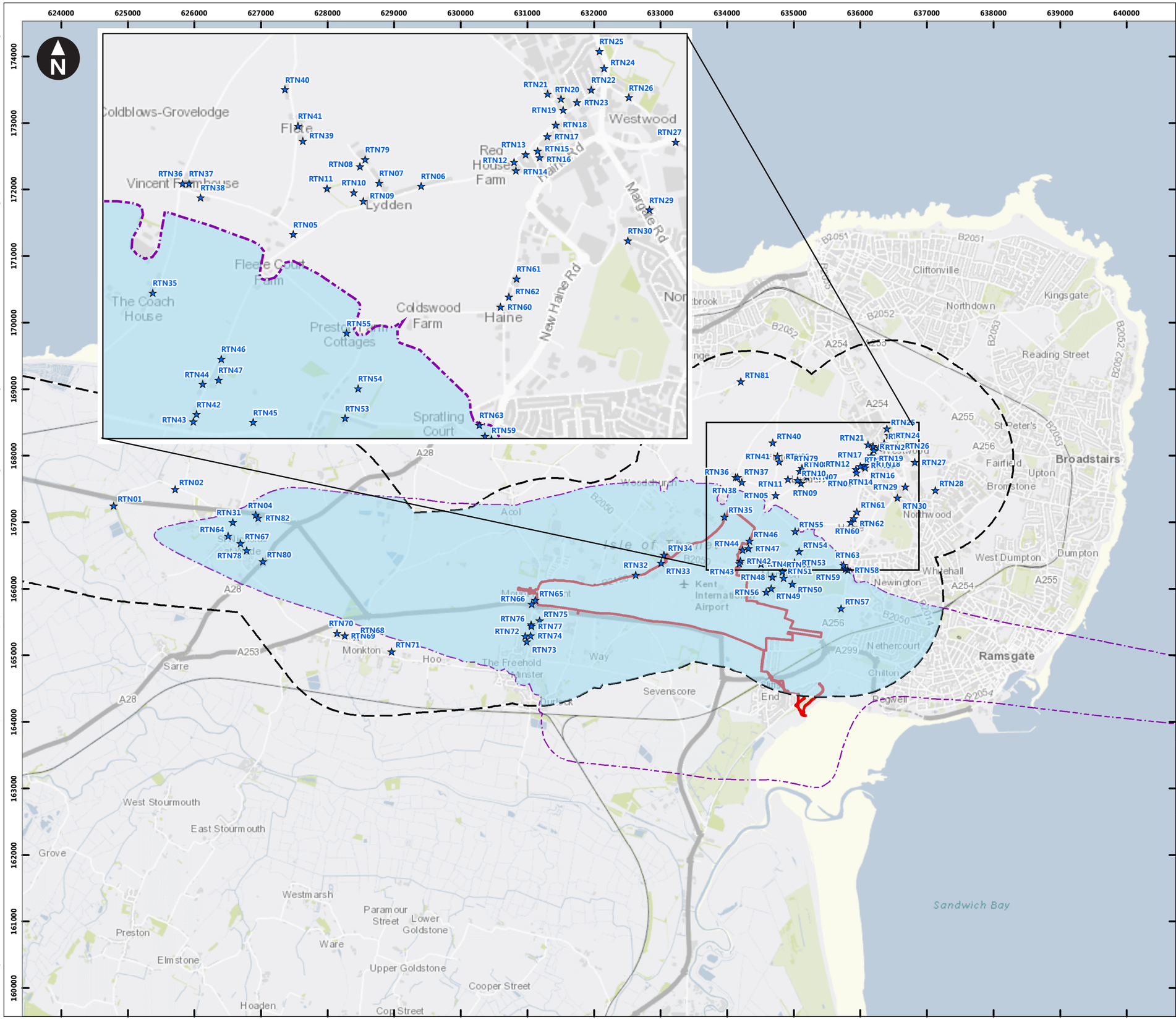
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Appendix Ns.3.3a

Appendix NS.3.3 Part A

P:\Projects\40820 LON Manston Airport Post Application\Drawings\GIS\Figures\40820-Lon208 Figure 12.33.mxd Originator:



Key

- Order Limits
- Region where combined road and aircraft daytime noise effects are possible
- Aircraft noise daytime LOAEL
- 1.5km road noise study area
- Noise receptor location

Notes:
1. To be read in conjunct
Note: Manston Airport Devel
Consent Order – Combined air
traffic noise exercise".

0 500 1,000 1,500 2,000 2,500 3,000 m

Scale 1a:t 55A,3Q0 0

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Client

RSP

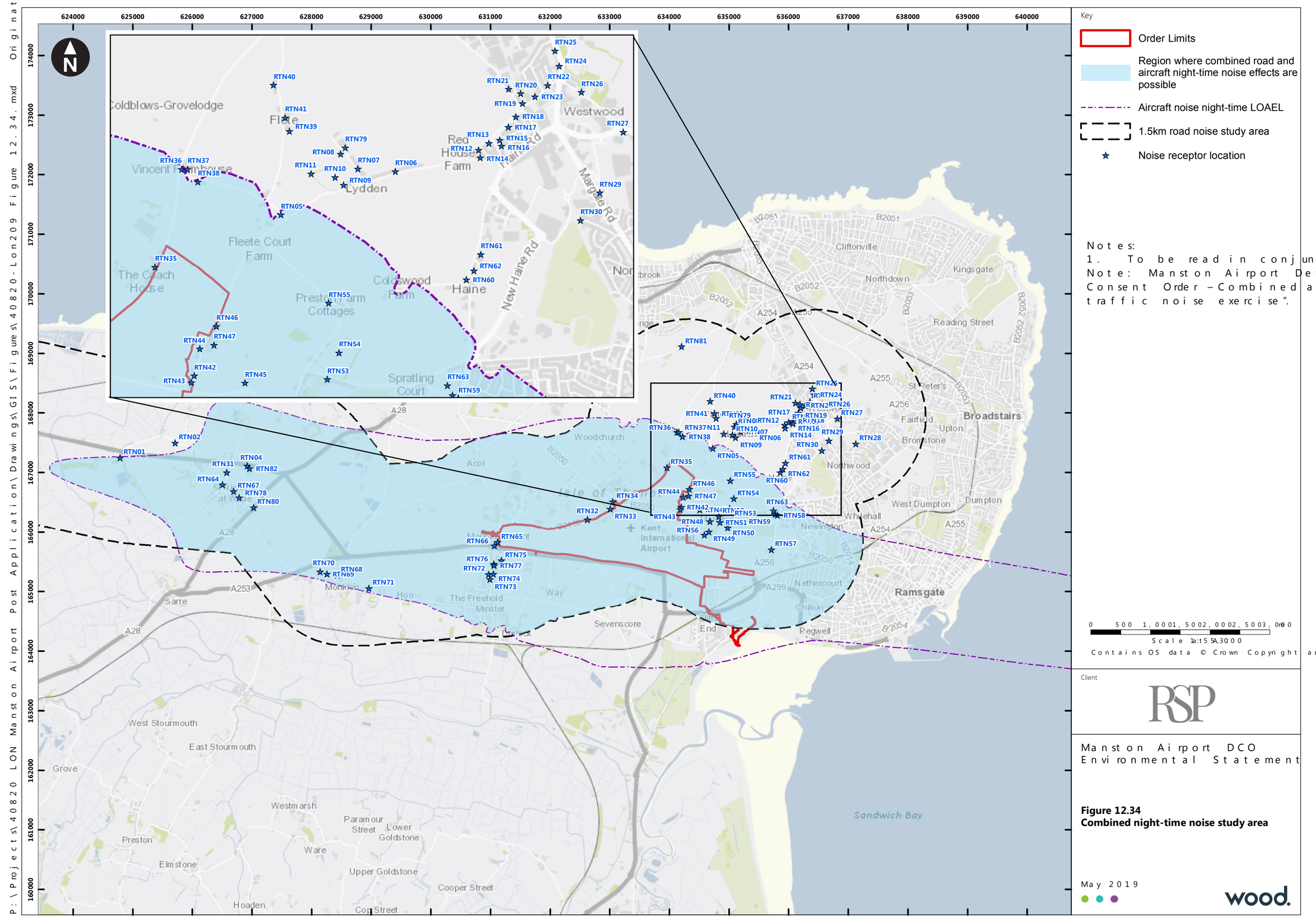
Manston Airport DCO
Environmental Statement

Figure 12.33
Combined daytime noise study area

May 2019

wood.

Appendix NS.3.3 Part A

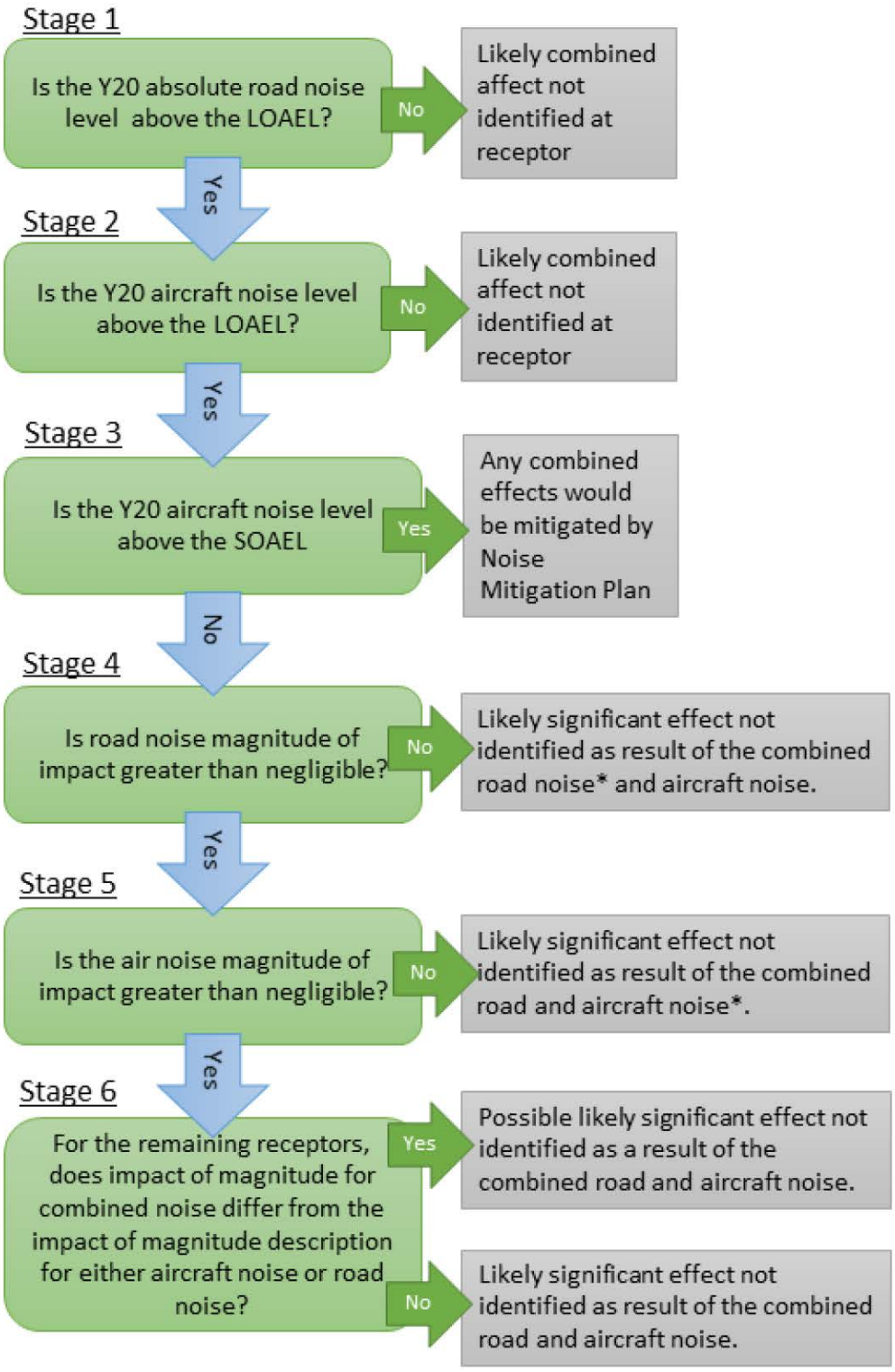


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Appendix NS.3.3 Part A

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Appendix NS3.3b
Flow diagram



*a 'negligible' change is not perceptible over the time period it occurs so it is considered that there can be no combined significant effect where this is the case

Appendix NS.3.3 Part B

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Appendix NS.3.3c

Appendix NS.3.3 Part C

Results tables for combined road and air noise

Key

	Column heading
Column A	Receptor location – See F**igures 12.33 and 12.34**
Column B	Area represented by receptor location
Column C	Number of residential properties represented by receptor location
Column D to F	Predicted road traffic noise levels with and without the Proposed Development
Column G	The noise change resulting from development traffic relative to in baseline road traffic (Column F minus Column D)
Column H	The DMRB impact classification
Column I	The noise change due to development traffic only (Column F minus Column E)
Column J	Predicted aircraft noise levels
Column K	Predicted change in noise levels due to aircraft noise relative to baseline road traffic noise
Column L	Estimated magnitude of change for aircraft noise
Column M	Estimated combined level for road and aircraft noise
Column N	Predicted change in noise levels due to combined road and aircraft noise relative to baseline road traffic noise*
Column O	Estimated magnitude of change for combined road and aircraft aviation noise*
	Cell shading represents a noise level above the daytime or night-time road or air traffic noise SOAEL of 63 dB $L_{Aeq,16hr}$ or 55dB $L_{Aeq,8hr}$ respectively
	Cell shading represents a noise level below the daytime or night-time road or air traffic noise SOAEL of 50 dB $L_{Aeq,16hr}$ or 40dB $L_{Aeq,8hr}$ respectively

Table C.1 Combined road and air traffic noise predictions – Year of maximum forecast capacity – Daytime

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,16hr}$						Aircraft Noise Level dB $L_{Aeq,16hr}$			Combined Noise Level dB $L_{Aeq,16hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN01	Wagtail Farm, BIRCHINGTON	2	59.6	60.5	60.8	1.2	Negligible	0.3	47.4	-12.2	No Change	61	1.4	Negligible
RTN02	Rose Cottage, BIRCHINGTON	21	53.8	54.7	55.0	1.2	Negligible	0.3	47.0	-6.8	No Change	55.6	1.8	Negligible
RTN03	Greys Farm, CANTERBURY	10	59.8	60.6	61.0	1.2	Negligible	0.4	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
RTN04	Frost Farm, BIRCHINGTON	3	68.8	69.7	70.1	1.3	Negligible	0.4	50.7	-18.1	No Change	70.1	1.3	Negligible
RTN05	Brookland Bungalow, MARGATE	5	50.0	59.7	60.2	10.2	Major	0.5	48.7	-1.3	No Change	60.5	10.5	Major
RTN06	Manston Court Road, MARGATE	27	55.5	56.6	56.9	1.4	Negligible	0.3	44.4	-11.1	No Change	57.1	1.6	Negligible
RTN07	Valley Road, MARGATE	10	44.6	52.3	52.7	8.1	Moderate	0.4	44.8	0.2	Negligible	53.4	8.8	Moderate
RTN08	Tree Tops, MARGATE	1	42.1	48.1	48.5	6.4	Moderate	0.4	44.5	2.4	Negligible	50.0	7.9	Moderate
RTN09	Bradgate Caravan Park, MARGATE	19	54.7	64.5	65.0	10.3	Major	0.5	46.3	-8.4	No Change	65.1	10.4	Major
RTN10	Bradgate Caravan Park, MARGATE	148	49.1	57.7	58.1	9.0.	Moderate	0.4	46.6	-2.5	No Change	58.4	9.3	Moderate
RTN11	Bradgate Caravan Park, MARGATE	50	47.7	54.8	55.3	7.6	Moderate	0.5	47.0	-0.7	No Change	55.9	8.2	Moderate
RTN12	Manston Way, MARGATE	14	55.8	47.9	48.1	-7.7	No Change	0.2	39.2	-16.6	No Change	48.6	-7.2	No Change
RTN13	Manston Way, MARGATE	27	55.5	54.4	54.4	-1.1	No Change	0	38.8	-16.7	No Change	54.5	-1.0	No Change
RTN14	Manston Way Walk, MARGATE	33	43.0	42.8	43.0	0	No Change	0.2	39.4	-3.6	No Change	44.6	1.6	Negligible
RTN15	Castle Drive, MARGATE	8	52.3	54.5	54.5	2.2	Negligible	0	38.6	-13.7	No Change	54.6	2.3	Negligible
RTN16	Castle Drive, MARGATE	77	53.6	55.7	55.8	2.2	Negligible	0.1	38.8	-14.8	No Change	55.9	2.3	Negligible

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,16hr}$						Aircraft Noise Level dB $L_{Aeq,16hr}$			Combined Noise Level dB $L_{Aeq,16hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN17	Castle Drive, MARGATE	22	50.8	55.9	55.9	5.1	Moderate	0	38.2	-12.6	No Change	56.0	5.2	Moderate
RTN18	Castle Drive, MARGATE	12	54.3	61.3	61.3	7.0	Moderate	0	37.8	-16.5	No Change	61.3	7.0	Moderate
RTN19	Wherry Close, MARGATE	30	52.6	58.7	58.7	6.1	Moderate	0	37.4	-15.2	No Change	58.7	6.1	Moderate
RTN20	Wherry Close, MARGATE	15	43.0	45.9	46.0	3.0	Minor	0.1	37.1	-5.9	No Change	46.5	3.5	Minor
RTN21	Wherry Close, MARGATE	32	42.8	45.8	46.0	3.2	Minor	0.2	37.2	-5.6	No Change	46.5	3.7	Minor
RTN22	Star Lane, MARGATE	54	54.7	60.6	60.6	5.9	Moderate	0	36.7	-18	No Change	60.6	5.9	Moderate
RTN23	Star Lane, MARGATE	67	53.8	60.2	60.2	6.4	Moderate	0	37.1	-16.7	No Change	60.2	6.4	Moderate
RTN24	Ramsgate Road, MARGATE	18	62.9	63.4	63.5	0.6	Negligible	0.1	36.1	-26.8	No Change	63.5	0.6	Negligible
RTN25	Ramsgate Road, MARGATE	41	63.0	63.5	63.6	0.6	Negligible	0.1	35.8	-27.2	No Change	63.6	0.6	Negligible
RTN26	Poorhole Lane Cottages, BROADSTAIRS	3	61.8	66.4	66.4	4.6	Minor	0	36.5	-25.3	No Change	66.4	4.6	Minor
RTN27	Westwood Road, BROADSTAIRS	63	44.3	48.2	48.2	3.9	Minor	0	37	-7.3	No Change	48.5	4.2	Minor
RTN28	Northwood Road, RAMSGATE	137	38.7	40.2	40.3	1.6	Negligible	0.1	38.1	-0.6	No Change	42.3	3.6	Minor
RTN29	Margate Road, RAMSGATE	50	39.0	40.7	40.9	1.9	Negligible	0.2	38.8	-0.2	No Change	43.0	4.0	Minor
RTN30	Orchard Close, RAMSGATE	8	43.6	44.3	44.5	0.9	Negligible	0.2	39.9	-3.7	No Change	45.8	2.2	Negligible
RTN31	Stuart Lane, BIRCHINGTON	3	56.1	57.0	57.4	1.3	Negligible	0.4	50.8	-5.3	No Change	58.3	2.2	Negligible
RTN32	Pouces Cottages, RAMSGATE	9	70.9	73.7	74.5	3.6	Minor	0.8	63.8	-7.1	No Change	74.9	4.0	Minor
RTN33	Bell Davies, RAMSGATE	16	63.0	65.7	66.6	3.6	Minor	0.9	55.8	-7.2	No Change	66.9	3.9	Minor
RTN34	Tollemache Close, RAMSGATE	68	53.3	55.2	56.0	2.7	Negligible	0.8	57.9	4.6	Minor	60.1	6.8	Moderate
RTN35	Manston Road, MARGATE	16	58.9	57.3	57.7	-1.2	No Change	0.4	51.6	-7.3	No Change	58.7	-0.2	No Change
RTN36	Vincent Farm House, MARGATE	2	70.5	71.8	71.9	1.4	Negligible	0.1	48.1	-22.4	No Change	71.9	1.4	Negligible

Appendix NS.3.3 Part C

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,16hr}$						Aircraft Noise Level dB $L_{Aeq,16hr}$			Combined Noise Level dB $L_{Aeq,16hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN37	Vincent Farm House, MARGATE	8	55.0	57.0	57.1	2.1	Negligible	0.1	46.1	-8.9	No Change	57.4	2.4	Negligible
RTN38	Vincent Farm Cottages, MARGATE	3	51.7	56.1	56.3	4.6	Minor	0.2	49.7	-2.0	No Change	57.2	5.5	Moderate
RTN39	Wellington Road, MARGATE	2	41.9	45.3	45.6	3.7	Minor	0.3	45.5	3.6	Minor	48.6	6.7	Moderate
RTN40	Fleet Road, MARGATE	1	46.9	48.2	48.3	1.4	Negligible	0.1	40.1	-6.8	No Change	48.9	2.0	Negligible
RTN41	Norfolk Road, MARGATE	3	44.2	46.1	46.3	2.1	Negligible	0.2	46.6	2.4	Negligible	49.5	5.3	Moderate
RTN42	Manston Court Road, RAMSGATE	8	57.5	57.8	58.9	1.4	Negligible	1.1	57.7	0.2	Negligible	61.4	3.9	Minor
RTN43	Manston Court Road, RAMSGATE	4	56.8	55.9	57.4	0.6	Negligible	1.5	58.2	1.4	Negligible	60.8	4.0	Minor
RTN44	Manston Court Road, RAMSGATE	6	54.2	54.7	55.5	1.3	Negligible	0.8	56.8	2.6	Negligible	59.2	5.0	Moderate
RTN45	Wood Farm Cottages, RAMSGATE	3	55.9	55.0	56.7	0.8	Negligible	1.7	57.2	1.3	Negligible	60.0	4.1	Minor
RTN46	Manston Court Road, RAMSGATE	11	55.3	56.2	57.0	1.7	Negligible	0.8	53.8	-1.5	No Change	58.7	3.4	Minor
RTN47	Manston Court Road, RAMSGATE	4	43.5	45.8	46.2	2.7	Negligible	0.4	52.6	9.1	Moderate	53.5	10.0	Major
RTN48	The Green, RAMSGATE	31	64.2	63.1	64.9	0.7	Negligible	1.8	57.2	-7.0	No Change	65.6	1.4	Negligible
RTN49	High Street, RAMSGATE	13	46.4	46.6	47.7	1.3	Negligible	1.1	61.3	14.9	Major	61.5	15.1	Major
RTN50	Manston Road, RAMSGATE	13	59.4	60.3	61.4	2.0	Negligible	1.1	58.2	-1.2	No Change	63.1	3.7	Minor
RTN51	Manston Road, RAMSGATE	30	50.8	51.7	52.7	1.9	Negligible	1	56.9	6.1	Moderate	58.3	7.5	Moderate
RTN52	Preston Road, RAMSGATE	24	47.6	47.2	48.3	0.7	Negligible	1.1	56.1	8.5	Moderate	56.8	9.2	Moderate
RTN53	Spratling St, RAMSGATE	23	45.9	45.9	46.7	0.8	Negligible	0.8	54.3	8.4	Moderate	55.0	9.1	Moderate

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,16hr}$						Aircraft Noise Level dB $L_{Aeq,16hr}$			Combined Noise Level dB $L_{Aeq,16hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN54	Preston Park Caravan Site, RAMSGATE	24	47.9	49.1	49.6	1.7	Negligible	0.5	53.0	5.1	Moderate	54.6	6.7	Moderate
RTN55	Preston Farm Cottages, RAMSGATE	4	42.5	45.8	46.2	3.7	Minor	0.4	51.1	8.6	Moderate	52.3	9.8	Moderate
RTN56	High Street, RAMSGATE	5	47.9	48.2	49.1	1.2	Negligible	0.9	62.5	14.6	Major	62.7	14.8	Major
RTN57	Haine Road, RAMSGATE	2	68.2	63.9	63.9	-4.3	No Change	0	55.7	-12.5	No Change	64.5	-3.7	No Change
RTN58	Haine Road, RAMSGATE	21	66.1	65.7	65.8	-0.3	No Change	0.1	50.6	-15.5	No Change	65.9	-0.2	No Change
RTN59	Saddlers Mews, RAMSGATE	14	52.9	52.6	52.7	-0.2	No Change	0.1	51.1	-1.8	No Change	55.0	2.1	Negligible
RTN60	Haine Farm Cottage, RAMSGATE	4	44.3	44.8	44.9	0.6	Negligible	0.1	44.4	0.1	Negligible	47.7	3.4	Minor
RTN61	Haine Farm Mews, RAMSGATE	19	46.4	46.8	46.8	0.4	Negligible	0	45.1	-1.3	No Change	49	2.6	Negligible
RTN62	Bijou Villas, RAMSGATE	7	46.1	46.2	46.2	0.1	Negligible	0	44.1	-2	No Change	48.3	2.2	Negligible
RTN63	Spratling Lane, RAMSGATE	2	50.1	49.7	49.8	-0.3	No Change	0.1	50.1	0	No Change	53.0	2.9	Negligible
RTN64	Court Road, BIRCHINGTON	22	49.9	50.7	51.1	1.2	Negligible	0.4	52.1	2.2	Negligible	54.6	4.7	Minor
RTN65	Smugglers Leap, RAMSGATE	23	65.5	67.7	68.5	3.0	Minor	0.8	62.9	-2.6	No Change	69.6	4.1	Minor
RTN66	Smugglers Leap, RAMSGATE	18	70	70.6	71.1	1.1	Negligible	0.5	61.7	-8.3	No Change	71.6	1.6	Negligible
RTN67	Sun Lane, BIRCHINGTON	9	50	50.9	51.2	1.2	Negligible	0.3	52.8	2.8	Negligible	55.1	5.1	Moderate
RTN68	Collards Close, RAMSGATE	10	51.6	52.1	52.6	1.0	Negligible	0.5	48.6	-3.0	No Change	54.1	2.5	Negligible
RTN69	Parsonage Fields, RAMSGATE	77	51.1	51.7	52.1	1.0	Negligible	0.4	48.3	-2.8	No Change	53.6	2.5	Negligible
RTN70	Parsonage Fields, RAMSGATE	11	52.6	53.2	53.5	0.9	Negligible	0.3	48.3	-4.3	No Change	54.6	2.0	Negligible
RTN71	Monkton Street, RAMSGATE	61	47.9	48.5	48.9	1.0	Negligible	0.4	48.3	0.4	Negligible	51.6	3.7	Minor

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,16hr}$						Aircraft Noise Level dB $L_{Aeq,16hr}$			Combined Noise Level dB $L_{Aeq,16hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN72	Fairfield Road, RAMSGATE	57	49.0	49.8	50.0	1.0	Negligible	0.2	55.5	6.5	Moderate	56.6	7.6	Moderate
RTN73	Orchard Close, RAMSGATE	20	54.7	55.4	55.4	0.7	Negligible	0	55.4	0.7	Negligible	58.4	3.7	Minor
RTN74	Toothill Street, RAMSGATE	75	64.6	65.2	65.2	0.6	Negligible	0	56.1	-8.5	No Change	65.7	1.1	Negligible
RTN75	Temple Close, RAMSGATE	31	53.4	53.9	54.2	0.8	Negligible	0.3	59.8	6.4	Moderate	60.9	7.5	Moderate
RTN76	Temple Close, RAMSGATE	11	64.2	64.9	64.9	0.7	Negligible	0	58.3	-5.9	No Change	65.8	1.6	Negligible
RTN77	Hill House, RAMSGATE	11	61.5	62.1	62.2	0.7	Negligible	0.1	57.9	-3.6	No Change	63.6	2.1	Negligible
RTN78	The Length, BIRCHINGTON	111	49.6	50.4	50.7	1.1	Negligible	0.3	53.0	3.4	Minor	55.0	5.4	Moderate
RTN79	Lydden Farm, MARGATE	3	40.3	45.2	45.6	5.3	Moderate	0.4	42.4	2.1	Negligible	47.3	7.0	Moderate
RTN80	Canterbury Rd, BIRCHINGTON	0	56.6	57.0	57.2	0.6	Negligible	0.2	53	-3.6	No Change	58.6	2.0	Negligible
RTN81	Shottendane Rd, RAMSGATE	0	67.9	71.0	71.1	3.2	Minor	0.1	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
RTN82	Frost Farm, BIRCHINGTON	42	61.4	62.3	62.6	1.2	Negligible	0.3	50.9	-10.5	No Change	62.9	1.5	Negligible

*'N/A' due to receptor being outside of the aircraft noise modelling bounds. Receptor included for completeness.

Table C.2 Combined road and air traffic noise predictions – Year of maximum forecast capacity – Night-time

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,8hr}$						Aircraft Noise Level dB $L_{Aeq,8hr}$			Combined Noise Level dB $L_{Aeq,8hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN01	Wagtail Farm, BIRCHINGTON	2	52.7	53.6	55.2	2.5	Negligible	1.6	40.1	-12.6	No Change	55.3	2.6	Negligible
RTN02	Rose Cottage, BIRCHINGTON	21	46.5	47.4	49.0	2.5	Negligible	1.6	39.2	-7.3	No Change	49.4	2.9	Negligible
RTN03	Greys Farm, CANTERBURY	10	52.8	53.7	55.3	2.5	Negligible	1.6	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
RTN04	Frost Farm, BIRCHINGTON	3	62.4	63.3	64.8	2.4	Negligible	1.5	43	-19.4	No Change	64.8	2.4	Negligible
RTN05	Brookland Bungalow, MARGATE	5	41.3	52.5	52.9	11.6	Major	0.4	40.6	-0.7	No Change	53.1	11.8	Major
RTN06	Manston Court Road, MARGATE	27	47.0	48.4	49.0	2.0	Negligible	0.6	36.3	-10.7	No Change	49.2	2.2	Negligible
RTN07	Valley Road, MARGATE	10	35.7	44.5	45.0	9.3	Moderate	0.5	36.2	0.5	Negligible	45.5	9.8	Moderate
RTN08	Tree Tops, MARGATE	1	33.4	40.0	40.5	7.1	Moderate	0.5	36.5	3.1	Minor	42.0	8.6	Moderate
RTN09	Bradgate Caravan Park, MARGATE	19	46.1	57.4	57.9	11.8	Major	0.5	38.1	-8.0	No Change	57.9	11.8	Major
RTN10	Bradgate Caravan Park, MARGATE	148	40.3	50.0	50.5	10.2	Major	0.5	38.3	-2.0	No Change	50.8	10.5	Major
RTN11	Bradgate Caravan Park, MARGATE	50	39.1	46.9	47.4	8.3	Moderate	0.5	38.6	-0.5	No Change	47.9	8.8	Moderate
RTN12	Manston Way, MARGATE	14	47.5	39.0	39.4	-8.1	No Change	0.4	30.7	-16.8	No Change	39.9	-7.6	No Change
RTN13	Manston Way, MARGATE	27	46.9	45.8	45.8	-1.1	No Change	0	30.4	-16.5	No Change	45.9	-1.0	No Change
RTN14	Manston Way Walk, MARGATE	33	34.2	33.6	34	-0.2	No Change	0.4	30.9	-3.3	No Change	35.7	1.5	Negligible
RTN15	Castle Drive, MARGATE	8	43.6	45.8	45.9	2.3	Negligible	0.1	30.2	-13.4	No Change	46.0	2.4	Negligible
RTN16	Castle Drive, MARGATE	77	45.1	47.2	47.3	2.2	Negligible	0.1	30.4	-14.7	No Change	47.4	2.3	Negligible
RTN17	Castle Drive, MARGATE	22	42.2	47.5	47.6	5.4	Moderate	0.1	29.8	-12.4	No Change	47.7	5.5	Moderate

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,8hr}$						Aircraft Noise Level dB $L_{Aeq,8hr}$			Combined Noise Level dB $L_{Aeq,8hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN18	Castle Drive, MARGATE	12	45.8	53.2	53.2	7.4	Moderate	0	29.4	-16.4	No Change	53.2	7.4	Moderate
RTN19	Wherry Close, MARGATE	30	44	50.3	50.3	6.3	Moderate	0	29.0	-15.0	No Change	50.3	6.3	Moderate
RTN20	Wherry Close, MARGATE	15	34.1	37.2	37.1	3.0	Minor	-0.1	28.8	-5.3	No Change	37.7	3.6	Minor
RTN21	Wherry Close, MARGATE	32	34.1	36.8	37.1	3.0	Minor	0.3	28.8	-5.3	No Change	37.7	3.6	Minor
RTN22	Star Lane, MARGATE	54	46.2	52.6	52.4	6.2	Moderate	-0.2	28.3	-17.9	No Change	52.4	6.2	Moderate
RTN23	Star Lane, MARGATE	67	45.3	52	52	6.7	Moderate	0	28.7	-16.6	No Change	52.0	6.7	Moderate
RTN24	Ramsgate Road, MARGATE	18	54.7	55.3	55.4	0.7	Negligible	0.1	27.7	-27	No Change	55.4	0.7	Negligible
RTN25	Ramsgate Road, MARGATE	41	54.9	55.4	55.6	0.7	Negligible	0.2	27.4	-27.5	No Change	55.6	0.7	Negligible
RTN26	Poorhole Lane Cottages, BROADSTAIRS	3	53.6	58.4	58.4	4.8	Minor	0	28.2	-25.4	No Change	58.4	4.8	Minor
RTN27	Westwood Road, BROADSTAIRS	63	35.4	39.5	39.5	4.1	Minor	0	28.7	-6.7	No Change	39.8	4.4	Minor
RTN28	Northwood Road, RAMSGATE	137	29.9	31.2	31.5	1.6	Negligible	0.3	29.9	0	No Change	33.8	3.9	Minor
RTN29	Margate Road, RAMSGATE	50	30.4	31.6	32.1	1.7	Negligible	0.5	30.6	0.2	Negligible	34.4	4	Minor
RTN30	Orchard Close, RAMSGATE	8	35.3	36.1	36.3	1.0	Negligible	0.2	31.6	-3.7	No Change	37.6	2.3	Negligible
RTN31	Stuart Lane, BIRCHINGTON	3	49.0	49.9	51.4	2.4	Negligible	1.5	43.3	-5.7	No Change	52.0	3	Minor
RTN32	Pouces Cottages, RAMSGATE	9	64.9	67.0	69.0	4.1	Minor	2.0	56.6	-8.3	No Change	69.2	4.3	Minor
RTN33	Bell Davies, RAMSGATE	16	56.6	58.6	60.7	4.1	Minor	2.1	47.7	-8.9	No Change	60.9	4.3	Minor
RTN34	Tollemache Close, RAMSGATE	68	47.0	47.0	48.8	1.8	Negligible	1.8	49.6	2.6	Negligible	52.2	5.2	Moderate
RTN35	Manston Road, MARGATE	16	51.9	50.2	49.9	-2.0	No Change	-0.3	43.9	-8.0	No Change	50.9	-1.0	No Change
RTN36	Vincent Farm House, MARGATE	2	64.0	64.1	65.7	1.7	Negligible	1.6	40.9	-23.1	No Change	65.7	1.7	Negligible
RTN37	Vincent Farm House, MARGATE	8	47.7	48.9	50.3	2.6	Negligible	1.4	39.4	-8.3	No Change	50.6	2.9	Negligible

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,8hr}$						Aircraft Noise Level dB $L_{Aeq,8hr}$			Combined Noise Level dB $L_{Aeq,8hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN38	Vincent Farm Cottages, MARGATE	3	44.3	48.5	49.3	5.0	Moderate	0.8	41.5	-2.8	No Change	50.0	5.7	Moderate
RTN39	Wellington Road, MARGATE	2	33.5	36.5	37.4	3.9	Minor	0.9	37.2	3.7	Minor	40.3	6.8	Moderate
RTN40	Fleet Road, MARGATE	1	39.2	39.2	40.7	1.5	Negligible	1.5	31.1	-8.1	No Change	41.2	2.0	Negligible
RTN41	Norfolk Road, MARGATE	3	36.2	37.1	38.3	2.1	Negligible	1.2	38.1	1.9	Negligible	41.2	5.0	Moderate
RTN42	Manston Court Road, RAMSGATE	8	49.1	49.6	52.2	3.1	Minor	2.6	49.3	0.2	Negligible	54.0	4.9	Minor
RTN43	Manston Court Road, RAMSGATE	4	48.9	48.0	50.9	2.0	Negligible	2.9	49.5	0.6	Negligible	53.3	4.4	Minor
RTN44	Manston Court Road, RAMSGATE	6	45.6	46.2	48.5	2.9	Negligible	2.3	47.9	2.3	Negligible	51.2	5.6	Moderate
RTN45	Wood Farm Cottages, RAMSGATE	3	47.3	47.5	49.5	2.2	Negligible	2	48.7	1.4	Negligible	52.1	4.8	Minor
RTN46	Manston Court Road, RAMSGATE	11	46.9	47.8	50.1	3.2	Minor	2.3	45.7	-1.2	No Change	51.4	4.5	Minor
RTN47	Manston Court Road, RAMSGATE	4	34.9	37.2	38.4	3.5	Minor	1.2	44.0	9.1	Moderate	45.1	10.2	Major
RTN48	The Green, RAMSGATE	31	56	56.2	58.1	2.1	Negligible	1.9	48.7	-7.3	No Change	58.6	2.6	Negligible
RTN49	High Street, RAMSGATE	13	37.6	38.2	40.2	2.6	Negligible	2	53.0	15.4	Major	53.2	15.6	Major
RTN50	Manston Road, RAMSGATE	13	51	52.9	54.4	3.4	Minor	1.5	50.0	-1.0	No Change	55.7	4.7	Minor
RTN51	Manston Road, RAMSGATE	30	42.2	44	45.4	3.2	Minor	1.4	49.0	6.8	Moderate	50.6	8.4	Moderate
RTN52	Preston Road, RAMSGATE	24	38.9	39	40.9	2.0	Negligible	1.9	48.1	9.2	Moderate	48.9	10	Major
RTN53	Spratling St, RAMSGATE	23	37.3	37.6	38.7	1.4	Negligible	1.1	46.3	9.0	Moderate	47.0	9.7	Moderate
RTN54	Preston Park Caravan Site, RAMSGATE	24	39.4	40.7	41.3	1.9	Negligible	0.6	44.8	5.4	Moderate	46.4	7.0	Moderate

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,8hr}$						Aircraft Noise Level dB $L_{Aeq,8hr}$			Combined Noise Level dB $L_{Aeq,8hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN55	Preston Farm Cottages, RAMSGATE	4	33.9	37.2	38.1	4.2	Minor	0.9	43.0	9.1	Moderate	44.2	10.3	Major
RTN56	High Street, RAMSGATE	5	39.2	39.9	41.4	2.2	Negligible	1.5	53.9	14.7	Major	54.1	14.9	Major
RTN57	Haine Road, RAMSGATE	2	61.2	57.1	57.1	-4.1	No Change	0	48.1	-13.1	No Change	57.6	-3.6	No Change
RTN58	Haine Road, RAMSGATE	21	59.4	59.0	59.3	-0.1	No Change	0.3	42.9	-16.5	No Change	59.4	0	No Change
RTN59	Saddlers Mews, RAMSGATE	14	45.5	45.2	45.5	0	No Change	0.3	43.5	-2.0	No Change	47.6	2.1	Negligible
RTN60	Haine Farm Cottage, RAMSGATE	4	36.2	37	37.1	0.9	Negligible	0.1	36.0	-0.2	No Change	39.6	3.4	Minor
RTN61	Haine Farm Mews, RAMSGATE	19	38.4	39.1	39.2	0.8	Negligible	0.1	36.8	-1.6	No Change	41.2	2.8	Negligible
RTN62	Bijou Villas, RAMSGATE	7	38.0	38.6	38.7	0.7	Negligible	0.1	35.8	-2.2	No Change	40.5	2.5	Negligible
RTN63	Spratling Lane, RAMSGATE	2	42.3	42.0	42.0	-0.3	No Change	0	42.0	-0.3	No Change	45.0	2.7	Negligible
RTN64	Court Road, BIRCHINGTON	22	42.3	43.2	44.8	2.5	Negligible	1.6	44.8	2.5	Negligible	47.8	5.5	Moderate
RTN65	Smugglers Leap, RAMSGATE	23	58.7	61	63.9	5.2	Moderate	2.9	55.5	-3.2	No Change	64.5	5.8	Moderate
RTN66	Smugglers Leap, RAMSGATE	18	63.4	63.5	65.7	2.3	Negligible	2.2	54.3	-9.1	No Change	66.0	2.6	Negligible
RTN67	Sun Lane, BIRCHINGTON	9	42.3	43.2	44.6	2.3	Negligible	1.4	45.5	3.2	Minor	48.1	5.8	Moderate
RTN68	Collards Close, RAMSGATE	10	43.7	44.2	45.9	2.2	Negligible	1.7	41.3	-2.4	No Change	47.2	3.5	Minor
RTN69	Parsonage Fields, RAMSGATE	77	43.2	43.7	45.2	2	Negligible	1.5	41.0	-2.2	No Change	46.6	3.4	Minor
RTN70	Parsonage Fields, RAMSGATE	11	44.8	45.4	46.6	1.8	Negligible	1.2	41.0	-3.8	No Change	47.7	2.9	Negligible
RTN71	Monkton Street, RAMSGATE	61	40.0	40.2	42.3	2.3	Negligible	2.1	40.6	0.6	Negligible	44.5	4.5	Minor
RTN72	Fairfield Road, RAMSGATE	57	41	41.7	42.5	1.5	Negligible	0.8	47.8	6.8	Moderate	48.9	7.9	Moderate
RTN73	Orchard Close, RAMSGATE	20	47.2	47.9	48.1	0.9	Negligible	0.2	47.7	0.5	Negligible	50.9	3.7	Minor

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Receptor Location ID	Area Represented	Number of residential	Road						Aircraft			Combined		
			Road Noise level dB $L_{Aeq,8hr}$						Aircraft Noise Level dB $L_{Aeq,8hr}$			Combined Noise Level dB $L_{Aeq,8hr}$		
			Total without project Y2	Total without project Y20	Total with project Y20	Change long-term	DMRB Criteria	Change resulting from project traffic only	Total with project Y20	Change long-term	Magnitude of Impact	Total with project Y20	Change long-term	Magnitude of Impact
RTN74	Toothill Street, RAMSGATE	75	57.4	58.1	58.3	0.9	Negligible	0.2	48.1	-9.3	No Change	58.7	1.3	Negligible
RTN75	Temple Close, RAMSGATE	31	45.9	45.8	46.9	1.0	Negligible	1.1	51.8	5.9	Moderate	53.0	7.1	Moderate
RTN76	Temple Close, RAMSGATE	11	57.1	57.7	57.9	0.8	Negligible	0.2	50.5	-6.6	No Change	58.6	1.5	Negligible
RTN77	Hill House, RAMSGATE	11	54.2	54.9	55.1	0.9	Negligible	0.2	50.1	-4.1	No Change	56.3	2.1	Negligible
RTN78	The Length, BIRCHINGTON	111	41.8	42.7	44.0	2.2	Negligible	1.3	45.7	3.9	Minor	47.9	6.1	Moderate
RTN79	Lydden Farm, MARGATE	3	31.4	36.9	37.4	6.0	Moderate	0.5	34.8	3.4	Minor	39.3	7.9	Moderate
RTN80	Canterbury Rd, BIRCHINGTON	0	48.9	49.5	49.8	0.9	Negligible	0.3	45.7	-3.2	No Change	51.2	2.3	Negligible
RTN81	Shottendane Rd, RAMSGATE	0	63.0	63.2	63.5	0.5	Negligible	0.3	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
RTN82	Frost Farm, BIRCHINGTON	42	54.6	55.5	57.0	2.4	Negligible	1.5	43.3	-11.3	No Change	57.2	2.6	Negligible

*'N/A' due to receptor being outside of the aircraft noise modelling bounds. Receptor included for completeness.

Appendix NS.3.3 Part C

Appendix NS.3.7

Appendix NS3.7

631000 632000 633000 634000 635000 636000

168000 167000 166000 165000 164000 163000

N

A B C D E

Isle of Thanet
Woodchurch
Acol
Minster
Minster Marshes
Manston
Haine
Newington
Westwood Cross
Lydden
Nethercourt
Chilton
Pegwell
Cliffs End
Pegwell Bay
Mount Pleasant
Manston Park
Durlock
Clapper Hill

Key

Maximum extent of LAeq,16hr or LAeq,8hr noise contours for westerly operations in year of forecast maximum capacity

Eligible property

0 200 400 600 800 1,000 m

Scale at A3: 1:20,000

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Client

RSP

Manston Airport DCO
Environmental Statement

Figure 12.31
Eligibility for Manston noise insulation and ventilation scheme - westerly operations.

May 2019

wood.

P:\Projects\40820 LON Manston Airport Post Application\Drawings\GIS\Figures\40820-Lon206 Figure 12.31.mxd Originator: vicki.smith

Appendix NS3.7

630000 631000 632000 633000 634000 635000 636000

168000 167000 166000 165000 164000 163000

N

A B C D E

Isle of Thanet
Woodchurch
Acol
Minster
Manston
Haine
Cliffs End
Pegwell Bay
Minster Marshes
Clapper Hill
Durlock
Mount Pleasant
Lydden
Flete
Isle of Thanet

Key

Maximum extent of LAeq,16hr or LAeq,8hr noise contours for easterly operations in year of forecast maximum capacity

Eligible property

0 200 400 600 800 1,000 m

Scale at A3: 1:20,000

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Client

RSP

Manston Airport DCO
Environmental Statement

Figure 12.32
Eligibility for Manston noise insulation and ventilation scheme - easterly operations.

May 2019

wood.

P:\Projects\40820 LON Manston Airport Post Application\Drawings\GIS\Figures\40820-Lon207 Figure 12.32.mxd Originator: vicki.smith

Appendix NS3.7

Office of the General Counsel

BY EMAIL

Angus Walker
Bircham Dyson Bell
50 Broadway
London SW1H 0BL

15 September 2017

Dear Angus

R (oao M Barraud) v Civil Aviation Authority Case No C1/2015/2589

I refer to our meeting on 12 June 2017 and to your letter dated 11 July 2017. I apologise that your letter has gone unanswered for so long.

I can confirm that the CAA is able to accept into it system an application for a potential change to airspace design prior to your clients being in receipt of a Development Consent Order, and therefore in the case of Manston prior to your clients being owners of the site of Manston Airport.

We acknowledge the CAA is a statutory consultee in the Development Consent Order process and that there are points in that process when the CAA is required to provide that information which it can at the relevant stage on aspects of your DCO application. We also acknowledge that you propose to submit and then develop your airspace change proposal alongside the work that you carry out for the purpose of the DCO process. I can confirm that it is our view that it is for you to decide how best to run the two process for which your client is responsible and that we will endeavour to be as clear as possible about the information we required and time frames within which it must be delivered to us to enable you to plan as best you can your approach to the two processes.

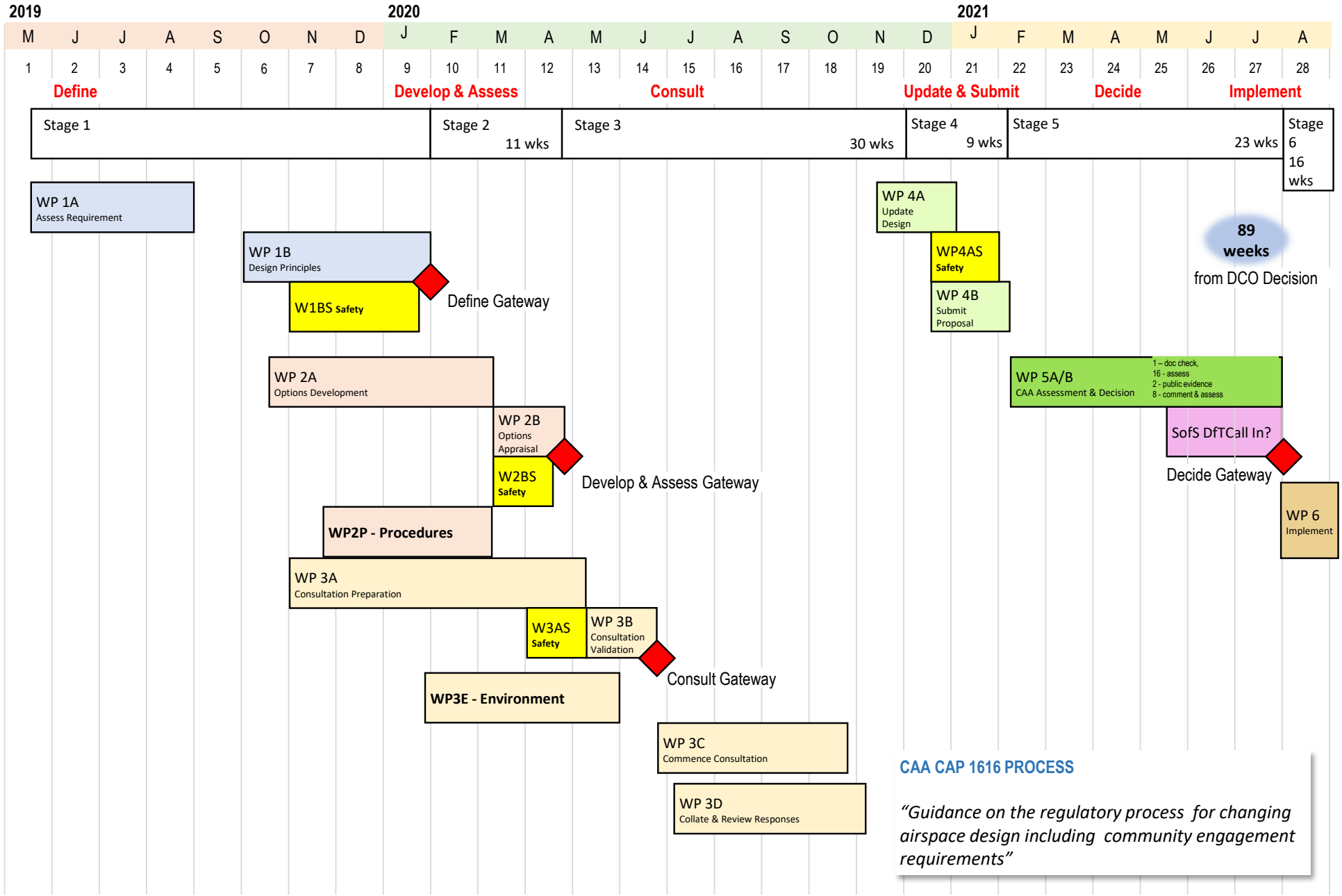
Yours sincerely

[redacted]

Imogen Brooks
Principal Legal Adviser

Civil Aviation Authority
CAA House K5, 45-59 Kingsway London WC2B 6TE www.caa.co.uk
Direct Line 020 7453 6173 Fax 020 7453 6175 imogen.brooks@caa.co.uk

Appendix OP.3.2



Appendix OP.3.4

APPENDIX OP.3.6 - APPLICANT'S COMMENTS ON STONE HILL PARK DRAFT TIMETABLE

Start	End	Phase	SHP Comments	RiverOak Comments
09/01/2019	09/01/2020	DCO Decision	In line with recent precedent, any decision by the SoS to grant the DCO would be unlikely to occur before January 2020.	Agreed
09/01/2020	31/12/2020	JR Period	Where judicial review of a decision has been sought, recent cases have taken c.9 months (without appeals). However, given complexity and number of matters on which SHP would reasonably be able to seek a JR, this is unlikely to be settled within 12 months. (There would be scope for appeal beyond that, which could add significant time period of another 12 months, however this has been ignored). However, given the Brexit situation and general need for the site even before the Brexit referendum (for transport resilience purposes), there could be no certainty that the Operation Stack arrangements would not be extended beyond the end of 2020, as it has been on 3 separate occasions since 2015. The Manston site is considered by Government to be the only current option of its sort. This would also coincide with the end of the current Special Development Order at the end of 2020.	The Applicant can implement the order immediately it is granted, at risk of any litigation. The government has confirmed in a written answer that it will restore and return the site by 31/12/20.
01/01/2021	30/06/2021	Land acquisition	RSP would need to follow the process for land acquisition, which would take at least 6 months.	A notice of entry can be issued immediately with actual entry taking place three months later.
01/07/2021	30/06/2022	Pre-construction phase 1	Prior to commencement of the development, RSP would need to undertake the surveys (e.g.	The surveys could be taken immediately once

			archaeological surveys etc) and detailed design and planning and other requirements that would be set out in the DCO requirements. In view of the need for surveys, detailed planning, consultation with numerous statutory bodies, mitigation and complex traffic works, this overall phase realistically would take a minimum of c.12 months, even for an experienced, well-resourced firm (something that cannot be said for RSP). As George Yerrall noted in his evidence, costs could not be determined until this stage.	the land had been entered upon, starting in April 2020.
01/07/2022	30/09/2022	Contracting	Completion of contractor appointments (post tendering process), and other licensing, permits etc.	This does not have to be sequential to other activities but can be done concurrently
31/09/2022	30/06/2024	Construction Phase	The 15 month forecast by the Applicant would appear optimistic for an infrastructure project of this scale. A further 6 months has been allowed, which is still considered optimistic.	This period can start at the beginning of 2021. Some activities may be able to be undertaken earlier if compatible with Operation Brock or Operation Brock is not needed.
01/07/2024	30/09/2024		Post practical completion testing, finalising CAA certification processes to ensure the airport would be safe for operations.	CAA certification would take a few weeks once construction was complete as much of the construction would have their involvement as to its specification.
Q4 2024			Best case opening day. This programme assumes there are	This is not agreed. The

Appendix OP.3.6

			no delays caused by funding, additional groundworks and /or replanning as a result of survey work, planning, construction issues or other impediments such as CAA Airspace Change or Certification processes and /or other material issues such as DIO HRDF Beacon relocation.	Applicant maintains its timetable as set out in its application.

Appendix OP.3.6

Brazilian air transport: experiences of elderly passengers

Talita Naiara Rossi da Silva[a,b], Jerusa Barbosa Guarda de Souza[a], Larissa Lunardon Gomes[a], Julia Pierre Figueiredo[a], Nilton Luiz Menegon[a]

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[b]*Occupational Therapy Department, Federal University of Minas Gerais, Belo Horizonte, MG, BRAZIL.*

Abstract

Population aging has become a global phenomenon, and elderly people are potential air passengers. However, studies have shown that elderly passengers encounter difficulties during all stages of flight. The aim of this paper was to understand the difficulties faced by elderly passengers in Brazilian air transport in order to promote the development of specifications for improvement of airports and aircraft cabin design to meet the needs of these passengers. This study was based on a survey of 73 Brazilian elderly people conducted in 2013. The results indicate that the overwhelming majority of respondents said they have experienced transportation barriers. The difficulties these passengers face include long walking distances and wayfinding signs in the terminals. Moreover, elderly passengers reported that due to physical limitations they have faced problems during boarding and disembarking, when going up or down the stairs, and in crowded shuttle buses without enough seats available for all passengers. In the final stage of the journey, they referred to problems associated with baggage claim, mainly due to difficulties to retrieve baggage from the carousel, and luggage delay, damage or loss, which can happen to all kinds of passengers. Inside the aircraft, the main difficulties encountered by the elderly passengers are similar to those of many users of air transport, such as limited space in the cabin and small, narrow, and uncomfortable seats. Accordingly, it is necessary to invest in improvements in the Brazilian air transport in order to adequately meet the needs of elderly passengers.

Keywords: elderly passengers, air transport, ergonomics

1. Introduction

This study is part of the project entitled “Universal Aircraft Cabin”, which has been carried out through a partnership between the Federal University of São Carlos Embraer SA and which was designed to understand the transportation needs of air travelers.

According to the World Health Organization (WHO, 2012), despite the characteristics of each region, population aging has become a global phenomenon, and the proportion of the world’s population over 60 years is about 11%. The United Nations projections (UN, 2011) show that the number of people aged 60 and over is expected to more than double, a jump from 784 million in 2011 to 2 billion by 2050.

In Brazil, people aged 60 years or over account for approximately 12% of the population. By 2030, it is estimated that this age group will account for 14% of the total population and nearly 30% by 2050 (Brazil, 2012).

With respect to the trends in air travel, Henley and Amadeus (2008) emphasized that older people are among the groups of potential air passengers. However, the physical, physiological, cognitive, and sensory changes in later years can limit their experience in air travel since most of the transportation needs of these passengers are not addressed at all.

It is expected that the number of older passengers will increase, mainly because future generations of older adults will be healthier and more familiar with air transport. However, elderly passengers have already faced multiple barriers during all stages of air travels (Wolfe, 2003; Chang, Chen, 2012).

The first challenge faced by elderly passengers is the access to the airport, which depends on the type of transport chosen, but it may include long distances to departure gates, boarding and unboarding a shuttle bus, and transporting luggage (Wolfe, 2003; Suen, Wolfe, 2006).

At the airport, another challenge is wayfinding. Elderly people have more difficulties to understand the meaning and terminology of directional signs, to perceive colors, and to read small print and three-

dimensional maps. Other problems are the long lines at check-in and airport security and the lack of comfortable seating (Wolfe, 2003; Suen, Wolfe, 2006).

The automated boarding pass and check-in machines and vending machines also present difficulties for elderly passengers since these machines lack standardization among airlines. Their use requires manual dexterity, touchscreen familiarity, and inserting a credit card into a slot. In addition, the understanding of displayed information may be hindered due to the size, color, and brightness of characters on the screen. It is worth mentioning that motor, sensory, perceptual, and cognitive functions may decline with age, which may impair the performance of certain activities during the trip (Wolfe, 2003; Suen, Wolfe, 2006).

When going to the aircraft through terminals, the difficulties are related to long distances, use of moving walkways, stairs, escalators, and elevators. When there are vehicles available for the transport of passengers, boarding and unboarding these vehicles can also be challenging for elderly passengers. When going through the airport security process, the problems are related to standing in long lines, taking personal items from their carry-on baggage and putting them in the trays and the bag on the conveyor belt for x-ray, and finally walking through the body scanners (Wolfe, 2003; Suen, Wolfe , 2006).

Boarding and exiting the aircraft using passenger boarding bridges can pose some difficulties for elderly passengers such as the ramps or insufficient illumination, compared with that of the terminal or inside the aircraft cabin, which may increase the risk of falls. On the other hand, when there is no boarding bridge, these passengers have difficulty climbing and/or descending stairs, especially when carrying luggage. In addition, the background noise in the terminal can make it difficult for elderly people to hear the announcements properly (Wolfe, 2003; Suen, Wolfe, 2006).

Upon arrival at the destination airport, their difficulties are related to the likelihood of less familiarity with the airport and a lack of immediate instructions to the baggage claim area or to exit the terminal. In addition, they will need to retrieve their checked baggage, but they may have difficulties finding the correct carousel number, waiting standing until bags arrive, and pulling bags off the conveyor belt (especially for those with declined manual dexterity, grip strength, and balance). Another issue is reading and filling out forms, which are often printed in very small fonts and that must be completed standing without a safe and appropriate place for their baggage (Wolfe, 2003; Suen, Wolfe, 2006).

Inside the cabin, stowing and retrieving carry-on items from the overhead compartments are difficult tasks for elderly or disabled passengers (Wolfe, 2003; Suen, Wolfe, 2006).

During the different stages of air travel, these passengers have many difficulties handling documents and the several transfers during the journey either from one vehicle to another, or from a wheelchair into their seat. In the case of passengers using mobility aid devices, such as wheelchairs, there is still concern about the safety and conditions of transporting these devices (Wolfe, 2003; Suen, Wolfe, 2006).

In a study carried out at an airport in Taiwan, Chang and Chen (2012) found that elderly passengers are less satisfied with the followings items: food, information disclosure, lavatories on board, and distance between the seats and the lavatory.

According to Howland et al. (2012), due to the high flow of passengers thorough airports, the rate of falls is significantly high, and it tend to increase since this kind of accident is associated with aging. These authors argue that the elderly are especially at risk for this type of injury in airports, mainly in escalators. 79% reported falls involved people 45 years of age or more, and 43% were 65 years or older.

Considering the demographic trends and the transportation barriers aforementioned, as well as the lack of studies on this topic in Brazil, the aim of this paper was to understand the difficulties faced by elderly passengers in Brazilian air transport in order to promote the development of specifications for improvement of airports and aircraft cabin design to meet the needs of elderly passengers.

2. Method

This study, with a predominantly qualitative approach, focuses on the needs of elderly air passengers and related issues such as travel habits and transportation barriers faced during the entire journey. The survey was conducted between April and November 2013 using a web-based questionnaire and face-to-face interviews at a technology fair and in Brazilian airports and using self-administered questionnaires on board of aircrafts. Regardless of the context and data collection method, the research instrument used was the same.

The questionnaire consisted of 15 questions divided into three parts. The first nine questions were about demographic characteristics (gender, age, weight, height, level of education, disability, and use of

mobility aid devices). Two other questions were related to general travelling habits, such as purpose of travel, modes of transport used, and the frequency of air travel. In the third part, there were four questions about air transport experiences; among them one addressed the difficulties encountered in different phases of the journey, and other was about strategies, satisfaction, and suggestions for improvement. These last three questions were not addressed in the present study.

A total of 73 elderly people aged 60 years or more participated in this study. Sampling followed the concept of saturation during the analysis of the questionnaires. The participation of all passengers was voluntary and defined after the presentation of the research project and signing the principle of free, prior, and informed consent (FPIC) agreement, as approved by the Human Research Ethics Committee of the Federal University of São Carlos.

Data analysis included a descriptive analysis of the passenger and travel characteristics. In order to detail the difficulties reported by the respondents, a content analysis was conducted, more specifically a thematic analysis (Bardin, 2011). These data were initially separated into databases according to the context and data collection method. The classification categories were defined based on these data. The responses in each category were summed, and the databases were finally integrated.

3. Results

3.1 Socio-demographic characteristics of elderly passengers

The socio-demographic characteristics shown in Table 1 are gender, age, body mass index (BMI), and level of education. Data related to disability and use of mobility aid devices are presented later.

More than half of the participants were men (62%), and the passengers' age ranged between 60 and 69 years, and there were no significant differences between the genders. A total of 57% of the participants were university or college graduates or held post-graduate degrees, indicating high level of education. With regard to the BMI, it can be observed that most of the participants are above the healthy range, and 25% can be considered obese (BMI greater than or equal to 30).

Table 1. Socio-demographic characteristics of the elderly passengers

Socio-demographic characteristics	**Male** (n=45)			**Female** (n=28)			**Both** (n=73)		
	60-69	70-79	80+	60-69	70-79	80+	60-69	70-79	80+
					%				
Age									
60-69 years	72	-	-	72	-	-	71	-	-
70-79 years	-	22	-	-	21	-	-	22	-
80 years and older	-	-	6	-	-	7	-	-	7
BMI									
Less or equal to 25	16	9	4	18	7	4	16	8	4
Greater than 25 and less than 30	29	9	-	32	7	4	30	8	1
Greater than or equal to 30	20	2	2	14	7	-	18	4	1
Not informed	7	2	-	7	-	-	7	3	-
Educational level									
None	-	-	-	-	-	4	-	-	1
Incomplete Elementary and/or Middle School	4	2	4	18	4	-	10	3	3
Complete High School	13	7	-	11	4	4	12	5	1
Incomplete College or Higher Education	9	-	2	-	4	-	5	1	1
College/University Degree	29	9	-	29	11	-	29	10	-
Graduate Degree	16	4	-	14	-	-	15	3	-

With regard to disability, 25% (n = 18) of the respondents had some kind of disability; among them 14% were men and 11% women, and 19% had some form of physical disability, 4% had visual impairment, and 1% had physical and visual disabilities.

As for the mobility aid devices, 19% (n = 14) of the respondents reported using some device; among them are the manual wheelchair (7%, n = 5), lower limb prosthesis (4%, n = 3), cane and crutch (both 3%, n = 2), and motorized wheelchair (1%, n = 1).

3.2 Travel characteristics of elderly passengers

As show in Table 2 below, elderly passengers travel mainly for leisure purposes (34%), followed by business and leisure (26%), and business (25%). Among women, the main purpose of travel is leisure (29%), and among men is business and leisure (29%), followed by business only (27%).

Overall, their frequency of air travel is relatively high since 64% make more than 3 trips per year.

Table 2. Travel characteristics

Travel characteristics	**Male (n=45)**			**Female (n=28)**			**Both (n=73)**		
	60-69	70-79	80+	60-69	70-79	80+	60-69	70-79	80+
					%				
Purpose of Travel									
Business	27	2	2	18	-	-	23	1	1
Leisure	9	13	2	29	18	7	16	14	4
Health Tourism	2	-	-	4	-	-	3	-	-
Business and Leisure	29	4	2	4	4	-	19	4	3
Leisure and Health Tourism	-	2	-	7	-	-	3	1	-
Other	2	-	-	4	4	-	3	-	-
Not informed	2	-	-	7	-	-	4	-	-
Frequency of Air Travel									
Less than once a year	4	9	-	11	7	-	7	8	-
1-2 times a year	9	4	4	14	4	7	11	4	5
3-5 times a year	13	4	2	32	4	-	21	4	1
More than 5 times a year	44	4	-	14	7	-	33	5	-

3.3 Elderly passengers: Air travel difficulties

The following data will be presented considering the subgroups in the sample: 60% (n = 44) are non-obese elderly people without disabilities; 16% (n = 12) are non-obese elderly people with some kind of disability; 15% are obese elderly people without disability (n = 11) and 8% (n = 6) are obese elderly people with disability.

3.3.1 Difficulties related to airports

A total of 73% of the elderly passengers encountered difficulties the terminals, which are presented in Table 3 and classified according to the airport infrastructure and operation aspects.

Table 3. Difficulties related to airport infrastructure

Difficulties	Elderly (n=44)	Elderly+ disability (n=12)	Elderly+ obesity (n=11)	Elderly+ dis.+ob. (n=6)	General (n=73)
			%		
Airport Infrastructure					
Difficulty in using stairs, ramps, and elevators	14	17	9	-	12
Long walking distances in the airport	11	25	-	17	12
Difficulty with wayfinding signs in airports	14	17	-	-	11
Lack of seating places close to the service desks and to the access corridors	9	8	9	-	8
Lack of adapted restrooms	-	8	-	17	3
Lack of parking space	5	-	-	-	3
Lack of accessibility	-	25	-	-	1
Lack of wheelchairs	-	8	-	-	1
Operation					
Waiting lines	18	8	9	17	15
Lack of or inaccurate information	9	-	36	-	11
Lack of trained customer service staff	9	8	18	-	10
Poor hygiene and sanitation in the restrooms	5	-	-	-	3
Delays	-	-	18	-	3
Lack of organization to meet especial passenger needs	-	8	-	17	3
Denial of age privilege	2	-	-	-	1
Non-properly identified staff	2	-	-	-	1
Automated check-in	-	-	9	-	1
Going through the airport security process	-	-	-	-	1
Understanding and hearing information and announcements properly	2	-	-	-	1

The results corroborate those found by Wolfe (2003), Suen and Wolfe (2006) and Chang and Chen (2012), who also highlighted the difficulties encountered by elderly people using regular stairs or escalators ramps, and elevators, and walking long distances in airports added to the lack of seating places in these paths and wayfinding; therefore, passengers consider moving around the airport very confusing.

Wolfe (2003) and Suen and Wolfe (2006) also highlighted other difficulties faced by elderly passengers in the Brazilian air transport, such as the use of automated ticket and check-in machines and going through security procedures, which requires carry-on baggage handling and the removal of personal belongings such as belt.

Furthermore, passengers indicated some difficulties related to waiting in long lines, lack of or inaccurate information, and lack of trained customer service staff, which lead to fail meeting passenger needs and to conform to the Brazilian norms of age privileges. These issues can also be present in other phases of the air travel such as boarding and disembarking.

3.3.2 Difficulties in boarding and disembarking

The difficulties faced by elderly passengers during boarding and disembarking are related to the airport infrastructure and operations, as shown in Table 4. The respondents also reported difficulties related to the aircraft cabin, which are presented in Table 5, in the following section. A total of 68% and 66% of the respondents reported having some difficulties with these factors, respectively.

Table 4. Difficulties related to boarding and disembarking

Difficulties	Elderly (n=44)	Elderly+ disability (n=12)	Elderly+ obesity (n=11)	Elderly+ dis.+ob. (n=6)	General (n=73)
			%		
Airport Infrastructure					
Lack of adequate equipment for boarding and disembarking (lack of boarding bridges)	7	8	45	-	12
Not enough seats in the shuttle bus that take passengers from the terminals to the aircraft	9	25	-	-	10
Moving around the airport can be confusing	9	-	9	-	7
Retrieve checked baggage from the carousel	7	8	-	-	5
Shuttle bus steps are too high	5	-	-	17	4
Boarding from remote gates without a boarding bridge	5	-	-	-	3
Unsafe boarding stairs	5	-	-	-	3
Walking Long distances in the airport	-	-	-	33	3
Lack of seating places in the departure lounge	2	-	-	-	1
Operation					
Boarding/disembarking from remote gates: difficulty going up the stairs	18	42	36	100	31
Boarding/disembarking from remote gates: need for shuttle bus	30	-	-	-	18
Delay in releasing checked baggage	25	-	9	-	16
Frequent changes in the departure gate and baggage carousel number	14	-	-	17	10
Lack of or inaccurate information	7	-	18	-	7
Denial of age privilege	5	17	9	-	7
They have to be manually carried	-	-	18	33	5
Delayed disembarking	-	17	18	-	5
Lack of trained customer service staff	5	8	-	-	4
Baggage lost or damaged	7	-	-	-	4
Long lines	2	-	-	-	1
Delayed boarding	2	-	-	-	1
Lack of privilege seats in the aircraft	-	8	-	-	1
Lack of full disembarking instructions	-	-	9	-	1
Lack of baggage assistance	2	-	-	-	1

With regard to boarding and disembarking, the infrastructure issues are mainly related to the lack of boarding bridges in some Brazilian airports. However, the respondents was also reported it as an operational issue since boarding and disembarking using remote gates can be an airline choice, which creates great difficulty for elderly passengers because it involves going up or down stairs, especially when carrying luggage.

In addition, when boarding and disembarking from remote gates, i.e., without boarding bridges, the passengers are transported from the terminals to the aircraft by a shuttle bus, and older people have difficulty boarding and unboarding the bus, mainly because the steps are too high and because there are not enough seats in the bus, which is always crowded.

3.3.3 Difficulties related to the aircraft cabin

A total of 71% of the elderly passengers reported difficulties related to the aircrafts. These difficulties are mainly associated with: limited legroom and limited space in the cabin (41%); inadequate seats, which are too narrow, have small recline angle, and lack footrest (40%); height and space of overhead compartments,

which have limited space to stow carry-on items and are too high (16%); and on-board lavatories (10%), as shown in Table 5

Table 5. Difficulties related to the aircraft cabin

Difficulties	Elderly (n=44)	Elderly+ disability (n=12)	Elderly+ obesity (n=11)	Elderly+ dis.+ob. (n=6)	General (n=73)
			%		
Aircraft cabin					
Small, narrow, and uncomfortable seats	32	58	27	33	36
Limited legroom	27	42	18	33	29
Limited space and height of overhead compartments make it difficult to stow and retrieve carry-on items	16	8	18	33	16
Limited space in the cabin	9	25	18	-	12
Lavatory accessibility and space	7	-	18	33	10
Aisles are too narrow	2	8	9	33	7
Inadequate seats without footrest	2	-	9	-	3
Cabin light and temperature control	2	-	9	-	3
Sense of insecurity due to the use of electronic devices by other passengers	5	-	-	-	3
Stair steps are too high	5	-	-	-	3
Seats have small recline angle	2	-	-	-	1

Ease of use and easy access to the lavatory, mainly due to its limited space, were also mentioned by Chang and Chen (2012) as one of the factors that causes dissatisfaction among elderly passengers.

4. Conclusions

Older people may face a range of challenges during a journey including negative experiences at airports and on board of aircrafts. However, the difficulties associated with the airports were the most frequently factors mentioned by the respondents, and they can hamper the smooth running of the journey in terms of performing the necessary procedures before departure as well as boarding and disembarking the aircraft These factors involve infrastructure and operators of airports and airlines.

The survey was completed, but this research will continue to be carried out to include observations of air travel in real situations during the year of 2015 in order to deepen the understanding of the barriers encountered by older passengers and make recommendations for improvement of terminals and aircraft cabin accessibility following the regulated procedures, according to the Brazilian norms established to meet the needs of passengers.

The collaborative work of different players is of paramount importance for the improvement of end-to-end travel experiences, otherwise elderly passengers will have to deal with difficult situations in which their needs are neglected.

Acknowledgements

The authors are grateful to the passengers who participated in this study and to the National Civil Aviation Agency (ANAC), the São Paulo State Secretariat for the Rights of People with Disabilities, and the Brazilian Paralympic Committee for the support during the collection of data in airports and flights. The authors also gratefully acknowledge the Coordination for the Improvement of Higher Education Personnel (Capes) for the PhD scholarship granted to the first author and to the Minas Gerais State Research Foundation (Fapemig) for the generous financial assistance to support attendance at an important conference.

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Appendix SE 3.7 Part A

Airneth

The impact of ageing on aviation

Airneth Report 3

Guillaume Burghouwt, Jaap de Wit, Justin van der Bruggen

Date of publication: 14 December 2006



Appendix SE.3.7 Part B

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Appendix SE.3.7 Part B

Executive summary

The ‘grey boom’ at European airports is about to start. The share of older air travellers is growing quickly. At Amsterdam Airport Schiphol, 50+ travellers accounted for 24% of total origin-destination traffic in 2005. After 2010, a 50% share of older air travellers in origin-destination traffic will be the rule rather than the exception at many European airports. On top of that, the air transport industry itself will have to deal with an ageing workforce.

Older air travellers show different travel characteristics compared to younger travellers. In particular, they differ with respect to their propensity to fly, travel purpose, destination choice, access modes, airport dwelling time, perception of the travel product and the use of airport facilities.

The physical and mental conditions of people change with age. Eyesight and hearing become worse, mobility decreases and also mental changes such as anxiety may accompany age. Because of these changes, older travellers have difficulties with three issues in airport terminals: walking, waiting and way-finding (3 W’s). Meeting their needs is both a social and an economic imperative. Therefore, each stakeholder in the air transport sector faces challenges to serve this growing market.

However, the current air transport industry does not always deal with the barriers for older air travellers adequately. Older air travellers face many physical barriers during their trip. In addition, they may suffer from lack of co-ordination between air transport service providers, insensitive/inappropriate communication, neglect and loss/ damage of mobility equipment.

Appendix SE.3.7 Part B

In July 2006, the European Parliament and the Council accepted a new EC Regulation (No 1107/2006) concerning the rights of disabled persons and persons with reduced mobility when travelling by air. Managing bodies of airports must be responsible for ensuring that high quality assistance is provided. The European Civil Aviation Conference (ECAC) has produced Codes of Practice to help ensure that the regulation is implemented consistently and to an acceptable standard.

Ageing does not only have implications for air travel patterns and the organisation of the air transportation system, but also for the workforce of many stakeholders in the industry. Employers such as airlines and airports will increasingly face a lack of employees due to the increasing 'grey pressure'. In addition, employability changes with age due to changes in productivity.
However, there is a difference in the images of and the facts about older workers. Physical and mental health is not only influenced by age, but also by lifestyle and work factors. Often, only the weak points of the ageing workforce are taken into account and strong points are not exploited enough. In most cases, good human resource policies can prevent a decrease of performance when workers get older.

Airneth concludes that ageing is likely to have a substantial impact on the air transport industry. However, the knowledge about air travel behaviour of older age groups is limited. This is even truer regarding the air travel behaviour of older age groups in the future. Therefore, Airneth stresses the need to address the issue of ageing and air transport in research, in policy and in the air transport industry itself.

1. About Airneth

Airneth is an initiative to support aviation policy in The Netherlands using the most recent insights from academic experts from various disciplines. In addition, Airneth has the objective to address important policy issues in the academic world.

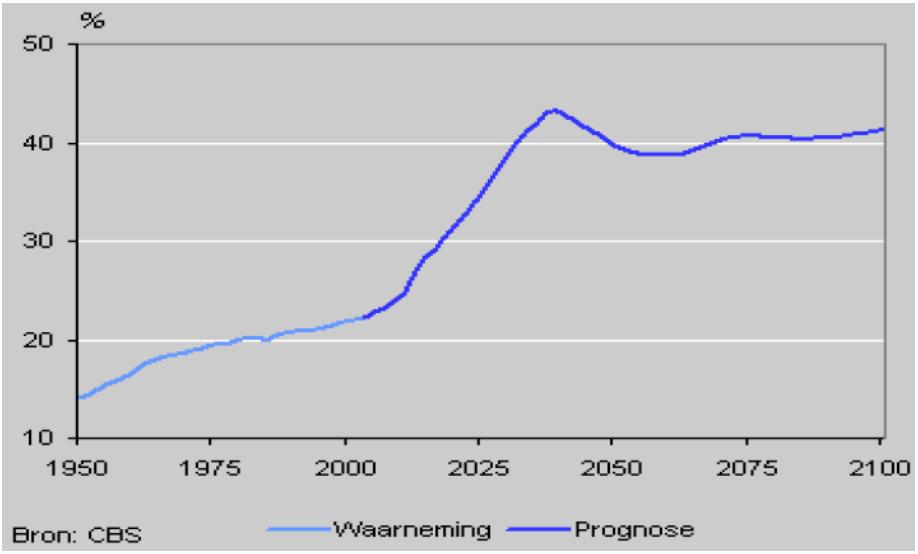
Airneth uses several tools to achieve its goals. In workshops, conferences, seminars and via the interactive website, Airneth stimulates the exchange of knowledge between academics and policy makers in the field of air transport.

This report is based on the results of the seminar “The impact of ageing on aviation” on 23 November 2006 at Madurodam in The Hague, The Netherlands. Participants came from different academic, policy and industry backgrounds. The views expressed in this document are not necessarily those of Airneth.

2. Context and objectives

Ageing will be one of the major policy issues in the decades to come. The share of older adults in the total population is already increasing. In a few years time, the share of elderly in total population will start to grow even more radically (figure 2.1). Not only in Europe, but also in countries such as China and India.

Figure 2.1 ‘Grey pressure’ in the Netherlands (number of persons >65 years on 100 working persons)



Source: Gründemann 2006

The opportunities and challenges of ageing have been addressed in many fields, ranging from the housing market, the labour market to urban commuter behaviour. Yet, the relation between ageing and air transport remains largely unclear and undocumented, both in the academic world and in aviation policy. What will be the impact of ageing on the air transport industry and aviation policy?

Airneth has addressed this question in a seminar entitled ‘the impact of ageing on

aviation' since Airneth believes that the implications of ageing on aviation will be substantial. Airneth stresses the need to address the issue of ageing and air transport in the academic world, in policy and in the air transport industry itself.

The objective of the seminar was fourfold:

1. To gain insight into the characteristics of elderly and the travel behaviour of senior air travellers
2. To gain insight into the needs of older air travellers in the air transportation system
3. To gain insight into the implications of ageing for airlines and airports
4. To assess the opportunities and threats of ageing for policy-making

A number of speakers have shed their light on these issues, including:

- Ton van Egmond, NHTV Breda
- Hans Martens, Schiphol Group
- Rob Gründemann, TNO
- Harry Wolfe, Maricopa Association of Governments
- Ann Frye, chair of ECAC working group of people with reduced mobility
- Carmen van Casteren, KLM (participant panel discussion)
- Jaap de Wit, Airneth (participant panel discussion)

This seminar report includes the conclusions from presentations and discussions during the seminar as well as insights from the available literature in the field of ageing and aviation.

3. Air travel behaviour of the elderly

3.1 Older and younger adults, now and in the future

Older adults exhibit quite different characteristics compared to younger adults[1]. These different characteristics have implications for the air travel behaviour of elderly now and in the future as well as their needs in the air transportation system.

The youth of the 2000s: hedonistic and idealistic

The youth in the 2000s can be characterised as hedonistic, following the motto "having fun is compulsory!" They are restlessly searching for ever-new experiences in their hectic lives. Their life-worlds tend to be narrow, because of the increasing possibilities for personal communication (mobile phones/internet/chat/msn) without the need of face-to-face contacts. They are hedonistic but also idealistic.

The senior of the 2000s: between hedonism and asceticism

The seniors of the 2000s can be characterised as balancing between hedonism and asceticism. On the one hand, it is important to enjoy life ("here and now") and exploit the benefits of the modern consumer culture. They are less prepared than their parents to postpone the gratification of needs. On the other hand they value working hard. Doing nothing is 'not done'.

From a physical and mental perspective, individuals experience typical changes in human functioning as he or she ages[2]. Such changes include sensory changes (eyesight/hearing problems), physiological changes (dexterity, mobility problems) and mental changes (loss of cognitive skills, anxiety).

The senior of the 2050s?

Although many of the physical and mental changes will also accompany ageing in the future, the elderly of the future will certainly be different from elderly now. First of

all, elderly in the future are expected to be healthier than older people now. Second, the characteristics of elderly in 2050s are not quite clear. There characteristics in relation to their travel behaviour will amongst other things depend on[3]:

- The question if early retirement options still exist (or do future seniors have to work till 67, 68, and 70?)
- The extent to which value is attached to the consumer culture or a trend break sets in.
- Will elderly of the future spend most of their time in small life-worlds with narrow horizons, facilitated by ICT? Or will they show wider interests?
- Interest in uniqueness or tourism highlights?
- A safe world or many safety issues?
- Virtual travel more attractive than physical travel?

3.2 (Air) travel behaviour of elderly

A different air travel pattern

Air travel behaviour of the older adults differs substantially from the air travel behaviour of the younger adults. The box below highlights some of the insights into air travel behaviour of older adults.

Some insights on long-distance travel behaviour of elderly

*The number of long-distance air trips per person for older people is generally lower than for young adults, although they tend to travel longer distances and spend more time at the destination. Increased time availability allows those in older age groups to undertake longer trips in length and duration[4] (US domestic travel). The mobility drop is larger for older elderly groups (>75 years).

*There are substantial differences between older age categories. There are substantial differences between the age group of 65-74 and the age group of 75 years or more with respect to long-distance travel activities. Air travel expenditures increase until the age group of 45-55 and decline in older age categories. Yet, joint expenditures on air travel and package travel products are roughly constant between 45 and 75. It is not until 75 that travel drops[5] (Canadian household expenditures).

*In relative terms, air travel becomes a more important transport mode for long-distance trips with increasing age, in particular for social visits (US domestic travel) [6].

*Older men and women travel by air at similar rates. This is in contrast to other modes of long-distance transport, where men generally travel more than women[7].

*Purposes of long-distance travel of seniors relate more to leisure and personal business (healthcare for example) than to business and commuting (like for younger adults) [8].

*As for all age groups, income is an important determinant for long-distance trip generation. However, the impact of income on long-distance travel is lower for seniors and much lower for older elderly: older elderly have physical and other limitations that prevent them from travelling long distances[9].

Surprisingly, the number of studies on the impact of ageing on air travel is rather limited. This is in particular true when we compare the current body of knowledge on this issue with the vast amount of research carried out on ageing and person mobility. The studies that do exist focus primarily on the US situation. In short: ageing and air transportation is a field of research still to be explored.

Holidays of the aged in the 2000s

With respect to holidays of the aged, in the 2000s, the following characteristics can be mentioned[10]:

- Many holidays, but limited spending per holiday.
- Holidays must be “deserved” and educational elements are important.
- There’s a growth in city breaks, growth in nature- and culture-oriented travel and those holidays have tight travel schedules.
- Senior markets are very important because of early retirement entitlements, which include many healthy and wealthy seniors with a high propensity to fly.
- Regional airports can benefit from the ‘grey boom’. Dutch regional airports such as Groningen Airport Eelde and Eindhoven Airport thrive on older air travellers. Since the older air travellers are primarily leisure passengers, they attach a lower value to flight frequency offered at the larger airports. In addition, they prefer short walking distances and less complex airport layouts. Smaller airports can clearly benefit from ageing[11].

Senior travel now differs from senior travel in the future

Although it is likely that ageing will have a dampening effect on the propensity to fly, the impact of ageing on the number of trips will be less severe than one would expect based on current air travel patterns of seniors. The number of elderly travelling and the number of travels the elderly make will increase in the future. Older people in the future will have better health, higher levels of education and higher incomes than older people now. They also expect higher levels of service than at present.

Although we expect an increase in the share and number of elderly travelling, one should not exclude air travel decline scenarios[12]:

- Growing environmental awareness; less prepared to use GHG (Green House Gas) producing energy.
- Decrease in interest in exploring/learning and growing comfort of virtual travel at home.
- Increasing insecurity and xenophobia.

3.3 The example of Amsterdam Airport Schiphol

The ‘grey boom’ at Schiphol

At Amsterdam Airport Schiphol[13], the share of older origin-destination air travellers[14] (>50 years) has grown substantially between 1991 and 2005. In particular the group between 51 and 65 shows high growth figures. Until now, the growth of 65+ class was more modest, though above average.

The share of air travellers over 50 years accounted for about 24% of all passengers at the airport in 2005. The share of air travellers of 65 years old accounted for about 4%. The age distribution of Dutch passengers was roughly the same.

The travel purpose of seniors is mostly leisure oriented: about 80% of the Dutch older air travellers (>50) consisted of leisure travellers, while 20% were business travellers. After the year 2000, the gap between leisure and business segment increased for the Dutch 50+ passengers. Until 2000 the Dutch 50+ leisure passenger share accounted for 25% of total Dutch leisure passengers, in 2005 it had increased to 31% (“The grey boom”).

Compared to the younger adults (>50 years), Dutch older leisure travellers show a preference for destination countries such as Spain and Portugal, while Turkey and the UK are less popular destinations.

A different trip 'preparation pattern'

Older air travellers show a different air trip 'preparation pattern' than passengers below 50 years.

With respect to airport access, older passengers (50+) are more often going by taxi to the airport. Younger adults show a greater preference for public transport.

With respect to airport dwelling time, the Dutch 50+ passengers stay significantly longer at Amsterdam Airport Schiphol than younger travellers. Total minutes spent by Dutch 50+ passengers are 167. For <50 Dutch passengers it is 155 minutes. Total O&D passengers globally spend on average 146 minutes at the airport. So the older passengers go earlier to the airport, where they spend more time in the lounge. In addition, older air travellers tend to minimise uncertainty and go earlier to the gate.

Older air travellers have greater information needs

There is a greater need for information from Dutch senior passengers before arriving at Amsterdam Airport Schiphol. Older air travellers want to get as much information about their trip as possible, so they will not feel uncomfortable about their trip. Accordingly, older air travellers are more frequent users of airport information desks.

..but adopt new technologies if airport pushes right button

In general, older age categories are characterised by a lower readiness for new technologies, such as self-service check in at airports. However, older air travellers at Schiphol use self-service check in almost at the same rate as younger people do. Condition is that older air travellers are introduced to the new technology in the right way.

Another striking thing is that older Dutch passengers (50+) shop less than the <50 Dutch passengers. They consider the services offered and delivered by airlines and airport of a lower value for money.

..and are quite satisfied with the airport's quality

In general older Dutch passengers (50+) are more satisfied about quality key issues at Schiphol airport, such as ambience, cleanliness, efficiency and waiting comfort than younger travellers. However, they are not that much satisfied with the long walking distances at the airport. In addition, they show a somewhat lower overall perception of the airport, compared with younger adults. Older air travellers results to be very keen on getting value for money. Yet, prices in the terminal area are above average.

Certainty seekers, exclusivity claimers and ambience enjoyers

Schiphol divides all passengers in six target groups based on their needs:

- Active fun seekers: seek for a lot of fun and also freedom, less functionality and certainty.
- Trendy shoppers: seek for a lot of freedom and also fun, less functionality and certainty.
- Exclusivity claimers: seek for freedom, but are also functionality, less fun and certainty.
- Successful functionals: are extremely functional and look also for freedom, less fun and certainty.
- Ambience enjoyers: seek for certainty, but also fun. Less freedom and functionality.
- Certainty seekers: seek mostly for certainty. It must also be functional. Less fun and freedom.

According to Hans Martens[15], younger Dutch leisure passengers at Schiphol are

predominantly ‘active fun seekers’, ‘ambience enjoyers’ and ‘certainty seekers’. They attach more value to the fun element at the airport.
Above 50 years, travellers tend to attach a relatively high value to certainty and functionality, compared to younger passengers. In other words, they want to feel ‘in control’ and want value for money. Leisure passengers between 50 and 65 years can be categorised to a smaller extent as ‘active fun seekers’, but to a larger extent as ‘successful functionals’ and ‘ambience enjoyers’. Above the age of 65, the certainty and functional element tend to become more and more important. ‘Successful functionals’, ‘ambience enjoyers’ and ‘certainty seekers’ dominate among Dutch leisure passengers.

3.4 Conclusions by Airneth

The ‘grey boom’ at European airports is about to start

The share of older air travellers at European airports is growing quickly. Yet, the real ‘grey boom’ is about to start around 2010. Older air travellers exhibit different travel characteristics compared to younger air travellers, in particular with respect to their propensity to fly, travel purposes, access modes, airport dwelling times, perception of the travel product and the use of airport facilities.

Research lags behind

Airneth concludes that the knowledge about air travel behaviour of older age groups is limited or at least fragmented. Relatively few academic studies have paid attention to air travel behaviour of seniors. This is even truer regarding the air travel behaviour of older age groups in the future, for which major uncertainties exist with respect to their air travel behaviour. In addition, the group of older adults is far from homogeneous in terms of their travel behaviour. Differentiation in additional age categories is needed.

Questions that should be considered are:

- How does the propensity to fly exactly relate to age? *The* older air traveller does not exist. Instead, the group of older air travellers is quite heterogeneous and should be differentiated.
- How do older travellers make their choice out of the available air travel options? What is the role of airport quality and airport accessibility, airline, price, frequency and direct versus indirect travel options in the air travel behaviour of seniors?
- How do older travellers choose between different long-distance travel modes such as air, high-speed train, bus and car?
- To what extent will ageing lead to a shift in seasonal patterns (more off-season traffic) at airports?
- What are feasible scenarios for the air travel behaviour of seniors on the short-term, mid-term and long-term?
- To what extent are these scenarios sufficiently included in strategic aviation foresight studies of policymakers?
- To what extent are current airline network concepts feasible in an ageing society?
  - Given the fact that older air travellers tend to negatively value long walking distances and search for certainty, the question is to what extent the time-critical hub-and-spoke system suits the needs of the older passenger.
  - Given the high seating densities and limited leg room at low-cost carrier flights and associated risks of deep-vein thrombosis, to what extent is the low-cost carrier product compatible with an ageing society. Are seniors forced to buy superior but more expensive products (more leg room, full-service flights)?[16]

Given the growing 'grey pressure', the travel characteristics of elderly air travellers at for example Amsterdam Airport Schiphol and the known differences from existing US studies, Airneth advocates more research in this field.

4. Challenges for the air transportation system

4.1 Older air traveller different from the disabled air traveller

The physical and mental conditions of people change with age. Eyesight and hearing become worse, mobility decreases and also mental changes may accompany age (for example, increasing anxiety). However, older adults are different from disabled people. "They don't want a wheelchair, they would like to be able to walk!"[17]

Because of the physical and mental difficulties that come with age, there are large opportunities but also challenges for each stakeholder to serve this ageing market. Some of them are already taking action. For example, aircraft manufacturers ad assist handles, design easier-to-use seat belts, better aisle illumination and cabin layouts (e.g. Boeing's 'ageing project'). Measures are taken to reduce risks of deep-vein thrombosis during long-haul flights. Some airlines are giving guided airport tours to seniors at US airports. In this way older people get to know how the process is of travelling by air. Airlines but also airports should seek partnership with other stakeholders such as advocacy groups, advisory committees and hospitals in order to better serve the needs of older adults.

4.2 Difficulties for older travellers at airports

Older travellers have difficulties with three issues in airport terminals (3 W's):

- Walking
- Waiting
- Way-finding

Almost on each large airport walking distances are too long for seniors. For that reason, older travellers may prefer secondary airports, which have shorter walking distances and can be better overviewed. In traversing horizontally, a solution at larger airports would be more moving sidewalks, electric carts, automatic people movers and more resting areas along concourses. In addition, the journey to the gate often involves moving from one terminal level to another. The use of steps with thresholds clearly marked), escalators and most preferably, elevators, can help to overcome these problems.

For each flight passengers have to wait: for check in, for security, at the gate and for their luggage. In particular older adults would like to rest while they are waiting. Most of the time there are not enough seats for everyone. A solution would be to increase the number of seats at each stage of the process.

Older travellers find way-finding most important. Because they are not quite certain about their trip, at least they want to know where to go. There are not only informational signs at the airport, but also commercial ones (like hair salons for example). This can be confusing. Facilitation of way-finding could be improved by signage, technology, but also by human touch.

Because of these 3 W's older travellers (50+) seem to have a preference for direct flights. It is not clear if older travellers have the same tendency to transfer as younger travellers[18]. For hub-airports this could be an important issue, given the extensive walking distances between connecting flights at many hub airports such as Chicago O'Hare and Amsterdam Airport Schiphol.

In summary:

- The older air traveller is a significant force
- Older air travellers are different from people with reduced mobility.
- Because of the physical and mental difficulties that come with age, there are large opportunities but also challenges for each stakeholder to serve this ageing market.
- In adapting the air transportation system to an ageing society, Harry P. Wolfe[19] makes the following policy recommendations:
  - Involve the relevant stakeholders in adapting the air transportation system
  - Conduct cost-benefit analysis with respect to these adaptations
  - Partner with FAA, ECAC and ICAO
  - Conduct research on the travel behaviour of elderly.

5. EC Regulation 1107/2006

5.1 Older and disabled air travellers: what goes wrong?

There is a close correlation between age and disability. About two thirds of disabled people are over the retirement age. Almost half of the population aged over 75 has some kind of disability. On the other hand, older people in the future will have better health than older people now. They expect higher levels of service. At the same time, they open up new market opportunities[20].

Older and disabled people face barriers in the air transportation system (see also section 4): they have a lack of confidence, experience attitudinal barriers as well as physical barriers (inside the airport, airport access, organisational).

The air transport service providers do not always deal with these barriers in an adequate way:

- There is lack of co-ordination between the different air service providers with respect to the handling of older and disabled air travellers (airport, airline, etc)
- There is poor communication with older and disabled travellers (insensitive, inappropriate communication)
- Neglect: being left for long periods without information
- Loss of or damage of mobility equipment

5.2 New EC regulation

In July 2006, the European Parliament and the Council accepted a new EC Regulation (No 1107/2006) concerning the rights of disabled persons and persons with reduced mobility when travelling by air. This regulation says that assistance should be provided at the airport as well as on board aircraft to meet the needs of disabled persons and persons with reduced mobility. The persons concerned should receive assistance without additional charge. Requirements on refusal of carriage come into effect in July 2007 and other requirements come into effect in July 2008.

Managing bodies of airports are responsible for ensuring that high quality assistance is provided. Assistance must be provided by a central body. Airports can provide the assistance themselves or can contract a third party, including an airline.

Assistance should be available from the designated arrival area at the airport to the point at which the person with reduced mobility (prm) is seated on board the aircraft and vice versa. Appropriate equipment is needed to assist the prm and should be provided when necessary.

The ECAC Codes of Practice

The European Civil Aviation Conference (ECAC) has produced Codes of Practice to help ensure that the regulation is implemented consistently and to an acceptable standard. These codes cover:

- Ground handling
- Staff training

The ground handling service provided must be:

- Seamless
- Mutually agreed by all stakeholders
- Regularly monitored
- Reviewed annually
- Subject to all service level agreements

Guidelines for staff training cover disability awareness and disability equality training for all airport and airline staff dealing with the travelling public. Staff that has an understanding of disability and its diversity, and the types of barriers people with disability experience in society, will be better able to provide a high quality service that respects the safety, independence and dignity of each passenger.

5.3 Opportunities for stakeholders

For each stakeholder there are opportunities and challenges to serve this ageing market.

For policy makers

- Older and disabled people are a large and growing part of the population.
- Meeting their needs is both a social and an economic imperative.
- It's about changing attitudes and cultures.

For airports and airlines

- Recognise and welcome older and disabled passengers as a growing market sector.
- Remember that older and disabled people now have the force of law behind them.
- Use the codes of practice and integrate them into your own training programmes.
- Use them as part of tender requirements for ground handling contracts.
- Involve older and disabled people in your planning.

For air travellers

- Know your rights
- Offer to work with airports/airlines on training etc
- Demand good service
- Complain when you do not receive it.

6. Labour participation of older workers

Ageing does not only have implications for air travel patterns and the organisation of the air transportation system, but also for the workforce of many stakeholders in the industry. Employers such as airlines and airports will increasingly face a lack of employees due to the increasing 'grey pressure'. In addition, employability changes with age due to changes in productivity.

6.1 Ageing and labour participation

Ageing does not only take place in The Netherlands, but also in the rest of Europe and in many other countries of the world such as China and India. Although ageing is a world-wide phenomenon, the growth in The Netherlands has been higher than in other EU-countries (see figure 2.1).

In The Netherlands, labour participation of older workers (55-64 yrs) has risen more quickly than in other EU-countries. Some striking numbers are:

- Number of older workers more than doubled between 1993 and 2003 from 345.000 to 709.000. In October 2006 this was already 858.000.
- The average retirement age in The Netherlands rose from 59,5 yrs to 62,2 yrs.
- Labour participation of older workers increased from 24% in 1993 to 38% in 2003 and 42% in October 2006. Compared with the Lisbon goal, 40% in 2007 and 45% in 2010, The Netherlands are already above it.
- The average EU labour participation of older workers is 41%.
- The number of people of 65+ yrs in The Netherlands will increase from 2 mln in 2005 to 4 mln in 2040. In contrast, the labour population (18-64 yrs) will decline from 8,3 mln in 2005 to 7 mln in 2040.

6.2 Policies of the Dutch national government

The Dutch national government has developed some policies in reaction to the ageing problem:

- Reintroduction of the obligation to apply for jobs for people older than 57,5 yrs.
- Abolition Occupational Disability Insurance Act- (WAO-) premium employers for employees with age >55 yrs.
- Introduction law against age discrimination in 2004.
- Abolition of tax advantages early retirement and pre-pensions in 2005.
- Grant scheme of the Ministry of Social Affairs and Employment: 21 mln for age management projects at the workplace.

6.3 Health problems

There is a difference in the images of and the facts about older workers. Ageing leads to more physical complaints (hearing/vision, less fitness, less power (strength), more chronicle diseases) and increases the risk for long time absenteeism and disability. However, physical health is not only influenced by age, but also by lifestyle and work factors (work demands). In addition, in most jobs decreasing physical health does not or hardly influence performance. Many jobs can be easily adapted to physical disabilities. Only in very heavy physical jobs, decreasing physical health results in a substantial reduction of productivity as workers age. In these jobs,

various problems frequently come together such as heavy work, unhealthy lifestyles, low incomes, low education and very long-term job careers.

The decrease of cognitive abilities (memory and concentration) for older workers is small. In fact, mental health is often increasing. Older people do not learn less, but in a different way. Older workers often compensate physical limitations by using tools and smarter work strategies. The negative effect of ageing on productivity will be compensated by a positive effect of experience. This productivity-effect is often counterbalanced by higher wages.

In short, employers should not look at age, but also at each individual person. Not every person is the same. In addition, physical and mental health is not only influenced by age, but also by lifestyle and work factors. Often, only the weak points of the ageing workforce are taken into account and strong points are not exploited enough. In most cases, good human resource policies can prevent a decrease of performance when workers get older.

6.4 Some implications for airlines

Ageing is also a challenging opportunity for many stakeholders in the airline industry, such as KLM[21]. The airline experiences ageing problems mostly at maintenance and baggage service. Maintenance work is done by highly technically skilled workers. In addition, specific maintenance jobs are often bound to only a few specialists. The average age in that part of the company is 53 to 55 years. Many of these workers will retire in the near future. Ageing will pose a substantial challenge to KLM for this part of the company, since the airline has not invested in multifunctional career paths.

Work at the baggage service is mostly heavy physical work. There is a bigger chance that someone needs to be replaced, when he or she has done heavy physical work for a long time. In this case it does not matter that someone is older or not. It depends more on the time period that he or she has done heavy physical work than on age.

7. Conclusions, research agenda and policy recommendations

7.1 Conclusions

The 'grey boom' at European airports is about to start. The share of older air travellers is growing quickly. At Amsterdam Airport Schiphol, 50+ travellers accounted for 24% of total origin-destination traffic at Amsterdam Airport Schiphol in 2005. After 2010, a 50% share of older air travellers in origin-destination traffic will be the rule rather than the exception at many European airports. The air transport industry itself will have to deal with an ageing workforce.

Older air travellers exhibit different travel characteristics compared to younger travellers. In particular, they differ with respect to their propensity to fly, travel purpose, destination choice, access modes, airport dwelling time, perception of the travel product and the use of airport facilities.

The physical and mental conditions of people change with age. Eyesight and hearing become worse, mobility decreases and also mental changes such as anxiety may accompany age. Because of these changes, older travellers have difficulties with three issues in airport terminals: walking, waiting and way-finding (3 W's). Meeting their needs is both a social and an economic imperative. Therefore, each stakeholder in the air transport sector faces challenges to serve this growing market.

However, the current air transport industry does not always deal with the barriers for older air travellers adequately. Older air travellers face many physical barriers during their trip. In addition, they may suffer from lack of co-ordination between air transport service providers, poor (insensitive/inappropriate) communication, neglect and loss/ damage of mobility equipment.

In July 2006, the European Parliament and the Council accepted a new EC Regulation (No 1107/2006) concerning the rights of disabled persons and persons with reduced mobility when travelling by air. Managing bodies of airports must be responsible for ensuring that high quality assistance is provided. The European Civil Aviation Conference (ECAC) has produced Codes of Practice to help ensure that the regulation is implemented consistently and to an acceptable standard.

Ageing does not only have implications for air travel patterns and the organisation of the air transportation system, but also for the workforce of many stakeholders in the industry. On top of that, Employers such as airlines and airports will increasingly face a lack of employees due to the increasing 'grey pressure'. In addition, employability changes with age due to changes in productivity.
However, there is a difference in the images of and the facts about older workers. Physical and mental health is not only influenced by age, but also by lifestyle and work factors. Often, only the weak points of the ageing workforce are taken into account and strong points are not exploited enough. In most cases, good human resource policies can prevent a decrease of performance when workers get older.

7.2 Research agenda

Older air travellers exhibit different travel characteristics compared to younger air travellers. Airneth concludes that the knowledge about air travel behaviour of older age groups is limited or at least fragmented. Relatively few academic studies have

paid attention to air travel behaviour of seniors. This is even more true regarding the air travel behaviour of older age groups in the future.

Questions that should be considered are:

- How does the propensity to fly exactly relate to age? *The* older air traveller does not exist. Instead, the group of older air travellers is quite heterogeneous and should be differentiated.
- How do older travellers make their choice out of the available air travel options? What is the role of airport quality and airport accessibility, airline, price, frequency and direct versus indirect travel options in the air travel behaviour of seniors?
- How do older travellers choose between different long-distance travel modes such as air, high-speed train, bus and car?
- To what extent will ageing lead to a shift in seasonal patterns (more off-season traffic) at airports?
- To what extent are current airline network concepts feasible in an ageing society? Given the fact that older air travellers tend to negatively value long walking distances and search for certainty, the question is to what extent the time-critical hub-and-spoke system suits the needs of the older passenger.

7.3 Relevant issues and questions for policymakers

- Older and disabled people are a large and growing part of the population.
- Meeting their needs is both a social and an economic imperative.
- Implementation of the new EC Regulation and ECAC Codes of Practices plays a major role in this.
- Ageing means different air travel behaviour now and in the future
- Ageing may open up new opportunities for regional airports
- However, knowledge about air travel behaviour of older age groups now and in the future is limited.
- What are feasible scenarios for the air travel behaviour of seniors in the future?
- To what extent is ageing included in strategic aviation foresight studies in policy?

8. Registered participants

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[1] Ton van Egmond, NHTV Breda
http://www.airneth.nl/documents/VanEgmondfinal.pdf
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http://www.airneth.nl/documents/HarryWolfefinal.pdf
[3] Ton van Egmond, NHTV Breda
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[10] Ton van Egmond, NHTV Breda
http://www.airneth.nl/documents/VanEgmondfinal.pdf
[11] Geertje Scholten, Groningen Airport Eelde
[12] Ton van Egmond, NHTV Breda
http://www.airneth.nl/documents/VanEgmondfinal.pdf
[13] Section largely derived from the presentation of Hans Martens (Manager Market Research, Schiphol Group) 'Older air travelers at Amsterdam Airport Schiphol'
[14] Results in this section only for origin-destination passengers. Connecting traffic not included.
[15] Section largely derived from the presentation of Hans Martens (Manager Market Research, Schiphol Group) 'Older air travelers at Amsterdam Airport Schiphol', unless otherwise indicated.
[16] Jaap de Wit, Airneth/ University of Amsterdam
[17] Section 4 is largely based on the presentation and work of Harry Wolfe, Maricopa Association of Governments http://www.airneth.nl/documents/HarryWolfefinal.pdf, unless otherwise indicated.
[18] Guillaume Burghouwt, Airneth
[19] Section 4 is largely based on the presentation and work of Harry Wolfe, Maricopa Association of Governments http://www.airneth.nl/documents/HarryWolfefinal.pdf, unless otherwise indicated.
[20] Section 5 is largely base on the presentation of Ann Frye, Ann Frye Consulting http://www.airneth.nl/documents/AnnFryefinal.pdf, unless otherwise indicated.
[21] Carmen van Casteren, KLM

Appendix SE.3.7 Part B

Studying the travel needs of the ageing passenger population at London Heathrow

We reviewed previous research, analysed London Heathrow's passenger survey data and interviewed relevant stakeholders, like airlines and the charity Age Concern, in a study of the travel needs of the airport's ageing passenger population.

Key Facts

It is predicted that in many developed and developing societies, elderly citizens will account for a rising proportion of the population.

Beyond the age of 60, there is accelerated deterioration in capabilities which can restrict mobility, confuse the senses and impair cognitive function. This can make airport terminals particularly challenging for many elderly citizens.

Increased disposable income means that elderly citizens will have a high appetite for travel, providing significant commercial opportunities for the air travel industry.

For many elderly citizens, the air travel experience can be very confusing and stressful. Airports and other air transport service providers have not fully considered the implications of population ageing in terms of what products need to be offered and how processes, systems and architectures needs to be adapted.

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London Heathrow Airport has recognised the need to address the challenges and opportunities posed by the ageing population phenomenon.

Our research highlighted some important findings relating to future travel trends and to how, historically, elderly passengers have rated elements of its service provision and how the airport is positioned relative to its key competitors. This information provides London Heathrow with an important insight into which processes need greater management focus.

Our stakeholder analysis presented some really important insights in the area of operational and strategic communication between the airport and its partners and how the airport's current elderly passenger proposition is perceived.

Why the research was commissioned

Given that the elderly passenger market is becoming more important to the airport, we set out to initially review previous research in the fields of health and mobility and the effects of population ageing on travel, tourism and air transport.

London Heathrow also sought to obtain deeper insights into how elderly passengers had rated their experience of its services, both historically and relative to its key competitors. It also wanted to obtain deeper qualitative perspectives on ageing population from its partners, relevant interest groups and population ageing subject experts.

Why Cranfield?

We have a large number of academics focused on management and policy in air transport. We recognise that one of the most important issues that will affect the industry in the coming years will be what population ageing is likely to mean in terms of how systems will need to be redesigned, services delivered and customer needs satisfied.

Related areas

UK regional airport connectivity (/case-studies/research-case-studies/uk-regional-airport-connectivity)

Drones for accident investigation (/case-studies/research-case-studies/uavs-for-accident-investigation)

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AIRPORT COOPERATIVE RESEARCH PROGRAM

Impacts of Aging Travelers on Airports



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Appendix SE 3.7 Part D

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AIRPORT COOPERATIVE RESEARCH PROGRAM

ACRP SYNTHESIS 51

Impacts of Aging Travelers on Airports

A Synthesis of Airport Practice

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Appendix SE 3.7 Part D

AIRPORT COOPERATIVE RESEARCH PROGRAM

Airports are vital national resources. They serve a key role in transportation of people and goods and in regional, national, and international commerce. They are where the nation's aviation system connects with other modes of transportation and where federal responsibility for managing and regulating air traffic operations intersects with the role of state and local governments that own and operate most airports. Research is necessary to solve common operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the airport industry. The Airport Cooperative Research Program (ACRP) serves as one of the principal means by which the airport industry can develop innovative near-term solutions to meet demands placed on it.

The need for ACRP was identified in *TRB Special Report 272: Airport Research Needs: Cooperative Solutions* in 2003, based on a study sponsored by the Federal Aviation Administration (FAA). The ACRP carries out applied research on problems that are shared by airport operating agencies and are not being adequately addressed by existing federal research programs. It is modeled after the successful National Cooperative Highway Research Program and Transit Cooperative Research Program. The ACRP undertakes research and other technical activities in a variety of airport subject areas, including design, construction, maintenance, operations, safety, security, policy, planning, human resources, and administration. The ACRP provides a forum where airport operators can cooperatively address common operational problems.

The ACRP was authorized in December 2003 as part of the Vision 100-Century of Aviation Reauthorization Act. The primary participants in the ACRP are (1) an independent governing board, the ACRP Oversight Committee (AOC), appointed by the Secretary of the U.S. Department of Transportation with representation from airport operating agencies, other stakeholders, and relevant industry organizations such as the Airports Council International-North America (ACI-NA), the American Association of Airport Executives (AAAE), the National Association of State Aviation Officials (NASAO), Airlines for America (A4A), and the Airport Consultants Council (ACC) as vital links to the airport community; (2) the TRB as program manager and secretariat for the governing board; and (3) the FAA as program sponsor. In October 2005, the FAA executed a contract with the National Academies formally initiating the program.

The ACRP benefits from the cooperation and participation of airport professionals, air carriers, shippers, state and local government officials, equipment and service suppliers, other airport users, and research organizations. Each of these participants has different interests and responsibilities, and each is an integral part of this cooperative research effort.

Research problem statements for the ACRP are solicited periodically but may be submitted to the TRB by anyone at any time. It is the responsibility of the AOC to formulate the research program by identifying the highest priority projects and defining funding levels and expected products.

Once selected, each ACRP project is assigned to an expert panel, appointed by the TRB. Panels include experienced practitioners and research specialists; heavy emphasis is placed on including airport professionals, the intended users of the research products. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, ACRP project panels serve voluntarily without compensation.

Primary emphasis is placed on disseminating ACRP results to the intended end-users of the research: airport operating agencies, service providers, and suppliers. The ACRP produces a series of research reports for use by airport operators, local agencies, the FAA, and other interested parties, and industry associations may arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by airport-industry practitioners.

ACRP SYNTHESIS 51

Project A11-03, Topic S07-01
ISSN 1935-9187
ISBN 978-0-309-27128-8
Library of Congress Control Number 2014931673

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Published reports of the

AIRPORT COOPERATIVE RESEARCH PROGRAM

are available from:

Transportation Research Board
Business Office
500 Fifth Street, NW
Washington, DC 20001

and can be ordered through the Internet at
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Printed in the United States of America

Appendix SE 3.7 Part D

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Cover figure: Elderly travelers. *Source*: Corgan.

Appendix SE 3.7 Part D

FOREWORD

Airport administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to the airport industry. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire airport community, the Airport Cooperative Research Program authorized the Transportation Research Board to undertake a continuing project. This project, ACRP Project 11-03, "Synthesis of Information Related to Airport Practices," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an ACRP report series, *Synthesis of Airport Practice*.

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

By Gail R. Staba
Senior Program Officer
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This report presents information from the literature and interviews that airport operators are generally aware of the needs of the elderly who make up a significant portion of their customer base, and how they are trying to accommodate them. Challenges of wayfinding, fatigue, technology and equipment, and needed amenities are described, and practices that airports are enacting to accommodate and improve the airport experience of aging travelers are provided. However, often airport operators' efforts are hampered by the lack of a well-coordinated policy, the constraints presented by existing buildings, and the costs of implementation both in terms of capital investment and increased staffing. The report will be of special interest to airport operators, airlines, and related stakeholders in understanding the aging demographic, defining issues, and implementing effective practices to accommodate aging travelers.

Philip Mein, Andrew Kirchhoff, and Patrick Fangen, Corgan Associates Inc., Dallas, Texas, collected and synthesized the information and wrote the report. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

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Note: Many of the photographs, figures, and tables in this report have been converted from color to grayscale for printing. The electronic version of the report (posted on the Web at www.trb.org) retains the color versions.

IMPACTS OF AGING TRAVELERS ON AIRPORTS

SUMMARY

The number of aging and elderly travelers is increasing, challenging airports and airlines to respond to the physical and psychological needs of this important demographic. According to the Administration on Aging, the number of persons over 65 years of age is projected to increase from 40 million in 2010 to 70 million—from 13% to 19% of the population—by 2030. Although healthier in some respects than earlier generations, this age group is subject to such chronic illnesses as cardiovascular disease, Alzheimer's, diabetes, osteoporosis, and obesity, any of which can affect a person's ability to navigate an airport. The normal effects of aging, including muscular/skeletal problems, respiratory conditions, and deteriorating sight and hearing, also play a role. Contributing psychological issues include anxiety and lack of ability to adapt to change.

The stress affecting anyone undertaking a major journey can be felt more acutely by an older person because of the factors mentioned above. This study identified the following as the most prevalent issues the elderly face:

Wayfinding:

- Unfamiliarity with a complex airport environment
- Unclear or confusing informational and directional signage
- Difficulty understanding the meaning and terminology of directional signs.

Fatigue:

- Standing or waiting in line, at check-in, passenger security screening, bag claim, or curbside
- Long walking distances in the terminal, parking garage, and surface lots
- Handling heavy bags at curbside, check-in, and bag claim.

Technology and equipment:

- Understanding and using self-service devices
- Negotiating the security checkpoint process
- Using escalators and moving walkways.

Amenities:

- Difficulty in using toilet facilities
- Using congested retail and food service concessions.

A broad understanding of the current impact of aging travelers on airports, and what is being done to accommodate them, was established through an Internet review of relevant literature and a two-part survey of knowledgeable airport representatives in the United States and Canada. Fifteen of 18 airports selected for interviews responded to questions (an 83% response rate), each providing important contributions to the study process.

The interviews indicated that there was certainly an industry awareness of the special needs of elderly passengers. In all cases, close attention was being paid to compliance with the Americans with Disabilities Act (ADA). Besides that, the following efforts were identified:

Wayfinding:

- Master plans commissioned to clarify signage
- Signage inventories carried out, and the removal of redundant signs
- Installation of simpler, clearer, brighter public service signs
- Staffed information kiosks supplemented by touch screens
- Visual two-way paging systems
- Airport-specific smart phone wayfinding applications.

Fatigue:

- Seating provided in check-in lobbies, concourse areas, bag claim areas, and curbside
- Availability of wheelchairs
- Motorized carts organized into “transit systems” for the elderly and disabled
- Parking shuttles providing service to the passenger’s car
- Shuttle buses with low decks to align with sidewalk curbs
- Lounges for passengers to await ground transportation
- Remote and off-site bag check
- Baggage pick-up and delivery services.

Technology and equipment:

- Customer service personnel assisting at self-service devices
- Video displays explaining the security screening process
- TSA Cares and TSA Notification Card programs
- More elevators, ramps, and sloped floors as alternatives to escalators
- Audible caution alerts at escalators and moving walkways.

Amenities:

- Wider toilet stalls
- Volunteer help stations
- Greater provision of family toilets, which are often used by the elderly
- Concession contracts requiring the same accessibility standards as the public spaces
- Availability of porters in bag claim, etc.

A number of interventions that would clearly benefit the elderly were not yet commonly employed, most likely owing to the cost of implementing them, particularly in existing buildings. These included:

- Flat-plate claim devices, from which it is easier to retrieve bags
- Large capacity flow-through elevators as an alternative to escalators
- Check-in bag wells level with the floor to eliminate the need to lift bags
- Universal design toilets, where there is no differentiation between able-bodied and handicap accessible facilities.

In summary, the literature review and interviews indicate that airport operators are generally aware of the needs of over-65 travelers, who make up a significant portion of their customer base, and are trying to accommodate them. However, often their efforts are hampered by the lack of a well-coordinated policy, the constraints presented by existing buildings, and the costs of implementation both in terms of capital investment and increased staffing. If these issues are not addressed by airport authorities and airlines, it can be expected that there will be a negative impact on airport operations. As pointed out by one of the interviewees, successful implementation of elderly-accessible facilities will require determination and strong advocacy.

CHAPTER ONE

REPORT METHODOLOGY

In preparing this report, the researchers undertook (1) an Internet review of relevant literature dealing with air travel by aging passengers; and (2) a survey of key airport personnel at a broad cross-section of airports, who are familiar with the issues facing elderly travelers and the measures being taken at their respective airports to accommodate them.

LITERATURE REVIEW

The literature review entailed an in-depth Internet search of the most relevant research and data on topics relating to aging travelers, specifically:

- The demographic context
- Common physical and behavioral characteristics
- Challenges typically faced by aging travelers
- Current airport practices for accommodating aging travelers.

AIRPORT PERSONNEL INTERVIEWS

The two-step survey of airport personnel began with an online questionnaire and was followed by telephone interviews. The questionnaire was distributed to knowledgeable airport staff at 29 large and medium hub airports across the United States, as well as some smaller airports with a high percentage of elderly passengers. The questionnaire included the following three questions:

1. Does your airport make any special provisions for elderly travelers?
2. If yes, briefly list some of those special provisions.
3. Would you be interested in participating in a 15- to 20-minute telephone interview regarding the impact of elderly travelers on airports?

Some brief biographical information was also requested. A sample copy of the questionnaire is included in Appendix A. Twenty-two (22) questionnaires, which were designed to identify people whom it would be most beneficial to interview, were completed and returned; and based upon their responses to questions 2 and 3, 18 airports were selected to take part in a follow-up interview; one declined to participate and two did not respond. The 15 resulting interviews were conducted by the principal investigator using a list of standard follow-up questions, a copy of which is included in Appendix B. Interviewees were also invited to address any additional topics they felt were relevant.

REPORT ORGANIZATION

The report contains seven main chapters. The first describes the report methodology. The second is devoted to the definition and characteristics of the aging traveler. The remaining five chapters trace the progress of passengers from the starting point of their journey to the airport, on to the departure gate and back again, documenting the challenges they face and the assistance that may be available to them in each of the following steps:

- From home or office to the airport terminal
- From the terminal entrance through the security checkpoint
- From the security checkpoint to the gate and from gate to gate
- From the arrival gate to the terminal exit
- From the terminal exit to leaving the airport.

There is a matrix at the end of chapters one through seven that summarizes the key issues facing the elderly addressed in that chapter; and the strategies currently being employed to address them as discussed in the preceding chapter text. In addition, there are symbols shown indicating the main obstacles standing in the way of implementing the various strategies as follows:


Capital Cost to Implement


Operational Costs/Staff Required


Existing Buildings Constraints/Disruption


No Obstacles to Implementation.

The issues addressed in this summary apply to all airports, but are especially relevant to larger hub facilities. The findings from the literature review are integrated within the text of each chapter; however, many of the findings were derived from the first-hand experiences of airport staff described during the interviews. In talking to each individual, it was agreed that the observations made would not be attributed directly to him/her or the particular airport. Many statements were common to several airports, in which case it is so noted. A list of participating airports is included in Appendix C.

CHAPTER TWO

THE AGING TRAVELER

As noted previously, it has been well documented that the proportion, as well as the actual number, of older persons in the United States is increasing at a faster rate than in the general population. The Administration on Aging estimates the number of people over 65 years of age will increase from approximately 40 million in 2010 to 70 million by the year 2030, and from 13% to 19% of the population. It is interesting to note that according to the European Commission Economic and Financial Affairs Department's Aging Report, the percentage of elderly persons in the European population is already higher than that in the United States, with levels above 16%, which may account for the apparently greater focus on elderly issues in European airport terminal design.

Figure 7 from the U.S. Census Bureau Age and Sex Composition Report—2010 illustrates the growth in the percentage of persons over 65 from 9% in 1960 to 13% in 2010 (see Figure 1). Significantly, the number of those between 45 and 65 years of age—the future elderly, so to speak—has increased from 20.3% to 26.4% over the same period. The U.S. Travel Association notes that mature travelers, those born before 1946, account for 21% of all leisure travelers, making four trips a year on average; and 14% of all business passengers, making approximately eight trips a year. It is also expected that the proportion of older travelers choosing to fly will increase as a result of increased affluence and education levels.

CHARACTERISTICS OF THE OLDER TRAVELER

The main explanations for the increase in the number of air travelers over aged 65 are that the post-war "baby boomer" generation is reaching retirement age, and that people are generally living longer. This may suggest that elderly persons are healthier than in the past, and in some respects they are. However, according to the paper, "The Normal Aging Process" (*Leading Age Wisconsin*), there is an increase in the prevalence of a number of chronic diseases among the elderly, such as diabetes, arthritis, and hypertension. It is these ailments, even in their early stages, that are most likely to impact an older traveler's ability to navigate an airport terminal.

A general deterioration in some physical and mental functions can be expected with advancing years. Mobility and stamina can be impaired by a variety of muscular/skeletal problems and respiratory conditions, and eyesight and hearing generally decline. Elderly persons tend to be less flexible than they were in their youth and can often be in denial about not having the same capabilities they had formerly. The psychological effects of aging cannot be overlooked either: According to the article, "Psychosocial Changes with Aging" (Pearson Higher Education n.d.), the elderly are more risk-averse and anxiety-prone, which can result in difficulty with decision making, particularly under the pressure of an unfamiliar environment.

It is important to recognize there is no such thing as a typical elderly person. Just because a person may be limited in one particular respect does not mean he/she is not fully capable in others. There are also different "generations" of elderly people (see Figure 2). For example, many of the "younger" seniors are more capable of dealing with technology than their older predecessors. The same article quoted in the previous paragraph notes that although some brain functions in areas such as math do decline with age, others, including vocabulary skills, may actually improve. Symptoms of aging and early onset limitations may hinder travelers in their 50s, while those who are still traveling in their upper 80s and beyond may be less affected.

AMERICANS WITH DISABILITIES ACT AND THE AIR CARRIER ACCESS ACT

The Americans with Disabilities Act (ADA) defines a disabled person as one with a physical or mental impairment that substantially limits one or more major life activities. Although not necessarily fitting this description, the majority of elderly persons may benefit from some of the stipulations of ADA, such as more ample toilet stalls, automatic doors, and pedestrian routes without staircases. On the other hand, many older travelers do have physical or mental limitations that, although not classifying them as disabled, may cause difficulties in navigating an airport terminal.

The Air Carrier Access Act essentially prohibits discrimination on the basis of disability in airport terminals, parking garages, and ground transportation. This basically requires enabling a disabled passenger to use the airport facilities without hindrance and ensuring that any assistance that may be

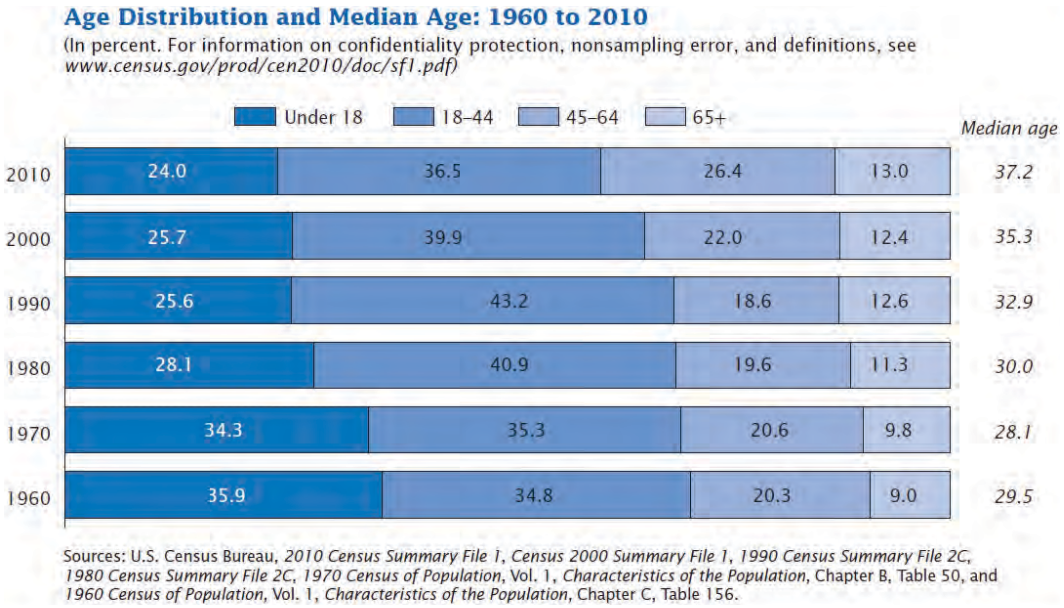


FIGURE 1 *U.S. Census Bureau Age and Sex Composition—2010.*



FIGURE 2 Elderly travelers (Corgan).

necessary, such as wheelchairs, is provided. The airlines have generally taken responsibility for the journey from check-in to the aircraft, from gate to gate for connecting passengers, and from the aircraft to bag claim or ground transportation. Increasingly, there are other situations where wheelchairs may be requested, such as from parking facilities into the terminal; and the airport often steps in to provide them.

CHAPTER THREE

FROM HOME OR OFFICE TO THE AIRPORT TERMINAL

Once an older person has made the decision to travel by air, he or she must set about planning the journey, including making allowances for the extra time it will likely take to get to the airport and traversing the terminal to the gate. Travelers may also have recourse to one or more of the trip planning aids that can be found online, such as the FAA's "Preparing to Fly." There are also a number of commercial websites that offer advice on how to prepare for a journey by air. Nevertheless, air travel can be stressful, beginning with the journey from home or office to the airport and terminal entrance.

If the trip to the airport is by some form of public transit, there should be no wayfinding issue unless the train or bus does not drop off directly at the terminal front door, but rather at a remote location such as a ground transportation center (Figure 3). In this case, requiring a secondary method of transportation to the terminal can provide a challenge for the elderly in finding their way to the appropriate shuttle or moving walkway system. This may be exacerbated by the fact that they are probably still hauling the bags they intend to check. Most airports mitigate this problem by running shuttle buses with low decks that closely align with the curb, and having paid or volunteer staff to assist with directions.

HIGHWAY WAYFINDING

If the traveler is driving to the airport, there may be several wayfinding issues to deal with, including roadway signage design, sign spacing, and extraneous clutter. One respondent noted that signs are often erected in response to a specific issue but remain long after the issue is no longer relevant. That airport had instigated periodic signage inventories leading to the removal of redundant signs as appropriate. At another surveyed airport, the terminal roadway signage had been replaced by signs that had a design similar to the state highway signage en route to the airport, which was considered more comprehensible by the driver.

There are also multiple factors that increase the complexity of the journey, such as a series of arrivals or departures in a single journey, short-term or long-term parking, rental car return, etc. Airline signage can also be an issue, especially at large airports where a single airline may occupy more than one terminal with many gates in each, leading to the possibility of gate changes during the course of the journey to the airport.

PARKING CHALLENGES

Parking options at the airport can be especially confusing to older travelers. Because of the higher cost of close-in parking and the longer stays associated with leisure travel, aging passengers frequently use remote parking facilities. Often these facilities are large surface lots exposed to the weather, where there may be long waits for shuttle buses. These remote lots create the same problems of transferring to the terminal that the ground transportation centers do. Some remote parking and most close-in parking is in large multi-level parking structures, where it may be difficult to identify the most convenient area to park in order to minimize the walk distance to the appropriate terminal entrance. Even close-in lots can be hazardous in winter, when ice can lead to falls. One airport representative reported that the parking sections were identified by the gates and airlines to which they were closest.

For the technology-savvy traveler, there is a range of assistance available for finding a parking place. Gate information smart phone applications such as FlightTrack can help determine the most convenient parking location in relation to the aircraft departure gate; and there are smart phone applications that direct the driver to any available parking space ("Airport Apps Put You First in Line," *The New York Times*, 2010).

Most parking garages do not have baggage carts available within them because of their potential damage to cars. This requires passengers to transport their check-in and carry-on bags to the terminal unassisted. This issue has been ameliorated somewhat for the elderly by ADA requirements for ramps and automatic doors along travel paths. One airport had a passenger services website that allowed passengers to call and arrange for an agent to meet them at their parking space with a wheelchair to convey them to the check-in lobby.

DEALING WITH BAGS

Apart from wayfinding, the greatest challenge at the airport for aging travelers is dealing with their baggage. The ultimate solution to this problem is to have one's baggage picked up at home or other originating location. However, this raises several TSA security issues, primarily that the baggage may have



FIGURE 3 Remote terminal—Vienna (Corgan).

been tampered with. Also, there is no opportunity to have an airline employee positively identify the person checking the bag. Nevertheless, there are many off-site locations such as large hotels, resorts, convention centers, and cruise ship terminals certified by the TSA that deliver bags directly to the airport for screening and loading onto the aircraft ("On the Road with Harriet Baskas," *USA Today*, 2008). These services, as well as on-site locations, are generally provided by third-party vendors. The newer trend of shipping bags door-to-door is an alternative that could be a relief for elderly travelers.

In Europe, a number of airports have remote terminals, usually located in the city center or at major transportation nodes, where bags may be checked prior to riding a transit system to the airport (Figure 4). Because of regional demographic and infrastructural issues, including a lack of railway networks and generally dispersed population centers, this concept has not generally been adopted in the United States. The airports surveyed did indicate there is a trend toward on-airport bag check at parking garages and consolidated rental car facilities, etc., which is certainly a boon to the elderly. However, there are logistical and cost issues that have slowed the implementation of remote bag drop.



FIGURE 4 Garage bag check.

CURBSIDE CHECK

The most common method of checking a bag prior to entering the terminal is at curbside. This is generally convenient for the older traveler, and is available at all the larger airports surveyed. However, this does not eliminate all the issues for those who find it difficult to handle their bags. Generally, curbside agents will not lift bags from the trunks of cars, and curbside porters may only be interested in conveying bags from the car to the ticket counter. Also, elderly passengers who are dropped off at the curb while their traveling companion is parking the car or while waiting for a wheelchair can rarely find a place to sit, although waiting in what is often an unpleasant environment of vehicle exhaust fumes and traffic noise (see Table 1).

TABLE 1
CHAPTER THREE SUMMARY

Issues	Obstacles	Strategies
Trip Anxiety		- FAA's "Preparing to Fly"
		- Commercial flight prep websites
Using Ground Transportation Within the Airport		- Shuttle buses with curb-height decks
		- Shuttle boarding platforms
Following Roadway Signage		- Signage inventories to remove redundant signs
		- Use of similar signs to surrounding highways
Using Large Parking Garages		- Wheelchair service to the passenger's parking space
		- Smart phone applications for locating parking spaces
		- Ramps at level changes on pedestrian routes
		- Automatic doors
		- Smart garage systems that enable empty space finding
Handling Heavy Baggage		- Bag shipping
		- Check-in at off-site locations
		- Check-in at a remote terminal; e.g., downtown
		- Remote check-in on airport, long-term parking, or car rental
		- Garage check
		- Curbside/valet check

ICON KEY

Capital Cost to Implement.

Operational Costs/Staff Required.

Existing Buildings Constraints/Disruption.

No Obstacles to Implementation.

CHAPTER FOUR

FROM THE TERMINAL ENTRANCE THROUGH THE SECURITY CHECKPOINT

The check-in area—usually an architecturally impressive space intended to instill a sense of awe and excitement at the prospect of taking a trip by air—traditionally represented the front door to an airport terminal. Nowadays, an older traveler entering such a space, with its visual information overload, large numbers of people, and loud ambient noise levels, may find it stressful and even disorienting (Figure 5). Some passengers will have already checked in, either at curbside or at a remote location such as a parking garage, and deposited their baggage prior to entering the building; but many will not have. For those aging travelers who need to obtain a boarding pass and check their baggage inside the terminal building, wayfinding can be a challenge.

CHECK-IN AREA WAYFINDING

A survey respondent noted that while volunteer "ambassadors" in the terminal were often located beyond the security checkpoint, having a staffed information station immediately inside the front door would be helpful and reassuring to the elderly passenger. Another respondent indicated that a "You Are Here" map of the terminal would be helpful—provided it was oriented on the same two-dimensional axis as the terminal, and was not three-dimensional, which passengers, including the elderly, tend to find confusing. Generally, airline signage at the curbside was considered adequate for passengers to alight at the appropriate location.

Navigating the check-in process can be made more difficult by an excess of signs in the lobby, some of which are in airline jargon that may not be clear to a person who travels infrequently. At one of the terminals at London's Heathrow Airport, signs identifying check-in areas, bag drop, ticketing, etc., are replaced by three very large signs that simply read Step 1, Step 2, and Step 3. Step 1 refers to obtaining a boarding pass; if the individual already has a boarding pass, a sign below the main sign instructs them to proceed to Step 2, which is the bag drop. From there, passengers are instructed to either go to security or Step 3 for further assistance with check-in.

COPING WITH TECHNOLOGY

One obvious concern is how older travelers cope with the proliferation of technology, particularly self-service check-in devices (Figure 6). Survey respondents reported that the airlines were generally doing a good job of assisting their customers using self-service devices. One airport reported that it had its own help stations near the self-service check-in areas. At a number of airports, the self-service devices have audio menus and instructions that can be accessed by headphones, which those who are hard of hearing often carry. The trend among airlines to have an agent approach the passenger with a handheld check-in device, enabling the identification and assistance of an elderly person who may be experiencing difficulties, was identified as a positive development.

FATIGUE

The issue of fatigue among older travelers caused by their having to stand in line in an overcrowded check-in area was raised by several of the airport representatives interviewed. Most had added seating to the lobby, so that elderly passengers could wait while their more able traveling companion checked them in, or while awaiting a wheelchair. One respondent suggested that elderly passengers could be given a number or an electronic device similar to those used by restaurants, so they could sit down until their turn came for checking in. Lifting bags into the bag well at the check-in counter poses another physical problem for the elderly traveler. This issue has been addressed in Europe by installing the index belt almost flush with the floor (Figure 7).

SECURITY SCREENING CHECKPOINT

Once check-in has been completed, aging travelers are faced with the challenges of the security screening checkpoint. A succinct list of these problems is contained in the paper "Accommodating Aging Population Needs in Airport Terminals" (Wolfe 2003). They include:

- Waiting in line and prolonged standing
- Removing personal items and items of clothing and depositing them in tubs
- Maneuvering baggage onto and off the screening conveyor belt
- Walking through the passenger screening devices.

The process of clearing the security checkpoint queue can be even more stressful than that of negotiating the check-in lobby (Figure 8). One airport is addressing the problem



FIGURE 5 Crowded check-in hall.



FIGURE 6 New check-in technology.

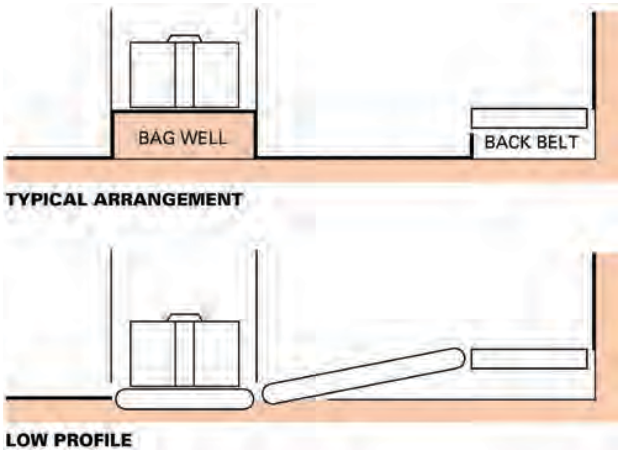


FIGURE 7 Flush bag well (*ACRP Report 10*).

by installing live action videos earlier in the queuing area that show clearly what is about to take place. Respondents generally acknowledged that the recomposing areas on the other side of the checkpoint are often too small, usually as a result of the constraints of adding checkpoints to buildings that were designed before the current screening requirements were instituted. One airport's recently designed terminal includes a large "recomposing lounge" where passengers can relax without having immediately to rush to their gates.

The TSA has made considerable efforts to accommodate those with disabilities and the elderly. Travelers who believe they will have difficulties at security can obtain a TSA Notification Card that assures assistance for the holder when passing through security. There is a program called TSA Cares, which operates a help line passengers can call to receive advice about getting through the security process. There is also a smart phone app called "My TSA" available at some airports that directs the traveler to the security checkpoint with the shortest line ("Airport Apps Put You First in Line," *New York Times* 2010). A review published on the TSA's website indicates that waits of 20 to 30 minutes are not uncommon at major hubs. Passengers over the age of 75 can also apply to use "Pre-Check" lanes at most airports, which exempt passengers from having to take off their shoes, belts, or light jackets. However, this might result in mixing elderly passengers with business travelers, which could cause some conflicts (see Table 2).

Most surveyed airports had special security check-in lanes for disabled or elderly passengers. Sometimes these lanes were opened on an ad hoc basis, and sometimes they were shared with a staff lane.

TABLE 2
CHAPTER FOUR SUMMARY

Issues:	Obstacles:	Strategies:
Wayfinding in the Check-in Lobby		- Volunteer information booths directly inside entry
		- Correctly oriented “You Are Here” maps
		- Signs in plain language, not airline/airport jargon
Dealing with Technology		- Airline staff with hand-held devices to assist the elderly
		- Volunteer staff located near self-service check-in devices
		- Self-service devices with audio menus
Fatigue Due to Standing/Queuing		- Provision of abundant seating in the check-in hall
		- Pager system to allow passengers to be seated while waiting
Handling Heavy Baggage		- European-style ticket counter bag wells at floor level
Negotiating the Security Checkpoint		- Screens showing live action film of the screening process
		- Dedicated lane for elderly and disabled
		- Enlarged “recomposing lounges”
		- TSA Notification card that assures special assistance
		- TSA Cares program help line to call for information
		- My TSA smart phone application

ICON KEY

 Capital Cost to Implement.

 Operational Costs/Staff Required.

 Existing Buildings Constraints/Disruption.

 No Obstacles to Implementation.

CHAPTER FIVE

FROM THE SECURITY CHECKPOINT TO THE GATE AND FROM GATE TO GATE

If the check-in process can be confusing to the aging traveler, the airside environment, with its abundance of potential destinations (gates, retail outlets, eating establishments, toilets, etc.) and resulting signage clutter and information overload, can be even more confounding. Much has been written about intuitive wayfinding in airport terminals, but directional and informational signs play a far greater role in helping passengers navigate their way through the typical terminal.

AIRSIDE WAYFINDING

Most of the airports surveyed agreed that signage clutter was a problem, and indicated that they were taking steps to deal with it. The primary approach was to establish a hierarchy of signs that could differentiate directional and informational notices from commercial and advertising displays (Figure 8). Wolfe presents the following useful list of criteria for terminal signage:

- Placement: Typically, directional signs should be placed where passengers can see them before they reach the concourse. They should also be placed near ticket counters or curbside check-in.
- Orientation: Maps need to be oriented with the axis of the environment. A different orientation of the map requires transposing directions on the part of the traveler, a difficult task, especially for seniors.
- Color: The choice of color is important, as seniors may have trouble discerning pastels and color intensity. Changes to the eye during aging may also make it difficult to distinguish certain color combinations.
- Text size: The size of the text should be large enough to allow for easy reading.
- Complexity: Wayfinding maps that try to display three-dimensional space are often too complicated to interpret. Furthermore, maps that attempt to convey too much information may be confusing.

There was a striking consistency of opinion from interviewees about the most effective design for public signs—ideally, that they would have a strong primary colored background with large, white, or yellow unadorned letters, and preferably back-lit (Figure 9). One airport had just replaced a terminal's original signage system, which had been designed in earth tones, because it could not compete visually with commercial messages. One airport, in the process of creating a new signage master plan, indicated it was adding more symbols to its signs to improve readability.

The second most common method of wayfinding is using information points. It was reported in the survey that elderly travelers apparently preferred to seek directions at booths staffed by volunteer "ambassadors," many of whom were elderly themselves and were therefore considered to be approachable. However, as discussed earlier, there is a "new" generation of older travelers who are more conversant with technology, for whom touch-screen information kiosks may be preferable to engaging in conversation. The Pew Research Center's Internet & American Life Project (Smith 2013) indicates that 18% of seniors had smart phones in May 2013, compared with 13% in February 2012, a 38% increase.

Several interview respondents said free Wi-Fi in terminals was leading to an increasing use of smart phone applications for wayfinding. One app gives gate changes in real time. Another helps passengers find gate locations, concessions, and amenities at more than 100 airports in the United States, Canada, and London (*New York Times*).

One idea put forward for helping the elderly passengers gather information was to group together the sources, including staffed positions, touch screen terminals, a correctly orientated "You Are Here" map, and Flight Information Display Systems (FIDS), to make the information more accessible. Visual paging systems have also benefited aging travelers, and are typically located as part of an FIDS array, although more sophisticated systems with two-way communications may overtake that arrangement. It was reported that the elderly often found FIDS difficult to read because of the font size; and were confused by the scrolling of flight information by airline alliances that have multiple flight numbers for a single flight.

TRANSITIONING BETWEEN FLOORS

Frequently the path of travel through an airport terminal involves the passenger changing levels, most commonly by escalator, with elevators and stairs being secondary choices. All survey respondents noted that escalators presented problems for the elderly, and that accidents were not uncommon. (The Consumer Product Safety Commission estimates that more than 10,000 people are injured on escalators in public areas every year.) This was also a frequent opinion



FIGURE 8 Confusing signage.

found in the literature review, including in the International Civil Aviation Organization (ICAO) Planning Manual, which states that elevators or ramps are preferable to escalators. The installation of variable speed escalators, which are generally preferred for energy saving reasons, may benefit the elderly, but there is no definitive data on that aspect.

One airport representative reported that, in remodeling its existing terminals, the airport was removing all of the existing escalators and replacing them with high-capacity,

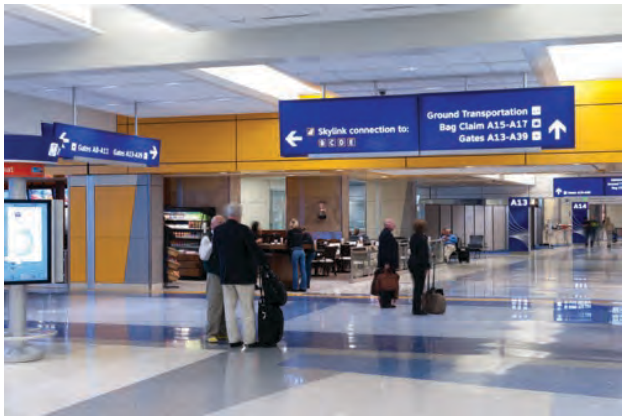


FIGURE 9 Clear signage (Corgan).



FIGURE 10 Large capacity elevators (Corgan).

flow-through elevators for reasons of safety, passenger convenience (especially for the elderly and families), and energy conservation Another respondent said that, in a recently completed terminal, escalators had been eliminated in favor of elevators, ramps, and 1:20 gradient sloped floors. At a smaller airport undergoing renovation, the relatively large number of elderly passengers was a factor in deciding on a single-level design.

In many European terminals, notably London's Heathrow Airport Terminal 5, the primary means of vertical circulation connecting the arrival and departure levels and the parking decks and ground transportation is by banks of as many as six large-capacity elevators, in effect, forming a vertical transit system (Figure 10). At one of the U.S. airports surveyed, the elevators had been reprogrammed to ensure that there was always one cab with its doors open on the primary level; lighting in the area had also been upgraded to increase visibility, especially for the elderly. Another airport had installed audible messages at escalators alerting passengers of the availability of nearby elevators. A suggestion for reducing accidents caused by older people missing their steps on escalators was to specify longer horizontal sections at the top and bottom.

LONG WALKING DISTANCES

Another frequently mentioned problem facing elderly travelers is the long walk distances often involved in getting to the gate and between gates. Planning standards generally recommend a maximum unassisted walk distance of 1,000 feet; however, distances far shorter than that can be tiring for an elderly traveler. The installation of moving walkways has been the common answer to this issue but, as with escalators, these moving belts can present problems getting on and off. Audible alerts before the end of the walks can be effective depending on the surrounding environment; but one respondent noted that in

certain situations they may only add to the general cacophony. Walking fatigue may also increase the likelihood of tripping and falling, which can be a serious problem for older persons.

Reliance on mechanized means of easing travel for the elderly, whether horizontally (by means of moving walkways) or vertically (via elevators and escalators) raises issues of reliability. An out-of-commission moving walkway, for example, may not only translate into a very long walk but might also result in passengers missing their connections. Many airports group escalators and walkways in threes to minimize the risk of mechanical failure, with the added benefit that they can accommodate directional flows as appropriate (Figure 11). Elevators are generally grouped in twos, at least. In any event, operational issues of monitoring and rapid response are part of any decision to install mechanized movement systems.

Motorized carts are another common method of reducing the impact of walking, but their operation tends to be haphazard. One respondent's airport had formalized the service into a mini-transit system, with clearly identified stops and seating for waiting elderly or disabled passengers. Another airport had gone further by developing what it called a "compact transit system" of carts, with separate lanes in some locations for pedestrians, moving walkways, and carts. The availability of carts is particularly important for passengers making connections, although booking flights in segments should enable travelers to plan for adequate layovers between flights.

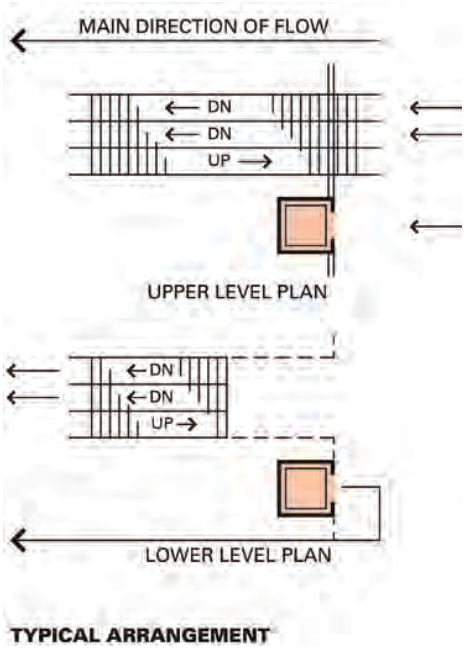


FIGURE 11 Elevators supplementing escalators (*ACRP Report 10*).

There is an apparent increase in the use of wheelchairs in airport terminals. This is partly owing to the increase in the number of elderly travelers. A 2013 study at Minneapolis International Airport, "Operations Accessibility Issues in Airports," ascertained that 90% of wheelchair users in airports did not use them in their daily lives. The same study recorded 15,000 wheelchair uses at the airport in a single month. This number is bound to increase substantially. Traditionally, wheelchair services have been provided by the airlines, but increasingly they are being provided or supplemented by airports eager to provide a high level of service to their customers.

An alternative to wheelchairs are motorized scooters, either provided by the airport or belonging to passengers. One interviewee reported that the increase in the number of scooters at their airport was causing congestion, particularly in the hold rooms. Also, the increased use of personal wheelchairs and scooters has made it virtually essential for elevators to be constructed near each gate to facilitate transfers from the concourse to the ramp. On the plus side, they do provide greater autonomy for the passengers, enabling them, for example, to shop or enjoy a restaurant on their way to the gate, possibly enhancing revenue; and also to dispense with the necessary assistance of a staff member.

At one airport, it had been noticed that elderly passengers were having difficulty pushing baggage carts across slight changes of floor level and thresholds; so airport management worked with the manufacturer to redesign the wheel system to overcome this problem. Problems with baggage carts still remain, however. Brakes are necessary to avoid runaway carts on ramps, but they can often be difficult to apply; they can also present a hazard at the end of a moving walkway, stopping the cart abruptly just as the passenger begins to walk.

Some airports reported they were reducing the impact of long walks by adding seating in "way stations" along longer concourses. It was noted that some elderly passengers tended to misjudge the distance to the gates, and refused the offer of a wheelchair at check-in only to realize, once through security, the length of the walk ahead of them. Unfortunately, airline-provided wheelchairs are not readily available at this point, resulting in the likelihood of a long wait for assistance.

The National Safety Council estimates that one in three adults over 65 falls in any given year, the primary causes being uneven floors, stairs, clutter, and poor lighting. Smooth, hard surfaces such as terrazzo are easier for older travelers to use if they are pushing a baggage cart, and are less likely to cause tripping than carpet. Lighting levels in many airports have been lowered for energy conservation reasons, but this can have a negative impact on the elderly, not just in avoiding accidents but in reading signage.

CONCESSIONS AND AMENITIES

Because of an abundance of merchandise, airport concessions can be challenging for the elderly to navigate. To ensure optimum accessibility, one airport revised its contracts with concessionaires to require them to meet the same, more stringent standards for corridor widths, etc., as the public areas of the terminal. Amenities offered at the surveyed airports that are especially relevant to the aging traveler included quiet rooms, some even containing a hospital-type bed; and on-site medical facilities. Wheelchair services were offered at all the airports.

Upon arriving at the gate, the elderly passenger needs a place to sit and relax. The evolution of hold room functionality and design taking place in the industry recognizes the differing requirements of passengers and would be beneficial overall. It was reported that some of the lounge-type seating being installed in hold rooms can be challenging for an elderly person to get in and out of easily. Most of the airports surveyed said they had set aside hold room seating for the disabled that also served the elderly, but that it was often taken up by regular passengers (Figure 12). Inadequate spacing between rows of seats was identified as a problem. The difficulty in hearing gate announcements was also mentioned several times, with the suggestion that boarding groups and other information be proffered visually as well as audibly (see Table 3).



FIGURE 12 Crowded hold room.

TABLE 3
CHAPTER FIVE SUMMARY

Issues:	Obstacles:	Strategies:
Wayfinding		- Reducing signage clutter
		- Differentiating between public service and commercial signs
		- Large, unadorned, illuminated fonts for directional signs
		- Grouped information sources, FIDS, staffed position, touch screen, maps, etc.
		- Airport-specific wayfinding applications for smart phones
		- Use of symbols on signs
		- Two-way visual paging
Transitioning Between Floor Levels		- Providing more elevator alternatives to escalators
		- Programming elevators to be “open door”
		- Use of ramps and 1:20 gradient sloped floors
		- Increasing length of escalator flat sections
		- Adding audio alerts at top of escalators

(*continued on next page*)

TABLE 3
(*continued*)

Issues:	Obstacles:	Strategies:
Long Walking Distances		- Moving walks with audible alerts at each end
		- Organization of motorized carts into a “transit system” for the elderly and disabled
		- Greater provision of wheelchairs
		- Use of scooters
		- Provision of seating “way stations” along concourses
		- Improved baggage cart design
Using Concessions and Amenities		- Requiring concessions to provide the same accessibility as public spaces
		- Providing quiet rooms
		- Providing on-site medical services
Hold Room Issues		- Designated seating for the elderly
		- Wider spacing between rows of seats
		- Visual as well as audio gate announcements
		- Elder-appropriate seating

ICON KEY

 Capital Cost to Implement.

 Operational Costs/Staff Required.

 Existing Buildings Constraints/Disruption.

 No Obstacles to Implementation.

CHAPTER SIX

FROM THE ARRIVAL GATE TO THE TERMINAL EXIT

Of all the transitions experienced by the elderly traveler moving through an airport terminal, the emergence from the cramped quarters of an aircraft cabin into the open spaces of the terminal, where they are faced with swarms of people hurrying to their gates, the visual confusion of competing signage, and the distractions of concessions and advertising, can be the most unsettling. There are additional physical factors that can add to the disorientation: The jet bridge may be steep and uneven, and the change in lighting levels between the bridge and the concourse may be significant.

It was suggested that wider jet bridges would facilitate the use of wheelchairs without blocking egress for other passengers. However, while directional signs to bag claim or connecting gates are often not immediately visible from the deplaning doorway, none of the airport representatives interviewed was addressing this issue apart from general efforts to improve signage.

RESTROOM ISSUES

The journey from the gate to the bag claim area presents most of the same issues as traveling on the terminal airside to the departure gate: long walks, wayfinding difficulties, moving walkways, etc. On the way to baggage claim, the amenity most commonly used by deplaning passengers is the toilets. Most of the airports surveyed were aware of the problems faced by the elderly using toilet stalls. There appears to be a trend towards enlarging the stalls to make room on the floor for carry-on luggage, so that older travelers do not have to lift it onto a shelf. One respondent reported the airport was installing more "family" toilets, which it considers helpful to elderly passengers who may need assistance from a traveling companion. There was some interest in the concept of "universal design," which essentially makes all amenities such as sinks and water closets equally easy to use for everyone, similar to the standardized design for drinking fountains.

BAG CLAIM AREA ISSUES

Wayfinding in the bag claim hall is not nearly so difficult as in the check-in lobby and was not identified as a problem. However, there are other challenges for the elderly, the first being the likelihood of having to stand, sometimes for long periods, while waiting for baggage to arrive (Figure 13). Some airports have begun to provide seating, but often, because of space constraints, it is not close to the claim devices themselves. The next issue is the retrieval of luggage from the claim device. Sloped plate carousel claim units have a sill difficult to lift a bag over (Figure 14). Furthermore, it is virtually impossible for an elderly person to retrieve a double-stacked bag from below another. Flat plate devices are far more user-friendly, since bags can be slid off of them. While they are relatively uncommon at large U.S. airports, where sloped plate devices are generally preferred because of their greater capacity and suitability for remote feeding, at European airports, flat plate devices are more prevalent, whether direct or remotely fed (Figure 15).

Most of the airport representatives identified the availability of assistance in the bag claim hall as an issue, particularly with respect to how porters or skycaps are compensated. Several of the airports surveyed provided no personnel assistance in the bag claim hall at all. One airport persuaded the airlines to absorb most of the cost in their rates and charges, with the airport making a smaller contribution. At one airport that has a high percentage of wealthy clients, the skycaps were happy to work for tips only. It was reported that airline baggage handlers, who often work inside pulling bags off the claims devices to increase new bag capacity, sometimes assist older passengers. One respondent suggested the airlines could tag "elder bags" as they do heavy bags, so they could be pulled off the claim devices by handlers.

FACILITIES FOR ARRIVING PASSENGERS

After claiming their bags, passengers may have to wait for some time to be picked up, or for ground transportation to arrive. In the ACRP report *Innovations for Airport Terminal Facilities* (2008), it was proposed that, rather than having the passengers waiting outside in the elements, they could be accommodated in an "arrivals lounge" (Figure 16). There they could sit and relax and be informed of their ground transportation arrival status by a video display or by cellular phone. One of the airports surveyed reported that such an amenity had been included in a recently completed terminal and had already proved a benefit to elderly and disabled passengers (see Table 4).



FIGURE 13 Queuing congestion (Corgan).

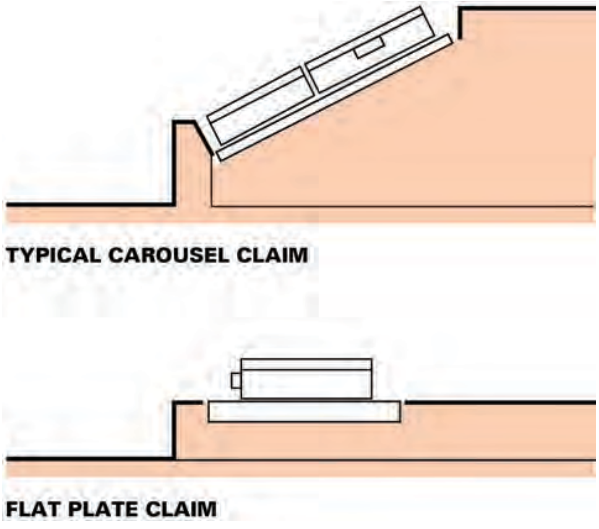


FIGURE 14 Slope plate vs. flat plate baggage claim (*ACRP Report 10*).



FIGURE 15 Flat plate claim device (Corgan).

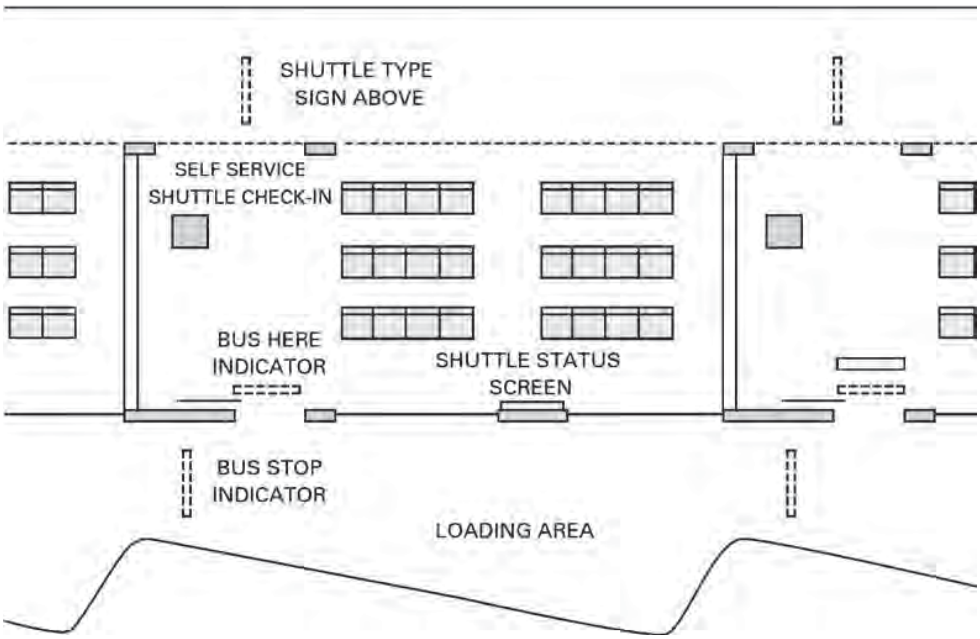


FIGURE 16 Arrivals lounge (*ACRP Report 10*).

TABLE 4
CHAPTER SIX SUMMARY

Issues:	Obstacles:	Strategies:
Toilet Provision	⚠ $	- Larger toilet stalls with floor space for bags
	⚠ $	- More family toilets for use by the elderly
	⚠ $	- Universal design with fixtures equally easy to use for all
Bag Claim Hall Fatigue	⚠	- Seating within close proximity of the claim device
	⚠ $	- Easy to use flat plate devices
	🚹+	- Assistance from airline staff or “skycaps”
	🚹+	- Tags identifying "elder bags" for assistance
Arrivals Amenities	⚠ $	- Provision of arrivals lounges in which to wait

ICON KEY

$ Capital Cost to Implement.

🚹+ Operational Costs/Staff Required.

⚠ Existing Buildings Constraints/Disruption.

⚠ No Obstacles to Implementation.

CHAPTER SEVEN

FROM THE TERMINAL EXIT TO LEAVING THE AIRPORT

Most of the problems faced by aging travelers when they leave the terminal building are similar to those they face when arriving at the terminal, including possible long walks to parking or ground transportation and wayfinding issues. One key difference is that passengers may have to wait for some time for transportation. Since a majority of airports do not have arrivals lounges, such as those described in the previous chapter, the waiting environment usually consists of a curbside or island that is covered but otherwise exposed to heat, cold, and likely low lighting levels. This situation can be aggravated by stress regarding the unknown arrival time for ground transport and possible concerns about personal safety. Several airports reported that they provided seating and enhanced lighting at the arrivals curb to address these issues.

ONGOING TRANSIT

Problems with shuttle buses for departing passengers, referred to in chapter three, can be even more critical for arriving passengers since they invariably have their checked baggage with them, making the boarding of shuttles even more difficult. It was also noted that the proliferation of shuttle services often made it difficult for travelers to find the correct curb or island and the appropriate shuttle stop. A trend that could certainly benefit elderly travelers is the delivery of a passenger's bag from the bag claim hall to their destination by a third party. One company will transport a bag up to 40 miles from the airport within four hours for less than $50. The service can be ordered on-line as late as the time of departure of the passenger's flight.

PARKING CHALLENGES

The last hurdle for many arriving passengers is the parking garage. Adding to the potential difficulty of locating their car is the concern for personal safety felt by many older people in large parking structures, especially at night. This has been mitigated at many airports by increased lighting levels and the installation of alarm stations in garages. One airport reported that one of its remote parking lots offers a shuttle service that takes passengers directly to their car, which not only reduces walk distances, but also eliminates passenger fears.

With the ever-increasing size of airport parking garages, the issue of locating a car has become a major problem, especially for the elderly. At Heathrow Airport's Terminal 5, the parking garage has a built-in car finding system. The ticket produced on entering includes the car license number. Upon leaving, the ticket is inserted into a machine and a map is displayed showing the level and zone, within a range of approximately 200 parking spaces, where the car is parked. (A similar system has been installed in a Santa Monica mall garage.) There are several smart phone GPS-based apps available, specifically designed for car-finding (see Table 5).

TABLE 5
CHAPTER SEVEN SUMMARY

Issues:	Obstacles:	Strategies:
Waiting at Curbside		- Provision of seating and adequate lighting
Parking Concerns		- Alarm systems and high lighting levels in parking garages
		- Parking shuttles that deliver passengers to their cars
		- Smart garage car-finding systems
		- Smart phone apps for car-finding

ICON KEY

Capital Cost to Implement.

Operational Costs/Staff Required.

Existing Buildings Constraints/Disruption.

No Obstacles to Implementation.

CHAPTER EIGHT

CONCLUSIONS

CONCLUSIONS

The study indicates there is a general awareness of the issues facing the increasing number of aging and elderly air travelers. This is supported by the documentation on the subject and by discussions with airport personnel. Efforts are being made to address these issues, albeit in a somewhat ad hoc fashion. There are, however, obstacles to be overcome, including the capital and operational costs of implementation, potential disruptions to ongoing operations, and the physical constraints of existing buildings. It appears clear that a concerted, integrated, and collaborative effort among airports, airlines, and other stakeholders will be required to satisfy the needs of the aging traveler without negatively impacting overall airport operations. Success will hinge on identifying a strong advocate for the elderly at each airport.

The following summarizes key issues and the efforts currently being made to address them:

- Wayfinding—difficulties in negotiating the complex environment presented by airport roadways, parking facilities, and terminal buildings

Solutions to wayfinding issues focus on efforts to improve public service signage as terminals are renovated or newly constructed; however, these efforts are often frustrated by pressure to generate revenue from commercial messages. Most airports have put a strong emphasis on volunteer helper programs, which they see as particularly beneficial to assisting older passengers through the airport.

- Fatigue—the physical effort involved in standing, waiting in line, lifting heavy bags, and walking long distances

The study indicates that relatively little is being done specifically to reduce the fatigue that aging and elderly passengers experience at an airport. Minor steps, such as acquiring shuttle buses with lower decks to facilitate boarding and having agents come out from behind the check-in counter with hand-held devices to assist elderly people, are positive developments. The increasing availability of remote bag check and bag delivery services relieves the elderly traveler of difficulties handling luggage. All the surveyed airports have been adding seating at check-in, along concourses, in the bag claim hall, and at curbside. Organized motorized cart service used as "compact transit" could also be helpful. Major improvements such as installation of flat plate claim devices, bag wells flush with the floor, and large flow-through elevators have not been generally adopted.

- Technology and equipment—coping with the increasing use of automation, self-service machines, TSA passenger screening process, and using escalators and moving walks

The study confirmed that there are different generations of "elderly" travelers, and that the youngest group is much more comfortable with technology than its predecessors. This should ease problems with self-service devices. The increasing use of smart phone apps for navigational purposes can be expected to assist future generations of tech-savvy older travelers. It is also anticipated that the TSA Pre Check program will be expanded, particularly for seniors, easing their way through security screening. Some newer terminals are reducing their reliance on escalators and the problems they represent by installing more elevators, ramps, and 1:20 sloping floors.

- Amenities—the challenges of using congested concessions area and constricted toilet facilities

The design of some amenities is still an issue for the elderly. There have been attempts to make retail and food service concessions, which are often very tightly arranged, more easily accessible. Toilet facility layout is still a major problem, though some airports are designing larger stalls and more "family" restrooms. The concept of universal design—making all amenities useable for everyone—has not yet taken hold.

OPPORTUNITIES FOR FURTHER RESEARCH

There are some opportunities for further research and creative thinking:

- Research on the development of overall goals and objectives for accommodating the aging and elderly traveler, perhaps as a precursor to creating policy guidelines for the industry

- Investigating the concept of “elder tags” for checked baggage that would identify bags whose owners might need assistance in the bag claim hall
- Identifying the opportunities and challenges of “compact transit,” whereby motorized carts are used not as an ad hoc back-up system for moving people but as a recognized and designated means of movement through the terminal for elderly and disabled passengers
- Further examination of smart phone applications available and being developed that would help the elderly in trip planning, wayfinding, and other travel issues
- A survey of aging and elderly travelers to identify the issues they faced along their journey so that the published issues can be validated and expanded
- Research on collaborative approaches between airports, airlines, and/or other stakeholders to better serve aging travelers and meet or exceed the requirements of the Air Carriers Access Act
- Research into the design of future accommodations for aging travelers at airports
- Research into the cost/benefits of catering to the needs of the aging traveler.

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APPENDIX A

Survey Questionnaire

Airport Cooperative Research Program

S13-07-01: Impacts of Aging Travelers on Airports

Corgan Survey Questionnaire

Dear Airport or Travel Facility Representative:

The Transportation Research Board is preparing a synthesis on the Impacts of Aging Travelers on Airports. This is being done for the Airport Cooperative Research Program (ACRP), an industry-driven, applied research program that develops near-term, practical solutions to problems faced by airport operators. ACRP is administered by TRB and sponsored by the Federal Aviation Administration.

This study will identify how older travelers are different and how those differences affect their airport experience. It will also define the issues in planning, design, and operation of airports associated with aging travelers. Current practices employed by airports and other travel facilities to accommodate the aging population will be documented.

This survey questionnaire is being distributed to airport and travel industry personnel who have been identified as having a significant role in providing the services and amenities desired by aging travelers. If you are not the appropriate person at your airport to complete this survey, please forward it to the correct person.

Please complete and submit this survey questionnaire by June 14th, 2013. If you have any questions, please do not hesitate to contact our principal investigator, Phil Mein, at phil.mein@corgan.com.

Confidentiality: All answers provided by survey respondents will be treated as confidential and aggregated with other responses in the reporting.

Thank you very much for participating in this survey!

1. Does your airport/facility make any special provisions for elderly travelers?
2. If yes, briefly list some of those special provisions.
3. Would you be interested in participating in a 15- to 30-minute interview on the subject of the impact of aging travelers on airports or other travel-related facilities?

APPENDIX B

Airports Responding to Survey Questionnaires

The survey was sent to 29 airports; 22 airports responded.

List of Airports Surveyed

1. Canada Place Terminal
2. City of Phoenix Aviation Department
3. Dallas/Fort Worth International Airport
4. Des Moines International Airport
5. Fort Lauderdale–Hollywood International Airport (Broward County, Florida)
6. Greater Orlando Aviation Authority
7. Harrisburg (Pennsylvania) International Airport
8. Los Angeles World Airports
9. Massport Authority–Boston Logan International Airport
10. Minneapolis–St. Paul International Airport
11. Palm Beach (Florida) International Airport
12. Port Authority of New York & New Jersey
13. Port Everglades
14. Port of Bellingham
15. Rochester International Airport
16. Salt Lake City International Airport
17. San Antonio International Airport
18. San Diego International Airport
19. San Francisco International Airport
20. Seattle–Tacoma International Airport
21. The Calgary Airport Authority
22. Tucson Airport Authority

APPENDIX C

Airports Where Staff Were Interviewed

There are 15 interviewees from 14 different airport organizations (Figure C1).

1. Los Angeles World Airports: 28,857,755 annual enplanements
2. Minneapolis–St. Paul International Airport: 15,512,487 annual enplanements
3. Port Authority of New York & New Jersey: 22,934,047 (JFK) annual enplanements
   12,001,501 (LGA) annual enplanements
   16,571,754 (EWR) annual enplanements
4. City of Phoenix Aviation Department: 18,901,171 annual enplanements
5. Dallas/Fort Worth International Airport: 27,100,656 annual enplanements
6. Greater Orlando Airport Authority: 17,071,491 annual enplanements
7. Massport Authority–Boston Logan International Airport: 13,561,814 annual enplanements
8. Palm Beach International Airport: 2,958,416 annual enplanements
9. Rochester International Airport: 1,263,965 annual enplanements
10. Salt Lake City International Airport: 9,910,493 annual enplanements
11. San Francisco International Airport: 19,359,003 annual enplanements
12. Seattle–Tacoma International Airport: 15,406,243 annual enplanements
13. The Calgary Airport Authority: 6,819,068 annual enplanements
14. Asheville Regional Airport: 371,226 annual enplanements

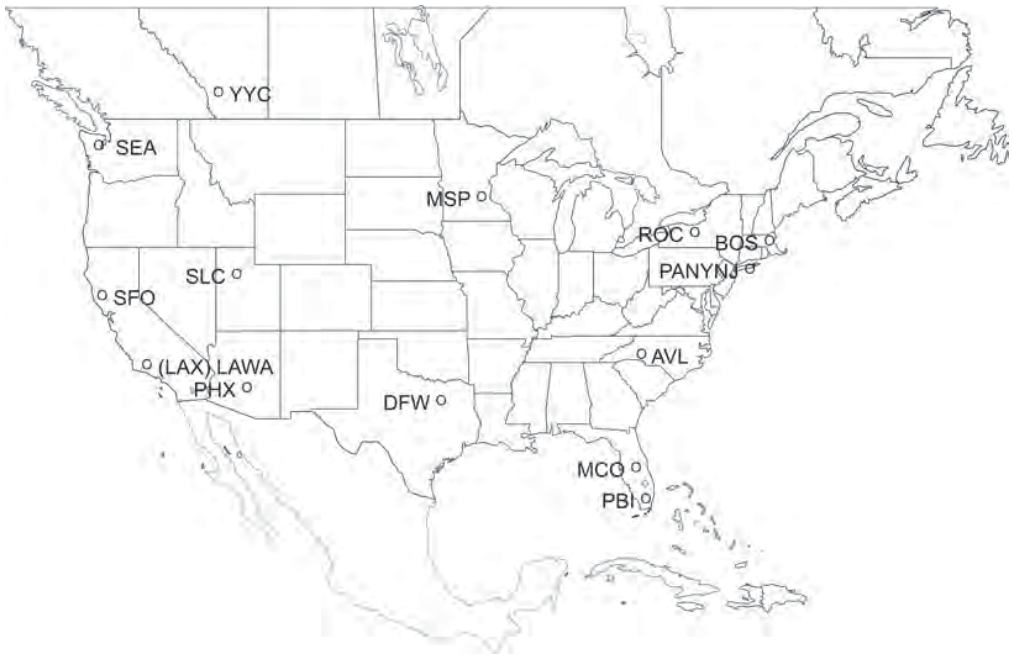


FIGURE C1 Location of interviewed airports (Corgan).

APPENDIX D

Interview Questionnaire

General questions about the impact of the elderly at your airport.

Specific questions about provisions for the elderly.

1. What are the difficulties you see facing the elderly in navigating through your airport?

   - Wayfinding, signage, FIDs, disorientation?
   - Dealing with technology, self-service devices etc.?
   - Walking distances, use of moving walks?
   - Making level transitions, escalator difficulties?
   - Difficulty standing for long periods, ticketing, security, bag claim etc.?
   - Managing luggage, curbside, check-in, bag claim, etc.?
   - Others?

2. Which of the following items are provided at your airport?

   - A person specifically responsible for ADA/elderly issues
   - A volunteer program for passenger assistance
   - Visual paging
   - Golf carts for conveying passengers
   - Flow through elevators
   - Seating at curbside, ticketing hall, bag claim hall
   - Designated seating for ADA/elderly in hold rooms
   - Flat plate claim devices
   - Others?

Abbreviations used without definitions in TRB publications:

A4A	Airlines for America
AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation

Appendix TR3.1

Appendix Tr.3.1

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Sheet 6
Proposed Access Road (Road 03)
Proposed Manston Road Realignment (Road 02)
Sheet 5
Area safeguarded for proposed radar operation
Proposed Turning Head
Proposed termination of of Manston Road Access Road (Cul-de-sac)
Sheet 4
Existing Radar Mast
RADAR ZONE
Sheet 3
Junction Improvement
Redundant ATC Tower and associated buildings
Sheet 2
RAF Manston S&H Memorial Museum
Museum Area
Sheet 1
Manston History Museum
Attenuation Ponds
Ponds
Continued on sheet 5
Airside Car Park and Storage Area
HGV area
Cargo Facility 4
Cargo Facilities
Cargo Facility 3
1 - B8 20,600m²
2 - B8 3560m²
3 - B8 5,050m²
4 - B8 7,380m²
5 - B8 8,020m²
6 - B8 9,540m²
7 - B8 18,520m²
8 - B8 2,600m²
9 - B8 2,600m²
10 - B1 2,600m²
11 - B1 3,475m²
12 - B1 2,520m²
13 - B1 1,130m²
14 - B1 1,720m²
15 - B1 1790m²
16 - B1 2,900m²
17 - B1 2,480m²
18 - B1 2,480m²
19 - B1 2,480m²
20 - B 2,460m²
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Key

- Red Line Boundary
- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed Road Marking
- Proposed Footway
- Intervisibility area
- Highway boundary
- Manston - Haine Link Land for safeguarding

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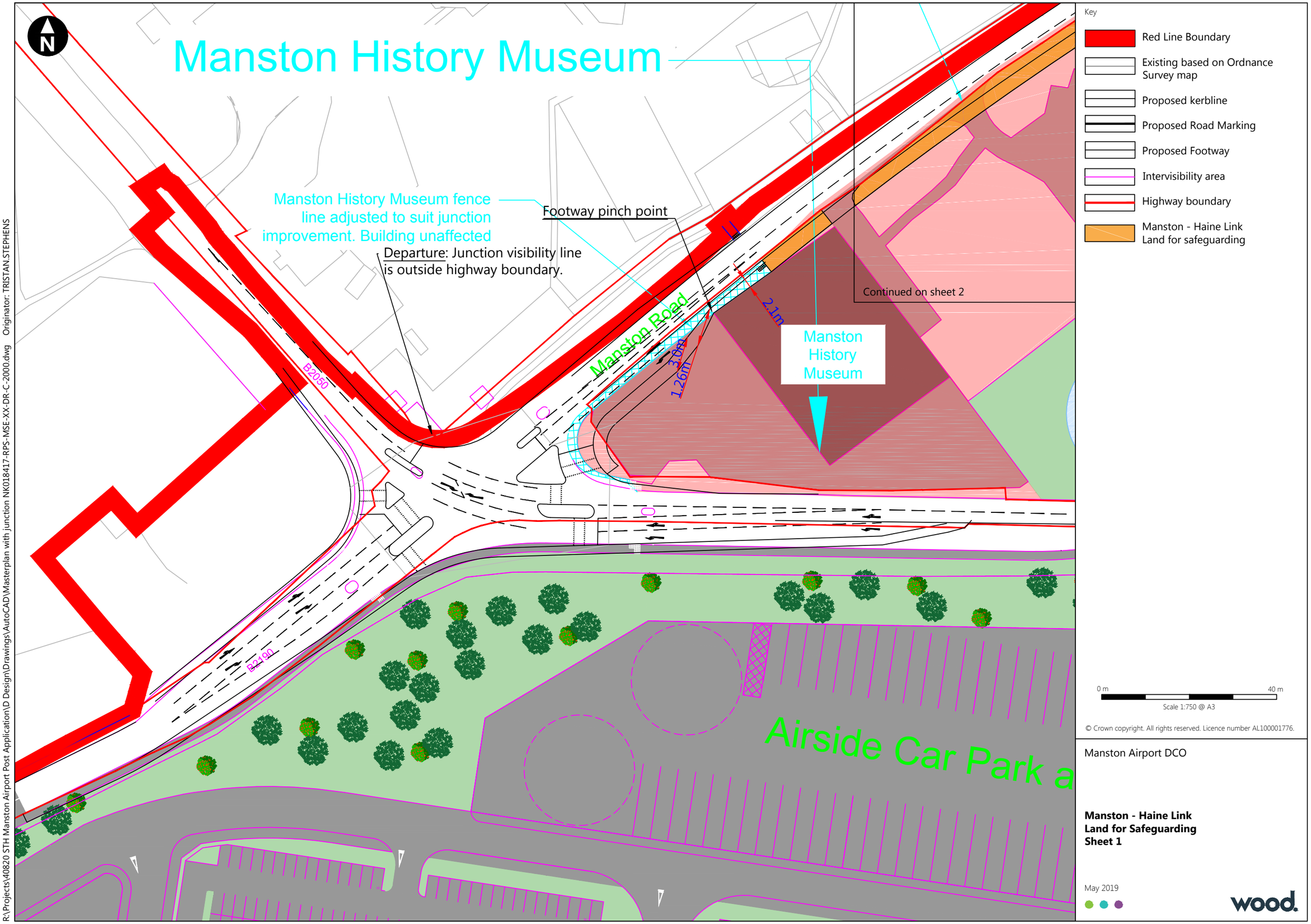
Manston Airport DCO

Manston - Haine Link Land for Safeguarding Keyplan

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Manston Airport DCO

Manston - Haine Link Land for Safeguarding Sheet 1

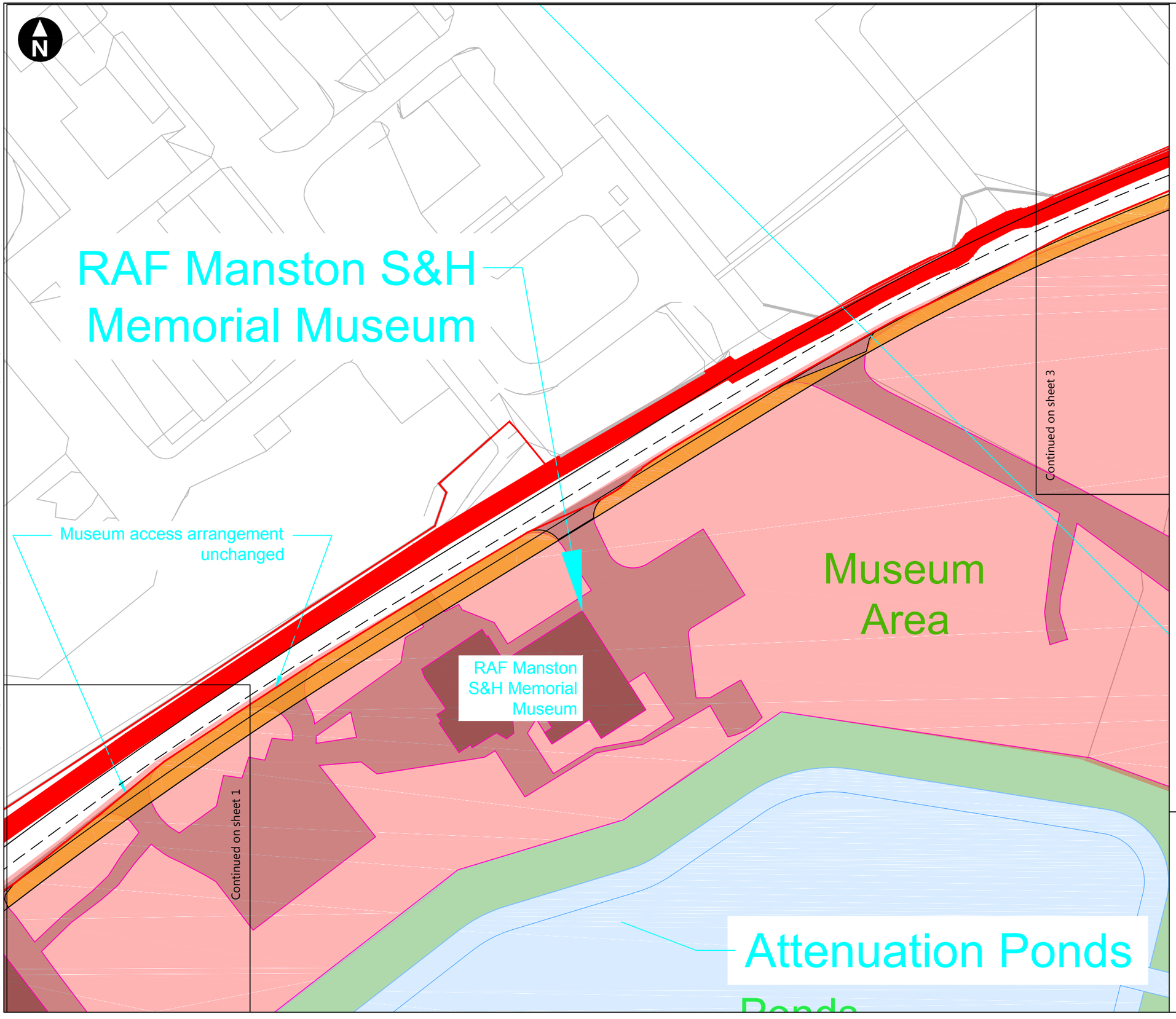
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Key

- Red Line Boundary
- Existing based on Ordnance Survey map
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- Proposed Footway
- Intervisibility area
- Highway boundary
- Manston - Haine Link Land for safeguarding

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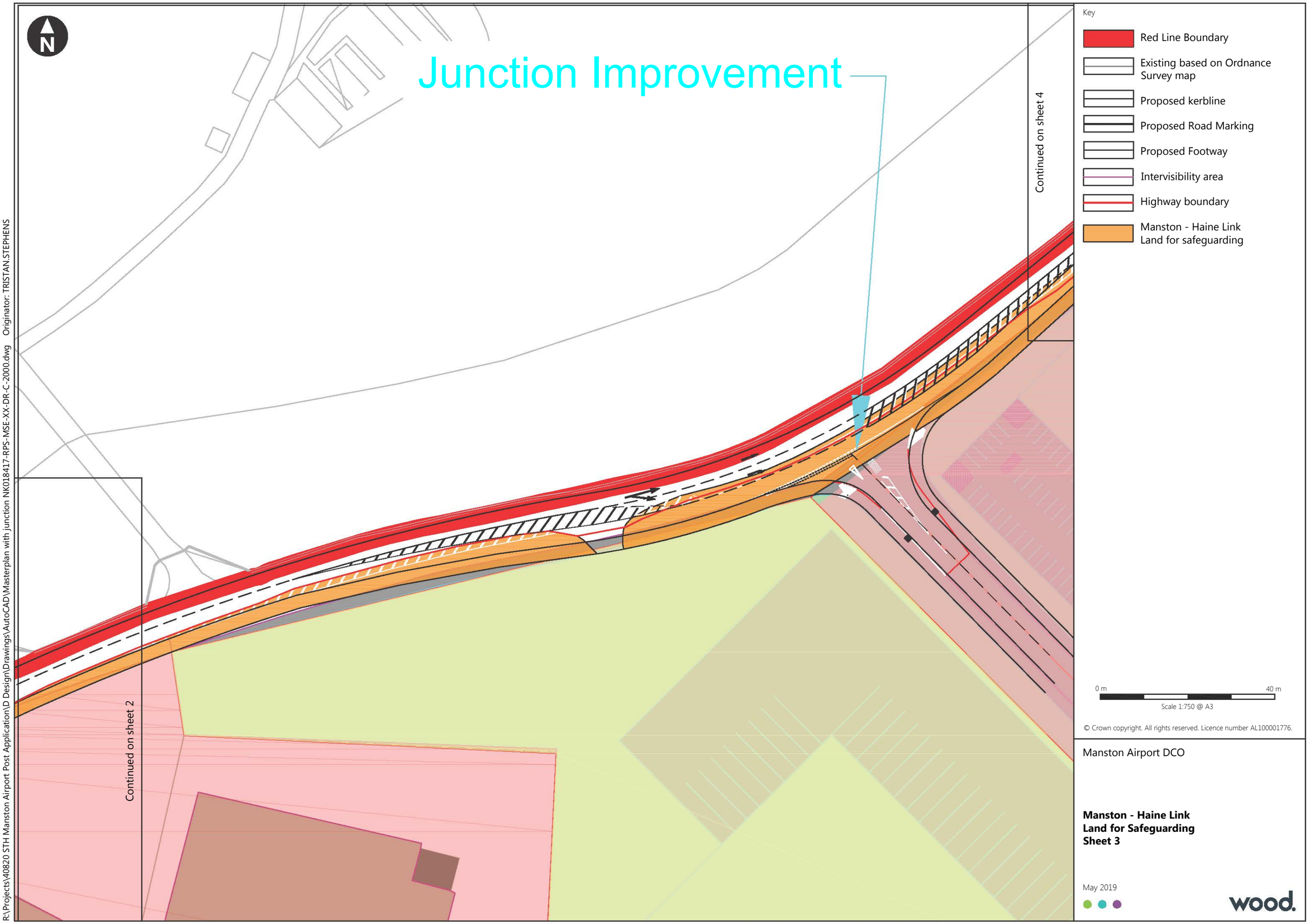
Manston Airport DCO

Manston - Haine Link Land for Safeguarding Sheet 2

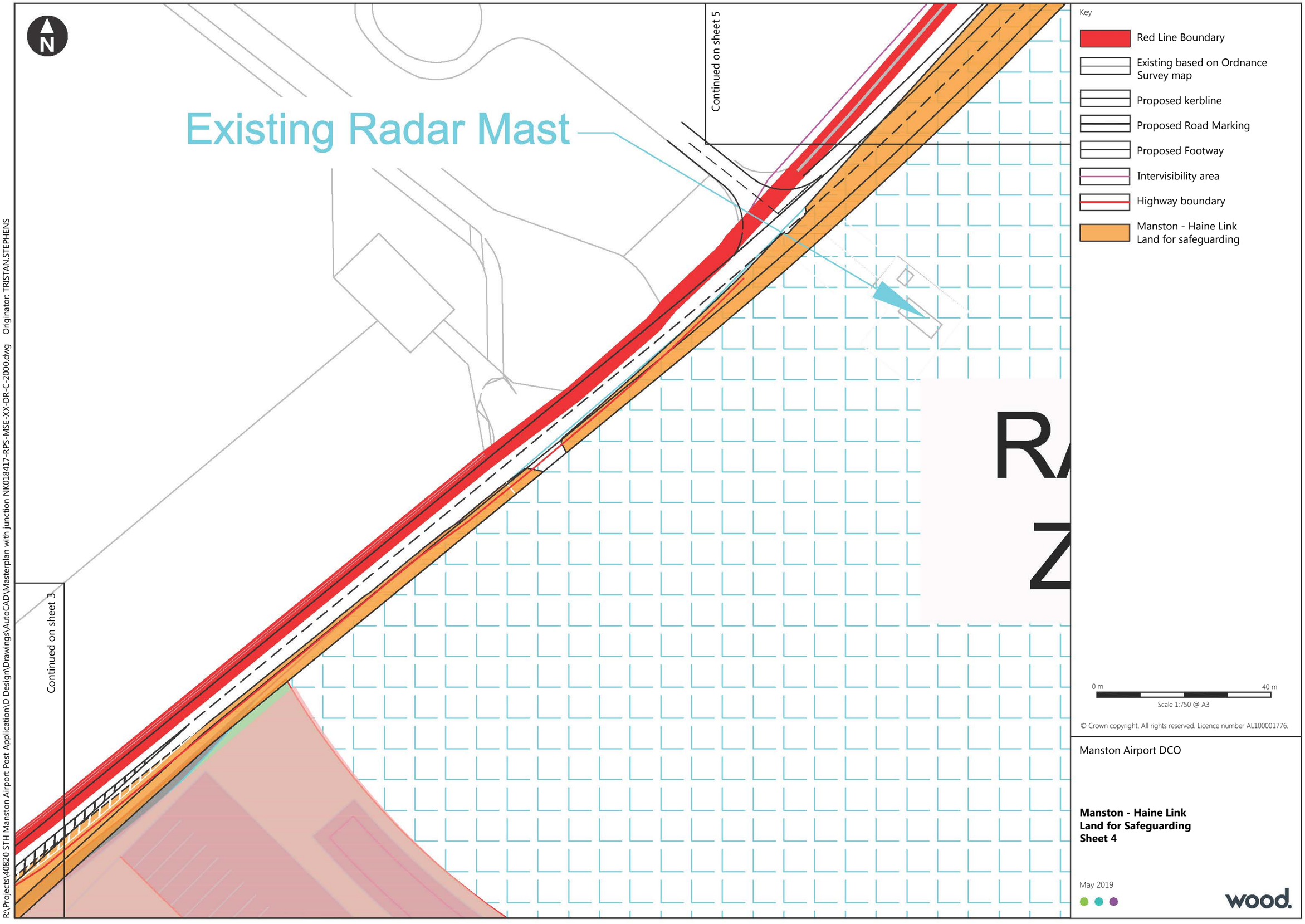
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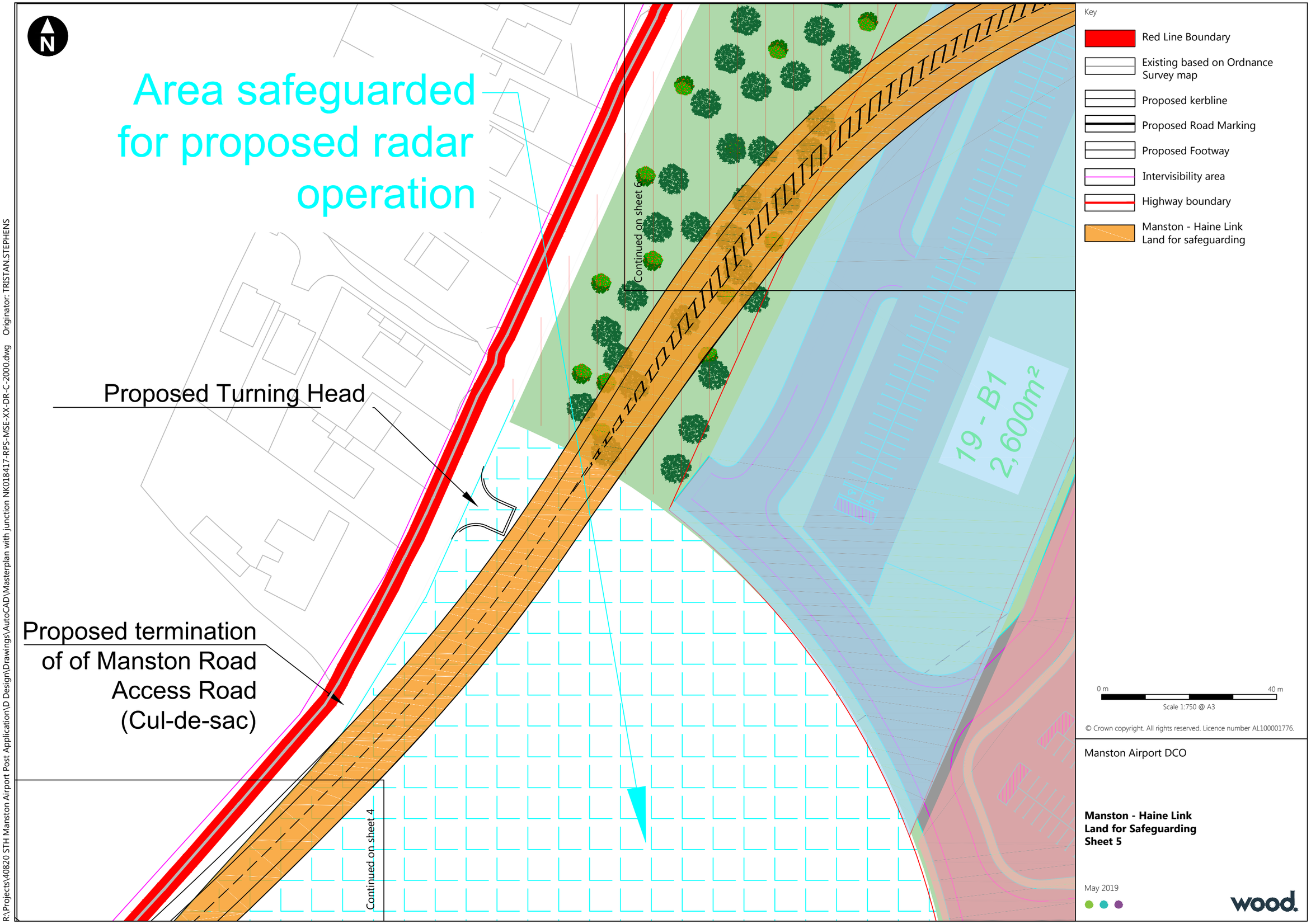
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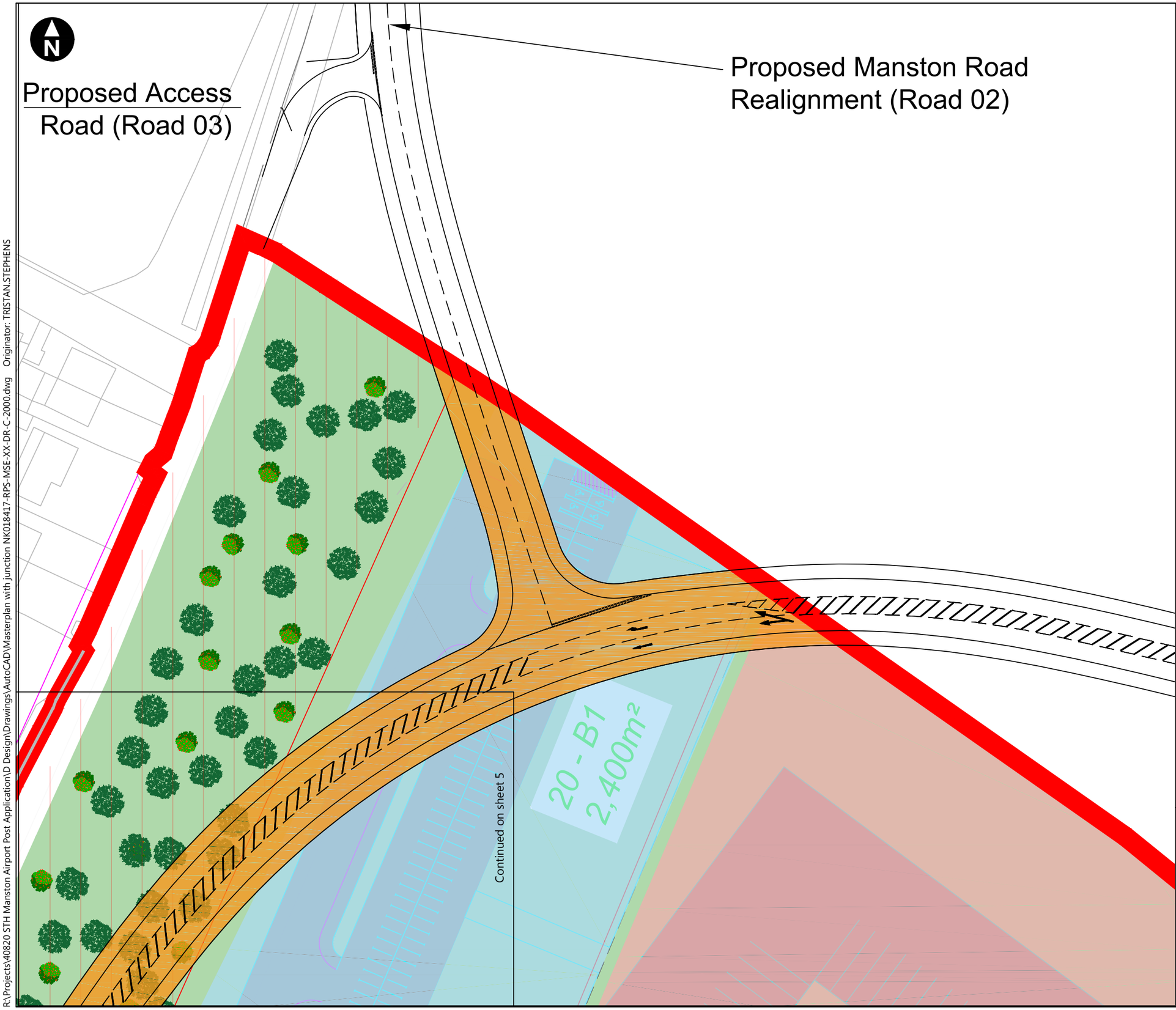
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Appendix Tr.3.1



Key

- Red Line Boundary
- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed Road Marking
- Proposed Footway
- Intervisibility area
- Highway boundary
- Manston - Haine Link Land for safeguarding

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Manston Airport DCO

Manston - Haine Link
Land for Safeguarding
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Appendix Tr.3.1

[THANET DISTRICT COUNCIL

-and-

KENT COUNTY COUNCIL]

-and-

RIVEROAK FUELS LIMITED

PLANNING OBLIGATION BY DEED OF AGREEMENT

under section 106 of the Town and Country Planning Act 1990 (as amended) and section 111 of the Local Government Act 1972 and section 1 of the Localism Act 2011 relating to land at Manston Airport, Manston Rd, Ramsgate, Kent, CT12 5BQ.

Appendix Tr.3.1 Part B

DATE **2019**

PARTIES

(1) **THANET DISTRICT COUNCIL** of Cecil Street, Margate, Kent, CT9 1XZ ("the District Council")

(2) **KENT COUNTY COUNCIL** of County Council Hall, Maidstone, Kent, ME14 1QX ("the County Council")

(3) **RIVEROAK FUELS LIMITED** (Company Registration Number 11535715) whose registered office is situated at Calder & Co, 16 Charles II Street, London, SW1Y 4NW ("RiverOak")

INTRODUCTION

1. The District Council is the local planning authority for the purposes of the 1990 Act for the area in which the Site is situated.

2. The County Council is the local highways authority for the purposes of the Highways Act 1980 (as amended) for the area in which the Site is situated.

3. RiverOak owns certain of the rights and interests in the Site and has financial and operational responsibility for the Application (as defined herein) in relation to Manston Airport.

4. RiverOak has submitted the Application to the Planning Inspectorate for development consent to construct and operate the Project. The Application was accepted for examination by the Planning Inspectorate on 14 August 2018. The Secretary of State is responsible for determining the Application.

5. The parties to this Deed have agreed to enter into this Deed in order to secure the development consent obligations contained in this Deed.

NOW THIS DEED WITNESSES AS FOLLOWS

OPERATIVE PART

6. **DEFINITIONS**

For the purposes of this Deed the following expressions shall have the following meanings:

Word or Phrase	**Meaning**
"1990 Act"	means the Town and Country Planning Act 1990 (as amended)
"2008 Act"	means the Planning Act 2008 (as amended)

Word or Phrase	Meaning
"Application"	means the application for a development consent order under s37 of the 2008 Act submitted to the Planning Inspectorate on [ ] and given reference number [ ]
“CIL”	means the charge created pursuant to section 205 of the 2008 Act and Regulation 3 of the CIL Regulations and referred to as the Community Infrastructure Levy in those enactments
“CIL Regulations”	means the Community Infrastructure Levy Regulations 2010
“Commencement”	means the carrying out of a material operation as defined in section 155 of the 2008 Act comprised in the Project and the words "Commence" and "Commenced" and cognate expressions shall be construed accordingly
“Commencement Date”	means the date of Commencement of works pursuant to the Development Consent Order
“Construction Period”	means the period between the Commencement Date and the date when the temporary powers in the Development Consent Order to enable the Project to be constructed have ceased
“Contributions”	means the financial contributions payable to the Councils under the terms of this Deed
"Development Consent Order”	means the development consent order to be made pursuant to the Application
“Dispute”	means any dispute, issue, difference or claim as between the parties in respect of any matter contained in or arising from or relating to this Deed or the parties' obligations and rights pursuant to it (other than in respect of any matter of law)
"Expert"	means an independent person appointed in accordance with the provisions of clause 10 to determine a Dispute between the parties to this Deed

Word or Phrase	Meaning
"Implementation"	means the carrying out of a material operation as defined in section 56(4) of the 1990 Act and the words "Implement" and "Implemented" and cognate expressions shall be construed accordingly
“Index”	means the BIS Index of Construction Prices and Costs or in each case in default of publication thereof, such substitute index as the parties may agree in accordance with clause 12
"Interest Rate"	means interest at 4% per annum above the Bank of England's base rate applicable at the Payment Date
“Manston Airport”	means Manston Airport situated at Manston Road, Ramsgate, Kent, CT12 5BQ
“Plan”	means the plan attached to this Deed with drawing ref. no.
“Planning Inspectorate”	means the executive agency of the Ministry of Housing, Communities and Local Government
“Project”	means the authorised project as defined in and to be authorised by the Development Consent Order
“Requirement”	means a requirement of the Development Consent Order
“Secretary of State”	means the Secretary of State for Business, Enterprise and Industrial Strategy
“Site”	means the that part of the land identified in the Development Consent Order as Parcel [ ] and shown edged red on the Plan
“Stage”	means a stage of the Project as defined by the Development Consent Order
"Working Day(s)	means any day apart from Saturday, Sunday and any statutory bank holiday on which clearing banks are open in England for the transaction of ordinary business

7. **CONSTRUCTION OF THIS DEED**

7.1 References to “Councils” shall mean both the District Council and the County Council.

7.2 Where in this Deed reference is made to any clause, paragraph or schedule or recital such reference (unless the context otherwise requires) is a reference to a clause, paragraph or schedule or recital in this Deed.

7.3 Words importing the singular meaning where the context so admits include the plural meaning and vice versa.

7.4 Words of the masculine gender include the feminine and neuter genders and words denoting actual persons include companies, corporations and firms and all such words shall be construed interchangeably in that manner.

7.5 Wherever more than one person is a party and/or where more than one party undertakes an obligation all their obligations can be enforced against all of them jointly and against each individually.

7.6 "Including" means including without limitation or prejudice to the generality of any preceding description defined term phrase or word(s) and "include" shall be construed accordingly.

7.7 Words denoting an obligation on a party to do any act or matter or thing include an obligation to procure that it is done and words placing a party under a restriction include an obligation not to cause permit or allow infringement of that restriction.

7.8 Any reference to an Act of Parliament shall include any modification, extension or re-enactment of that Act for the time being in force and shall include all instruments, orders, plans regulations, permissions and directions for the time being made, issued or given under that Act or deriving validity from it and "statutory requirement" shall be construed accordingly.

7.9 Reference to any party to this Deed shall include the successors in title to that party and to any deriving title through or under that party and in the case of the District Councils the successors to their respective statutory functions and any duly appointed employee or agent of the District Councils or such successors.

7.10 Headings in this Deed are for convenience only and shall not be taken into account in its construction and interpretation.

7.11 References to “notice” shall mean notice in writing.

7.12 References to “including” shall mean including without limitation.

8. **LEGAL BASIS**

8.1 This Deed is made pursuant to Section 106 of the Act Section 111 of the Local Government Act 1972 Section 1 of the Localism Act 2011 and all other enabling powers.

8.2 The covenants contained in the schedules are development consent obligations (to the extent that they are capable of being so) for the purposes of section 106 of the 1990 Act and are enforceable by each of the District Council and the County Council as local planning authority or local highway authority as appropriate, and as a party to this Deed.

9. **CONDITIONALITY**

9.1 Subject to clauses 4.2 and 4.3, the parties agree that none of the terms or provisions in this Deed shall have operative effect unless and until:

9.1.1 the Development Consent Order has been duly made; and

9.1.2 the Construction Period has commenced

with the exception of this Clause 4 insofar as it relates to obligations in the Schedules that must be complied with prior to the commencement of the Construction Period, all of which shall have operative effect upon the making of the Development Consent Order and shall have operative effect from the date of this Deed.

9.2 Where the Development Consent Order becomes the subject of any judicial review proceedings:-

9.2.1 until such time as such proceedings including any appeal have been finally determined, the terms and provisions of this Deed will remain without operative effect unless the Project has been Commenced

9.2.2 if following the final determination of such proceedings the Development Consent Order is quashed and, in the event that the court orders the Application to be remitted to the Secretary of State, the Application is subsequently refused, this Deed will cease to have any further effect and any money paid to the Councils pursuant to the Schedules and not spent or committed by the Councils (or such other person as the money has been paid to under this Deed) shall be repaid in full within 56 days of the final determination of such proceedings; and

9.2.3 if following the final determination of such proceedings the Development Consent Order is capable of being Commenced, then this Deed will take effect in accordance with its terms.

9.3 Wherever in this Deed reference is made to the final determination of judicial review proceedings (or cognate expressions are used), the following provisions will apply:-

9.3.1 proceedings by way of judicial review are finally determined:-

(a) when permission to bring a claim for judicial review has been refused and no further application may be made;

(b) when the court has given judgment in the matter and the time for making an appeal expires without an appeal having been made or permission to appeal is refused;

(c) when any appeal is finally determined and no further appeal may be made.

10. **DEVELOPMENT CONSENT OBLIGATIONS**

10.1 RiverOak covenants with the Councils to perform:-

10.1.1 the development consent obligations contained in the Schedules One to Seven; and

10.1.2 any other obligations which are not development consent obligations contained in the Schedules pursuant to section 111 of the Local Government Act 1972 and all other powers so enabling, in each case so far as they relate to RiverOak's land interests in the Site from time to time.

10.2 The Councils each covenant with RiverOak to perform the obligations on their respective parts contained in Schedules Eight and Nine.

10.3 The parties agree that the development consent obligations contained in this Deed will not be enforceable against any other owner of any land interest in the Site who is not a party to this Deed nor against any successors in title to or permitted assigns or any person claiming through or under such other owners (save for RiverOak) unless that person itself undertakes any part of the Project.

11. **RELEASE**

RiverOak and its successors in title and those deriving title from them shall, upon disposing of the whole or any part of their respective interests in the Site, be released from all obligations in this Deed in relation to that interest or the relevant part thereof (as the case may be) but without prejudice to the rights of the parties in relation to any antecedent breach of those obligations.

12. **FURTHER PLANNING PERMISSIONS AND DEVELOPMENT CONSENT ORDERS**

Nothing in this Deed shall be construed as prohibiting or limiting the rights of RiverOak to use or develop any part of the Site in accordance with and to the extent permitted by a certificate of lawful use, planning permission, development consent order or other statutory authority other than the Development Consent Order granted either before or after the date of this Deed.

13. **EXPIRY**

If the Development Consent Order expires or is revoked prior to the Commencement Date then this Deed shall forthwith determine and cease to have effect and the Councils will forthwith cancel all entries made in their respective registers of local land charges in respect of this Deed.

14. **CERTIFICATES OF COMPLIANCE**

14.1 The Councils (as appropriate) will upon request by RiverOak certify compliance or partial compliance (as and if appropriate and subject to payment of the Councils' (as appropriate) reasonable legal and professional fees) with the provisions of this Deed and if so requested by RiverOak will (as and if appropriate and subject to payment of the Councils' (as appropriate) reasonable legal and professional fees) execute a deed of release or partial release from the relevant provisions of this Deed and promptly register the same in the register of local land charges maintained by the Councils (as appropriate).

14.2 Where the Councils (as appropriate) is obliged to execute a deed of release or partial release pursuant to clause 9.1, the other parties to this Deed shall enter into such deed to the extent necessary to effect such release or partial release.

15. **RESOLUTION OF DISPUTES**

15.1 In the event of any Dispute arising between the parties then the parties will attempt to resolve that Dispute amicably including holding a meeting attended by at least one representative from each party.

15.2 If the parties are unable to resolve the Dispute amicably pursuant to clause 10.1, one party may by serving notice on all the other parties (the "Notice") refer the Dispute to an Expert for determination.

15.3 The Notice must specify:-

15.3.1 the nature, basis and brief description of the Dispute;

15.3.2 the clause or paragraph of this Deed pursuant to which the Dispute has arisen; and

15.3.3 the proposed Expert.

15.4 In the event that the parties are unable to agree whom should be appointed as the Expert within 10 Working Days after the date of the Notice then either party may request the President of the Law Society to nominate the Expert at their joint expense, and the parties shall request that such nomination shall be made within 10 Working Days of the request, and any failure for such nomination to be made within 10 Working Days shall entitle any party to withdraw from the process of appointing an Expert and to refer the Dispute to the courts of England and Wales instead.

15.5 The Expert shall act as an expert and not as an arbitrator and his decision will (in the absence of manifest error) be final and binding on the parties hereto and at whose cost shall be at his discretion or in the event that he makes no determination, such costs will be borne by the parties to the Dispute in equal shares.

15.6 The Expert will be appointed subject to an express requirement that he reaches his decision and communicates it to the parties within the minimum practicable timescale allowing for the nature and complexity of the dispute and in any event not more than 20 Working Days from the date of his appointment to act.

15.7 The Expert will be required to give notice to each of the said parties inviting each of them to submit to him within 10 Working Days written submissions and supporting material and will afford to each of the said parties an opportunity to make counter submissions within a further 5 Working Days in respect of any such submission and material.

16. **NOTICES**

16.1 Any notice, consent or approval required to be given under this Deed shall be in writing and shall be sent to the address and marked for the attention of the persons identified below or instead to such other persons as may be substituted for them from time to time.

16.2 Any such notice must be delivered by hand or by pre-paid Special Delivery post and shall conclusively be deemed to have been received:-

16.2.1 if delivered by hand, on the next Working Day after the day of delivery; and

16.2.2 if sent by Special Delivery post and posted within the United Kingdom, on the day 2 Working Days after the date of posting.

16.3 The address for service of any such notice, consent or approval as aforesaid shall:-

16.3.1 in the case of service upon Thanet District Council be at its address given above or such other address for service as shall have been previously notified in writing to the other parties and any such notice shall be marked for the attention of [ ];

16.3.2 in the case of service upon Kent County Council be at its address given above or such other address for service as shall have been previously notified in writing to the other parties and any such notice shall be marked for the attention of [ ];

16.3.3 in the case of service upon RiverOak be at its address given above or such other address for service as shall have been previously notified in writing to the other parties and any such notice shall be marked for the attention of [ ].

17. **INDEXATION**

Subject to the terms of this Deed, where any obligation in this Deed is expressed to require RiverOak to pay, provide or make available any sum of money [(whether by way of a Contribution or otherwise)], the amount to be paid, provided or made available shall be adjusted by reference to changes in the relevant Index in accordance with the following formula:-

Amount Payable = Sum x (Index at Payment Date / Index at today's date)

where:-

"Amount Payable" is the amount of money required to be paid;

"Sum" is the amount of the Contribution or other sum of money stated in this Deed;

"Index at Payment Date" is the relevant Index last published before the Payment Date; and

"Index at today's date" is the relevant Index last published prior to the date the Development Consent Order is made.

18. **INTEREST**

18.1 Where any obligation in this Deed is expressed to require RiverOak to pay any sum of money, interest at the Interest Rate shall be payable in addition to the sum of money itself calculated from the due date to the date on which the sum of money is actually paid.

18.2 Where RiverOak has paid, provided or made available any sum of money (whether by way of a Contribution or otherwise) and the sum or sums have not been applied as required or within the agreed timescale then the sum or sums to be refunded shall be returned to RiverOak inclusive of interest calculated in accordance with clause 13.1.

19. **NOTICE OF WORKS**

19.1 RiverOak shall notify each of the other parties to this Deed:-

19.1.1 prior to the Commencement Date, of the anticipated date of Commencement of works pursuant to the Development Consent Order (which obligation shall apply again if Commencement Date does not occur on the notified date);

19.1.2 within seven days of the actual Commencement Date; and

19.1.3 within two weeks of the day on which the Construction Period ends.

19.2 RiverOak shall give written notice to the Councils within five Working Days of RiverOak paying, providing or making available to any third party any sum(s) of money required to be paid, provided or made available pursuant to this Deed.

20. **COMMUNICATIONS**

20.1 The communications teams for the Councils and RiverOak will coordinate external communications on behalf of the Councils with RiverOak's communications team in accordance with a protocol agreed between RiverOak and the District Councils PROVIDED THAT once launch communications material associated with a project or activity funded by contributions from RiverOak have been produced in accordance with the protocol, RiverOak shall have the right to include information in its future communications without the need for approval by the other parties to this Deed.

20.2 The parties agree that where particular mitigation works, projects or benefits are funded from any of the Contributions secured under this Deed:-

20.2.1 RiverOak shall have the right to be acknowledged as having funded such works, projects or benefits;

20.2.2 RiverOak branding and/or corporate images or logos shall be included (at the discretion of RiverOak) in literature, publicity material related to, and/or fixed at the site of such works, projects or benefits;

20.2.3 RiverOak shall have the right to be involved in publicity activities relating to such works, projects or benefits in consultation with the Councils.

21. **COMMUNITY INFRASTRUCTURE LEVY**

The parties hereby acknowledge and agree that:-

21.1 this Deed has been negotiated and agreed on the assumption that liability to CIL does not arise in respect of any of the development authorised by the Development Consent Order because such development is situated in an area for which no charging schedule is in effect on the date of this Deed and no charging schedule is anticipated to be in effect in relation to such development on the day the Development Consent Order is made;

21.2 were liability to CIL to arise in respect of any of the development authorised by the Development Consent Order, then (subject to the conditions in CIL Regulation 55 having been complied with or satisfied and subject to this clause 16.2 not fettering the discretion of the District Councils under CIL Regulation 55) CIL Regulation 55 would be applicable where the aggregate cost of complying with the development consent obligations in this Deed is greater than the chargeable amount payable in respect of such development.

22. **PAYMENTS TO THIRD PARTIES**

22.1 The Schedules to this Deed are subject to this Clause 17.

22.2 No sums of money expressed in this Deed to be payable to a person who is not a party to this Deed shall be payable to such person unless and until that person has entered into an agreement with National Grid substantially in the form attached to this Deed at Annex 4.

23. **VAT**

23.1 If this Deed or anything contained in it gives rise to a taxable supply for VAT purposes by the Councils to RiverOak then the Councils shall use all reasonable endeavours to recover the VAT in the first instance.

23.2 this Deed or anything contained in it gives rise to a taxable supply for VAT purposes by the District Councils to RiverOak then, subject to the Councils complying with clause 18.1, RiverOak shall pay to the relevant Council or third party an amount equal to the VAT chargeable in addition to and at the same time as any payment or the provision of any other consideration for such supply upon provision of a valid VAT invoice addressed to RiverOak.

24. **APPROVALS**

Where any approval, agreement, consent, confirmation or an expression of satisfaction is required under the terms of this Deed such approval, agreement, consent, confirmation or expression of satisfaction shall be given in writing and shall not be unreasonably withheld or delayed.

25. **COUNCILS' POWERS**

Nothing in this Deed shall fetter the respective statutory rights, powers or duties of the Councils.

26. **GOOD FAITH**

The parties agree with each other to act reasonably and in good faith in the discharge of the obligations contained in this Deed.

27. **RIGHTS OF THIRD PARTIES**

It is not intended that any person who is not a party to this Deed shall have any right under the Contracts (Rights of Third Parties) Act 1999 to enforce any term of this Deed.

28. **JURISDICTION**

28.1 This Deed including its construction, validity, performance and enforcement and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with English law.

28.2 Each party irrevocably agrees that the courts of England and Wales shall have exclusive jurisdiction to settle any dispute or claim arising out of or in connection with this Deed or its subject matter or formation (including non-contractual disputes or claims).

29. **COUNTERPARTS**

This Deed may be executed in any number of counterparts, each of which is an original and all of which may together evidence the same agreement.

IN WITNESS whereof the parties hereto have executed this Deed on the day and year first before written.

FIRST SCHEDULE

AIR QUALITY STATION ZH3

DEFINITIONS AND INTERPRETATION

30. Where in this Schedule the following defined terms and expressions are used they shall have the following respective meanings unless otherwise stated:-

Word or Phrase	**Meaning**
"Air Quality Station ZH3 Contribution"	means the following sums to be used towards the Air Quality Station ZH3 Contribution Purposes: • Tranche 1 - £45,000 (Forty five thousand pounds) to be used for the capital cost of an air quality monitoring station; • Tranche 2 - £4,000 (Four thousand pounds) to be used for the installation of an air quality monitoring station; • Monthly Payment 1 - £1,200 (One thousand two hundred pounds) per month to be used for the servicing of the air monitoring station to be paid on a monthly basis for the lifetime of the operation of Manston Airport; • Monthly Payment 2 – £ [ ] ([ ] pounds) [ ] per month to be used in relation to the diffusion tubes for the air monitoring station to be paid on a monthly basis for the lifetime of the operation of Manston Airport; • Annual Payment - £4,000 (Four thousand pounds) per annum to be used for the reporting costs in relation to the air monitoring station to be paid annually for the lifetime of the operation of Manston Airport.
"Air Quality Station ZH3 Contribution Purposes"	means the reinstatement and ongoing operational costs in relation to the continuous monitoring of air quality (NO_2 and NO) at Air Quality Station ZH3 (as shown on the Air Quality Station ZH3 Plan) such works including data examination; maintenance; operation; and a request for ongoing support for passive monitoring via diffusion tubes and receptors close to Manston Airport
"Air Quality Station ZH3 Plan"	means the plan attached to this Deed at Annex [ ] showing Air Quality Station ZH3 outlined in [COLOUR]

Commented [WA1]: To be supplied

31. RiverOak covenants with the District Council as follows:

31.1 To pay Tranche 1 and Tranche 2 of the Air Quality Station ZH3 Contribution in full to the District Council prior to the coming into operation of the Project and

31.2 Not to cause permit or allow the Project to come into operation unless Tranche 1 and Tranche 2 of the Air Quality Station ZH3 Contribution has been paid in full to the District Council.

31.3 To pay the Annual Payment 1 of the Air Quality Station ZH3 Contribution in full to the District Council on each anniversary of the installation of Air Quality Station ZH3.

31.4 To pay Monthly Payment 1 and Monthly Payment 2 in full to the District Council on a monthly basis with the first payments to be made at the end of the first month following the installation of Air Quality Station ZH3.

Appendix Tr.3.1 Part B

SECOND SCHEDULE

NOISE MONITORING

DEFINITIONS AND INTERPRETATION

32. Where in this Schedule the following defined terms and expressions are used they shall have the following respective meanings unless otherwise stated:-

Word or Phrase	**Meaning**
"Noise Monitoring Stations Contribution"	means the following sums to be used towards the Noise Monitoring Stations Contribution Purposes: • Capital Cost – up to £30,000 (Thirty thousand pounds) to be used for the capital cost of providing two noise monitoring stations; • Monthly Payment - £1,500 (Fifteen hundred pounds) per month to be used for the servicing, reporting and maintenance of the noise monitoring stations (to include downloading data; processing; basic reporting; and calibration) to be paid on a monthly basis for the lifetime of the operation of Manston Airport;
"Noise Monitoring Stations Contribution Purposes"	means the provision of two noise monitoring stations and ongoing servicing, reporting and maintenance of the Noise Monitoring Stations
"Noise Monitoring Stations Plan"	means the plan attached to this Deed at Annex [ ] showing the Noise Monitoring Stations outlined in [COLOUR]

33. RiverOak covenants with the District Council as follows:

33.1 To pay the Capital Cost of the Noise Monitoring Stations Contribution in full to the District Council prior to the coming into operation of the Project and

33.2 Not to cause permit or allow the Project to come into operation unless the Capital Cost of the Noise Monitoring Stations has been paid in full to the District Council.

33.3 To pay the Monthly Payment in full to the District Council on a monthly basis with the first payments to be made at the end of the first month following the installation of the Noise Monitoring Stations.

LOCAL HIRING POLICY / LOCAL EMPLOYMENT PARTNERSHIP BOARD

DEFINITIONS AND INTERPRETATION

34. Where in this Schedule the following defined terms and expressions are used they shall have the following respective meanings unless otherwise stated:-

Word or Phrase	Meaning
"Local Businesses"	means businesses whose established place of business is in the administrative area of Thanet District Council
"Local People"	means persons whose principal or only home is within the administrative area of Thanet District Council
"Returns"	means forms showing a breakdown of race, sex, postcode and any disability of people recruited to work on the construction of the Project
"TLEPB"	means the Thanet Local Employment Partnership Board created pursuant to Requirement 20 in the DCO in operation at the time of this Deed or its successor body carrying out largely the same functions

35. RiverOak covenants with the District Council:

35.1 In carrying out the Project to fully participate in TLEPB wherever possible and to promote the recruit employees contractors and subcontractors from the area of Thanet District Council required for and during the construction of the Project including the following:

35.1.1 to issue a written statement in accordance with the Form of Notice in Annex [ ] to this Deed to its prospective contractors and subcontractors at the tendering for work stage;

35.1.2 to monitor and record:

(a) the number of Local People and Local Businesses recruited from the area of Thanet District Council employed in the construction of the Project; and

(b) the names of local companies that have secured contracts for the carrying out of the construction of the Project;

35.1.3 submit Returns to the District Council at regular intervals of not more than one months throughout the construction of the Project;

35.1.4 to obtain from each of its contractors Returns of the number of Local People and Local Businesses recruited who reside or are registered within the area of Thanet District Council and who are actively engaged in the construction of the Project;

35.1.5 to include the full postcodes of such people and business referred to above in paragraph 2.1.4 in the Returns;

35.1.6 to ensure that each subcontractor's work force contains at least 5% apprentices on site at any one time throughout the construction of the Project.

THIRD SCHEDULE

PUBLIC RIGHTS OF WAY

36. Where in this Schedule the following defined terms and expressions are used they shall have the following respective meanings unless otherwise stated:-

Word or Phrase	Meaning
"PRoW Contribution"	means the sum of £[ ] ([ ] pounds) such sum to be used for the PRoW Contribution Purposes
"PRoW Contribution Purposes"	means the ongoing maintenance of the following public rights of way: TR8; TR9; and TR10 as show on the PRoW Plan
"PRoW Plan"	means the plan attached to this Deed at Annex [ ] showing TR8; TR9; and TR10 coloured [COLOUR]

Commented [WA2]: To be provided

37. RiverOak covenants with the County Council as follows:

37.1 To pay the PRoW Contribution to the County Council in the following tranches:

37.1.1 £[ ] prior to the coming into operation of the Project;

37.1.2 £[ ] [ ];

37.1.3 £[ ] [ ];

37.1.4 £[ ] [ ]; and

37.1.5 £[ ] [ ]

37.2 No to cause permit or allow the above trigger dates to be achieved the PRoW Contribution has been paid in full to the County Council.

FOURTH SCHEDULE

MANSTON – HAINE LINK ROAD

DEFINITIONS AND INTERPRETATION

38. Where in this Schedule the following defined terms and expressions are used they shall have the following respective meanings unless otherwise stated:-

Word or Phrase	Meaning
"Manston – Haine Link Road"	means that area of land sited in the Northern Grass Area as shown coloured [COLOUR] on the Manston – Haine Link Road Plan such road to be used to link the A256 to the B2050 through part of the Northern Grass Area
"Manston – Haine Line Road Plan"	means the plan attached to this Deed at Annex [ ] showing the Manston – Haine Link Road
"Northern Grass Area"	means the area shown [COLOUR] falling within the limits of the Development Consent Order which shall include a business park for Manston Airport

39. RiverOak covenants with the County Council:

39.1 In carrying out the Project to ensure that that part of the Northern Grass Area which may potentially be required for the provision of the Manston – Haine Link Road is safeguarded for a period of 10 years following the grant of the Development Consent Order or until the County Council has obtained funding and planning permission for the Manston – Haine Link Road whichever is the earlier.

39.2 No to cause permit or allow any development of any kind whether or not connected with the Development Consent Order to take on that part of the Northern Grass Area which may be required for the provision of the Manton – Haine Link Road for a period of 10 years following the date of grant of the Development Consent Order or until the County Council has obtained funding and planning permission for the Manston – Haine Link Road whichever is the earlier.

39.3 If at the end of the 10 year safeguarding period or by the time the County Council has obtained funding and planning permission for the Manston – Haine Link Road whichever is the earlier, the County Council has obtained funding for and brought forward a scheme for the Manston – Haine

Link Road to transfer that part of the Northern Grass Area safeguarded for the Manston – Haine Link Road to the County Council for £[1.00].

Appendix Tr.3.1 Part B

FIFTH SCHEDULE

PUBLIC TRANSPORT

DEFINITIONS AND INTERPRETATION

40. Where in this Schedule the following defined terms and expressions are used they shall have the following respective meanings unless otherwise stated:-

Word or Phrase	Meaning
"Public Transport Contribution"	means the sum of £[ ] ([ ] pounds) such sum to be used for the Public Transport Contribution Purposes
"Public Transport Contribution Purposes"	means the provision of a shuttle service from Ramsgate to Manston Airport

41. RiverOak covenants with the County Council as follows:

41.1 To pay the Public Transport Contribution to the County Council in the following tranches:

41.1.1 £[ ] prior to the coming into operation of the Project;

41.1.2 £[ ] [ ];

41.1.3 £[ ] [ ];

41.1.4 £[ ] [ ]; and

41.1.5 £[ ] [ ]

41.2 Not to cause permit or allow the above trigger dates to be achieved unless the Public Transport Contribution has been paid in full to the County Council.

SIXTH SCHEDULE

OFF-SITE JUNCTIONS

DEFINITIONS AND INTERPRETATION

42. Where in this Schedule the following defined terms and expressions are used they shall have the following respective meanings unless otherwise stated:-

Word or Phrase	Meaning
"Off-Site Junctions"	means the following junctions in the environs of the land comprising the Development Consent Order: • Junction 1 (A256/Sandwich Road) • Junction 2 (A299 / A256 / Cottington Link Road) • Junction 4 (A299 / B2190) • Junction 6 (A299 / Seamark Road / A253 / Willetts Hill) • Junction 7 (A299 / A28) • Junction 10 (Shottendane Rd / Manston Road / Margate Hill) • Junction 13 (Manston Court Road / B2050) • Junction 15 (Manston Rd / Hartsdown Rd / Tivoli Rd / College Rd / Nash Rd) • Junction 16 (Ramsgate Rd / College Rd / A254 / Beatrice Rd) • Junction 17 (Ramsgate Road / Poorhole Lane / Margate Road / Star Lane) • Junction 21 (A299 / A256 / Sandwich Rd / Canterbury Rd E / Haine Road) • Junction 26 (Newington Road / Manston Road) • Junction 27 (Newington Road / High Street) or such other off-site junction works as the County Council deems necessary to carry out works on in order to mitigate the effect of the Development Consent Order

Word or Phrase	Meaning
"Off-Site Junctions Contributions"	means the following amounts in respect of each Off-Site Junction: • Junction 1 - £91,000 • Junction 2 - £836,500 • Junction 4 - £826,800 • Junction 6 - £826,800 • Junction 7 - £162,000 • Junction 10 - £71,100 • Junction 13 - £590,500 • Junction 15 - £50,500 • Junction 16 - £415,700 • Junction 17 – £53,500 • Junction 21 - £102,000 • Junction 26 - £782,200 • Junction 27 – £205,000
"Off-Site Junctions Plan"	means the plan attached to this Deed at Annex [ ] showing the Off-Site Junctions
"Off-Site Junctions Contributions Purposes"	means the following in respect of each Off-Site Junction • Junction 1 – minor widening on arms • Junction 2 – signalisation of roundabout • Junction 4 – signalisation of roundabout • Junction 6 – signalisation of roundabout • Junction 7 – improvements to signage and carriageway markings • Junction 10 – minor widening and white lining

Word or Phrase	Meaning
	• Junction 13 – Provision of a new three arm signalised junction with pedestrian crossing facilities linked to the signalised junction proposals for the main airport terminal access • Junction 15 – provision of new signal head locations, road markings and revised stage sequence operation. • Junction 16 – provision of new stop line, road markings, signal head locations and revised stage sequence operation. • Junction 17 – minor widening and white lining • Junction 21 – Increase in flare length on approach to the junction and increase to entry widths. Also, proposals for revised signal stage timings and staging • Junction 26 – signalisation of junction • Junction 27 – minor road widening, removal of splitter islands and lane markings

43. RiverOak covenants with the County Council as follows:

43.1 To pay the Off-Site Junction Contributions in full to the County Council as follows:

43.1.1 Junction 13 – by the third year of the Project;

43.1.2 Junction 21 – by the fifth year of the Project;

43.1.3 Junctions 1, 2 and 4 – by the tenth year of the Project;

43.1.4 Junctions 6 and 7 – by the fifteenth year of the Project;

43.1.5 Junctions 10, 15, 16, 17, 26 and 27- by the twentieth year of the Project.

SEVENTH SCHEDULE

DISTRICT COUNCIL COVENANTS

44. The District Council covenants with RiverOak as follows:

44.1 To use all the Contributions payable by RiverOak under the terms of this Deed for the purposes specified in this Deed unless otherwise agreed in writing with RiverOak.

44.2 That following written request from RiverOak or other party/entity that made the relevant payment to the District Council that it will pay to the party that made that relevant payment to the District Council such amount of any payment made to the District Council under this Deed in accordance with the provisions of this Deed which has not been expended at the date of such written request together with interest which has accrued on the balance after deduction of tax (where required) and any other sum required to be deducted by law provided always that no such request will be made prior to the expiry of [ten] years of the date of receipt by the District Council of such payment. Any contribution or part of a contribution which the District Council has unconditionally contracted to expend prior to the date of receipt of such written request shall be deemed to have been expended by the District Council prior to that date. If capital works have been carried out then commuted sums for maintenance will not be returnable under this paragraph.

44.3 To provide to RiverOak or other party/entity that made the relevant payment such evidence, as RiverOak or other party/entity shall reasonably require in order to confirm the expenditure of the sums paid under this Deed upon a written request by RiverOak or other party/entity such request not to be made more than once in any year.

Discharge of Obligations

45. At the written request of the Owner RiverOak the District Council shall provide written confirmation of the discharge of the obligations contained in this Deed when satisfied that such obligations have been performed.

EIGHTH SCHEDULE

COUNTY COUNCIL COVENANTS

46. The County Council covenants with RiverOak as follows:

46.1 To use all the Contributions payable by RiverOak under the terms of this Deed for the purposes specified in this Deed unless otherwise agreed in writing with RiverOak.

46.2 That following written request from RiverOak or other party/entity that made the relevant payment to the County Council that it will pay to the party that made that relevant payment to the County Council such amount of any payment made to the County Council under this Deed in accordance with the provisions of this Deed which has not been expended at the date of such written request together with interest which has accrued on the balance after deduction of tax (where required) and any other sum required to be deducted by law provided always that no such request will be made prior to the expiry of [ten] years of the date of receipt by the County Council of such payment. Any contribution or part of a contribution which the County Council has unconditionally contracted to expend prior to the date of receipt of such written request shall be deemed to have been expended by the County Council prior to that date. If capital works have been carried out then commuted sums for maintenance will not be returnable under this paragraph.

46.3 To provide to RiverOak or other party/entity that made the relevant payment such evidence, as RiverOak or other party/entity shall reasonably require in order to confirm the expenditure of the sums paid under this Deed upon a written request by RiverOak or other party/entity such request not to be made more than once in any year.

Discharge of Obligations

47. At the written request of the Owner RiverOak the District Council shall provide written confirmation of the discharge of the obligations contained in this Deed when satisfied that such obligations have been performed.

THE COMMON SEAL of **THANET DISTRICT COUNCIL** was affixed in the presence of:

Authorised Signatory

THE COMMON SEAL of **KENT COUNTY COUNCIL** was affixed in the presence of:

Chief Executive

EXECUTED AS A DEED by **RIVEROAK FUELS LIMITED** acting by a Director and Secretary of two Directors

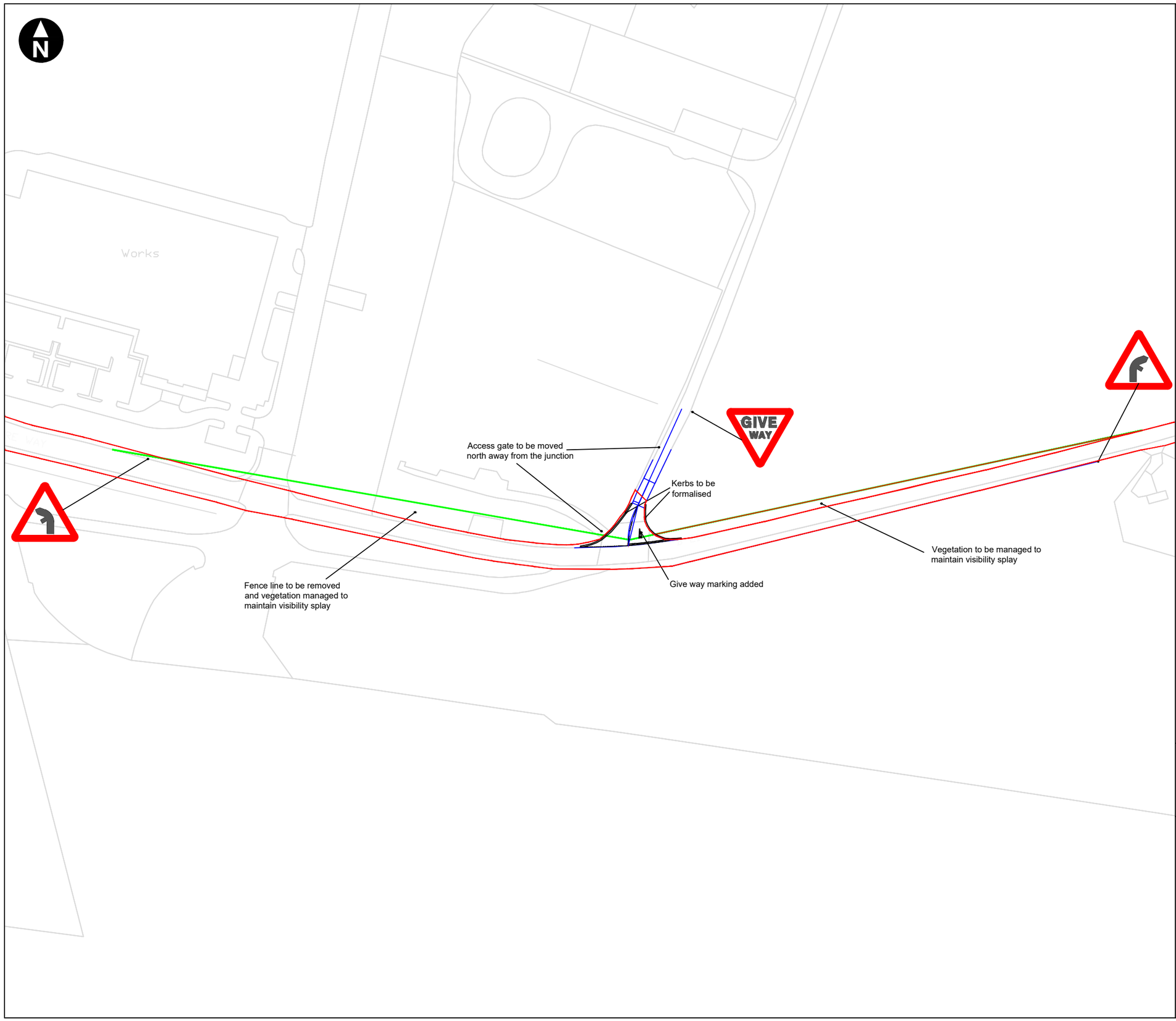
Director

Director/Secretary

DRAFT

Appendix TR3.8

Appendix TR3.8



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Key

Visibility splay 2.4m x 215m

Highway boundary

0 m 75 m

Scale 1:1500 @ A3

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Client

RSP

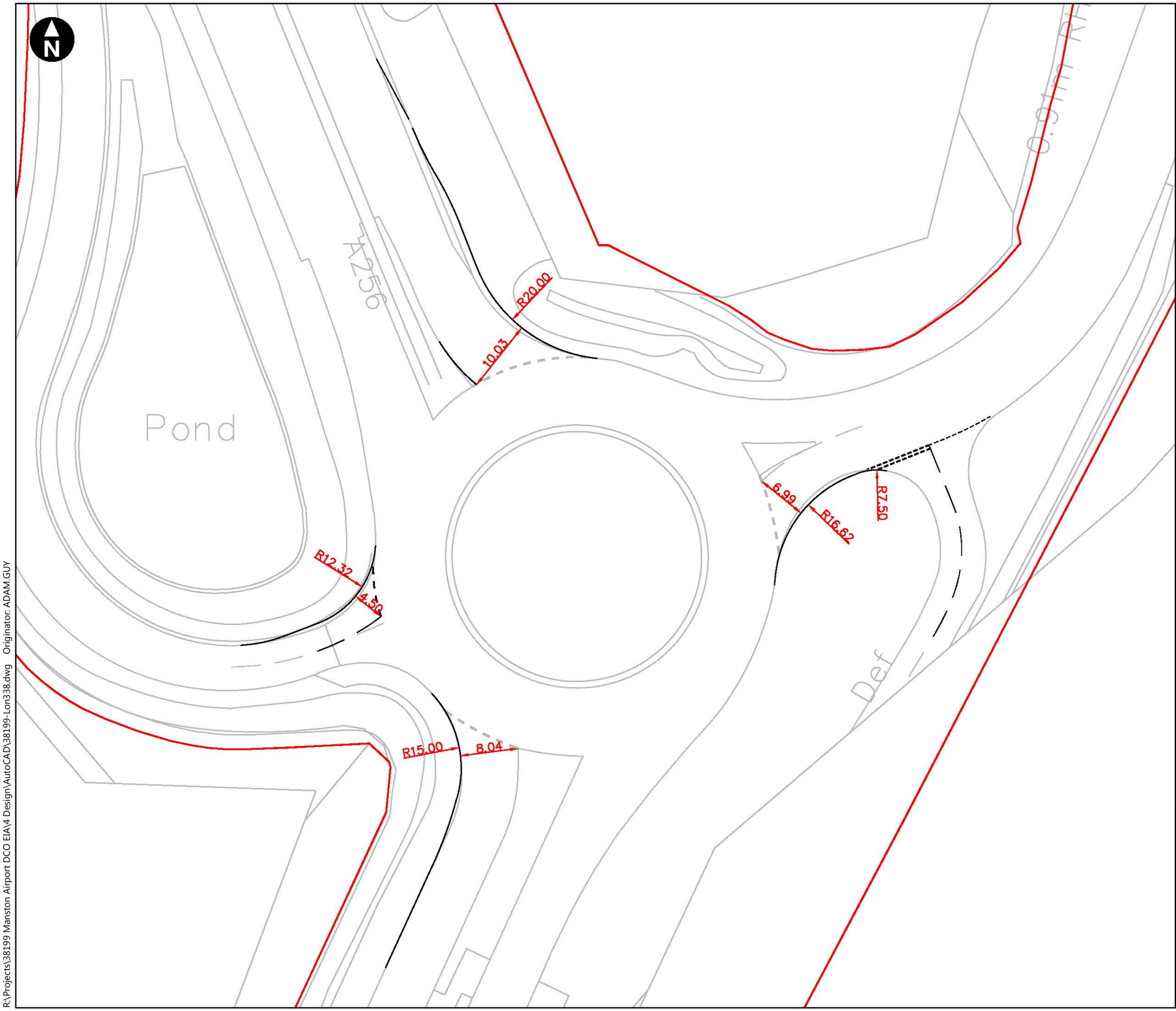
Manston Airport - Mitigation Scheme Highway Boundary

Appendix 3.8 - Junction 1

May 2019

wood.

Appendix TR3.8



Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Highway boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB) and Traffic Signs Regulations and General Directions (TSRGD).

0 m 30 m

Scale 1:500 @ A3

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Manston Airport DCO
Mitigation highway boundary

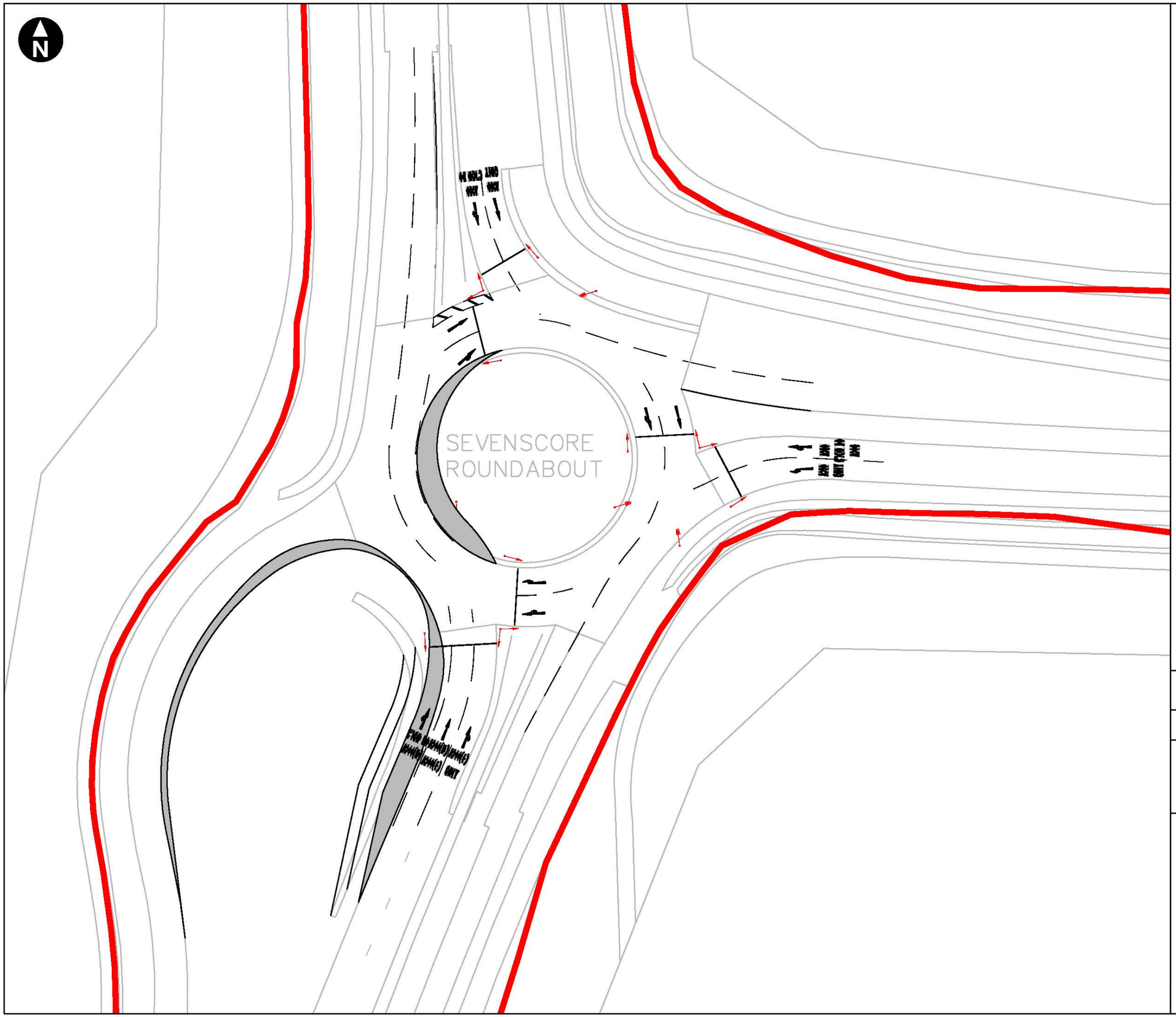
Appendix 3.8 - Junction 1

March 2018

wood.

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Appendix TR3.8



Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Proposed traffic signals
- Proposed new carriageway
- Highway Boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB) and Traffic Signs Regulations and General Directions (TSRGD).

Scale: 1:650 at A3

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Client

RSP

Manston Airport - Mitigation Scheme Highway Boundary

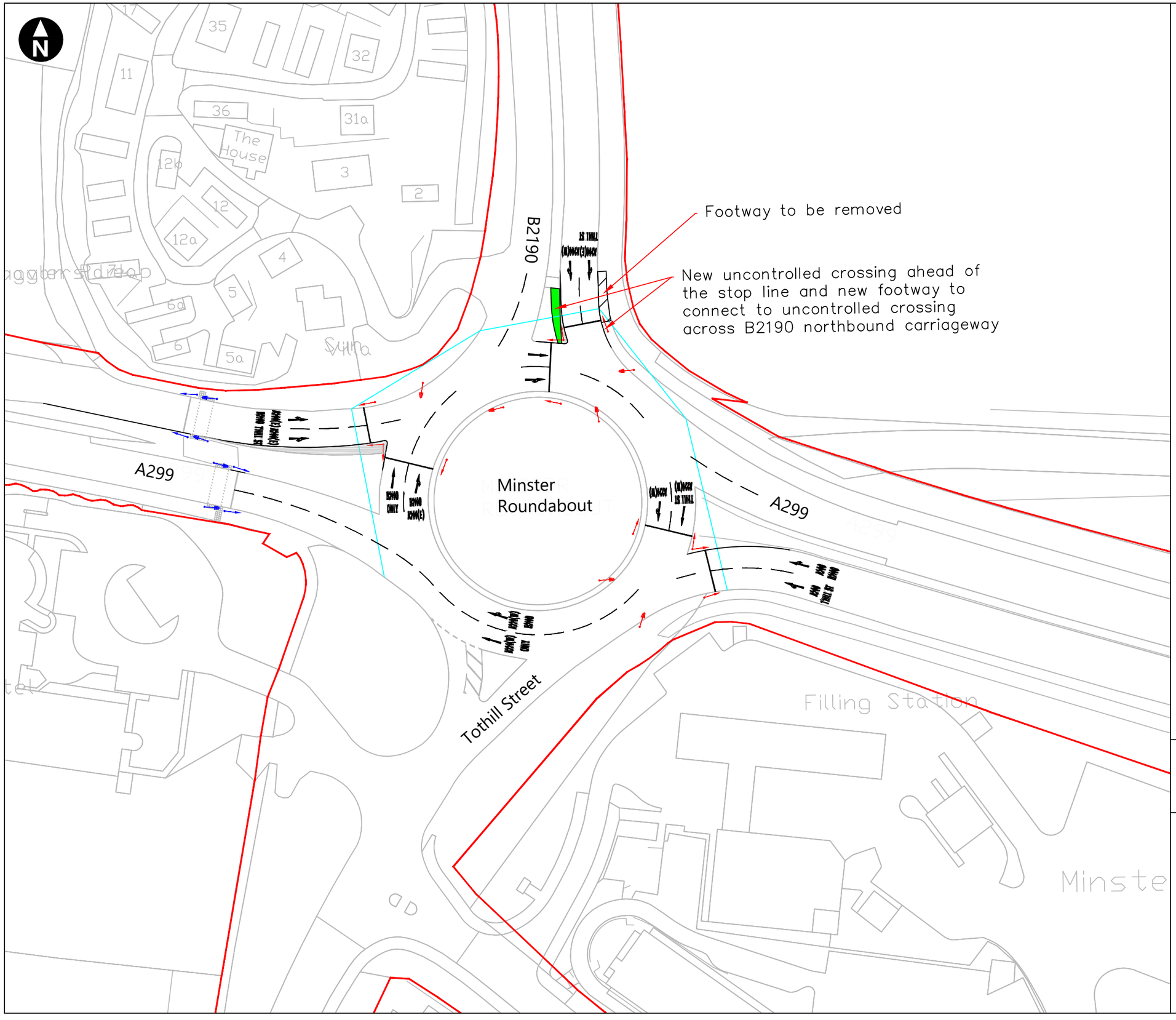
Appendix 3.8 - Junction 2

May 2019

wood.

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Appendix TR3.8



Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Existing road marking
- Proposed traffic signal head
- Existing traffic signal head
- Additional island area required
- Highways boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB) and Traffic Signs Regulations and General Directions (TSRGD).

0 m 40 m

Scale 1:750 @ A3

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Client

RSP

Manston Airport - Mitigation Highway Boundary

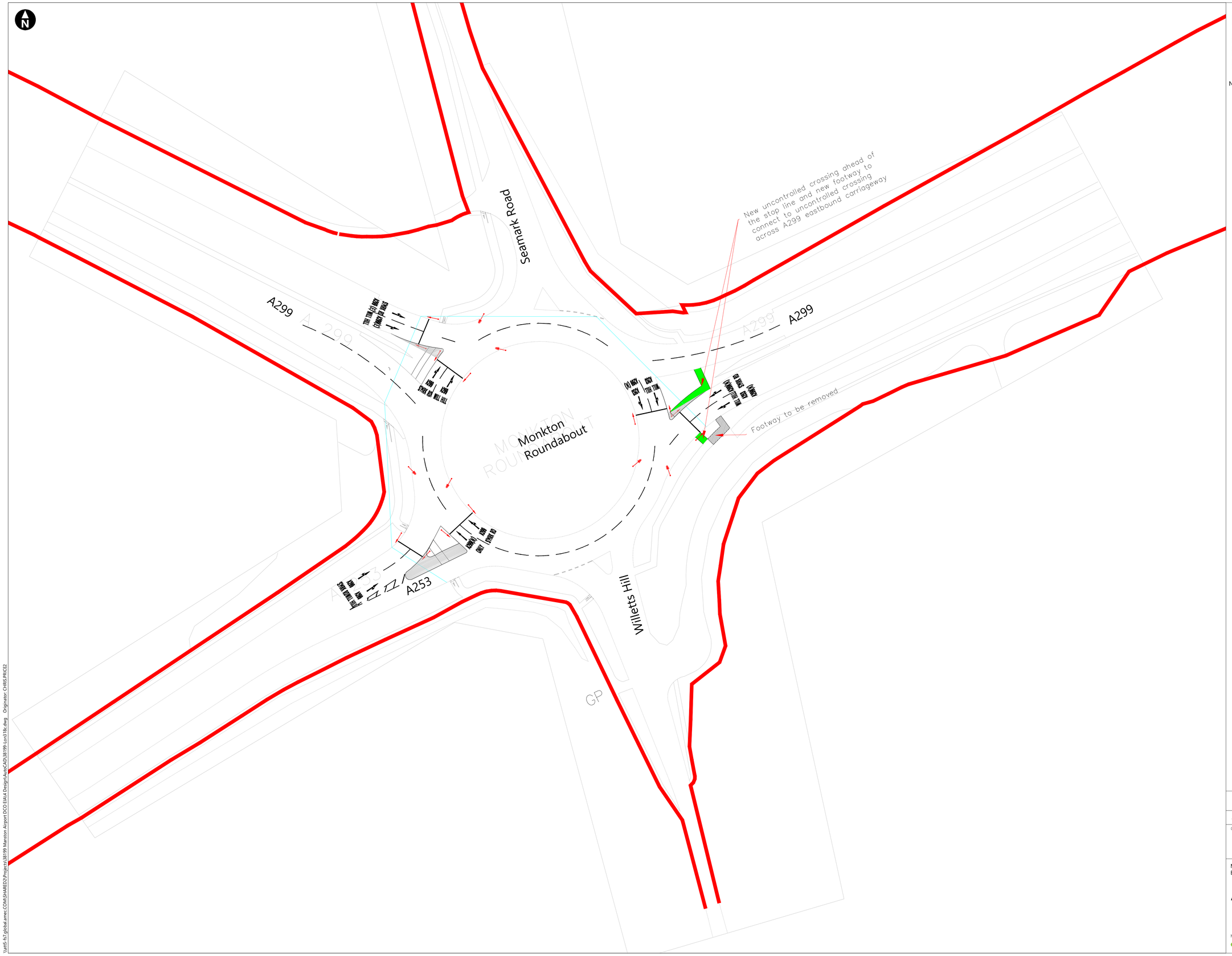
Appendix 3.8 - Junction 4

May 2019

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Appendix TR3.8



Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Highway Boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB) and Traffic Signs Regulations and General Directions (TSRGD).

Scale: 1:500 at A3

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Client

RSP

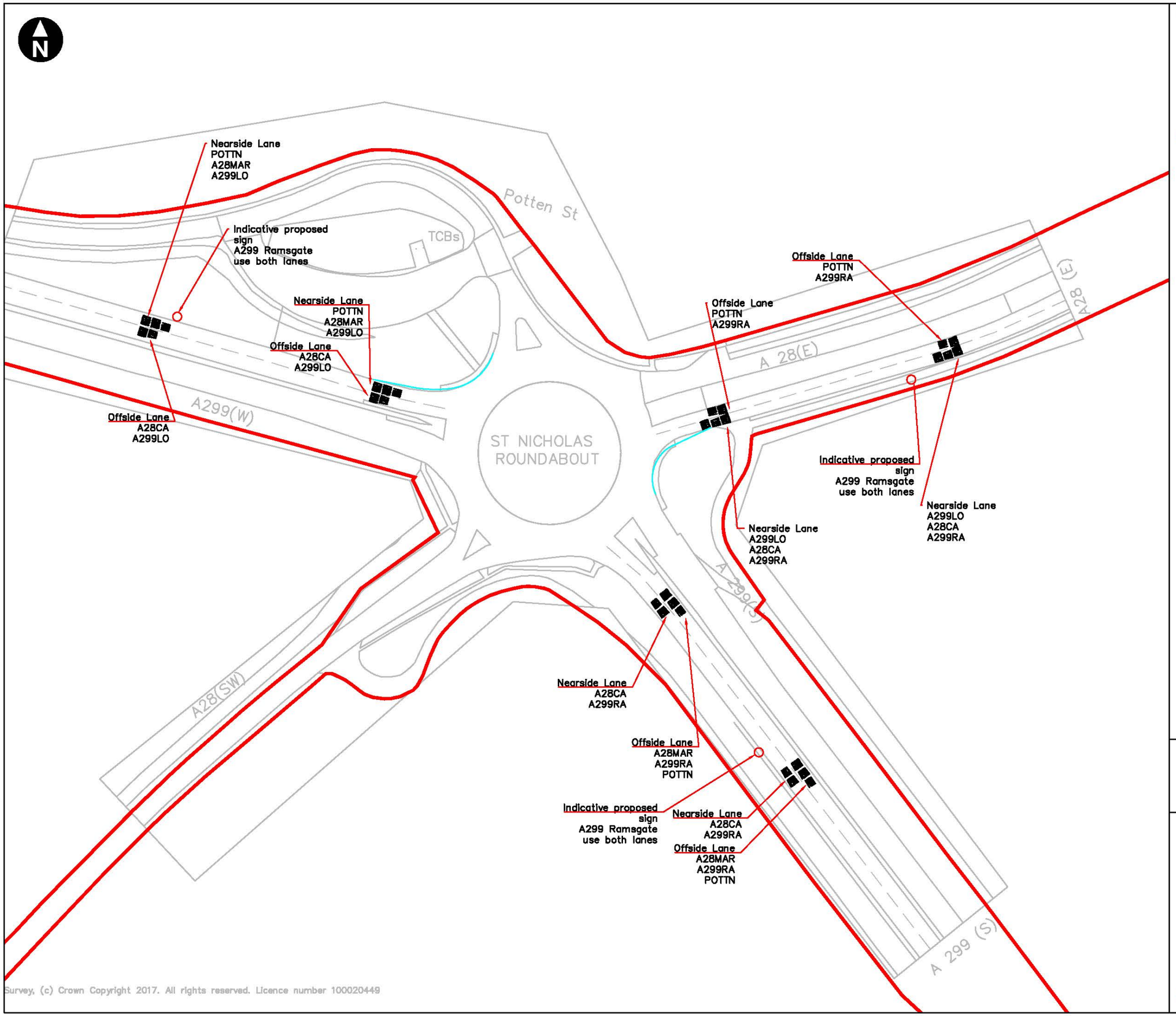
Manston Airport - Mitigation Scheme Highway Boundary

Appendix 3.8 - Junction 6

May 2019

wood.

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Key

- Existing based on Ordnance Survey Map
- Proposed Road Markings
- Indicative Proposed Sign
- Highway Boundary

Notes

1. This drawing is not to be used for construction.
2. Additional traffic signs will be provided in the next stage of the design to reinforce the information shown on the carriageway.

0 m 500 m

Scale 1:12,500 @ A3

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Client

RSP

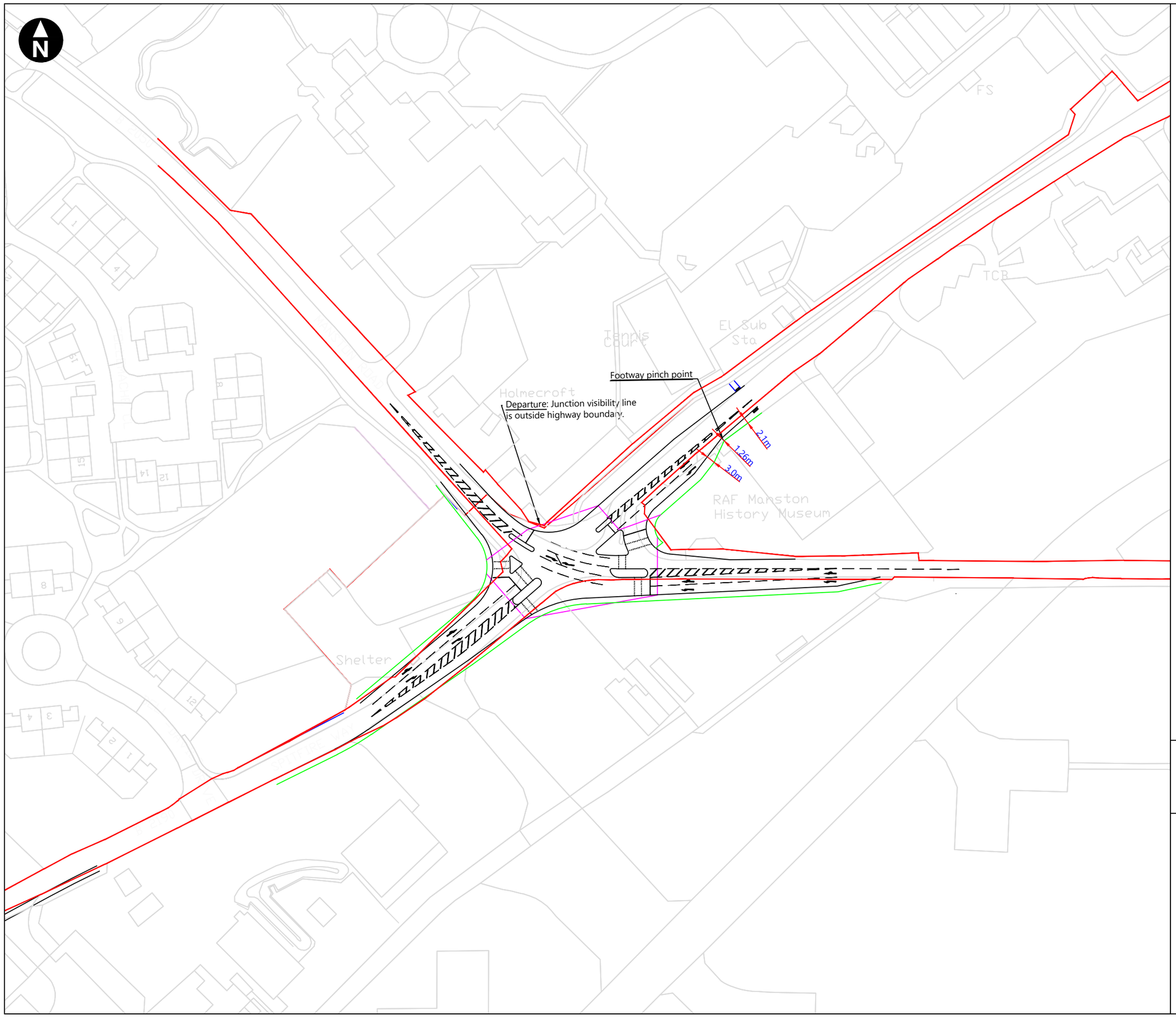
Manston Airport - Mitigation Scheme Highway Boundary

Appendix 3.8 - Junction 7

May 2019

wood.

Appendix TR3.8



Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed footway
- Proposed road marking
- Intervisibility Zone
- Assumed highway boundary
- Development boundary
- Highway Boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB) and Traffic Signs Regulations and General Directions (TSRGD).

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Scale 1:12,500 @ A3

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Client

RSP

Manston Airport - Mitigation Scheme Highway Boundary

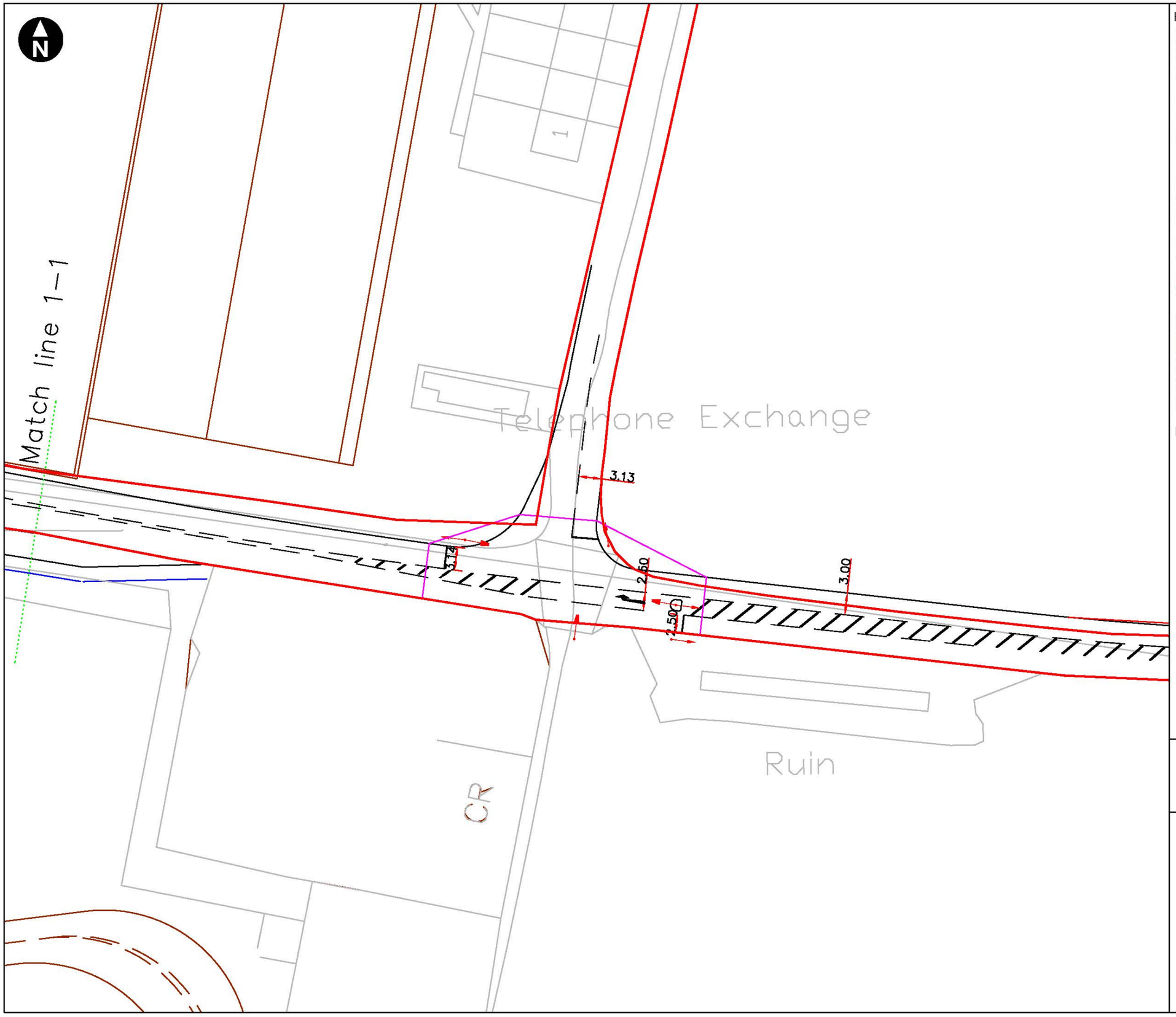
Appendix 3.8 - Junction 12

May 2019

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Appendix TR3.8



Key

- Proposed masterplan
- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Proposed tactile paving surface
- Proposed primary signal head
- Proposed secondary signal head
- Proposed signal head with additional green arrow signal
- Proposed signal head with substitute green arrow
- Junction intervisibility boundary
- Proposed footway edge
- Extent of visibility requirements
- Highway Boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB) and Traffic Signs Regulations and General Directions (TSRGD).
4. Junctions' intervisibility zones need to be kept clear from obstructions to maintain visibility.

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Scale 1:500 @ A3

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Client

RSP

Manston Airport - Mitigation Highway Boundary

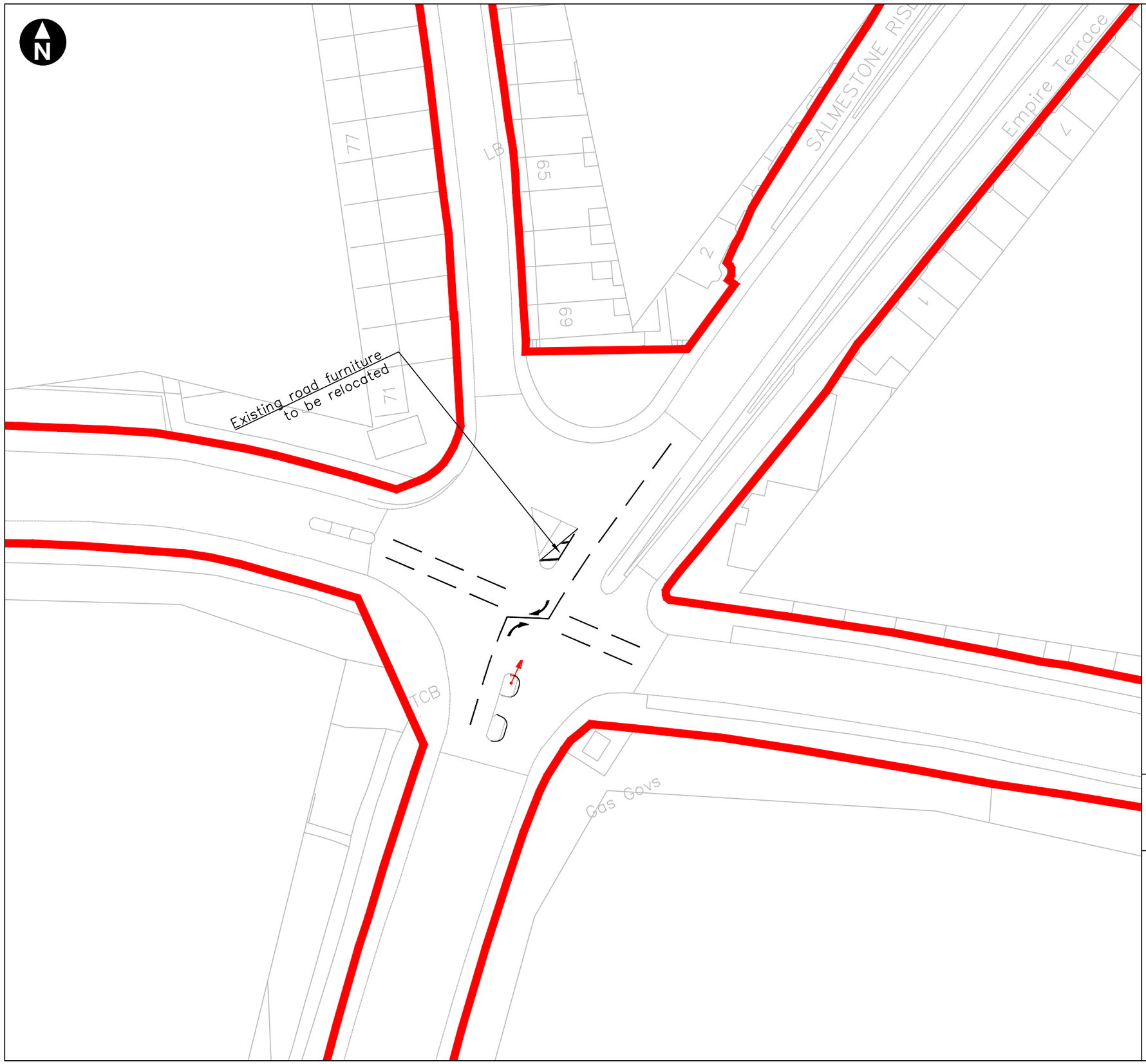
Appendix 3.8 - Junction 13

May 2019

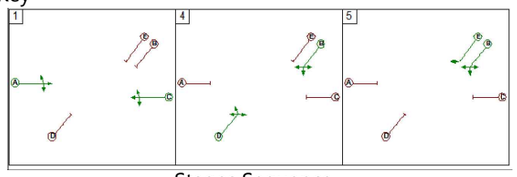
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Appendix TR3.8



Key



Stages Sequence

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Proposed secondary signal head with right turn indicative arrow
- Highway Boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB), Manual for Streets and Traffic Signs Regulations and General Directions (TSRGD).

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Client

RSP

Manston Airport - Mitigation Scheme Highway Boundary

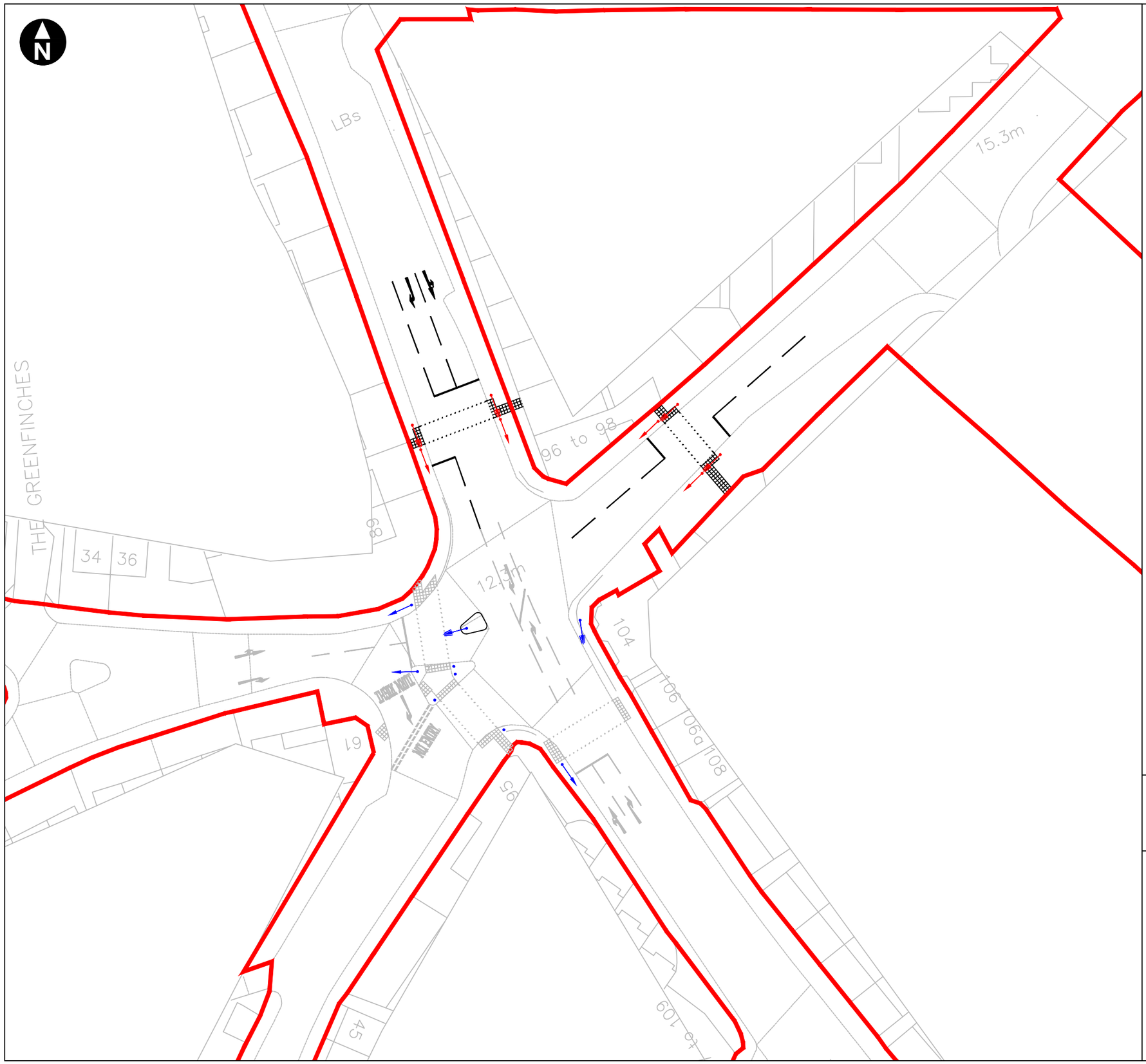
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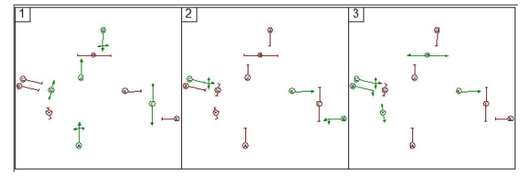
May 2018

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Appendix TR3.8





Stages Sequence

Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Proposed signal head
- Proposed signal head with right turn indicative arrow
- Proposed tactile paving surface
- Highway Boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB), Manual for Streets and Traffic Signs Regulations and General Directions (TSRGD).

0 m 30 m

Scale 1:500 @ A3

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Client

RSP

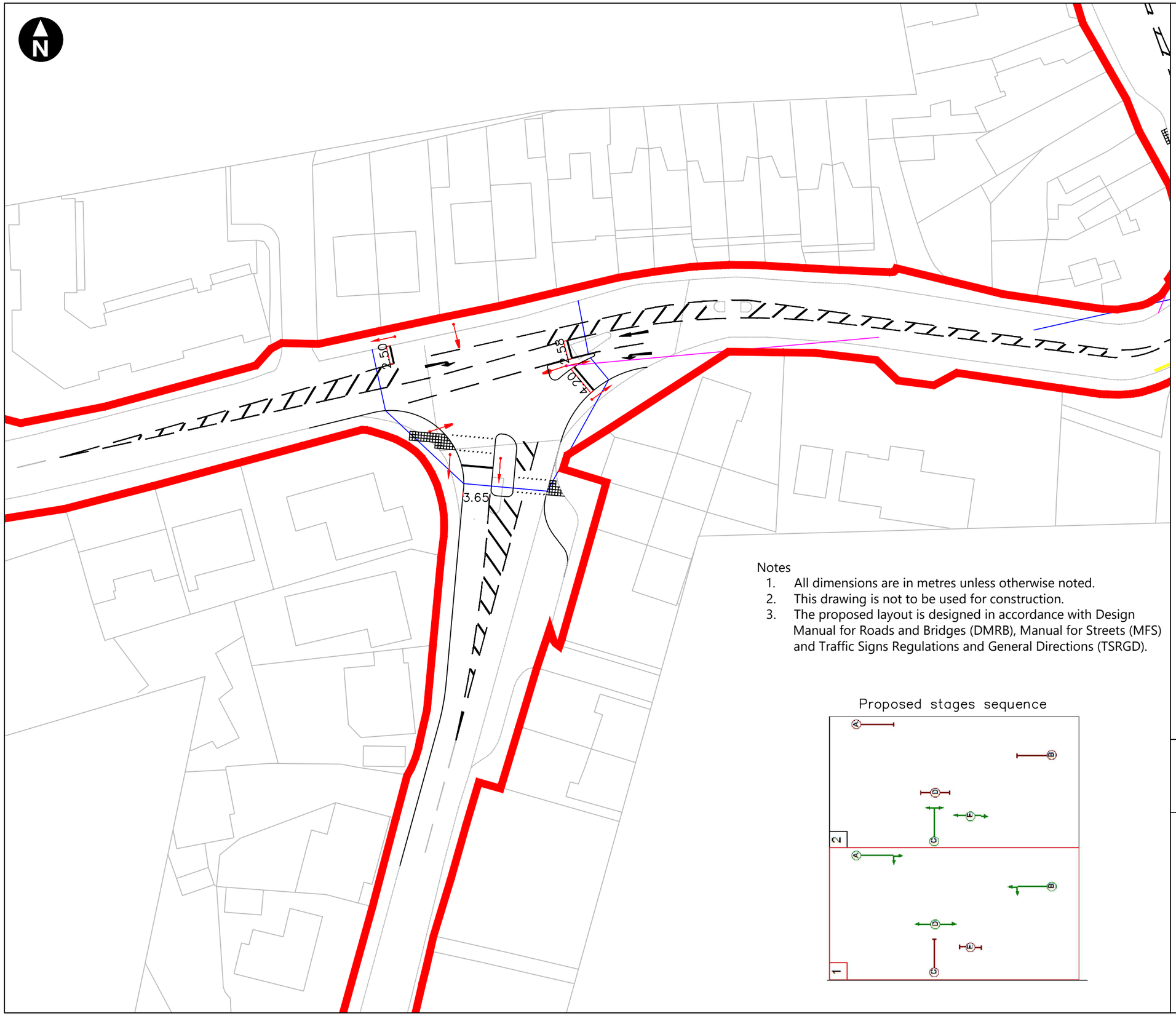
Manston Airport - Mitigation Scheme Highway Boundary

Appednix 3.8 - Junction 16

May 2019

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Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Proposed tactile paving surface
- Proposed signal head
- Extent of Junction intervisibility zone
- Stopping sight distance of 43 metres based on 30mph speed following Manual for Streets (MFS) guidance
- Highway Boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed layout is designed in accordance with Design Manual for Roads and Bridges (DMRB), Manual for Streets (MFS) and Traffic Signs Regulations and General Directions (TSRGD).

Proposed stages sequence

0 m 30 m

Scale 1:500 @ A3

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Client

RSP

Manston Airport - Mitigation Scheme Highway Boundary

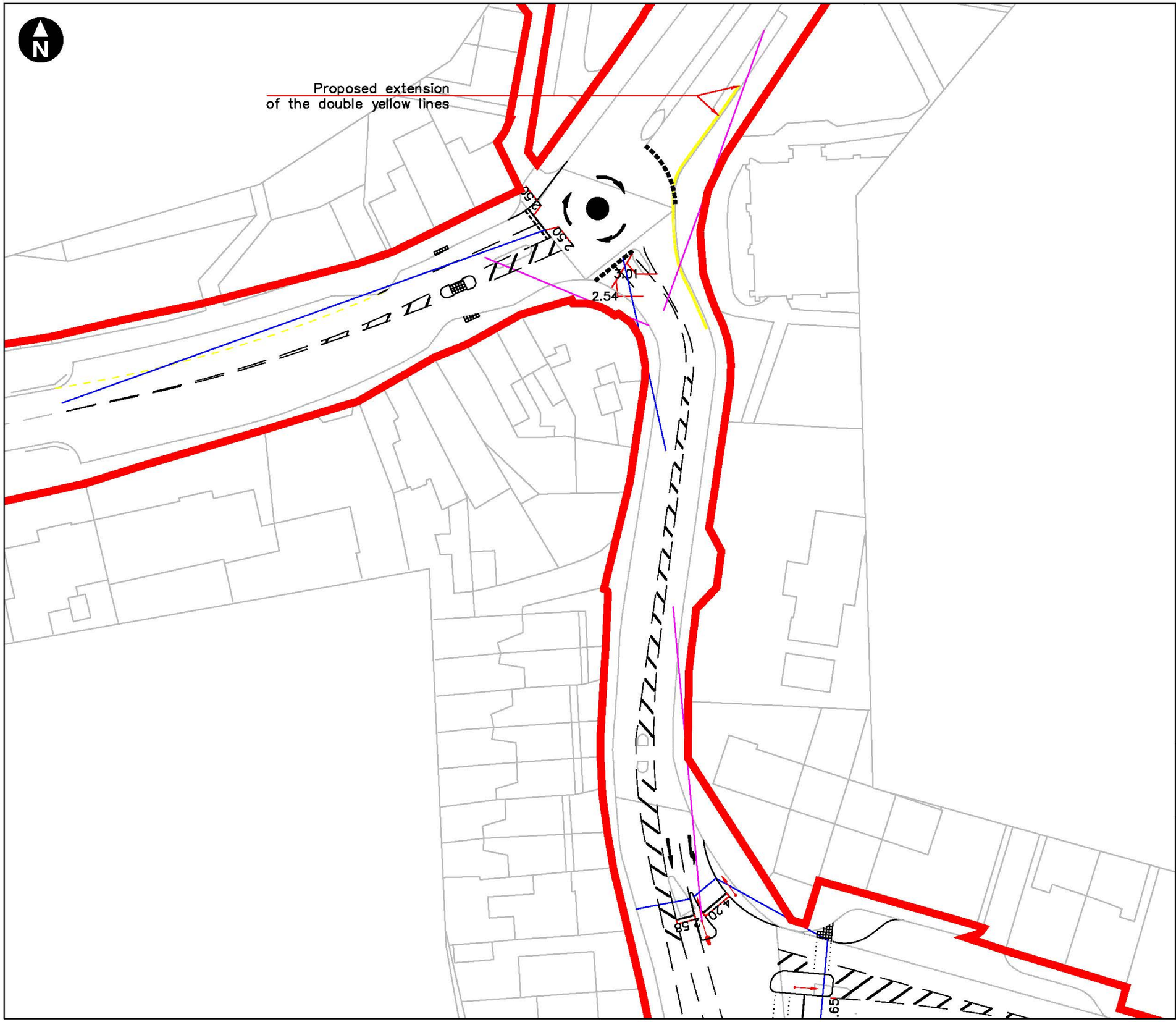
Appendix 3.8 - Junction 26

May 2019

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Appendix TR3.8



Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Proposed tactile paving surface
- Stopping sight distance
- Visibility to the right
- Highway Boundary

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed layout is designed in accordance with Design Manual for Roads and Bridges (DMRB), Manual for Streets (MFS) and Traffic Signs Regulations and General Directions (TSRGD).
4. The visibility to the right at High Street Western arm is not meeting DMRB standards due to the inherent footprint of the junction. Similarly, the visibility to the right and stopping sight distance at Newington Road are not achieved.

0 m 30 m

Scale 1:500 @ A3

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Client

RSP

Manston Airport - Mitigation Scheme Highway Boundary

Appendix 3.8 - Junction 27

May 2019

wood.

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Appendix TR3.8

Appendix TR3.16

Appendix TR3.16

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Technical note:
Revised TA - Additional Junction Assessment

1. Introduction

1.1.1 This Technical Note (TN) has been prepared to set out the methodology for calculating the traffic flows and the resulting model outputs for three junctions that had been included in the Transport Assessment (TA) submitted in support of the DCO application but were omitted from the TA Addendum as they are outside of the traffic model area. These three junctions are as follows:

- Junction 1 – Sandwich Road/A256/Jutes Lane;
- Junction 25 - Manston Road/Tescos Access; and
- Junction 28 - A255/Park Lane/Wilfred Road/Grange Road.

1.1.2 A fourth junction was also removed, Junction 9, but as this the layout will be revised as part of new residential development, it has been agreed with KCC that this does not need to be included.

1.1.3 The following sections set out the proposed methodology for deriving the traffic flows and present the matrix of total vehicles that are proposed to be assessed.

1.2 Junction 1 – A256/Sandwich Road/Jutes Lane

1.2.1 Flows for the A256(N) link are available from the TSTM. The junction modelling methodology is as follows:

- **2039 Baseline Scenario** - use the Northbound and Southbound A256 total traffic flows from the 2031 TSTM, growthed to 2039 for the link north of the junction and distribute the turning movements based on the percentage splits taken from the 2017 traffic survey taken at the junction (commissioned by Wood). Use the 2017 traffic counts and growth up to 2039 for the remaining turning movements at the junction. Growth rates will be the rates used from 2017 to 2039 set out in the Transport Assessment and agreed with KCC. This will form the 2039 base scenario.
- **2039 + Development Scenario** - development traffic will be derived from the select link analysis, assuming routeing will be on the A256 with no traffic turning onto the minor arms.
- **2039 Baseline and 2039 + Development Scenarios** – to be assessed in the validated baseline model to understand the development impact and need for any mitigation.

1.2.2 Table 1.1 sets out the proposed 2039 + Development Scenario for the AM Peak and Table 1.2 sets this out for the PM Peak for total vehicles. The quantum of development traffic on the A256 arms is 38 SB and 139 NB in the AM peak and 116 SB and 39 NB in the PM peak.

Table 1.1 2039 + Dev – Turning Matrix – Junction 1 - AM Peak

AM	A256 North	Sandwich Road	A256 South	Jutes Lane
A256 North		32	1886	36
Sandwich Road	26		252	0
A256 South	1402	129		17
Jutes Lane	16	1	24	

Table 1.2 2039 + Dev – Turning Matrix – Junction 1 - PM Peak

PM	A256 North	Sandwich Road	A256 South	Jutes Lane
A256 North		49	1103	14
Sandwich Road	25		210	1
A256 South	1764	279		5
Jutes Lane	12	5	32	

1.3 Junction 25 – Manston Road/Tesco Access

1.3.1 Flows for Manston Road are available from the TSTM. The junction modelling methodology is as follows:

- **2039 Baseline Scenario** - the strategic model flows for the 2039 base scenario for Manston Road East and West Bound will be used to inform the main line flows. The traffic from the 2017 traffic count commissioned by Wood will be used to inform the turning movements into and out of Tesco. No growth is assumed on this arm;
- **2039 + Development Scenario** - development traffic will be derived from the select link analysis will be added to the 2039 Base scenario. All development traffic routes east/west on Manston Road; and
- **2039 Baseline and 2039 + Development Scenarios** - to be assessed in the validated baseline model to understand the development impact and need for any mitigation.

1.3.2 Table 1.3 sets out the proposed 2039 + Development Scenario for the AM Peak and Table 1.4 sets this out for the PM Peak for total vehicles. The quantum of development traffic on the Manston Road arms is 20 EB and 50 WB in the AM peak and 63 EB and 16 WB in the PM peak.

Table 1.3 2039 + Dev – Turning Matrix – Junction 25 - AM Peak

AM	Manston Road E	Tescos Access	Manston Road E
Manston Road W		74	528
Tescos Access	84		78
Manston Road E	619	118	

Table 1.4 2039 + Dev – Turning Matrix – Junction 25 - PM Peak

PM	Manston Road E	Tescos Access	Manston Road E
Manston Road W		134	719
Tescos Access	120		175
Manston Road E	603	142	

1.4 Junction 28 – A255/Park Lane/Wilfred Road/Grange Road

1.4.1 There are no appropriate flows available from the TSTM therefore the 2017 traffic count survey data was used. The junction modelling methodology is as follows:

- **2039 Baseline Scenario** - use the 2017 Traffic Counts collated by Wood and growth up the turning movements at the junction. Growth will be the rates used from 2017 to 2039 set out in the Transport Assessment and agreed with KCC. This results in the 2039 base scenario;
- **2039 + Development Scenario** - development traffic derived from the select link analysis will be added on top of the growthed background flows. All development traffic routes east/west on the A255; and
- **2039 Baseline and 2039 + Development Scenarios** - to be assessed in the validated baseline model to understand the development impact and need for any mitigation.

1.4.2 Table 1.5 sets out the proposed 2039 + Development Scenario for the AM Peak and Table 1.6 sets this out for the PM Peak for total vehicles. The quantum of development traffic on the A255 arms is 16 EB and 30 WB in the AM peak and 12 EB and 9 WB in the PM peak.

Table 1.5 2039 + Dev – Turning Matrix – Junction 28 - AM Peak

AM	A255 W	Wilfred Road	A255 E	Grange Road
A255 W		202	554	6
Wilfred Road	238		12	76
A255 E	542	10		24
Grange Road	0	141	18	

Table 1.6 2039 + Dev – Turning Matrix – Junction 28 - PM Peak

PM	A255 W	Wilfred Road	A255 E	Grange Road
A255 W		281	628	1
Wilfred Road	223		10	117
A255 E	461	8		30
Grange Road	0	105	27	

1.5 Junction Capacity Assessments

1.5.1 Junction 1 and Junction 25 are roundabout junctions and have been modelled in Junctions 9. Ratio of flow to capacity (RFC) is used to assess the junction performance with a threshold of 0.85 RFC equating to the junction's theoretical capacity. Above this threshold queues and delays build exponentially.

1.5.2 Junction 28 is a signalised junction and has been modelled using LinSig3. Signalled junctions can be considered to reach their theoretical capacity when the junction total practical reserve capacity (PRC) becomes negative. In addition, individual arms are considered to reach their theoretical capacity when their Degree of Saturation (DoS) exceeds 90%.

Junction 1 - A256/Sandwich Road/Jutes Lane

1.5.3 Table 1.7 presents the results of the 2039 Baseline Scenario junction modelling.

Table 1.7 Junction 1 – 2039 Base –Peak hour modelling

Junction 1	AM Peak		PM Peak	
	Queue (veh)	RFC	Queue (veh)	RFC
Sandwich Road	29	1.19	1	0.59
A256 South	2	0.66	8	0.89
Jutes Lane	0	0.14	6	1.14
A256 North	135	1.13	3	0.74

1.5.4 The results show that the Sandwich Road and A256 North arms are over capacity in the AM peak and the A256 South and the Jutes lane arms are over capacity in the PM peak.

1.5.5 Table 1.8 presents the results of the 2039 + Development Scenario modelling.

Table 1.8 Junction 1 – 2039 + development – Peak hour modelling

Junction 1	AM Peak		PM Peak	
	Queue (veh)	RFC	Queue (veh)	RFC
Sandwich Road	30	1.19	1	0.60
A256 South	3	0.72	8	0.90
Jutes Lane	0	0.17	7	1.22
A256 North	148	1.14	3	0.74

1.5.6 In the AM Peak there is an increase in queuing of 1 vehicle on the Sandwich Road and A256 South arms, and an increase in queuing of 12 vehicles across the two lane of the A256 North arm, with a marginal change in RFC. It is considered that this is not a significant impact. In the PM Peak the overall operation of the junction with the additional development traffic is broadly the same performance as in the 2039 Base scenario with a slight increase in queueing by 3 vehicles on Jutes Lane. It is concluded that there is no significant impact and no requirement for mitigation.

Junction 25 – Manston Road/Tesco Access

1.5.7 Table 1.9 presents the results of the 2039 Baseline Scenario modelling.

Table 1.9 Junction 25 – 2039 Base – Peak hour modelling

Junction 25	AM Peak		PM peak	
	Queue (veh)	RFC	Queue (veh)	RFC
B2050 Manston Road E	1	0.58	2	0.63
Superstore Access	0	0.13	0	0.23
B2050 Manston Road W	1	0.58	4	0.82

1.5.8 The results show that the junction is operating within capacity with minimal queues.

1.5.9 Table 1.10 presents the results of the 2039 + Development Scenario modelling.

Table 1.10 Junction 25 – 2039+Dev –Peak hour modelling

Junction 25	AM Peak		PM Peak	
	Queue (veh)	RFC	Queue (veh)	RFC
B2050 Manston Road E	2	0.62	2	0.64
Superstore Access	0	0.13	0	0.23
B2050 Manston Road W	2	0.60	7	0.88

1.5.10 In the 2039+Development scenario there is a slight increase in queuing on the B2050 Manston Road West arm, and the RFC is just above 0.85, however, the junction continues to operate satisfactorily with minimal queueing.

Junction 28 - A255/Park Lane/Wilfred Road/Grange Road

1.5.11 Table 1.11 presents the results of the 2039 Baseline Scenario junction modelling.

Table 1.11 Junction 28 – 2039 Base – Peak Hour Modelling

Junction 28	AM Peak		PM Peak	
	Mean Max Queue	DoS	Mean Max Queue	DoS
Grange Road 1/1	8	83.8%	7	87.7%
A255 High Street 2/1	24	84.0%	32	91.3%
Park Road 3/1	14	61.2%	11	50.8%
Wilfred Road 4/1	13	83.1%	16	91.9%
	PRC	7.1%	**PRC**	-2.1%

1.5.12 In the 2039 Baseline Scenario the results show the junction is operating within capacity in the AM peak and over theoretical capacity in the PM peak on the A255 High Street and Wilfred Road arms

1.5.13 Table 1.12 presents the results of the 2039 + Development Scenario modelling.

Table 1.12 Junction 28 – 2039 + Dev – Peak Hour Modelling

Junction 1	AM Peak		PM Peak	
	Mean Max Queue	DoS	Mean Max Queue	DoS
Grange Road 1/1	7	84.6%	7	84.6%
A255 High Street	24	89.6%	33	94.1%
Park Lane 3/1	13	66.7%	11	52.5%
Wilfred Road 4/1	12	87.9%	16	92.4%
	PRC	0.5%	**PRC**	-4.5%

1.5.14 Within the model run set out in table 1.12 the signal stage timings have been amended to provide more green time to the A255 High Street and Park Lane arms. The change to the signal stage timings will decrease queuing on both these arms to within acceptable limits of nil detriment and as such no mitigation scheme is required.

1.6 Summary

1.6.1 The results of the modelling exercise show that the development traffic has no significant impact on the operational performance of the junctions and there is no requirement for mitigation.

Issued by

[redacted]

Glyn Price

.....

Approved by

[redacted]

Bev Coupe

.....

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Technical note:
RSA Stage 1: Designers Response – Cargo Facility Access

1. Introduction

This Technical Note forms the Designers Response to the Stage 1 Road Safety Audit (RSA) conducted by Baddingham Limited for a new site access into the proposed Cargo Facility development, at Manston Airport. The development forms part of the Manston Airport DCO submission.

Baddingham Limited has been provided with the latest preliminary access design for the Cargo Facility Area, the design is a three arm roundabout based on the guidance of the Design Manual for Road and Bridges (DMRB).

The designer's response to each of the issues raised by the Safety Audit Team is provided in the following sections. The text included within the RSA has been transposed in to this document, a full copy of the original RSA is provided within **Appendix A**.

2. Designers Response

Problem 3.1

Location: Proposed roundabout.

Summary: Potential collisions arising from large vehicle access.

No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage type collisions or over running of the verge.

Recommendation: It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly use the junction to demonstrate safe and efficient access.

Designers Response: A swept path assessment of the proposed junction design using an articulated HGV vehicle is provided in **Appendix B**. The vehicle used was 16.5m in length and represented the maximum legal length of an articulated HGV (UK). The swept path assessment assessed all the movements into and from the proposed Cargo Facility access and around the roundabout central island. The results show that the proposed design is sufficient to accommodate large vehicle movements.

Problem 3.2

Location: West of Rose Farm access.

Summary: Potential for "see-through effect".

If the old carriageway to the west of Rose Farm is retained there is potential for "see-through" effect for eastbound drivers and risk of loss of control type incidents. Drivers may perceive the carriageway as continuing on the old alignment.

Recommendation: It is recommended that the old carriageway to the west of Rose Farm is removed.

Designers Response: Removal of the old B2190 Spitfire Way alignment would be removed as part of the detailed design stage. An indication of this is included in the scheme plan provided in **Appendix C**.

Problem 3.3

Location: Proposed Rose Farm access with Spitfire Way.

Summary: Potential collisions arising from large vehicle access.

No swept path assessment is provided. The junction is provided with a tight radius turn. Large vehicles such as agricultural machinery and vehicles with trailers may collide with other vehicles waiting at the junction or over-run the verge and be in danger of tipping.

Recommendation: It is recommended that a swept path assessment is undertaken or the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.

Designers Response: A swept path has been undertaken at the junction from Rose Farm onto the realigned B2190 Spitfire Way using an agricultural vehicle (farm tractor with trailer). The swept path assessment shows that the vehicles can enter and exit the junction with some overrunning of the opposite lane on the minor arm. Given that this access only to the farm, this is considered to be acceptable.

This is included as **Appendix D**.

Problem 3.4

Location: Proposed roundabout and Rose Farm access.

Summary: Potential collisions arising from lack of visibility.

No visibility splays are shown on the drawing for the two proposed junction. Lack of suitable visibility can lead to late-braking decisions, difficulties with gap acceptance and collisions between vehicles.

Recommendation: It is recommended that suitable visibility splays are provided commensurate with the speed of traffic in these locations.

Designers Response: The cargo access junction has been designed based on DMRB minimum visibility requirements. These are shown in Appendix C. The land on the southern and eastern side of the carriageway – to the east and west of the cargo facility access arm – is within the development boundary and visibility splays will be provided and maintained. This is shown on Appendix C as the purple lines around the roundabout.

The Rose Farm junction visibility is also shown in the plan provided in Appendix C. This demonstrates that with an 'x' distance of 2.4m which is appropriate for the scale of use at the junction, a maximum visibility of 160m to the east can be achieved which is compliant with DMRB standards for a 50mph speed limit, and a longer distance to the west to the Cargo Access junction.

Problem 3.5

Location: Proposed roundabout.

Summary: Potential collisions arising from speeding.

The introduction of a roundabout in this location will slow traffic on the B2190. It is noted that a change in speed limit to 50mph is proposed. However, the roundabout approaches are straight and the current 85th percentile speeds are recorded at circa 50mph. There is a risk of drivers approaching the proposed roundabout at speed, leading to late braking decisions, skidding and loss-of-control type collisions with other vehicles and possibly increased severity levels.

Recommendation: It is recommended that the speed limit is reduced to 40mph and extended to the west to the roundabout junction with Columbus Avenue. It is recommended that the roundabout approaches are provided with high friction surfacing.

Designers Response: The roundabout design is to DMRB standards for the speed limit proposed, which is also the recorded 85th percentile speed and provides suitable forward visibilities for drivers approaching the roundabout. Street lighting at the roundabout and appropriate road signage will warn drivers of the junction. This will be included at the preliminary and detailed design stage. High friction surfacing on the approach arms will be included in the detailed design also.

Spitfire Way will connect to the Inner Circuit Road Improvement Scheme (ICRIS) proposed by the local highway authority, Kent County Council (KCC) within the draft Thanet Transport Strategy. The design standard for the ICRIS includes a 40mph speed limit. It may be considered appropriate that the speed limit on Spitfire Way is also reduced to 40mph.

Problem 6.1

Location: Proposed roundabout.

Summary: Lack of illumination.

No street lighting information is provided. There is a risk that insufficient illumination of the junction will lead to potential collisions between vehicles.

Recommendation: It is recommended that appropriate street lighting is provided.

Designers Response: Street lighting will be provided at the roundabout. This will be identified at the preliminary and detailed design stage and will be in accordance with design standards.

3. General Comments

The RSA also identifies the need for road markings, signage and drainage information to be provided. This will be included at the preliminary and detailed design stage.

Issued by

[redacted]

.....

Approved by

Bev Coupe

[redacted]

.....

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Appendix A
Road Safety Audit – Stage 1

B2190 Spitfire Way, Manston Airport, Kent
Proposed Highway Works – Cargo Access

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

28th March 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

contact@badinghamuk.com

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DOCUMENT ISSUE

Issue / Revision:	Issue 1			
Description / Status:	Final			
Date:	28/03/2019			
Prepared:	A. R. J. Setter			
Signature:	[redacted]			
Document Check:	D. F. Rogers			
Signature:	[redacted]			
Technical Check:	D. F. Rogers			
Signature:	[redacted]			
Authorised:	A. R. J. Setter			
Signature:	[redacted]			
File Reference:	0781 Manston Airport - Cargo - RSA1 - Issue 1.docx			

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FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo
Figure 3	Audit Plan

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It relates to a proposed highway access works on the B2190 Spitfire Way to serve a proposed cargo facility for Manston Airport, Kent.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 10.00am and 10.30am. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise a new three-arm roundabout junction on the B2190 Spitfire Way, to provide access to a proposed cargo facility to serve Manston Airport. Spitfire Way in this location is a rural single carriageway with a relatively straight alignment and minimal gradient. It is subject to the national speed limit. The proposals include a realignment of the carriageway with part of the old carriageway retained to serve as an access to Rose Farm. The proposed junction is to be situated within a new 50mph speed limit. No pedestrian facilities are proposed. The existing wearing course was noted to be in a good condition. There are no existing footways or street lighting. No pedestrians or cyclists were noted. Land to the north of the B2190 carriageway is currently in agricultural use.

1.11 CrashMap shows two slight collison's in the vicinity of the proposed access within the latest five-year period. A fatal and three further slight collisions are shown on Spitfire Way further to the east of Pouces Cottages.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 No previous audits have been undertaken.

Appendix TR3.23

SECTION 3: VEHICULAR AND HIGHWAY ISSUES

3.1 PROBLEM

Location: Proposed roundabout.

Summary: Potential collisions arising from large vehicle access.

3.1.1 No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions or over-running of the verge.

RECOMMENDATION

3.1.2 It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.



Photo 1 B2190 view east from Rose Farm access.

Appendix TR3.23

3.2 **PROBLEM**

Location: West of Rose Farm access.

Summary: Potential for 'see-through effect'.

3.2.1 If the old carriageway to the west of Rose Farm is retained there is potential for 'see-through' effect for eastbound drivers and risk of loss-of-control type incidents. Drivers may perceive the carriageway as continuing on the old alignment.

RECOMMENDATION

3.2.2 It is recommended that the old carriageway to the west of Rose Farm is removed.



Photo 2 - B2190 view east.

Appendix TR3.23

3.3 **PROBLEM**

Location: Proposed Rose Farm access with Spitfire Way.

Summary: Potential collisions arising from large vehicle access.

3.3.1 No swept path assessment is provided. The junction is provided with a tight radius turn. Large vehicles such as agricultural machinery and vehicles with trailers may collide with other vehicles waiting at the junction or over-run the verge and be in danger of tipping.

RECOMMENDATION

3.3.2 It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.



Photo 3 -B2190 view west to HGV.

Appendix TR3.23

3.4 **PROBLEM**

Location: Proposed roundabout & Rose Farm access.

Summary: Potential collisions arising from lack of visibility.

3.4.1 No visibility splays are shown on the drawing for the two proposed junctions. Lack of suitable visibility can lead to late-braking decisions, difficulties with gap acceptance and collisions between vehicles.

RECOMMENDATION

3.4.2 It is recommended that suitable visibility splays are provided commensurate with the speed of traffic in these locations.



Photo 4 - B2190 view east.

Appendix TR3.23

3.5 **PROBLEM**

Location: Proposed roundabout.

Summary: Potential collisions arising from speeding.

3.5.1 The introduction of a roundabout in this location will slow traffic on the B2190. It is noted that a change in speed limit to 50mph is proposed. However, the roundabout approaches are straight and the current 85th percentile speeds are recorded at circa 50mph. There is a risk of drivers approaching the proposed roundabout at speed, leading to late-braking decisions, skidding and loss-of-control type collisions with other vehicles and possibly increased severity levels.

RECOMMENDATION

3.5.2 It is recommended that the speed limit is reduced to 40mph and extended to the west to the roundabout junction with Columbus Avenue. It is recommended that the roundabout approaches are provided with high friction surfacing (HFC).



Photo 5 - B2190 view west.

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SECTION 4: NON-MOTORISED USERS

4.1 No observations.

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SECTION 5: ROAD MARKINGS AND SIGNAGE

5.1 No signing details have been provided. A suitable package of signage information will need to be provided as part of any further detailed design.

Appendix TR3.23

SECTION 6: STREET LIGHTING

6.1 PROBLEM

Location: Proposed roundabout.

Summary: Lack of illumination.

6.1.1 No street lighting information is provided. There is a risk that insufficient illumination of the junction, leading to potential collisions between vehicles.

RECOMMENDATION

6.1.2 It is recommended that appropriate street lighting is provided.



Photo 6 - B2190 view west.

Appendix TR3.23

SECTION 7: DRAINAGE

7.1 No drainage information is provided. A suitable package of drainage information will need to form part of any further detailed design.

Appendix TR3.23

SECTION 8: AUDIT STATEMENT

8.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 28th March 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

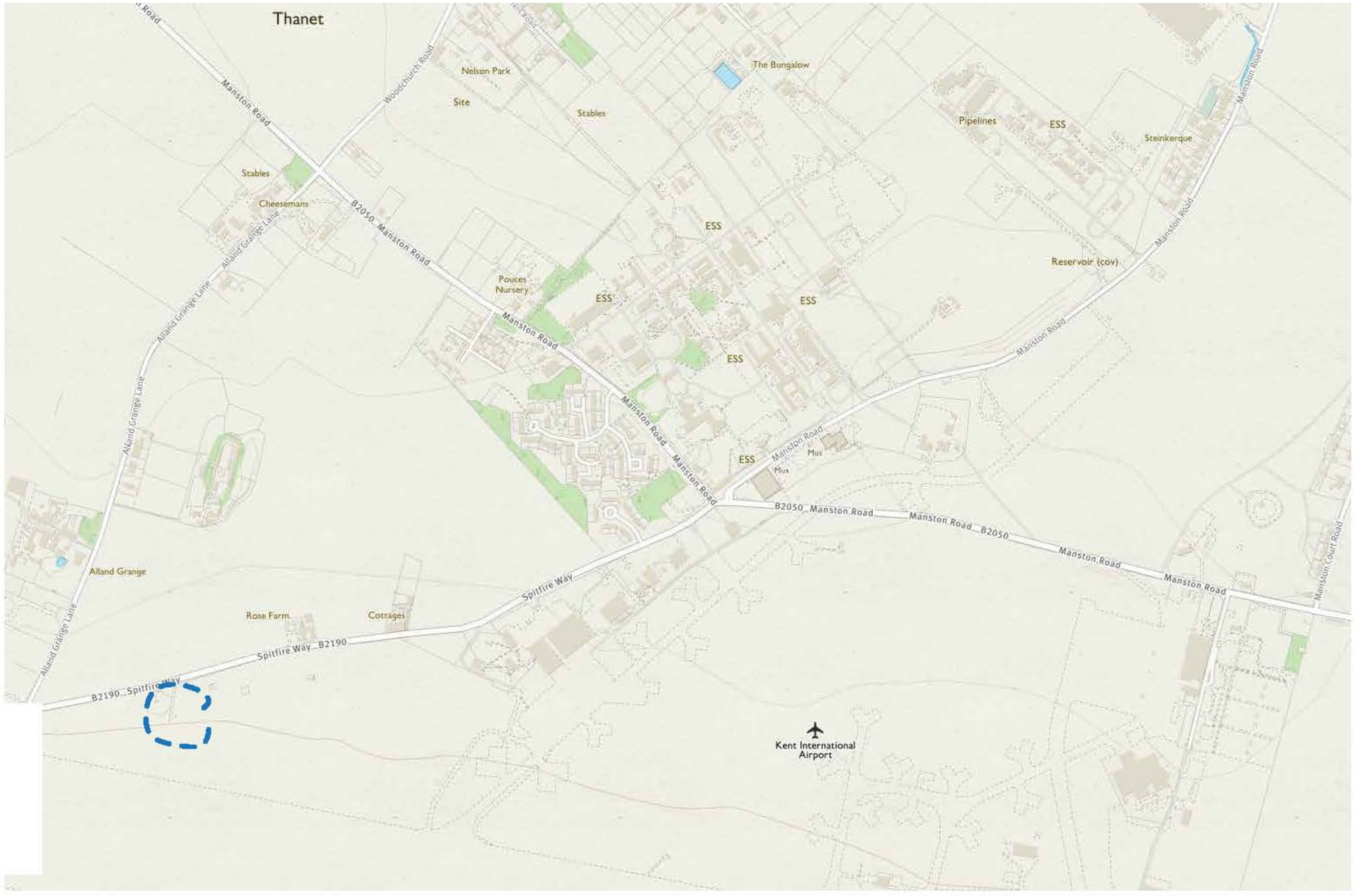
Director - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 28th March 2019

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FIGURES



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Client: RSP

Project: Manston Airport

Title: Location Plan

Date	Status
28/03/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Aerial Photo

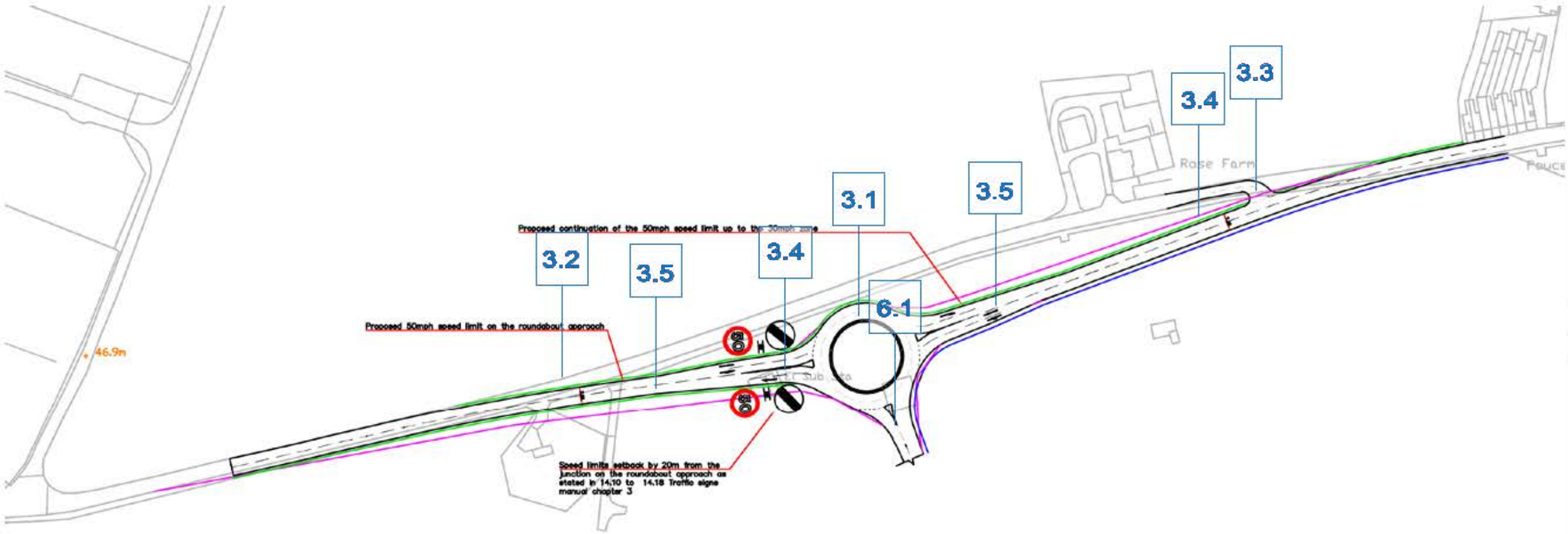
Date	Status
28/03/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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Source: Cargo Site Location & Access Design

Rev.	Date	Initials	Amendments

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Client: RSP

Project: Manston Airport

Title: Audit Plan

Date	Status
28/03/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 3	-

Appendix TR3.23

APPENDIX 1

Road Safety Audit Brief

Ref: AS/0781
Date: 28th March 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	22/03/19
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Cargo Facility Roundabout Access
Report title:	Manston Airport - Cargo Facility Roundabout Access - RSA Stage 1
PREPARED BY:	
Name:	Glyn Price
Sign	[redacted]
Organisation:	Wood
Date:	22/03/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Sig	[redacted]
Organisation:	RiverOak Strategic Partners
Date:	22/03/19

Appendix TR3.23

General Details				
Highway Scheme Name & Road Number	Manston Airport – Cargo Facility Access – Spitfire Way (B2190)			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Roundabout Junction with the B2190				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details	**Design Organisation Details**			
16 Charles II Street London SW1Y 4NW	Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK			
Police Contact Details (RSA3 Only)	**Maintaining Agent Contact Details**			
N/A	N/A			
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB - TD16/07 – Geometric Design of Roundabouts				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposals are for a new three arm roundabout junction with the B2109 north of Manston Airport.

The extents are the extents of the provided drawings of the scheme to the point where the changed road alignment on the B2019 links back in with the carriageway.

The objectives of the scheme are to provide a new access to a proposed new cargo facility on the Manson Airport footprint.

Construction would be proposed in Year one of the project life cycle which will be 2019 or 2020 depending on the approvals process of a DCO that is going through examination. Complete should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB has been applied to the design of the proposed roundabout. TD16/07 Geometric Design of Roundabouts.

Design Speeds
Provide details of applied and/or existing design speeds.

50MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit on Spitfire Way (B2109) is National Speed limit. It is proposed to change the speed limits in the area as part of the scheme design to 50mph.

An ATC was taken on the road in 2017 in the vicinity of the proposed junction.

This indicated an average speed of 42.5 eastbound and 48 westbound (85th Percentile). This data will be provided with this brief.

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The average traffic flows on the link will be provided from the ATC taken at the access location.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the access for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

The design has indicated proposed footways which does not include any pedestrian facilities to cross arms of the junction. There is no footway south and west of the junction towards Columbus avenue and one is not proposed.

Environmental Constraints
Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.

No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

The new roundabout is on Spitfire way approximately 500m south west of the junction of Manston Road and Spitfire Way.

General Description
Include road network, road type, relevant land uses etc.

The existing Spitfire Way carriageway is a two-lane carriageway. There are no footways either side of the carriageway and the road is subject to the NSL. To the north of the carriageway is open fields and the south the airport site.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Near the proposed junction two accidents have been recorded within the scope of the proposed junction. These are accidents 75 and 335.

The accidents were similar in nature with shunt type accidents and both were slight in nature.

The details for accidents the two accidents are provided.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Data for the Spitfire Way link will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – Cargo – ATC results	-	25.03.2019
RSA – Cargo – future Year Traffic Flows (2039)	-	25.03.2019
RSA – Cargo – Accident 75		25.03.2019
RSA – Cargo – Accident 335		25.03.2019

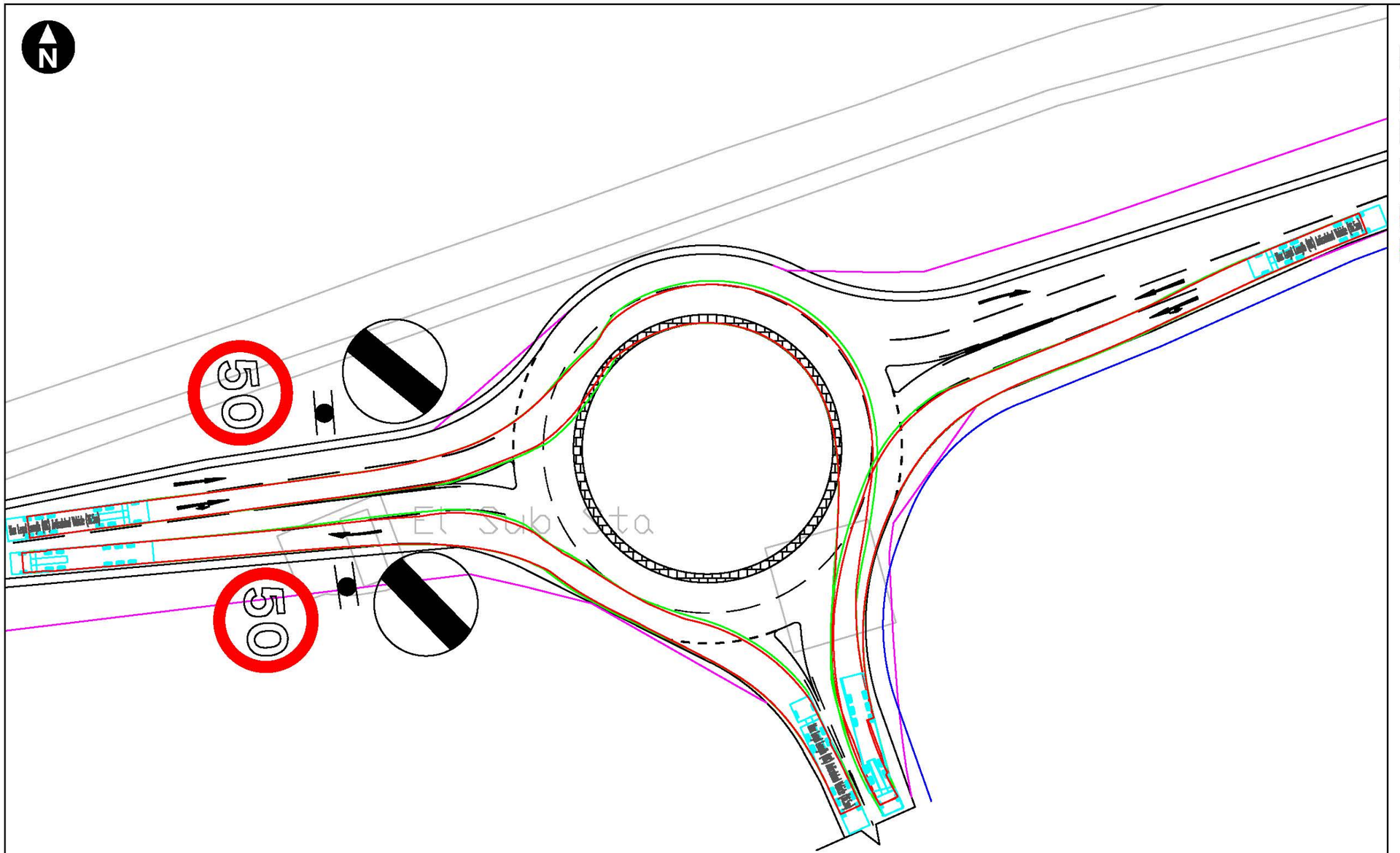
Drawings

Reference/Revision	Title	Date
RSA – Cargo – Site Location and Access design		25.03.2019
RSA – Cargo – Cad file		25.03.2019

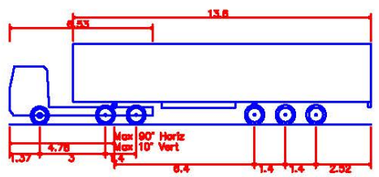
Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

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Appendix B
Swept Path Assessment



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Max Legal Length (UK) Articulated Vehicle (16.5m)	
Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	6.530m

Client

RSP

Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix B - Swept path assessment - Cargo Access

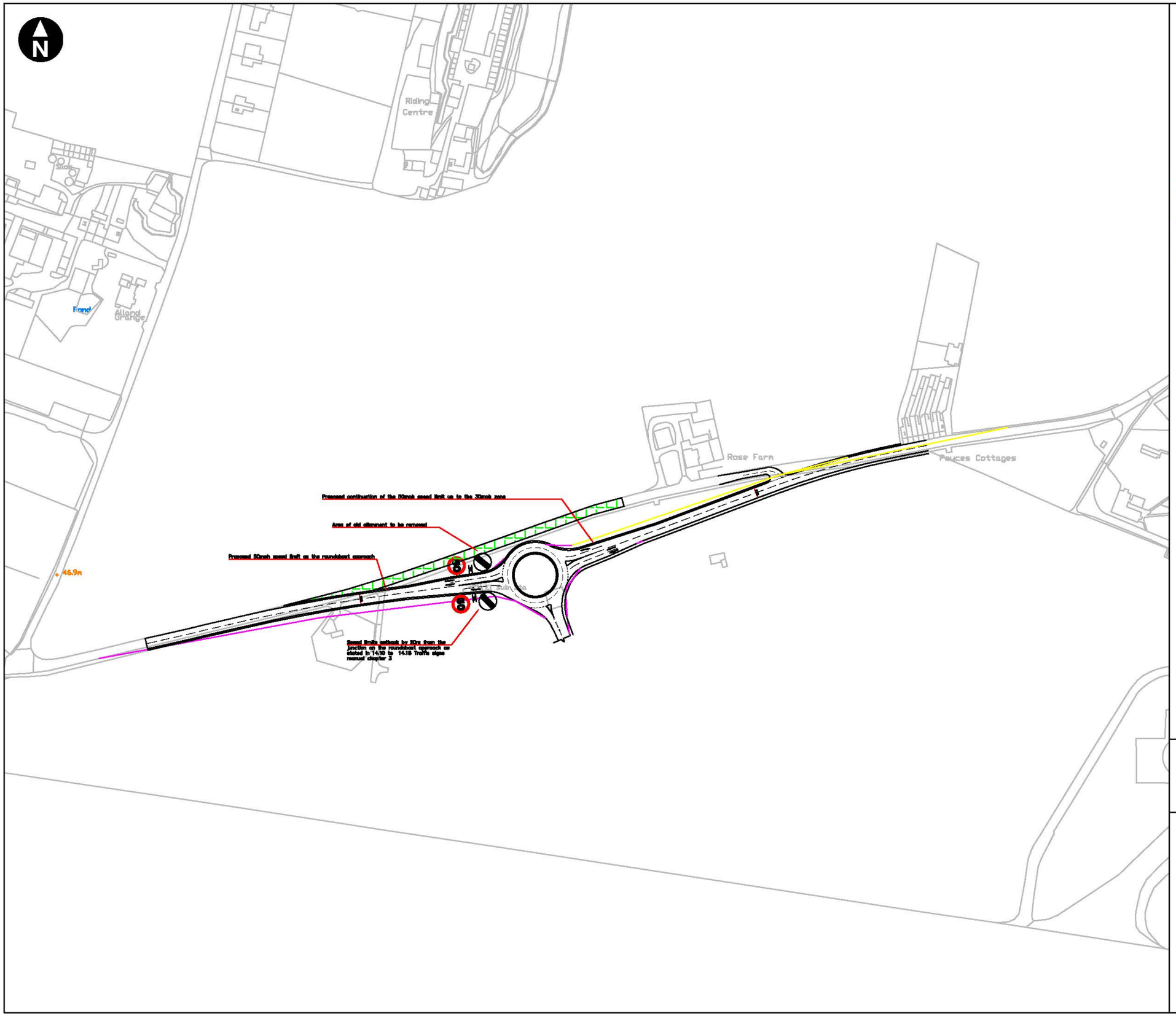
May 2019

wood.

R:\Projects\40820 STH Manston Airport Post Application\D Design\Drawings\AutoCAD\40820-Lon109.dwg Originator: ADAM.GUY

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Appendix C
Proposed Scheme



Key

- Existing based on Ordnance Survey Map
- Proposed Kerbline
- Proposed road marking
- Proposed location of speed limit signage
- Old Spitfire Way alignment to be removed
- Junction visibility requirements
- Rose Farm visibility requirements (2.4 x 160m east)

0 m 150 m

Scale 1:2500 @ A3

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Client

RSP

Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix C - Revised Cargo Access Scheme

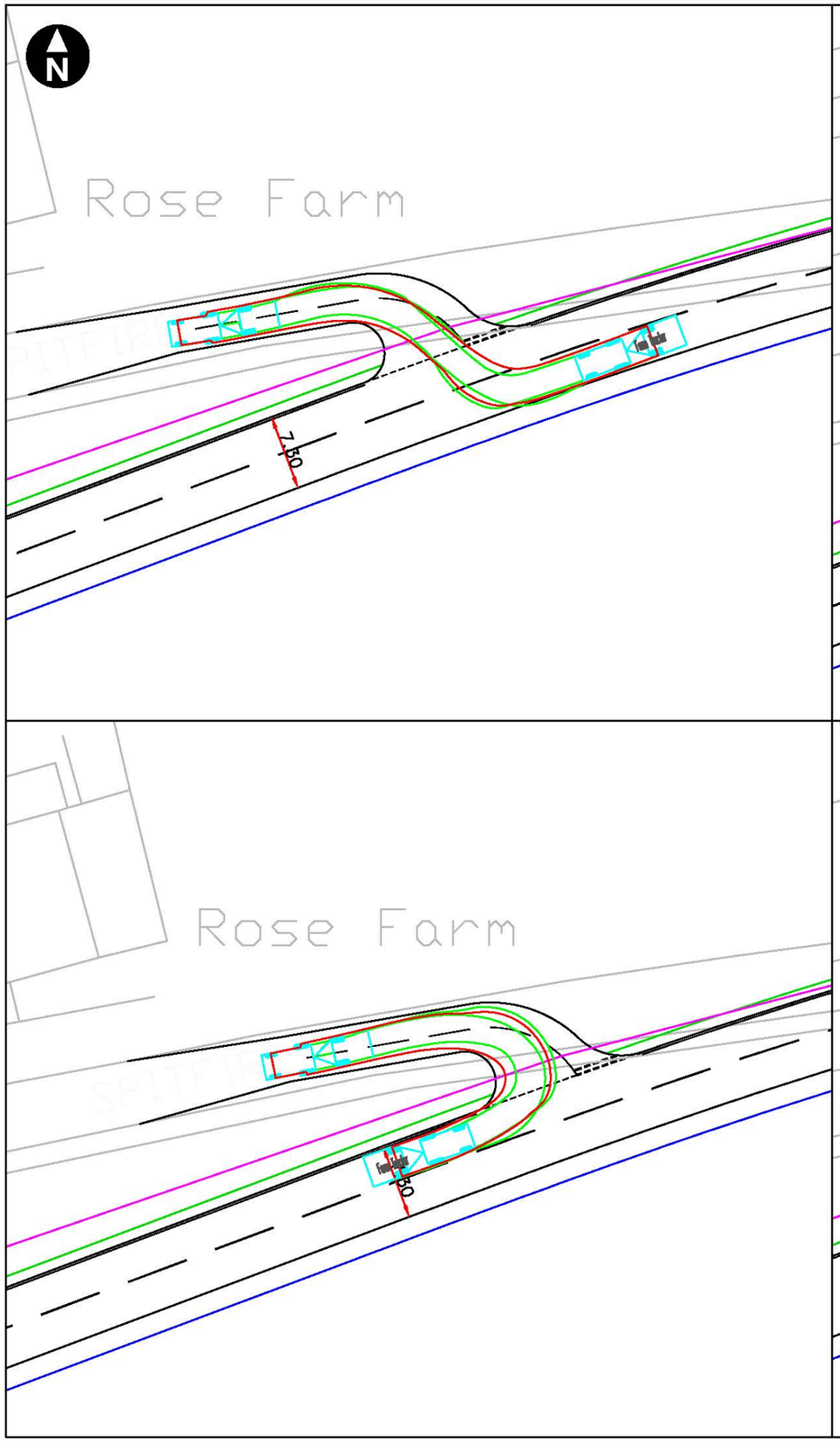
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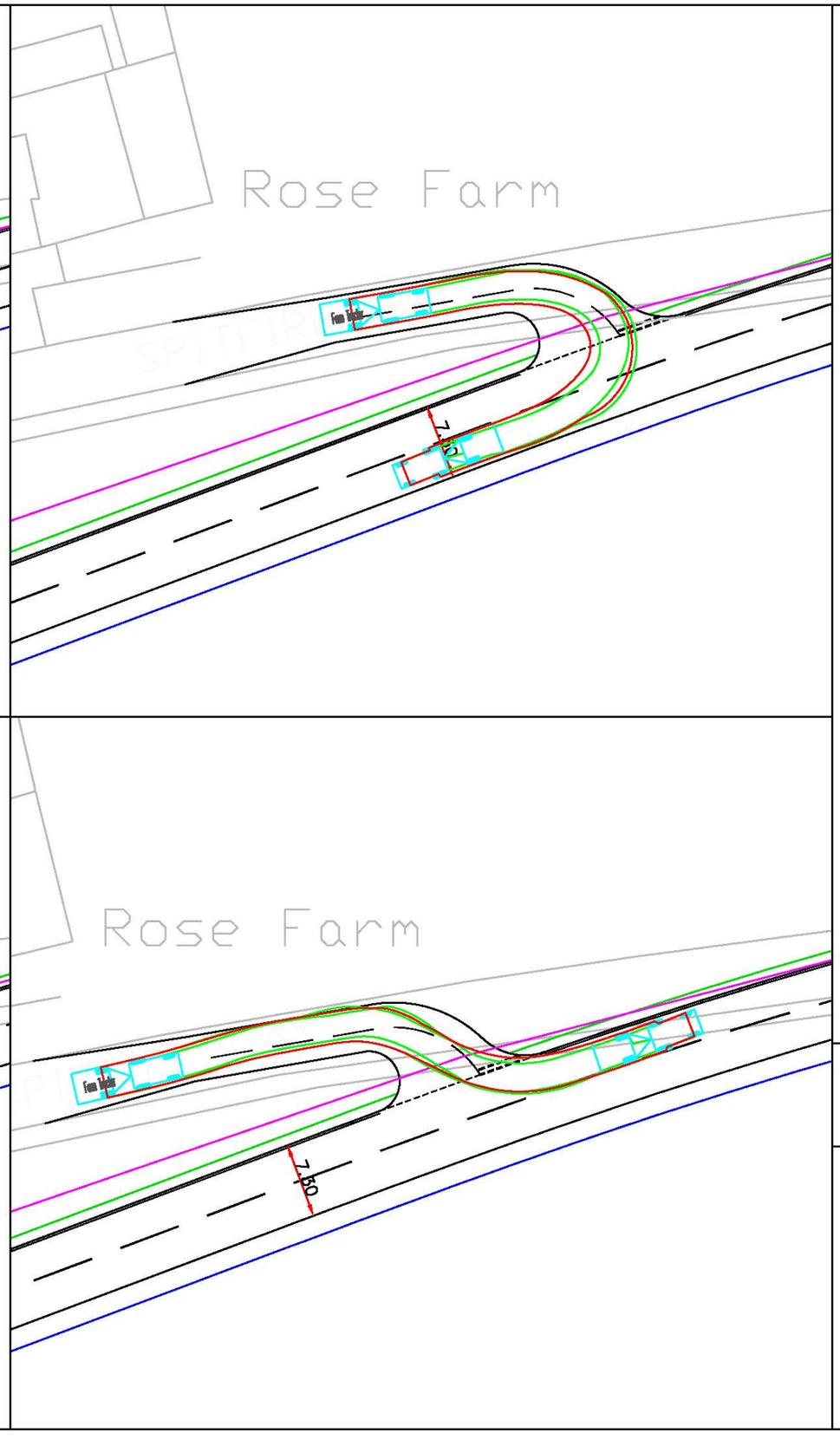
wood.

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Appendix D
Agricultural Vehicle Swept Path





Key

- Existing based on Ordnance Survey Map
- Proposed Kerbline
- Proposed road marking
- Proposed location of speed limit signage

0 m 150 m

Scale 1:2500 @ A3

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Client

RSP

Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix D - Swept Path Assessment for Rose Farm

May 2019

wood.

R:\Projects\38199 Manston Airport DCO EIA\4 Design\AutoCAD\38199-Lon137C.dwg Originator: ADAM.GUY

B2190 Spitfire Way, Manston Airport, Kent
Proposed Highway Works – Cargo Access

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

22nd May 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

contact@badinghamuk.com

www.badinghamuk.com

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Appendix TR3.23

DOCUMENT ISSUE

Issue / Revision:	Issue 1	Issue 2			
Description / Status:	Final	Revised Audit Brief			
Date:	28/03/2019	22/05/2019			
Prepared:	A. R. J. Setter	A. R. J. Setter			
Signature:	[redacted]				
Document Check:	D. F. Rogers	D. F. Rogers			
Signature:	[redacted]				
Technical Check:	D. F. Rogers	D. F. Rogers			
Signatu	[redacted]				
Authorised:	A. R. J. Setter	A. R. J. Setter			
Signature:	[redacted]				
File Reference:	0781 Manston Airport - Cargo - RSA1 - Issue 1.docx	0781 Manston Airport - Cargo - RSA1 - Issue 2.docx			

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SECTION 4:	AUDIT STATEMENT	5

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Figure 1	Site Location Plan
Figure 2	Aerial Photo

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It relates to a proposed highway access works on the B2190 Spitfire Way to serve a proposed cargo facility for Manston Airport, Kent.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 10.00am and 10.30am. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise a new three-arm roundabout junction on the B2190 Spitfire Way, to provide access to a proposed cargo facility to serve Manston Airport. Spitfire Way in this location is a rural single carriageway with a relatively straight alignment and minimal gradient. It is subject to the national speed limit. The proposals include a realignment of the carriageway with part of the old carriageway retained to serve as an access to Rose Farm. The proposed junction is to be situated within a new 50mph speed limit. No pedestrian facilities are proposed. The existing wearing course was noted to be in a good condition. There are no existing footways or street lighting. No pedestrians or cyclists were noted. Land to the north of the B2190 carriageway is currently in agricultural use.

1.11 CrashMap shows two slight collisions in the vicinity of the proposed access within the latest five-year period. A fatal and three further slight collisions are shown on Spitfire Way further to the east of Pouces Cottages.

Appendix TR3.23

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 A Road Safety Audit Stage 1 (Issue 1) was prepared by Badingham in March 2019. A Designer's Response was prepared by Wood in May 2019 together with a subsequent revised Audit Brief. This Road Safety Audit Stage 1 (Issue 2) considers the proposed design revisions and response to the original audit (Issue 1). No matters are outstanding.

SECTION 3: ITEMS RAISED AT THIS AUDIT

3.1 No observations.

Appendix TR3.23

SECTION 4: AUDIT STATEMENT

4.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 22nd May 2019

Audit Team Member

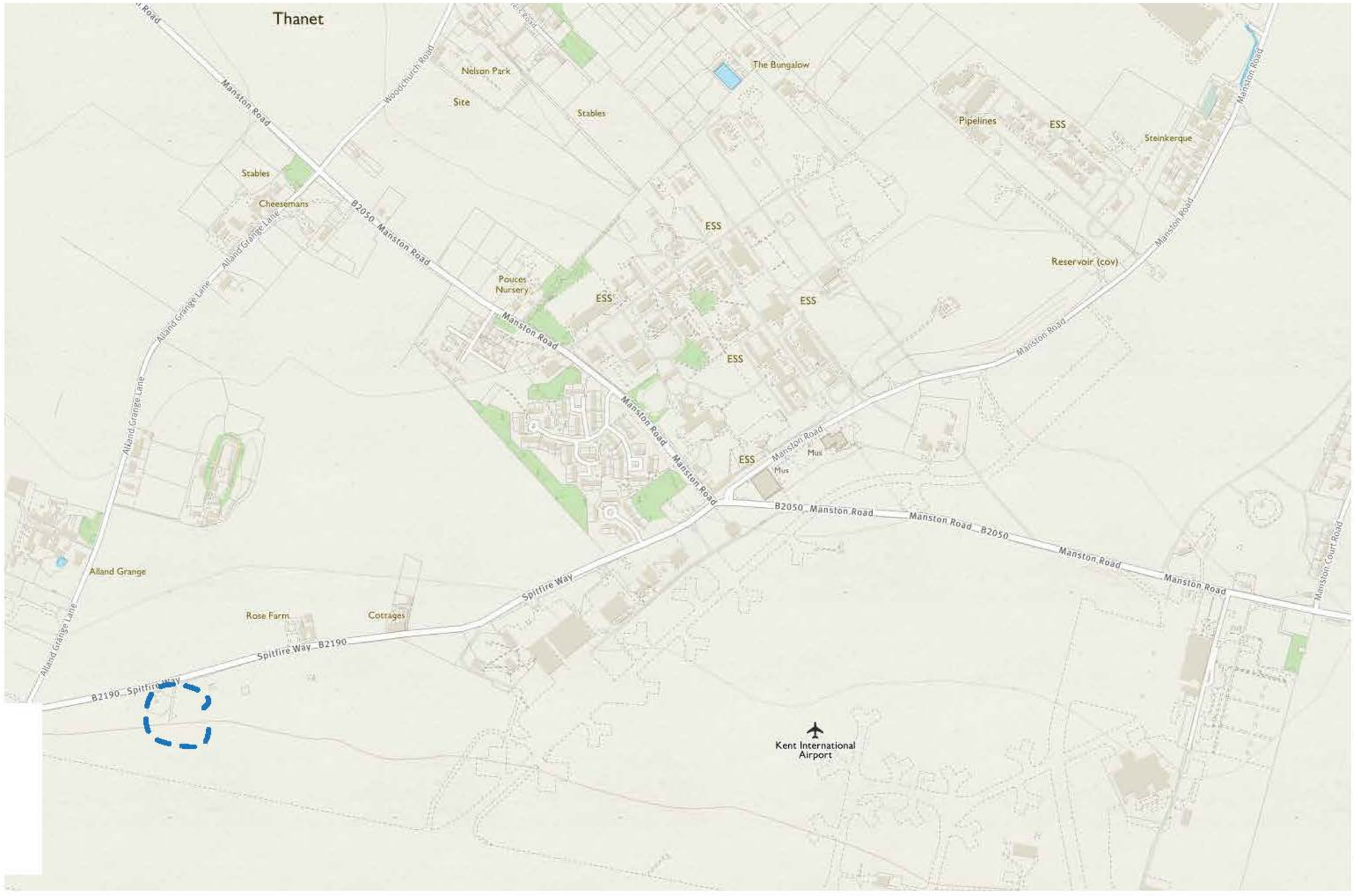
D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

Director - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 22nd May 2019

FIGURES



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North

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Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site.

Rev.	Date	Initials	Amendments

Badingham
Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Location Plan

Date	Status
28/03/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

Appendix TR3.23



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North

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Rev.	Date	Initials	Amendments

Badingham
Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Aerial Photo

Date	Status
28/03/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

Appendix TR3.23

APPENDIX 1

Road Safety Audit Brief (Revised)

Ref: AS/0781
Date: 22nd May 2019

Project Summary	
Date:	22/03/19
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Cargo Facility Roundabout Access
Report title:	Manston Airport - Cargo Facility Roundabout Access - RSA Stage 1
PREPARED BY:	
Name:	Glyn Price
Signed:	
Organisation:	Wood
Date:	15/05/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Cargo Facility Access – Spitfire Way (B2190)			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Roundabout Junction with the B2190				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details	**Design Organisation Details**			
16 Charles II Street London SW1Y 4NW	Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK			
Police Contact Details (RSA3 Only)	**Maintaining Agent Contact Details**			
N/A	N/A			
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB - TD16/07 – Geometric Design of Roundabouts				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposals are for a new three arm roundabout junction with the B2109 north of Manston Airport.

The extents are the extents of the provided drawings of the scheme to the point where the changed road alignment on the B2019 links back in with the carriageway.

The objectives of the scheme are to provide a new access to a proposed new cargo facility on the Manson Airport footprint.

Construction would be proposed in Year one of the project life cycle which will be 2019 or 2020 depending on the approvals process of a DCO that is going through examination. Complete should take between 3-6 months.

Visibility requirements in the proposed scheme have been based on DMRB standards. Swept path assessments using the maximum legal length of a HGV (UK 16.5m) have been undertaken to ensure the junction design can adequately and safely accommodate the vehicle around the turning movements within the design.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB has been applied to the design of the proposed roundabout. TD16/07 Geometric Design of Roundabouts.

Design Speeds
Provide details of applied and/or existing design speeds.

50MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit on Spitfire Way (B2109) is National Speed limit. It is proposed to change the speed limits in the area as part of the scheme design to 50mph.

An ATC was taken on the road in 2017 in the vicinity of the proposed junction.

This indicated an average speed of 42.5 eastbound and 48 westbound (85th Percentile). This data will be provided with this brief.

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The average traffic flows on the link will be provided from the ATC taken at the access location.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the access for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

The design has indicated proposed footways which does not include any pedestrian facilities to cross arms of the junction. There is no footway south and west of the junction towards Columbus avenue and one is not proposed.

Environmental Constraints *Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.*
No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

The new roundabout is on Spitfire way approximately 500m south west of the junction of Manston Road and Spitfire Way.

General Description
Include road network, road type, relevant land uses etc.

The existing Spitfire Way carriageway is a two-lane carriageway. There are no footways either side of the carriageway and the road is subject to the NSL. To the north of the carriageway is open fields and the south the airport site.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Near the proposed junction two accidents have been recorded within the scope of the proposed junction. These are accidents 75 and 335.

The accidents were similar in nature with shunt type accidents and both were slight in nature.

The details for accidents the two accidents are provided.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Data for the Spitfire Way link will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – Cargo – ATC results	-	15.05.2019
RSA – Cargo – future Year Traffic Flows (2039)	-	15.05.2019
RSA – Cargo – Accident 75		15.05.2019
RSA – Cargo – Accident 335		15.05.2019

Drawings

Reference/Revision	Title	Date
RSA – Cargo – Site Location and Access design		15.05.2019
RSA – Cargo – Swept path assessment		15.05.2019
RSA – Cargo – Cad file		15.05.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

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Technical note:
RSA Stage 1: Designers Response - Northern Grass Area Access (south) and Passenger Terminal Access

1. Introduction

This Technical Note forms the Designers Response to the Stage 1 Road Safety Audit (RSA) conducted by Baddingham Limited for a new site access into the proposed Northern Grass Area development and the proposed Passenger Terminal access, at Manston Airport. The development forms part of the Manston Airport DCO submission.

Baddingham Limited has been provided with the latest preliminary access design for the Northern Grass Area and the Passenger Terminal access, the design is a linked signal controlled junction based on the existing road layout where the B2050 is the major arm and the Northern Grass access and the Passenger Terminal access are the minor arms. The design is based on guidance of the Design Manual for Road and Bridges (DMRB).

The designer's response to each of the issues raised by the Safety Audit Team is provided in the following sections. The text included within the RSA has been transposed in to this document, a full copy of the original RSA is provided within **Appendix A**.

2. Designers Response

Problem 3.1

Location: Proposed junction.

Summary: Potential collisions arising from large vehicle access.

No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage type collisions or over running of the verge and footways, endangering users.

Recommendation: It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly use the junction to demonstrate safe and efficient access.

Designers Response: A swept path assessment of the proposed junction design using an articulated HGV vehicle is provided in **Appendix B**. The vehicle used was 16.5m in length and represented the maximum legal length of an articulated HGV (UK). The swept path assessment assessed all the movements into and from the proposed Northern Grass Area access and Passenger Terminal access from and to the west on the B2050 Manston Road. The results showed that the design is adequate to accommodate the all expected vehicles types safely.

Problem 3.2

Location: Proposed junction.

Summary: Potential collisions arising from a lack of inter-visibility.

No inter-visibility splays are shown on the drawing for the proposed junction. Lack of suitable inter-visibility can lead to collisions between vehicles and between vehicles and non-motorised users.

Recommendation: It is recommended that suitable inter-visibility splays are provided.

Designers Response: The junction has been designed based on DMRB guidance, and visibility requirements based on this guidance have been used in this design. Intervisibility splays are included in the drawing provided in **Appendix C**.

Problem 4.1

Location: Proposed junction.

Summary: Orientation of pedestrian crossings.

Guidance recommends that where possible staggered pedestrian crossings should be orientated so that users are facing approaching traffic when seeking to cross. The three refuge crossings proposed do not comply, to the general detriment in highway safety.

Recommendation: It is recommended that the three staggered pedestrian crossings are re-orientated to ensure pedestrians face the approaching traffic when arriving at the crossing.

Designers Response: The guidance identifies that staggered crossings should, where possible, be aligned as left/right manoeuvres rather than right/left so that users turn to face oncoming traffic. It is not unacceptable to provide a right/left manoeuvre. A left/right manoeuvre is not possible in this case as it would affect the inter-green timings and the capacity of the junction.

Problem 4.2

Location: Proposed junction.

Summary: Lack of cycle facilities.

No advance cycle storage facilitates are proposed. There is a risk of cyclists being “squeezed” by passing traffic, and particularly by left turning HGVs leading to collisions.

Recommendation: It is recommended that advance cycle storage facilities are provided in advance of any vehicle stop lines.

Designers Response: Cycle storage facilities can be provided at the junction, although it is noted that there is no other cycle provision on the road network and little demand for this provision.

Problem 6.1

Location: Proposed junction.

Summary: Lack of illumination.

No street lighting information is provided. There is a risk that insufficient illumination of the junction will lead to potential collisions between vehicles.

Recommendation: It is recommended that appropriate street lighting is provided.

Designers Response: Street lighting will be provided at the junctions. This will be identified at the preliminary and detailed design stage and will be in accordance with design standards.

3. General Comments

The RSA also identifies the need for road markings, signage and drainage information to be provided. This will be included at the preliminary and detailed design stage.

Issued by

G [redacted]

Approved by

Bev Coupe [redacted]

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This document has been produced by Wood Environment & Infrastructure Solutions UK Limited in full compliance with our management systems, which have been certified to ISO 9001, ISO 14001 and OHSAS 18001 by LRQA.

Appendix TR3.23

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Appendix A
Road Safety Audit – Stage 1

B2050 Manston Road, Manston Airport, Kent
Proposed Highway Works – Passenger Terminal Access

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

28th March 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

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Appendix TR3.23

DOCUMENT ISSUE

Issue / Revision:	Issue 1			
Description / Status:	Final			
Date:	28/03/2019			
Prepared:	A. R. J. Setter			
Signature:	[redacted]			
Document Check:	D. F. Rogers			
Signature:	[redacted]			
Technical Check:	D. F. Rogers			
Signature:	[redacted]			
Authorised:	A. R. J. Setter			
Signature:	[redacted]			
File Reference:	0781 Manston Airport - PT - RSA1 - Issue 1.docx			

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FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo
Figure 3	Audit Plan

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It relates to proposed highway access works on the B2050 Manston Road to serve a proposed passenger terminal facility for Manston Airport, Kent.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 10.30am and 11.00am. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise a staggered signal junction to provide a new access road serving the Northern Grass Area and to the passenger terminal serving Manston Airport on the south side of the B2050 Manston Road.

1.11 Manston Road is a busy single rural carriageway with a straight alignment and minimal gradient. It is proposed to introduce signal control to the existing stub access roads in this location. To the west of the proposed junction is the simple priority junction of Manston Road and Manston Court Road. The wearing course is showing sign of wear. Manston Road is subject to a 40mph speed limit and has yellow line parking restrictions. Barrier crossing and low flying aircraft advance warning signs are posted. No existing footways or street lighting are provided. No pedestrians or cyclists were noted during the site visit.

1.12 A cluster of seven collisions are recorded within the latest five-year period at the junction of Manston Road/Manston Court Road to the east of the proposed junction. These included 6 slight collisions and 1 serious collision.

Appendix TR3.23

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 No previous audits have been undertaken.

Appendix TR3.23

SECTION 3: VEHICULAR AND HIGHWAY ISSUES

3.1 PROBLEM

Location: Proposed junction.

Summary: Potential collisions arising from large vehicle access.

3.1.1 No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions or over-running of the verge and footways, endangering users.

RECOMMENDATION

3.1.2 It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.



Photo 1 - Manston Road view west.

Appendix TR3.23

3.2 **PROBLEM**

Location: Proposed junction.

Summary: Potential collisions arising from lack of inter-visibility.

3.2.1 No intervisibility splays are shown on the drawing for the proposed junction. Lack of suitable inter-visibility can lead to collisions between vehicles and between vehicles and non-motorised users.

RECOMMENDATION

3.2.2 It is recommended that suitable inter-visibility splays are provided.



Photo 2 - Manston Road view east.

Appendix TR3.23

SECTION 4: NON-MOTORISED USERS

4.1 PROBLEM

Location: Proposed junction.

Summary: Orientation of pedestrian crossings.

4.1.1 Guidance recommends that where possible staggered pedestrian crossings should be orientated so that users are facing the approaching traffic when seeking to cross. The three refuge crossings proposed do not comply, to the general detriment in highway safety.

RECOMMENDATION

4.1.2 It is recommended that the three staggered pedestrian crossings are re-oriented to ensure pedestrians face the approaching traffic when arriving at the crossing.



Photo 3 - Manston Road view east.

Appendix TR3.23

4.2 **PROBLEM**

Location: Proposed junction.

Summary: Lack of cycle facilities.

4.2.1 No advance cycle storage facilities are proposed. There is a risk of cyclists being 'squeezed' by passing traffic, and particularly by left-turning HGVs leading to collisions.

RECOMMENDATION

4.2.2 It is recommended that advance cycle storage facilities are provided in advance of any vehicle stop lines.



Photo 4 - Manston Road view west.

Appendix TR3.23

SECTION 5: ROAD MARKINGS AND SIGNAGE

5.1 No signing details have been provided. A suitable package of signage information will need to be provided as part of any further detailed design.

SECTION 6: STREET LIGHTING

6.1 PROBLEM

Location: Proposed junction.

Summary: Lack of illumination.

6.1.1 No street lighting information is provided. There is a risk that insufficient illumination of the junction, will lead to potential collisions between vehicles.

RECOMMENDATION

6.1.2 It is recommended that appropriate street lighting is provided.



Photo 5 - Manston Road view west.

Appendix TR3.23

SECTION 7: DRAINAGE

7.1 No drainage information is provided. A suitable package of drainage information will need to form part of any further detailed design.

Appendix TR3.23

SECTION 8: AUDIT STATEMENT

8.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 28th March 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

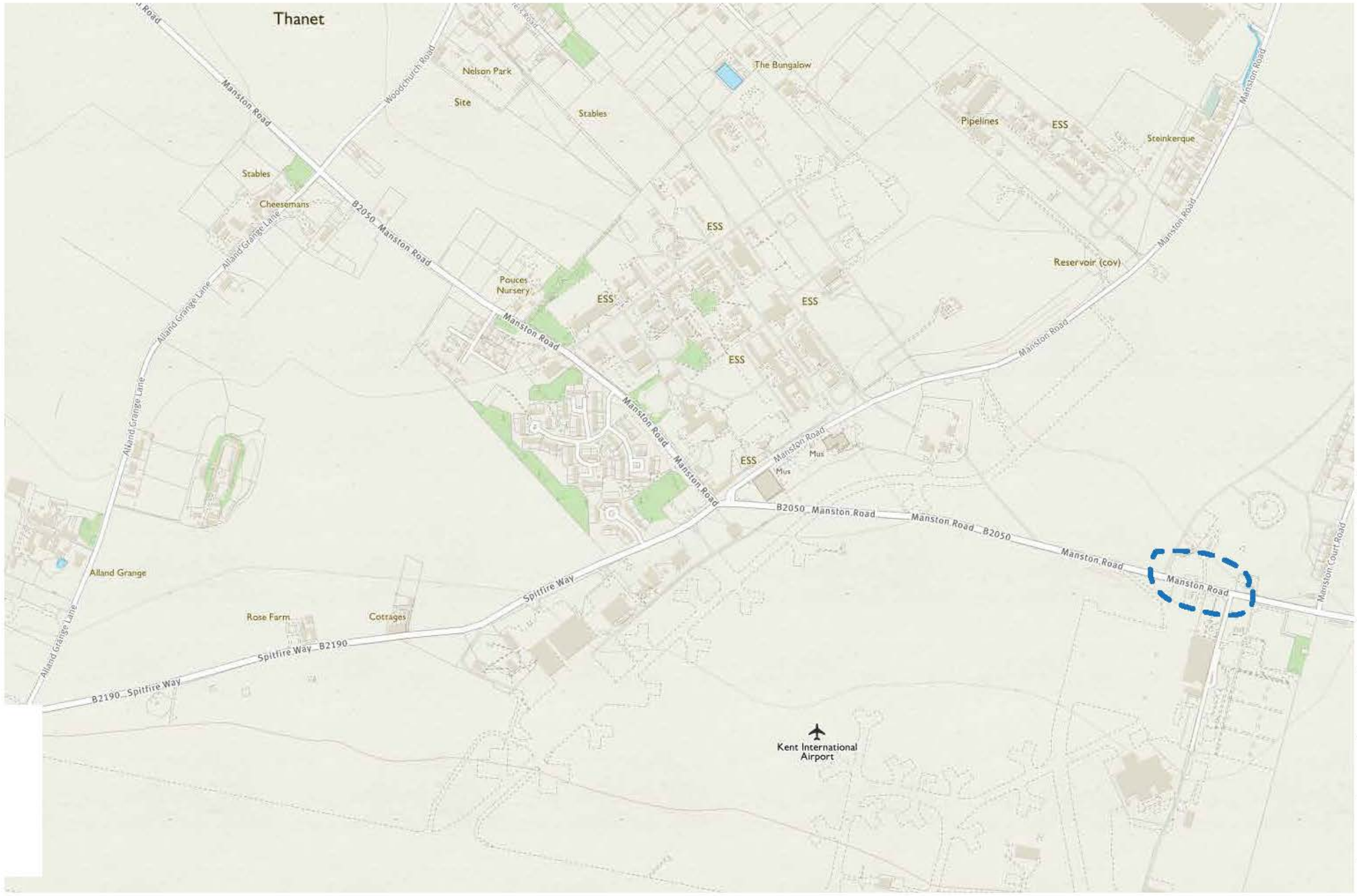
Director - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 28th March 2019

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FIGURES



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Transport Planning
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Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Location Plan

Date	Status
28/03/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Aerial Photo

Date	Status
28/03/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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Notes:

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2. All dimensions must be checked on site.

Source: NGA S & PT

Rev.	Date	Initials	Amendments

Badingham
Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Audit Plan

Date	Status
28/03/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 3	-

Appendix TR3.23

APPENDIX 1

Road Safety Audit Brief

Ref: AS/0781
Date: 28th March 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	22/03/19
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Passenger Terminal and NGA South Access
Report title:	Manston Airport – Passenger Terminal and NGA South Access
PREPARED BY:	
Name:	Glyn Price
Signed:	[redacted]
Organisation:	Wood
Date:	22/03/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Glyn Price
Sign	[redacted]
Organisation:	RiverOak Strategic Partners
Date:	22/03/19

General Details				
Highway Scheme Name & Road Number	Manston Airport – Nothern Grass Area Western Access – Manston Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Priority junction with ghost right turn lane with Manston Road.				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details		**Design Organisation Details**		
16 Charles II Street London SW1Y 4NW		Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK		
Police Contact Details (RSA3 Only)		**Maintaining Agent Contact Details**		
N/A		N/A		
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB – TD86/03 – LAYOUT OF LARGE SIGNAL CONTROLLED JUNCTIONS DMRB – TD40/04 - The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposals are for a new linked signal junction with arms north and south in close vicinity to the B2050 Manston Road. To the north will be an arm into the Northern Grass Area and to the south the Manston Airport Terminal. The arm to the north will be a new road while the arm to the south will be at the location of the existing priority junction into Manston Airport.

The extents of the area requiring RSA assessment is the extents the new junction. It should be noted that the B2050 Manston Road is proposed to be upgraded in the future year to a 7.3m wide carriageway in the vicinity of the proposed junction. This widening scheme to the west of the junction is not part of the RSA study area.

The objectives of the scheme are to provide a new access to the proposed Northern Grass Area Business Park and the airport passenger terminal.

Construction would be proposed in Year one of the project life cycle which will be 2019 or 2020 depending on the approvals process of a DCO that is going through examination. Complete should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB has been applied to the design of the proposed junction -
DMRB – TD86/03 – LAYOUT OF LARGE SIGNAL CONTROLLED JUNCTIONS
DMRB – TD40/04 - The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts

Design Speeds
Provide details of applied and/or existing design speeds.

40MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit on Manston Road (B2109) is 40mph and this is not proposed to change.

No ATC data was taken near this access so average speed data is not available

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

A junction turning count was undertaken at the Spitfire Way and Manston Road junction. This indicated in 2017;

- AM Peak – Eastbound 475 – Westbound 544
- PM Peak – Easbound 412 – Westbound 519

No traffic was recorded into and out of the access to the airports it was closed at the time of the counts.

The junction turning count for Junction 12 (Spitfire Way/Manston Road will be provided which can inform the traffic using the Manston Road B2050 link east of the junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the access for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

The clear design pedestrian line across the junction is across the minor arm and pedestrian facilities have been designed to accommodate this movement with a central splitter island.
Environmental Constraints *Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.*
No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

The new junction on Manston Road B2050 is approximately 780m East of the junction of Manston Road and Spitfire Way.

General Description
Include road network, road type, relevant land uses etc.

The existing Manston Road carriageway is a two-lane carriageway. There are no footways either side of the carriageway and the road is subject to a 40mph speed limit. To the north of the carriageway is the disused element of the Manston Airport site which is proposed to become the Northern Grass area Business Park. To the south the former Manston airport.

As mentioned as part of wider KCC proposals for the airport the road is proposed to be widened and upgraded to a 7.3m wide carriageway when the junction is constructed and also footways will be provided along the south side of the carriageway to the Manston Road/Spitfire Way junction.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Near the vicinity of the junction only one accident was recorded (269) which was slight in nature and was a result of a loss of control in wet and icy conditions. The details of this accident are recorded.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Data for the Manston Road link will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – NGA S and PT – future Year Traffic Flows (2039)	-	25.03.2019
RSA – NGA S and PT – Accident 269		25.03.2019
RSA – NGA S and PT – Signal Staging		25.03.2019
RSA – NGA S and PT – Linsig Output		25.03.2019

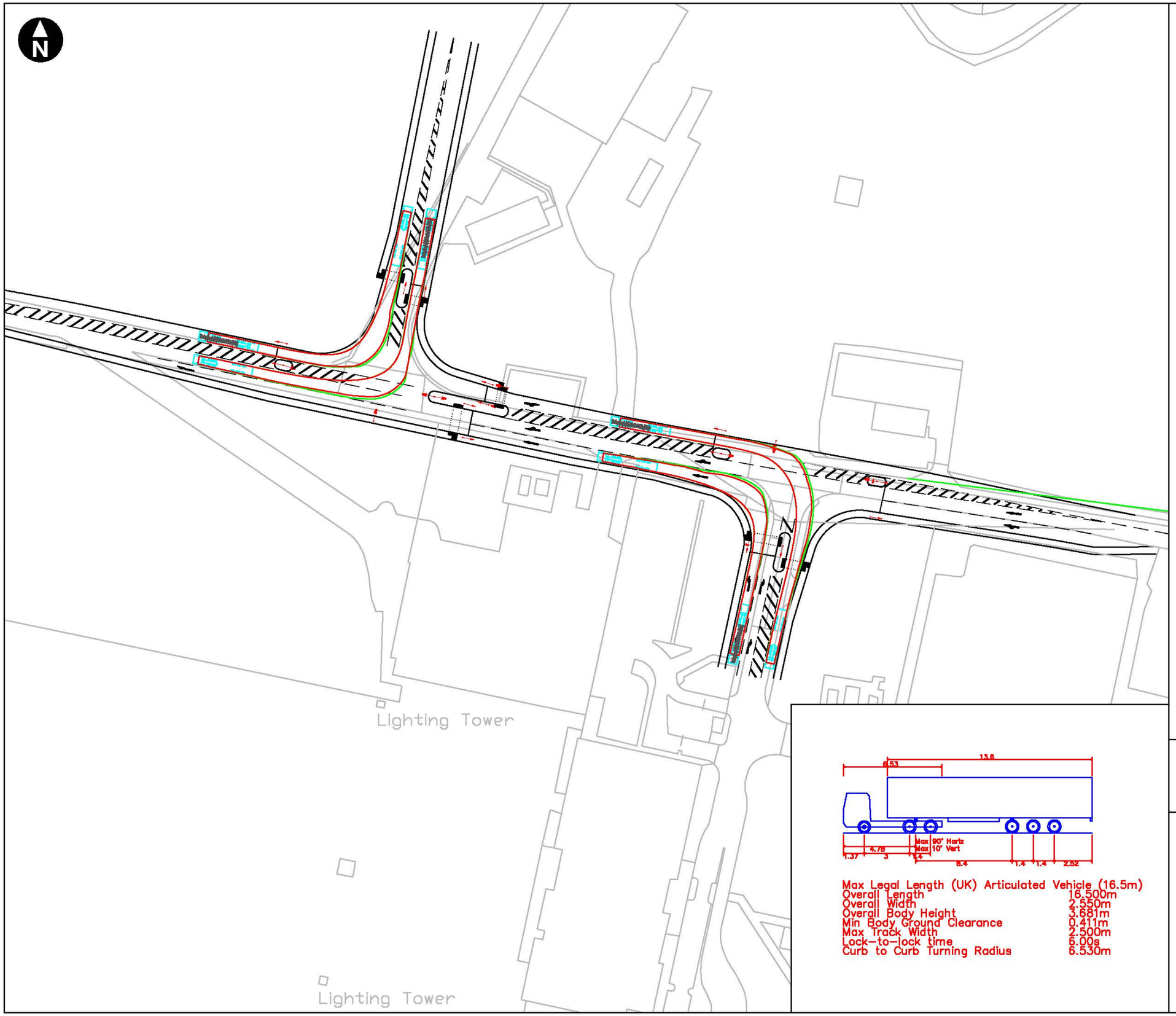
Drawings

Reference/Revision	Title	Date
RSA – NGA S and PT – Access design (1 of 2)		25.03.2019
RSA – NGA S and PT – Access design (2 of 2)		25.03.2019
RSA – NGA S and PT – Cad file		25.03.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

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Appendix B
Swept Path Assessment



Key

- Proposed masterplan
- Existing based on Ordnance Survey mapping
- Proposed kerbline
- Proposed road marking
- □ □eel outline
- □ody outline

0 m 50 m

Scale 1:1000 @ A3

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Client

RSP

Manston Airport DCO
RSA stage 1 - Designers Response

Appendix B - Swept path assessment - Northern Grass Area and Passenger Terminal Access

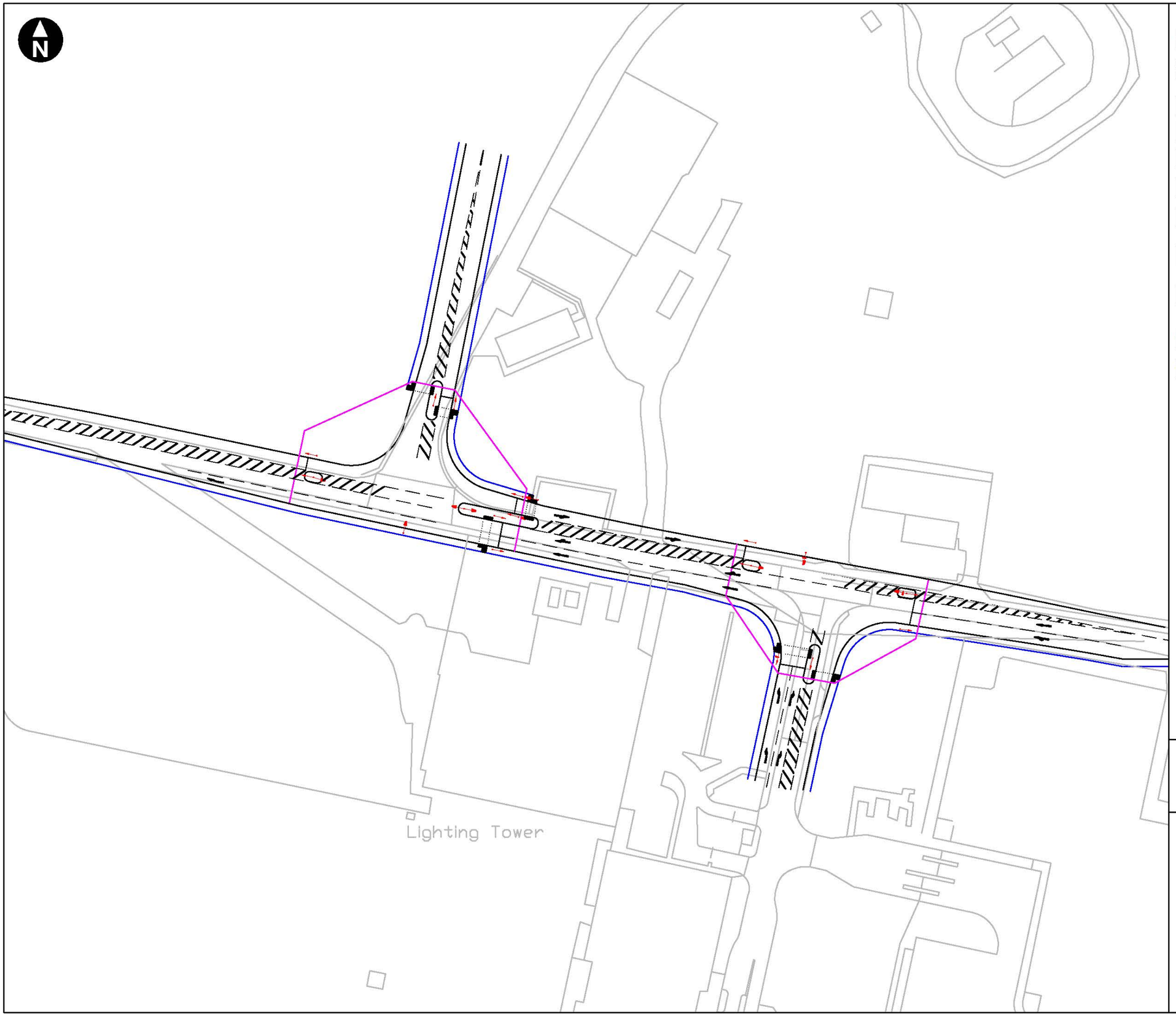
May 2019

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Appendix C
Proposed Scheme



Key

- Proposed masterplan
- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Proposed tactile paving surface
- Proposed primary signal head
- Proposed secondary signal head
- Proposed signal head with additional green arrow signal
- Proposed signal head with substitute green arrow
- Junction intervisibility boundary
- Proposed footway edge

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Client

RSP

Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix C - Proposed Scheme at the Passenger Terminal Access and Northern Grass Area South junctions

May 2019

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R:\Projects\38199 Manston Airport DCO EIA\4 Design\AutoCAD\38199-Lon142C.dwg Originator: ADAM.GUY

B2050 Manston Road, Manston Airport, Kent
Proposed Highway Works – Passenger Terminal Access

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

22nd May 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

contact@badinghamuk.com

www.badinghamuk.com

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Appendix TR3.23

DOCUMENT ISSUE

Issue / Revision:	Issue 1	Issue 2			
Description / Status:	Final	Final			
Date:	28/03/2019	22/05/2019			
Prepared:	A. R. J. Setter	A. R. J. Setter			
Signature:	[redacted]				
Document Check:	D. F. Rogers	D. F. Rogers			
Signature:	[redacted]				
Technical Check:	D. F. Rogers	D. F. Rogers			
Signatu	[redacted]				
Authorised:	A. R. J. Setter	A. R. J. Setter			
Signature:	[redacted]				
File Reference:	0781 Manston Airport - PT - RSA1 - Issue 1.docx	0781 Manston Airport - PT - RSA1 - Issue 2.docx			

CONTENTS

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SECTION 2:	ITEMS RAISED AT PREVIOUS AUDITS	3
SECTION 3:	ITEMS RAISED AT THIS AUDIT	4
SECTION 4:	AUDIT STATEMENT	5

FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It relates to proposed highway access works on the B2050 Manston Road to serve a proposed passenger terminal facility for Manston Airport, Kent.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 10.30am and 11.00am. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

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1.11 Manston Road is a busy single rural carriageway with a straight alignment and minimal gradient. It is proposed to introduce signal control to the existing stub access roads in this location. To the west of the proposed junction is the simple priority junction of Manston Road and Manston Court Road. The wearing course is showing sign of wear. Manston Road is subject to a 40mph speed limit and has yellow line parking restrictions. Barrier crossing and low flying aircraft advance warning signs are posted. No existing footways or street lighting are provided. No pedestrians or cyclists were noted during the site visit.

1.12 A cluster of seven collisions are recorded within the latest five-year period at the junction of Manston Road/Manston Court Road to the east of the proposed junction. These included 6 slight collisions and 1 serious collision.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 A Road Safety Audit Stage 1 (Issue 1) was prepared by Badingham in March 2019. A Designer's Response was prepared by Wood in May 2019 together with a subsequent revised Audit Brief. This Road Safety Audit Stage 1 (Issue 2) considers the proposed design revisions and response to the original audit (Issue 1). No matters are outstanding.

SECTION 3: ITEMS RAISED AT THIS AUDIT

3.1 No observations.

SECTION 4: AUDIT STATEMENT

4.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 22nd May 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

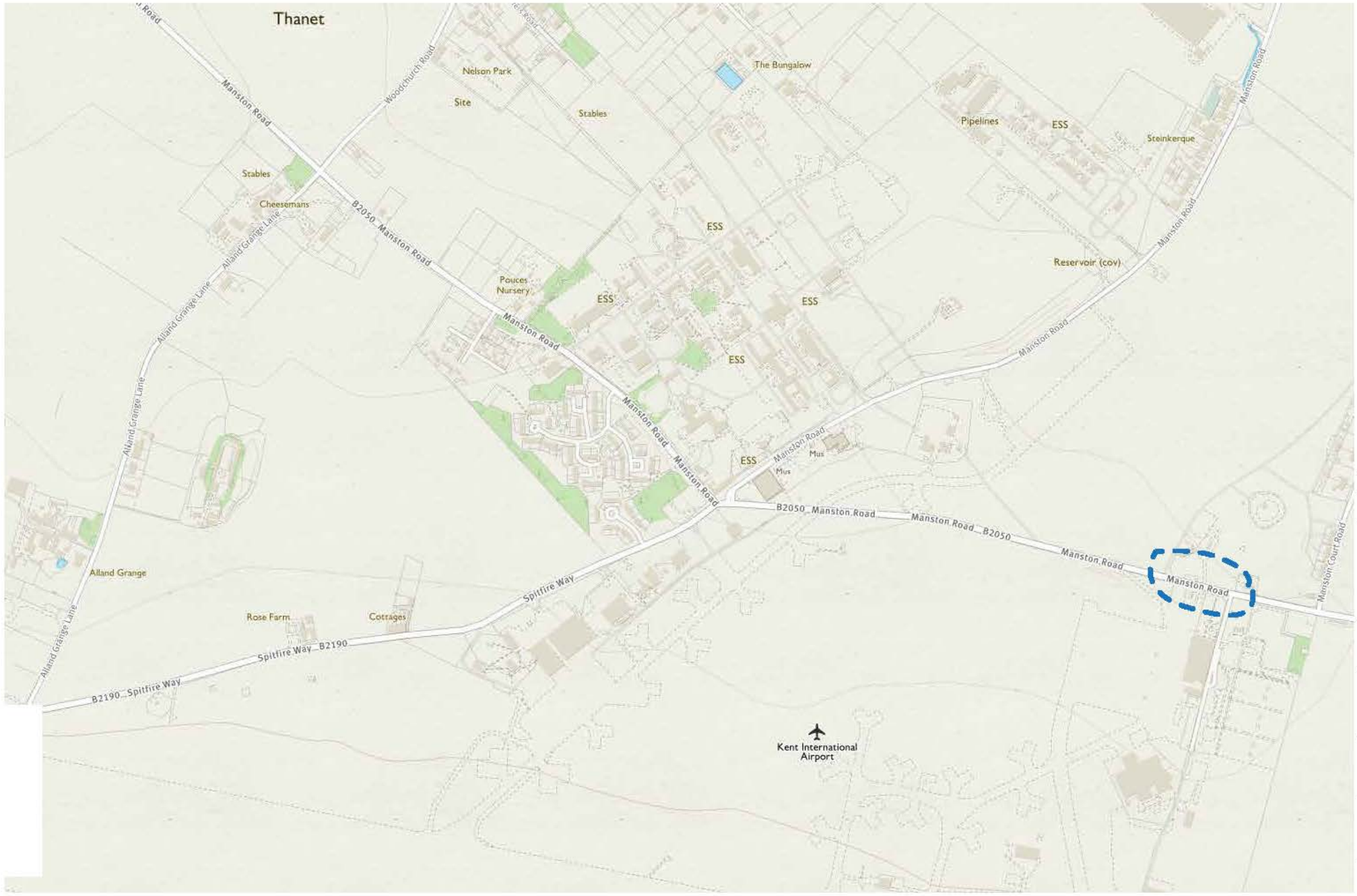
Director - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 22nd May 2019

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FIGURES



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www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Location Plan

Date	Status
28/03/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

Appendix TR3.23



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Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Aerial Photo

Date	Status
28/03/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

Appendix TR3.23

APPENDIX 1

Road Safety Audit Brief (Revised)

Ref: AS/0781
Date: 22nd May 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	22/03/19
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Passenger Terminal and NGA South Access
Report title:	Manston Airport – Passenger Terminal and NGA South Access
PREPARED BY:	
Name:	Glyn Price
Signed:	
Organisation:	Wood
Date:	15/05/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Glyn Price
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Nothern Grass Area Western Access – Manston Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Priority junction with ghost right turn lane with Manston Road.				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details		**Design Organisation Details**		
16 Charles II Street London SW1Y 4NW		Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK		
Police Contact Details (RSA3 Only)		**Maintaining Agent Contact Details**		
N/A		N/A		
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB – TD86/03 – LAYOUT OF LARGE SIGNAL CONTROLLED JUNCTIONS DMRB – TD40/04 - The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposals are for a new linked signal junction with arms north and south in close vicinity to the B2050 Manston Road. To the north will be an arm into the Northern Grass Area and to the south the Manston Airport Terminal. The arm to the north will be a new road while the arm to the south will be at the location of the existing priority junction into Manston Airport.

The extents of the area requiring RSA assessment is the extents the new junction. It should be noted that the B2050 Manston Road is proposed to be upgraded in the future year to a 7.3m wide carriageway in the vicinity of the proposed junction. This widening scheme to the west of the junction is not part of the RSA study area.

The objectives of the scheme are to provide a new access to the proposed Northern Grass Area Business Park and the airport passenger terminal.

Construction would be proposed in Year one of the project life cycle which will be 2019 or 2020 depending on the approvals process of a DCO that is going through examination. Complete should take between 3-6 months.

Visibility requirements in the proposed scheme have been based on DMRB guidance. Swept path assessments have been undertaken using the max legal length HGV (UK 16.5m) to ensure the design can adequately and safely accommodate the vehicle and all the anticipated turning movements.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB has been applied to the design of the proposed junction -
DMRB – TD86/03 – LAYOUT OF LARGE SIGNAL CONTROLLED JUNCTIONS
DMRB – TD40/04 - The Geometric Layout of Signal-Controlled Junctions and Signalised Roundabouts

Design Speeds
Provide details of applied and/or existing design speeds.

40MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit on Manston Road (B2109) is 40mph and this is not proposed to change.

No ATC data was taken near this access so average speed data is not available

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

A junction turning count was undertaken at the Spitfire Way and Manston Road junction. This indicated in 2017;

- AM Peak – Eastbound 475 – Westbound 544
- PM Peak – Easbound 412 – Westbound 519

No traffic was recorded into and out of the access to the airports it was closed at the time of the counts.

The junction turning count for Junction 12 (Spitfire Way/Manston Road will be provided which can inform the traffic using the Manston Road B2050 link east of the junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the access for the AM and PM Peak will be provided in a matrix format.
Pedestrian, Cyclist & Equestrian Desire Lines *Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].*
The clear design pedestrian line across the junction is across the minor arm and pedestrian facilities have been designed to accommodate this movement with a central splitter island.
Environmental Constraints *Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.*
No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

The new junction on Manston Road B2050 is approximately 780m East of the junction of Manston Road and Spitfire Way.

General Description
Include road network, road type, relevant land uses etc.

The existing Manston Road carriageway is a two-lane carriageway. There are no footways either side of the carriageway and the road is subject to a 40mph speed limit. To the north of the carriageway is the disused element of the Manston Airport site which is proposed to become the Northern Grass area Business Park. To the south the former Manston airport.

As mentioned as part of wider KCC proposals for the airport the road is proposed to be widened and upgraded to a 7.3m wide carriageway when the junction is constructed and also footways will be provided along the south side of the carriageway to the Manston Road/Spitfire Way junction.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Near the vicinity of the junction only one accident was recorded (269) which was slight in nature and was a result of a loss of control in wet and icy conditions. The details of this accident are recorded.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Data for the Manston Road link will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – NGA S and PT – future Year Traffic Flows (2039)	-	15.05.2019
RSA – NGA S and PT – Accident 269		15.05.2019
RSA – NGA S and PT – Signal Staging		15.05.2019
RSA – NGA S and PT – Linsig Output		15.05.2019

Drawings

Reference/Revision	Title	Date
RSA – NGA S and PT – Access design		15.05.2019
RSA – NGA S and PT – Swept Path Assessment		15.05.2019
RSA – NGA S and PT – Cad file		15.05.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

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Technical note:
RSA Stage 1: Designers Response - Northern Grass Area Access

1. Introduction

This Technical Note forms the Designers Response to the Stage 1 Road Safety Audit (RSA) conducted by Baddingham Limited for a new site access into the proposed Northern Grass Area development, at Manston Airport. The development forms part of the Manston Airport DCO submission.

Baddingham Limited has been provided with the latest preliminary access design for the Northern Grass Area, the design is a priority junction with a ghost right turn based on the guidance of the Design Manual for Road and Bridges (DMRB).

The designer's response to each of the issues raised by the Safety Audit Team is provided in the following sections. The text included within the RSA has been transposed in to this document, a full copy of the original RSA is provided within **Appendix A**.

2. Designers Response

Problem 3.1

Location: Proposed junction.

Summary: Potential collisions arising from large vehicle access.

No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage type collisions or over running of the verge.

Recommendation: It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly use the junction to demonstrate safe and efficient access.

Designers Response: A swept path assessment of the proposed junction design using an articulated HGV vehicle is provided in **Appendix B**. The vehicle used was 16.5m in length and represented the maximum legal length of an articulated HGV (UK). The swept path assessment assessed all the movements into and from the proposed Northern Grass Area access. Minor amendments to the radii have been made to accommodate the vehicle.

Problem 3.2

Location: Proposed junction.

Summary: Potential collisions arising from a lack of visibility.

No visibility splays/forward visibility is shown on the drawing for the proposed junction. Lack of suitable visibility can lead to late breaking decisions, difficult with gap acceptance and collisions between vehicles.

Recommendation: It is recommended that suitable visibility splays are provided commensurate with the speed of traffic at this location.

Designers Response: The junction has been designed based on DMRB guidance, and visibility requirements based on this guidance have been used in this design. The land on the eastern side of the carriageway - both to the north and south of the access - is within the project DCO boundary and is proposed to be used to provide an adequate visibility splay in both directions at the junction. Visibility splays are included in the drawing provided in **Appendix C**. These indicate that a maximum visibility from an 'x' distance of 4.5m is 160m in both directions, which is in excess of the DRMB requirement of 120m for a 40mph road.

Problem 3.3

Location: Proposed junction.

Summary: Potential for speeding.

Traffic survey results show 85th percentile speeds at circa 36mph in both directions, and therefore above the signed 30mph speed limit. There is a risk that the widening of the carriageway may encourage drivers to speed through the junction to the general detriment of highway safety and may lead to collisions with slow moving turning traffic and increased severity level of any collisions.

Recommendation: It is recommended that measures are introduced to reduce traffic speeds on Manston Road to within the signed limit.

Designers Response: Road signs alerting drivers to the junction, road markings showing the speed limit, as well as street lighting will be included in the preliminary and detailed designs.

Problem 4.1

Location: Proposed junction.

Summary: Lack of pedestrian crossing.

The drawings suggest a footway is to be provided either side of the proposed access road and on the southern side of Manston Road. No uncontrolled dropped crossing or tactile paving is shown across the new access road. This can cause difficulties for the visually and mobility impaired leading to potential collision with vehicles.

Recommendation: It is recommended that an appropriate dropped crossing is introduced together with tactile paving to be inset 1m from the tangent point of the radius on the minor arm.

Designers Response: A dropped crossing and tactile paving have been added to the concept drawing, as provided in **Appendix C**.

Problem 5.2

Location: Proposed junction.

Summary: Potential for overtaking through junction.

The increase carriageway width may encourage drivers to attempt to overtake in this location leading to possible collisions with opposing or turning traffic.

Recommendation: It is recommended that the off side hatched markings be enclosed with a solid continuous white line

Designers Response: The concept design drawing for the junction has been amended to include a solid continuous line along the off-side hatched markings, as shown in **Appendix C**.

Problem 6.1

Location: Proposed junction.

Summary: Lack of illumination.

No street lighting information is provided. There is a risk that insufficient illumination of the junction will lead to potential collisions between vehicles.

Recommendation: It is recommended that appropriate street lighting is provided.

Designers Response: Street lighting will be provided at the roundabout. This will be identified at the preliminary and detailed design stage and will be in accordance with design standards.

3. General Comments

The RSA also identifies the need for road markings, signage and drainage information to be provided. This will be included at the preliminary and detailed design stage.

[redacted]

Approved by

[redacted].....

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Appendix A
Road Safety Audit – Stage 1

Manston Road, Manston Airport, Kent
Proposed Highway Works – Northern Grass Area North Access

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

28th March 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

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DOCUMENT ISSUE

Issue / Revision:	Issue 1			
Description / Status:	Final			
Date:	28/03/2019			
Prepared:	A. R. J. Setter			
Signature:	[redacted]			
Document Check:	D. F. Rogers			
Signature:	[redacted]			
Technical Check:	D. F. Rogers			
Signature:	[redacted]			
Authorised:	A. R. J. Setter			
Signatur	[redacted]			
File Reference:	0781 Manston Airport - NGA N - RSA1 - Issue 1.docx			

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SECTION 6:	STREET LIGHTING	9
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FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo
Figure 3	Audit Plan

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It relates to a proposed highway works on the Manston Road, Manston, Kent, to provide an access to a Business Park

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 9.30am and 10.00am. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise as simple priority junction arrangement with Manston Road to provide access to a proposed Northern Grass Area Business Park.

1.11 Manston Road in this location has a curving alignment and is a single carriageway rural road with a 30mph speed limit. No footways or street lighting area provided. The proposed junction is to be located on an outside of a bend. Gradients in the area are minimal. The carriageway wearing course shows signs of wear.

1.12 A single collision is recorded in the location of the proposed access for the latest five-year period. This involved a single vehicle and is categorised as serious with a single casualty. It occurred in the early hours of the morning in darkness, in damp/wet conditions and resulted it the driver losing control and colliding with street furniture. No deficiencies with the highway are recorded.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 No previous audits have been undertaken.

Appendix TR3.23

SECTION 3: VEHICULAR AND HIGHWAY ISSUES

3.1 PROBLEM

Location: Proposed junction.

Summary: Potential collisions arising from large vehicle access.

3.1.1 No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions or over-running of the verge.

RECOMMENDATION

3.1.2 It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.



Photo 1 - Manston Road view south.

Appendix TR3.23

3.2 **PROBLEM**

Location: Proposed junction.

Summary: Potential collisions arising from lack of visibility.

3.2.1 No visibility splays/ forward visibility is shown on the drawing for the proposed junction. Lack of suitable visibility can lead to late-braking decisions, difficulties with gap acceptance and collisions between vehicles.

RECOMMENDATION

3.2.2 It is recommended that suitable visibility splays are provided commensurate with the speed of traffic in this location.



Photo 2 - Manston Road view south.

Appendix TR3.23

3.3 **PROBLEM**

Location: Proposed junction.

Summary: Potential for speeding.

3.3.1 Traffic survey results show 85th percentile speeds at circa 36mph in both directions, and therefore above the signed 30mph speed limit. There is a risk that the widening of the carriageway may encourage drivers to speed through the junction to the general detriment of highway safety and may lead to collisions with slow-moving turning traffic and increased severity level of any collisions.

RECOMMENDATION

3.3.2 It is recommended that measures are introduced to reduced traffic speeds on Manston Road to within the signed limit.



Photo 3 - Manston Road view north.

Appendix TR3.23

SECTION 4: NON-MOTORISED USERS

4.1 PROBLEM

Location: Proposed junction.

Summary: Lack of pedestrian crossing.

4.1.1 The drawings suggest a footway is to be provided either side of the proposed access road and on the southern side of Manston Road. No uncontrolled dropped crossing or tactile paving is shown across the new access road. This can cause difficulties for the visually and mobility impaired leading to potential collisions with vehicles.

RECOMMENDATION

4.2.2 It is recommended that an appropriate dropped crossing is introduced together with tactile paving to be inset 1m from the tangent point of the radius on the minor arm.



Photo 4 - Manston Road view north.

Appendix TR3.23

SECTION 5: ROAD MARKINGS AND SIGNAGE

5.1 No signing details have been provided. A suitable package of signage information will need to be provided as part of any further detailed design.

5.2 **PROBLEM**

Location: Proposed junction.

Summary: Potential for over-taking through junction.

5.2.1 The increased carriageway width may encourage drivers to attempt to overtake in this location leading to possible collisions with opposing or turning traffic.

RECOMMENDATION

5.2.2 It is recommended that the off-side hatched markings be enclosed with a solid continuous white line as shown on the example below, to discourage over-taking.



Photo 5 - White lining example.

Appendix TR3.23

SECTION 6: STREET LIGHTING

6.1 PROBLEM

Location: Proposed junction.

Summary: Lack of illumination.

6.1.1 No street lighting information is provided. There is a risk that insufficient illumination of the junction, will lead to potential collisions between vehicles.

RECOMMENDATION

6.1.2 It is recommended that appropriate street lighting is provided.



Photo 6 - Manston Road view north.

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SECTION 7: DRAINAGE

7.1 No drainage information is provided. A suitable package of drainage information will need to form part of any further detailed design.

Appendix TR3.23

SECTION 8: AUDIT STATEMENT

8.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 28th March 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

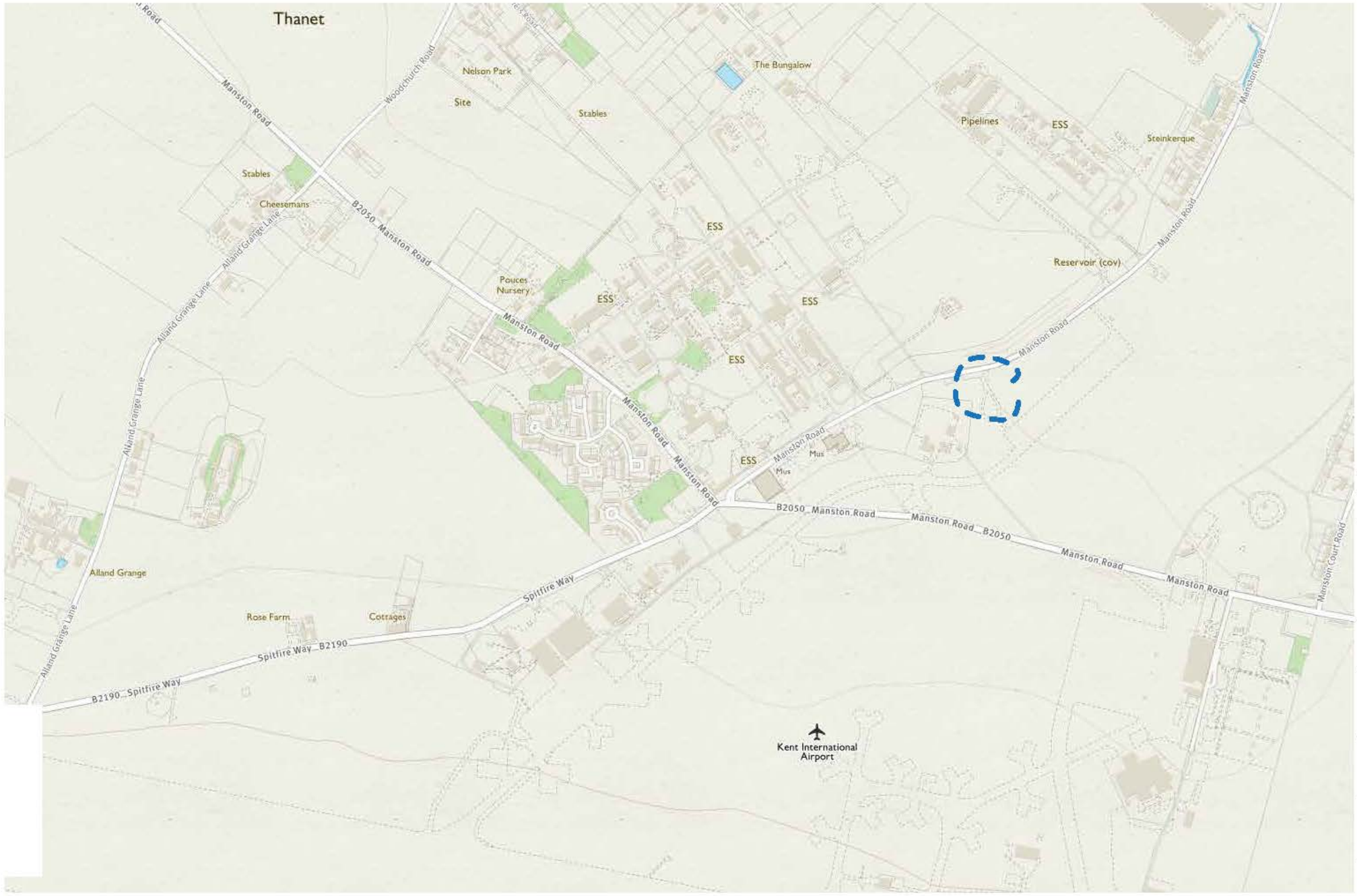
Director - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 28th March 2019

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FIGURES



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Rev.	Date	Initials	Amendments

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Client: RSP

Project: Manston Airport

Title: Location Plan

Date	Status
28/03/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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Client: RSP

Project: Manston Airport

Title: Aerial Photo

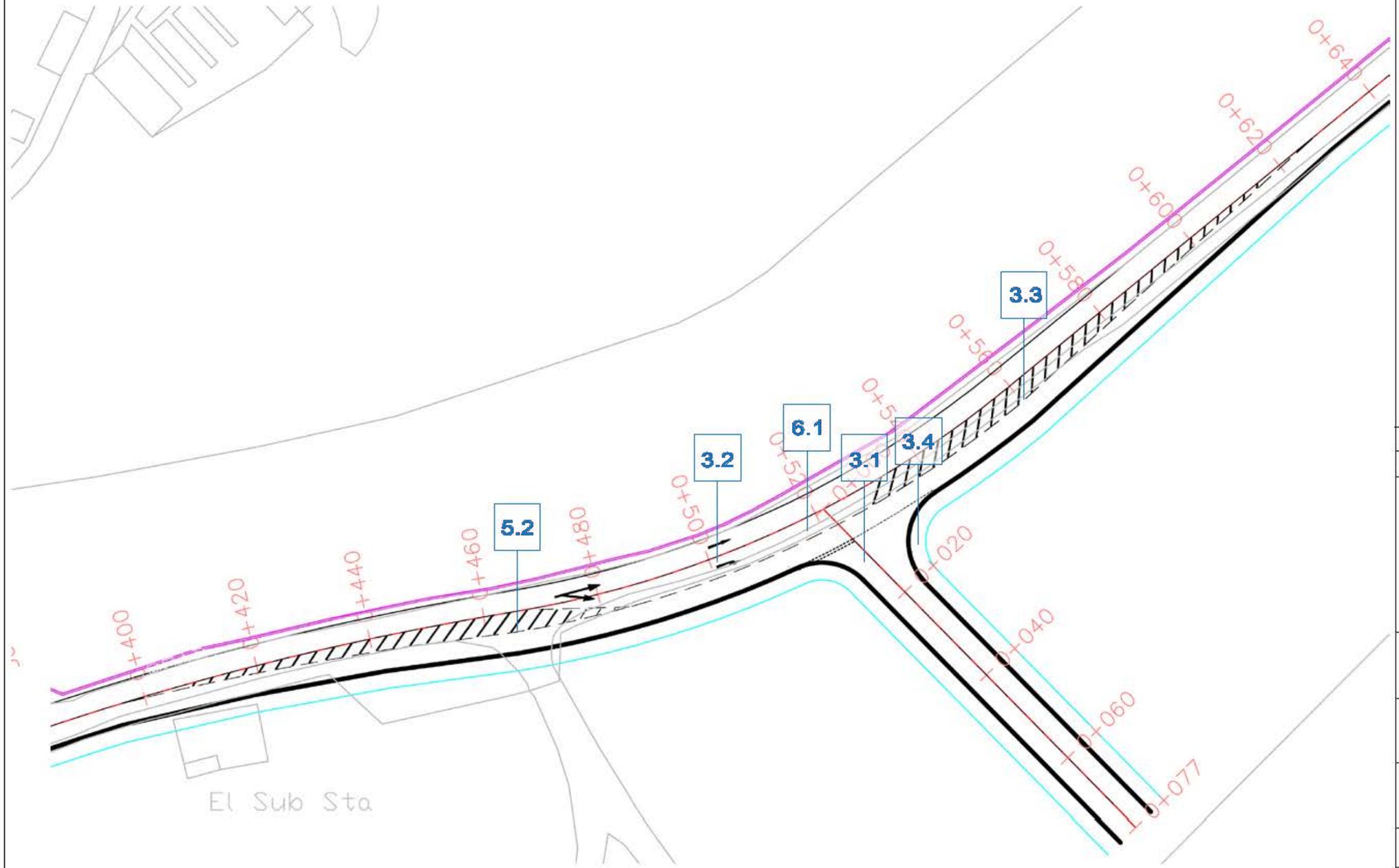
Date	Status
28/03/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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Source: NGA N

Rev.	Date	Initials	Amendments

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Client: RSP

Project: Manston Airport

Title: Audit Plan

Date	Status
28/03/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 3	-

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APPENDIX 1

Road Safety Audit Brief

Ref: AS/0781
Date: 28th March 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	22/03/19
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Northern Grass Area – Western Access
Report title:	Manston Airport – Northern Grass Area – Western Access - RSA Stage 1
PREPARED BY:	
Name:	Glyn Price
Signe	[redacted]
Organisation:	Wood
Date:	22/03/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Sign	[redacted]
Organisation:	RiverOak Strategic Partners
Date:	22/03/19

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General Details				
Highway Scheme Name & Road Number	Manston Airport – Nothern Grass Area Western Access – Manston Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Priority junction with ghost right turn lane with Manston Road.				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details	**Design Organisation Details**			
16 Charles II Street London SW1Y 4NW	Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK			
Police Contact Details (RSA3 Only)	**Maintaining Agent Contact Details**			
N/A	N/A			
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB - TD16/07 – Geometric Design of Roundabouts Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposals are for a new three arm priority junction with Manston Road west of the proposed Northern Grass areas north of the B2050 Manston Road.

The extents of the area requiring RSA assessment is the extents the new junction. It should be noted that Manston Road is proposed to be upgraded in the future year as part of the Manston to Haine Link Road to a 7.3m wide carriageway in the vicinity of the proposed junction. This widening scheme north and south of the junction is not part of the RSA study area.

The objectives of the scheme are to provide a new access to the proposed Northern Grass Area Business Park.

Construction would be proposed in Year one of the project life cycle which will be 2019 or 2020 depending on the approvals process of a DCO that is going through examination. Complete should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB has been applied to the design of the proposed roundabout. TD42/95 - Geometric Design of Major/Minor Priority Junctions

Design Speeds
Provide details of applied and/or existing design speeds.

40MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit on Manston Road (B2109) is 30mph, however as part of wider proposal to widen the Manston Road as part of the Manston to Haine Link Road it is proposed the speed limit will be increased to 40MPH.

An ATC (18) was undertaken just to the north of the proposed junction and this indicated that northbound the average 85th percentile speed was 55mph and southbound 54.1mph.

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

A junction turning count was undertaken at the Spitfire Way and Manston Road junction. This indicated in 2017;

- AM Peak – 217 Northbound – 188 Southbound
- PM Peak – 219 Northbound – 214 Southbound

The ATC from this junction will be provided and this gives north and southbound traffic flows in Manston Road for 12 hours of the day.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the access for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

The clear design pedestrian line across the junction is across the minor arm and pedestrian facilities have been designed to accommodate this movement with a central splitter island.
Environmental Constraints *Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.*
No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

The new junctions on Manston Road is approximately 520m north of the junction of Manston Road and Spitfire Way.

General Description
Include road network, road type, relevant land uses etc.

The existing Manston Road carriageway is a two-lane carriageway. There are no footways either side of the carriageway and the road is subject to a 30mph speed limit. To the east of the carriageway is the disused element of the Manston Airport site which is proposed to become the Northern Grass area Business Park. To the West is open fields.

As mentioned as part of wider KCC proposals for a Manston to Haine Link Manston Road is proposed to be widened and upgraded to a 7.3m wide carriageway when the junction is constructed.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

On Manston Road in the vicinity of the junction only one accident was recorded (256) which was a serious accident when a driver lost control with no other vehicles involved. With the road being upgraded and widened its noted that the existing accident record review is not as relevant. It is not considered the road has a significant accident issue in the vicinity of the junction. The details for accident 256 are provided.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Data for the Spitfire Way link will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – NGA N – ATC results	-	25.03.2019
RSA – NGA N – future Year Traffic Flows (2039)	-	25.03.2019
RSA – NGA N – Accident 256		25.03.2019

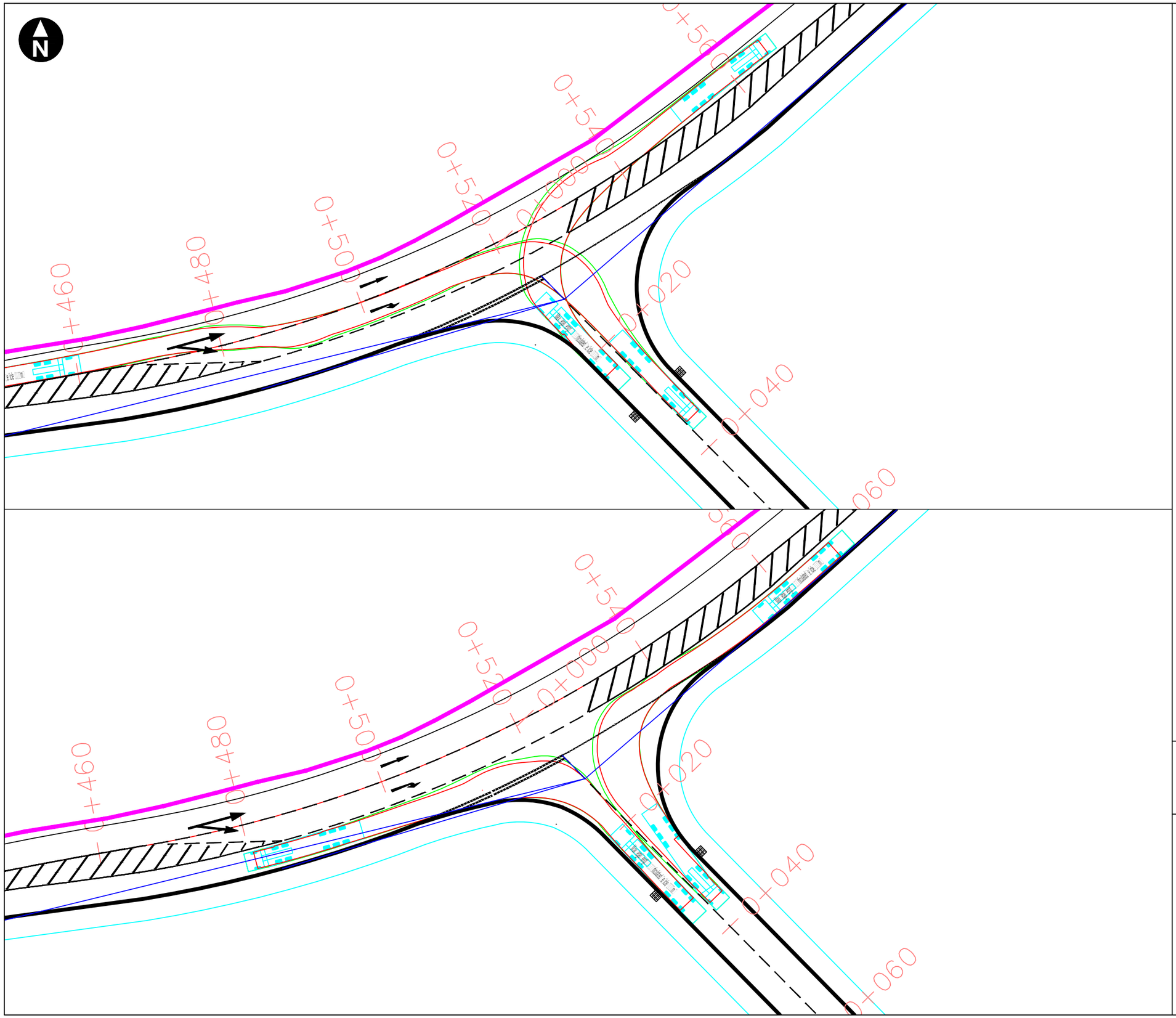
Drawings

Reference/Revision	Title	Date
RSA – NGA N– Access design		25.03.2019
RSA – NGA N – Cad file		25.03.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

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Appendix B
Swept Path Assessment



Key

- Existing based on Ordnance Survey mapping
- Proposed kerbline
- Proposed road marking
- □ □eel outline
- □ody outline
- Proposed □isibility □□□x□□□m□

0 m 30 m

Scale 1:500 @ A3

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Client

RSP

Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix B - NGA west access swept path assessments

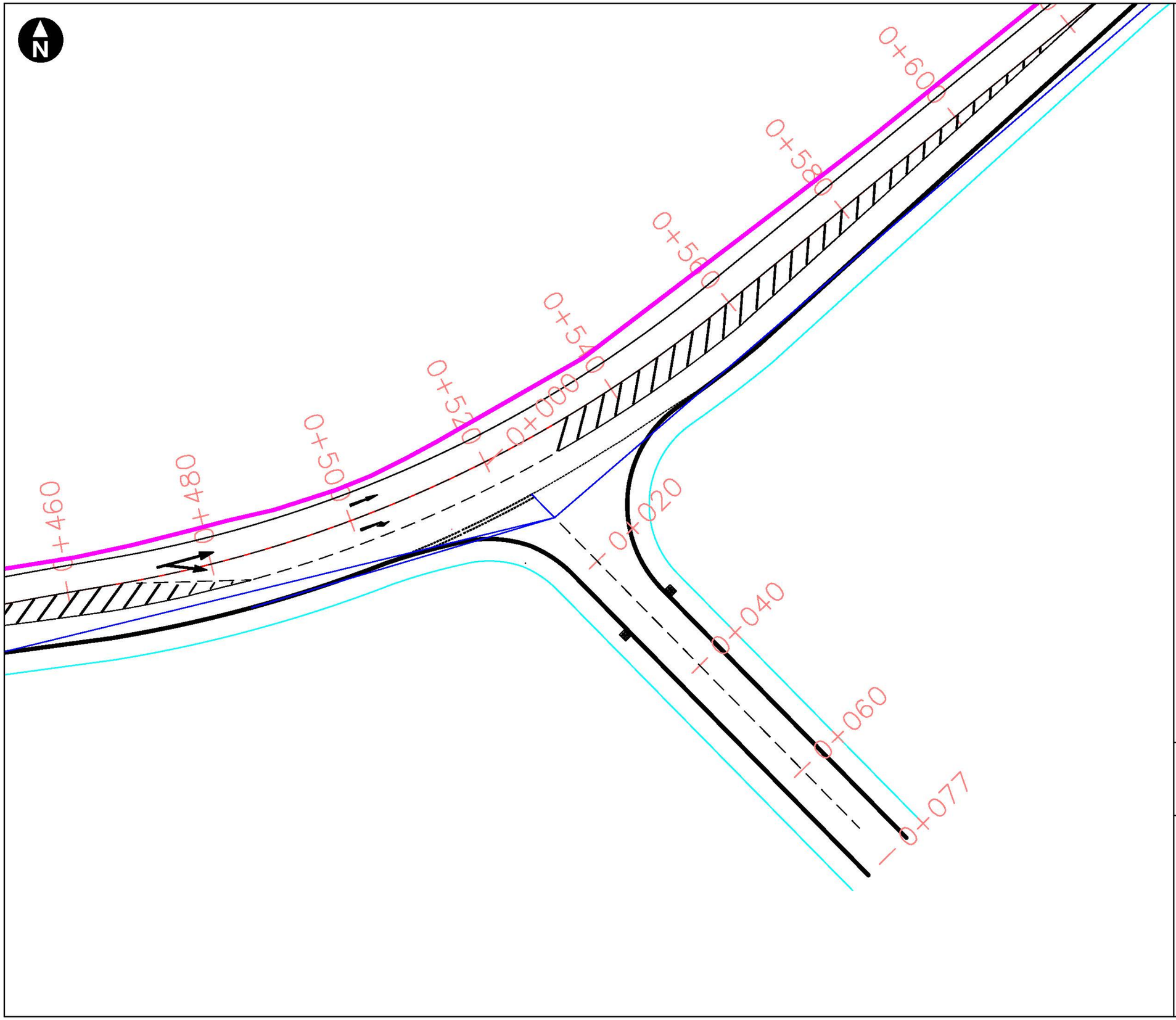
May 2019

wood.

R:\Projects\40820 STH Manston Airport Post Application\D Design\Drawings\AutoCAD\40820-Lon110.dwg Originator: ADAM.GUY

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Appendix C
Proposed Scheme



R:\Projects\40820 STH Manston Airport Post Application\D Design\Drawings\AutoCAD\40820-Lon110.dwg Originator: ADAM.GUY

Key

- Existing based on Ordnance Survey mapping
- Proposed kerbline
- Proposed road marking

0 m 30 m

Scale 1:500 @ A3

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Client

RSP

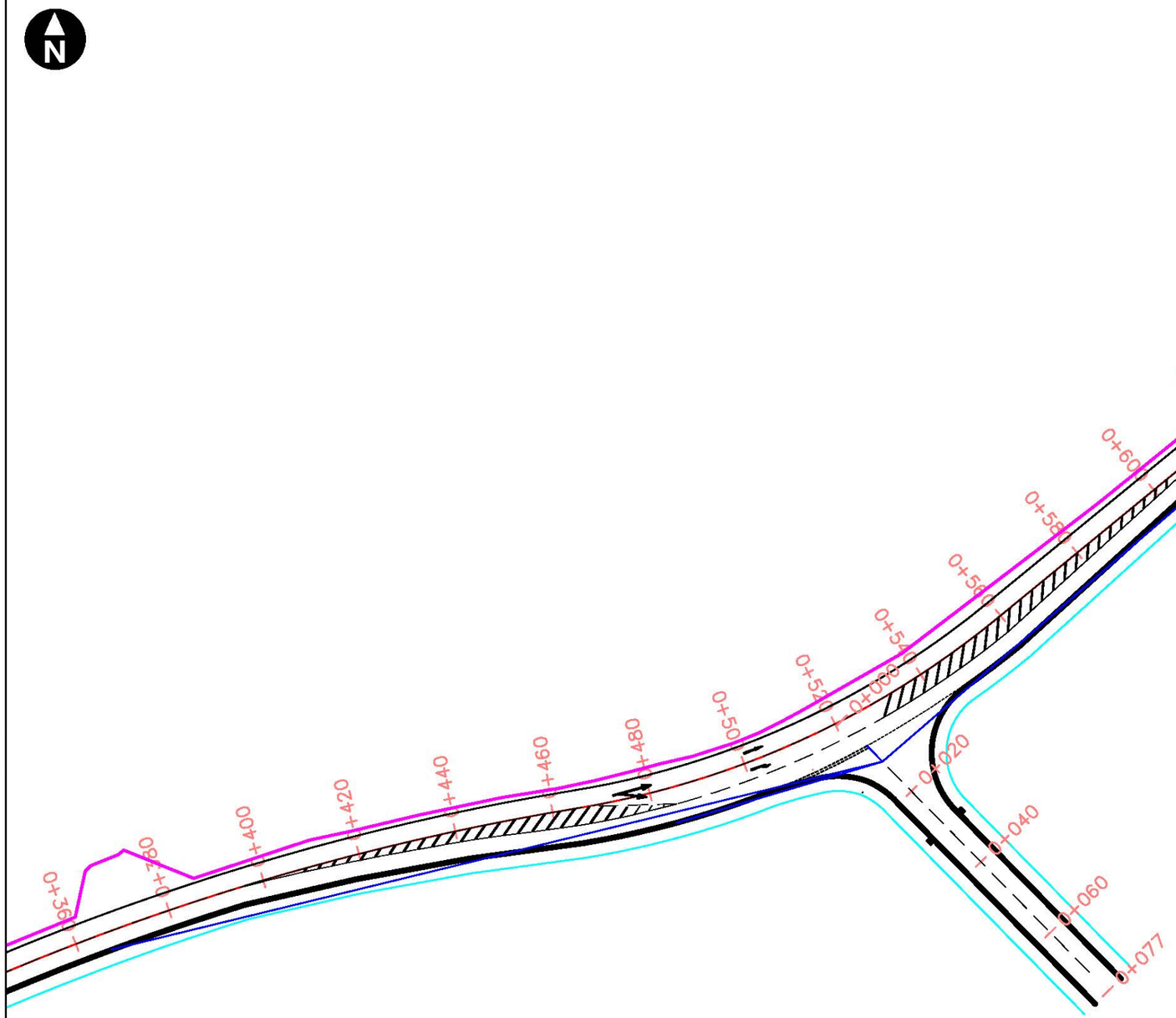
Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix C - Revised Northern Grass Area West Access - Sheet 1

May 2019

wood.

Appendix TR3.23



Key

- Existing based on Ordnance Survey mapping
- Proposed kerbline
- Proposed road marking

0 m 30 m

Scale 1:500 @ A3

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Client

RSP

Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix C - Revised Northern Grass Area West Access - Sheet 2

May 2019

wood.

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Appendix TR3.23

Manston Road, Manston Airport, Kent
Proposed Highway Works – Northern Grass Area North Access

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

22nd May 2019

Badingham
Transport Planning & Highway Engineering Consultants
16 Ashley Piece
Ramsbury, Marlborough
Wiltshire
SN8 2QE

T. +44(0)1672 521320
contact@badinghamuk.com
www.badinghamuk.com

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Appendix TR3.23

DOCUMENT ISSUE

Issue / Revision:	Issue 1	Issue 2			
Description / Status:	Final	Revised Audit Brief			
Date:	28/03/2019	22/04/2019			
Prepared:	A. R. J. Setter	A. R. J. Setter			
Signatu	[redacted]				
Document Check:	D. F. Rogers	D. F. Rogers			
Sign	[redacted]				
Technical Check:	D. F. Rogers	D. F. Rogers			
Signatu	[redacted]				
Authorised:	A. R. J. Setter	A. R. J. Setter			
Si	[redacted]				
File Reference:	0781 Manston Airport - NGA N - RSA1 - Issue 1.docx	0781 Manston Airport - NGA N - RSA1 - Issue 2.docx			

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SECTION 4:	AUDIT STATEMENT	5

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Figure 1	Site Location Plan
Figure 2	Aerial Photo

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It relates to a proposed highway works on the Manston Road, Manston, Kent, to provide an access to a Business Park

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 9.30am and 10.00am. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise as simple priority junction arrangement with Manston Road to provide access to a proposed Northern Grass Area Business Park.

1.11 Manston Road in this location has a curving alignment and is a single carriageway rural road with a 30mph speed limit. No footways or street lighting area provided. The proposed junction is to be located on an outside of a bend. Gradients in the area are minimal. The carriageway wearing course shows signs of wear.

1.12 A single collision is recorded in the location of the proposed access for the latest five-year period. This involved a single vehicle and is categorised as serious with a single casualty. It occurred in the early hours of the morning in darkness, in damp/wet conditions and resulted it the driver losing control and colliding with street furniture. No deficiencies with the highway are recorded.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 A Road Safety Audit Stage 1 (Issue 1) was prepared by Badingham in March 2019. A Designer's Response was prepared by Wood in May 2019 together with a subsequent revised Audit Brief. This Road Safety Audit Stage 1 (Issue 2) considers the proposed design revisions and response to the original audit (Issue 1). No matters are outstanding.

SECTION 3: ITEMS RAISED AT THIS AUDIT

3.1 No observations.

Appendix TR3.23

SECTION 4: AUDIT STATEMENT

4.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 22nd May 2019

Audit Team Member

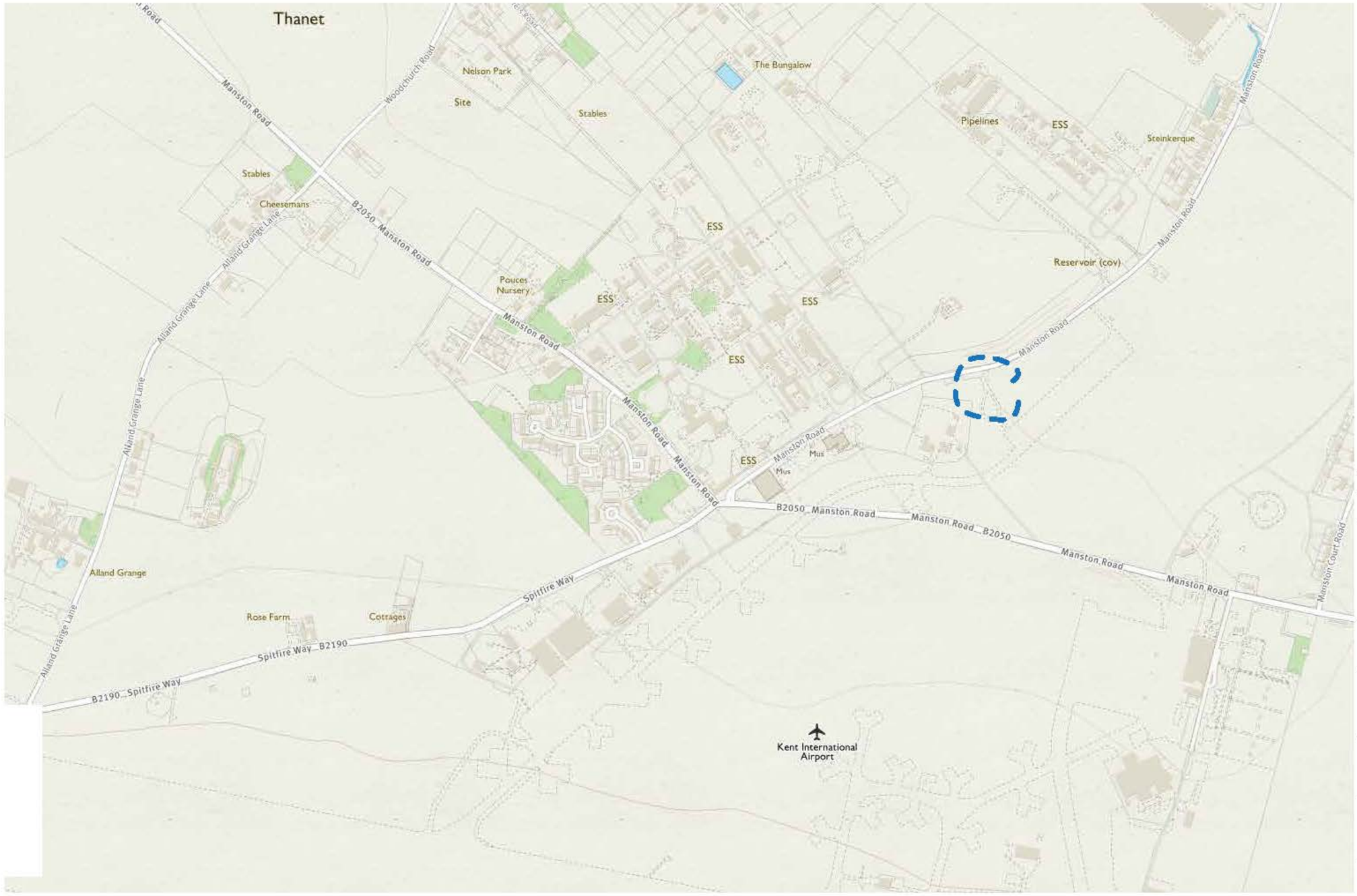
D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

Director - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 22nd May 2019

FIGURES



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North

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Notes:

1. Do not scale from this drawing.
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Rev.	Date	Initials	Amendments

Badingham
Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Location Plan

Date	Status
28/03/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

Appendix TR3.23



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1. Do not scale from this drawing.
2. All dimensions must be checked on site.

Rev.	Date	Initials	Amendments

Badingham
Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Aerial Photo

Date	Status
28/03/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

Appendix TR3.23

APPENDIX 1

Road Safety Audit Brief (Revised)

Ref: AS/0781
Date: 22nd May 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	22/03/19
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Northern Grass Area – Western Access
Report title:	Manston Airport – Northern Grass Area – Western Access - RSA Stage 1
PREPARED BY:	
Name:	Glyn Price
Signed:	
Organisation:	Wood
Date:	15/05/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Nothern Grass Area Western Access – Manston Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Priority junction with ghost right turn lane with Manston Road.				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details	**Design Organisation Details**			
16 Charles II Street London SW1Y 4NW	Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK			
Police Contact Details (RSA3 Only)	**Maintaining Agent Contact Details**			
N/A	N/A			
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB - TD16/07 – Geometric Design of Roundabouts Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposals are for a new three arm priority junction with Manston Road west of the proposed Northern Grass areas north of the B2050 Manston Road.

The extents of the area requiring RSA assessment is the extents the new junction. It should be noted that Manston Road is proposed to be upgraded in the future year as part of the Manston to Haine Link Road to a 7.3m wide carriageway in the vicinity of the proposed junction. This widening scheme north and south of the junction is not part of the RSA study area.

The objectives of the scheme are to provide a new access to the proposed Northern Grass Area Business Park.

Construction would be proposed in Year one of the project life cycle which will be 2019 or 2020 depending on the approvals process of a DCO that is going through examination. Complete should take between 3-6 months.

Visibility requirements used within the design are based on guidance within the DMRB. A swept path assessment has been undertaken using the maximum legal length of an articulated HGV (UK 16.5m) to ensure the design can accommodate the vehicle an d the anticipated turning movements adequately and safely.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB has been applied to the design of the proposed roundabout. TD42/95 - Geometric Design of Major/Minor Priority Junctions

Design Speeds
Provide details of applied and/or existing design speeds.

40MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit on Manston Road (B2109) is 30mph, however as part of wider proposal to widen the Manston Road as part of the Manston to Haine Link Road it is proposed the speed limit will be increased to 40MPH.

An ATC (18) was undertaken just to the north of the proposed junction and this indicated that northbound the average 85th percentile speed was 55mph and southbound 54.1mph.

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

A junction turning count was undertaken at the Spitfire Way and Manston Road junction. This indicated in 2017;

- AM Peak – 217 Northbound – 188 Southbound
- PM Peak – 219 Northbound – 214 Southbound

The ATC from this junction will be provided and this gives north and southbound traffic flows in Manston Road for 12 hours of the day.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the access for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines *Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].*
The clear design pedestrian line across the junction is across the minor arm and pedestrian facilities have been designed to accommodate this movement with a central splitter island.
Environmental Constraints *Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.*
No environmental constrains have been observed.

Locality
Description of Locality *Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.*
The new junctions on Manston Road is approximately 520m north of the junction of Manston Road and Spitfire Way.
General Description *Include road network, road type, relevant land uses etc.*
The existing Manston Road carriageway is a two-lane carriageway. There are no footways either side of the carriageway and the road is subject to a 30mph speed limit. To the east of the carriageway is the disused element of the Manston Airport site which is proposed to become the Northern Grass area Business Park. To the West is open fields. As mentioned as part of wider KCC proposals for a Manston to Haine Link Manston Road is proposed to be widened and upgraded to a 7.3m wide carriageway when the junction is constructed.
Relevant Factors Which May Affect Road Safety *Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.*
On Manston Road in the vicinity of the junction only one accident was recorded (256) which was a serious accident when a driver lost control with no other vehicles involved. With the road being upgraded and widened its noted that the existing accident record review is not as relevant. It is not considered the road has a significant accident issue in the vicinity of the junction. The details for accident 256 are provided.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Data for the Spitfire Way link will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – NGA N – ATC results	-	15.05.2019
RSA – NGA N – future Year Traffic Flows (2039)	-	15.05.2019
RSA – NGA N – Accident 256		15.05.2019

Drawings

Reference/Revision	Title	Date
RSA – NGA N– Access design		15.05.2019
RSA – NGA N – Swept Path Analysis		15.05.2019
RSA – NGA N – Cad file		15.05.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

Appendix TR3.24

Appendix TR3.24

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Technical note:
RSA Stage 1:Designers Response- Sevenscore Roundabout – Junction 2

1. Introduction

This Technical note forms the Designers Response to the Stage 1 Road Safety Audit (RSA) conducted by Badingham limited for works associated with a Mitigation Scheme to improve Sevenscore Roundabout located in Thanet. The junction was identified to require mitigation works as part of the Manston Airport TA.

Badingham Limited has been provided with the latest preliminary mitigation scheme designs, at this junction the mitigation scheme is to increase the entry widths on the Cottington Link Road, A256 Richborough way and A299 Hengist Way arms and increase the entries on the A299 Hengist Way and A256 Richborough Way to three lanes. Additionally the central island will be white lined.

The designer's response to each of the issues raised by the safety audit team is provided in the following sections. The text included within the RSA has been transposed into this document, a full copy of the original RSA is provided within **Appendix A**.

2. Designers Response

Problem 3.1

Location: Sevenscore Roundabout.

Summary: Potential collisions arising from large vehicle access.

No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage type collisions or over-running of the verge.

Recommendation: It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.

Designer's response: A Swept Path assessment for the junction has been undertaken for the revised junction layout.

In undertaking the SPA work as a response to Stage One RSA and reflecting the comments made below regards spiral markings (Problem 3.3) this indicated that HGVs could not safety traverse the junction with the three lane arrangement on the circulatory carriageway. As such the design has returned to a two-lane circulatory carriageway was required and for capacity reasons the junction needed to be converted to a signalised junction.

The revised Swept Path Assessment are provided as **Appendix B** to this report, while a new junction layout drawing is provided as **Appendix C.**

Problem 3.2

Location: Sevenscore Roundabout.

Summary: Potential for collisions arising from high speeds.

The long straight horizontal alignments of the A299 and A256 encourage drivers to approach this junction at speed, which is continued through the roundabout, which has a large central island. High circulatory speeds were noted during the site inspection. This is a risk of late braking, skidding and loss-of-control type collisions on the approaches and side-swipe damage-type collisions on the circulatory carriageway.

Recommendation: It is recommended that measures are introduced to reduce vehicles speeds approaching and through the junction.

Designers Response: The recommendation to explore the use of speed reduction measures the approaches to the A299 and A253 has been noted. A package of measures, including for anti-skid surfacing / rumble strips and advanced signage, which are noted to assist in speed reduction will be investigated through the detailed design process.

Problem 3.3

Location: Sevenscore Roundabout.

Summary: Three-lane circulatory potential for collisions.

The proposed change to three-lane circulatory marking is considered unsafe, there is potential for drivers to attempt to negotiate the junction at speed. Three lanes reduce available lane width and increase the opportunities for weaving manoeuvres and side impact type collisions, particularly on the egress merge.

Recommendation: It is recommended that if spiral markings are to be implemented only a two-lane circulatory can be introduced.

Designers Response: As set out above the junction arrangement has been revised further following SPA work and the comments set out in Problem 3.3 to provide for a two-lane circulatory carriageway and signal scheme. As such the issues set out in Problem 3.3 should no longer be a valid concern and have been addressed in the revised design.

3. General Comments

Sections 5-7

As part of the detailed design package of works a signage, lighting and drainage strategy will be provided.

[redacted]

Approved by

[redacted]

.....

Bev Coupe

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Appendix TR3.24

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Appendix A
Road Safety Audit – Stage 1

Appendix TR3.24

A299/A256 Sevenscore Roundabout, Manston, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

29th April 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

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www.badinghamuk.com

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Appendix TR3.24

DOCUMENT ISSUE

Issue / Revision:	Issue 1			
Description / Status:	Final			
Date:	29/04/2019			
Prepared:	A. R. J. Setter			
Signature:	[redacted]			
Document Check:	D. F. Rogers			
Signat	[redacted]			
Technical Check:	D. F. Rogers			
Signatur	[redacted]			
Authorised:	A. R. J. Setter			
Signature:	[redacted]			
File Reference:	0781 Manston Airport - 2 - RSA1 - Issue 1.docx			

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SECTION 5:	ROAD MARKINGS AND SIGNAGE	9
SECTION 6:	STREET LIGHTING	10
SECTION 7:	DRAINAGE	11
SECTION 8:	AUDIT STATEMENT	12

FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo
Figure 3	Audit Plan

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed modifications to the A299 Hengist Way/A256 Sevenscore roundabout junction, Manston, Kent. The works are associated with the redevelopment of Manston Airport.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 12.35pm and 12.50pm. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise proposed kerb modifications and spiral circulatory markings. Street lighting is provided and gradients in the area are minimal. The junction lies within a derestricted speed zone and approach speeds were noted to be high, as well as circulatory speeds. A dedicated left-turn lane is provided from the A229 north Hengist Way. A299 (east), Richborough Way (A256) and A299 (north) are standard dual carriageway. Cottington Link Road is a two-way single carriageway.

1.12 Loose gravel and other debris was noted around the junction presenting a hazard to two-wheelers. Several keep-left bollards on the dedicated left-turn slip were noted to be damaged. There is no provision for pedestrians or cyclists at the junction.

1.13 A total of six collisions are recorded at this junction over the latest 5-year period. One was categorised as serious and involved a motorcyclist losing grip on the highway. The remaining collisions were slight. Two involved motorcyclists with the major cause identified as driver error. No highway deficiencies were noted as contributory factors.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 No previous audits have been undertaken.

Appendix TR3.24

SECTION 3: VEHICULAR AND HIGHWAY ISSUES

3.1 PROBLEM

Location: Sevenscore Roundabout.

Summary: Potential collisions arising from large vehicle access.

3.1.1 No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions or over-running of the verge.

RECOMMENDATION

3.1.2 It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.



Photo 1 – HGV negotiating junction.

Appendix TR3.24

3.2 **PROBLEM**

Location: Sevenscore Roundabout.

Summary: Potential for collisions arising from high speeds.

3.2.1 The long straight horizontal alignments of the A299 and A256 encourage drivers to approach this junction at speed, which is continued through the roundabout, which has a large central island. High circulatory speeds were noted during the site inspection. This is a risk of late braking, skidding and loss-of-control type collisions on the approaches and side-swipe damage-type collisions on the circulatory carriageway.

RECOMMENDATION

3.2.2 It is recommended that measures are introduced to reduce vehicle speeds approaching and through the junction.



Photo 2 - A299 Hengist Way view north - note straight, high-speed, downhill approach.

Appendix TR3.24



Photo 3 - Large HGV trailer access. Note damaged bollards (possibly from too high an approach speed) and motorcyclist at risk from loose material.

Appendix TR3.24

3.3 PROBLEM

Location: Sevenscore Roundabout.

Summary: Three-lane circulatory potential for collisions.

3.3.1 The proposed change to three-lane circulatory markings is considered unsafe. There is potential for drivers to attempt to negotiate the junction at speed. Three lanes reduce available lane width and increase the opportunities for weaving manoeuvres and side-impact type collisions, particularly on the egress merge.

RECOMMENDATION

3.3.2 It is recommended that if spiral markings are to be implemented only a two-lane circulatory be introduced.



Photo 4 – Insufficient safe width for three-lane circulatory.

Appendix TR3.24

SECTION 4: NON-MOTORISED USERS

4.1 No observations.

Appendix TR3.24

SECTION 5: ROAD MARKINGS AND SIGNAGE

5.1 Limited signing and marking details have been provided. A suitable package of markings and sign information will need to be provided as part of any further detailed design.

Appendix TR3.24

SECTION 6: STREET LIGHTING

6.1 No street lighting details have been provided. A suitable package of street lighting information will need to be provided as part of any further detailed design.

Appendix TR3.24

SECTION 7: DRAINAGE

7.1 No drainage information is provided. A suitable package of drainage information will need to form part of any further detailed design.

Appendix TR3.24

SECTION 8: AUDIT STATEMENT

8.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 29th April 2019

Audit Team Member

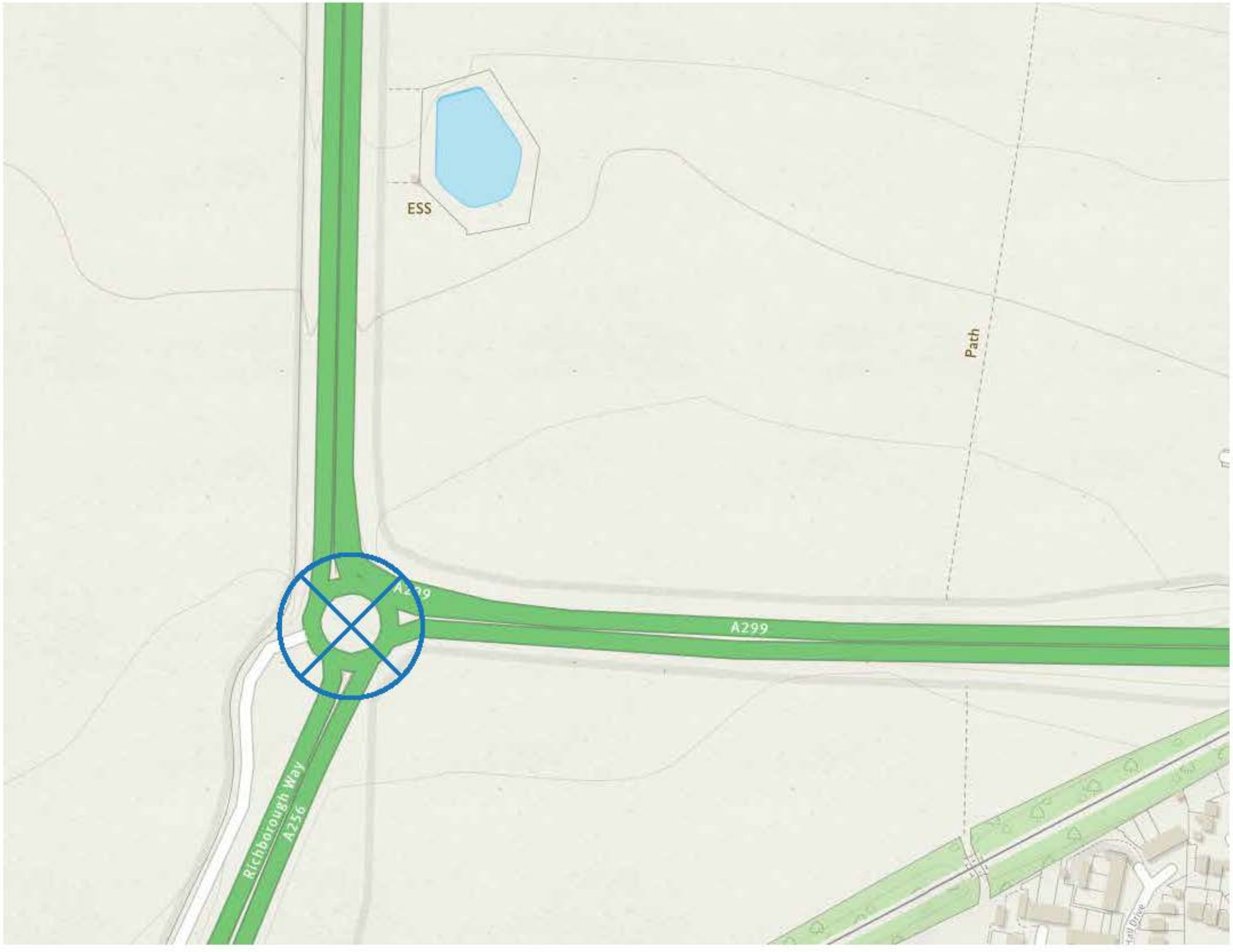
D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 29th April 2019

FIGURES



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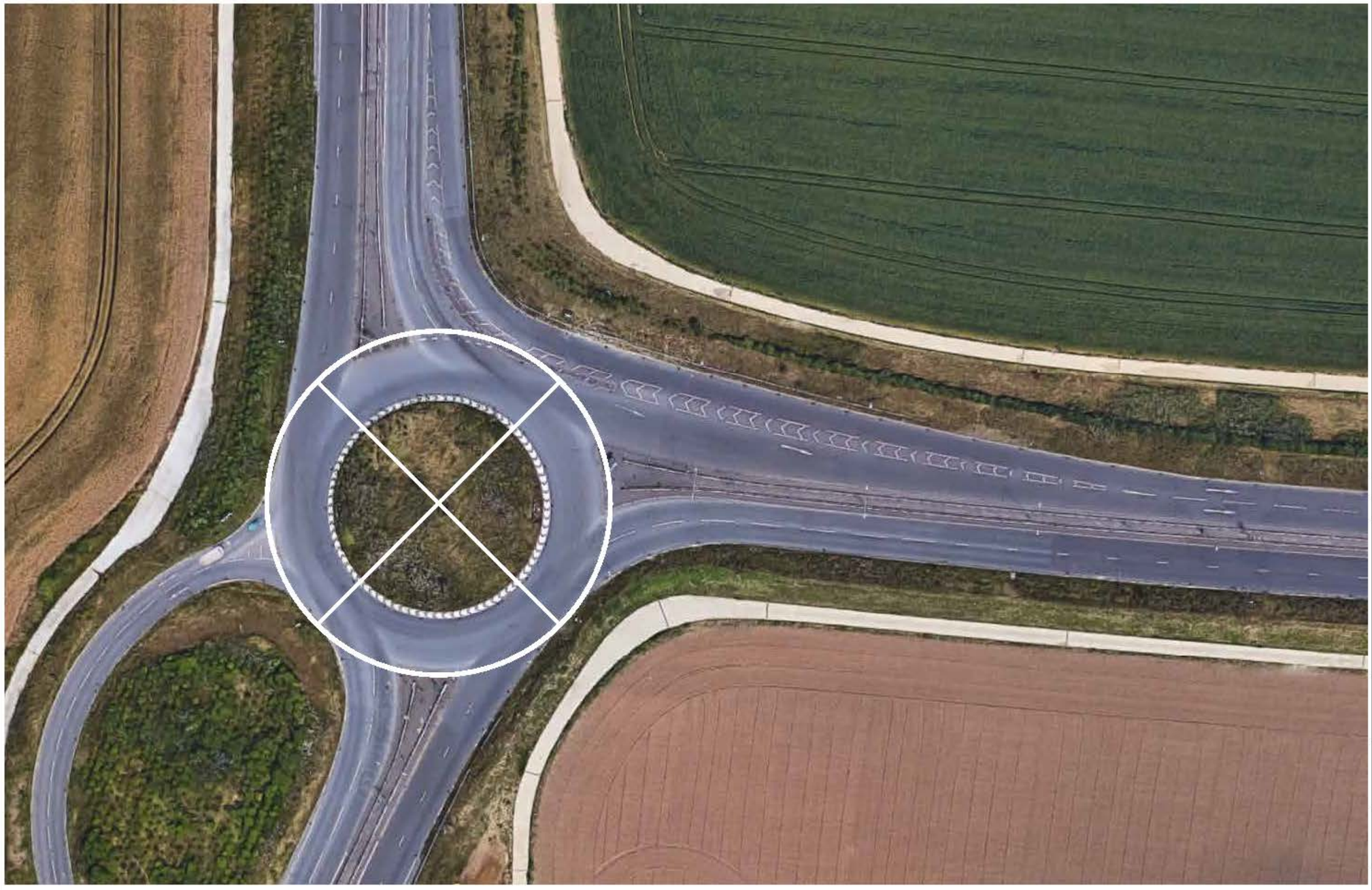
Project: Manston Airport

Title: Location Plan

Date	Status
23/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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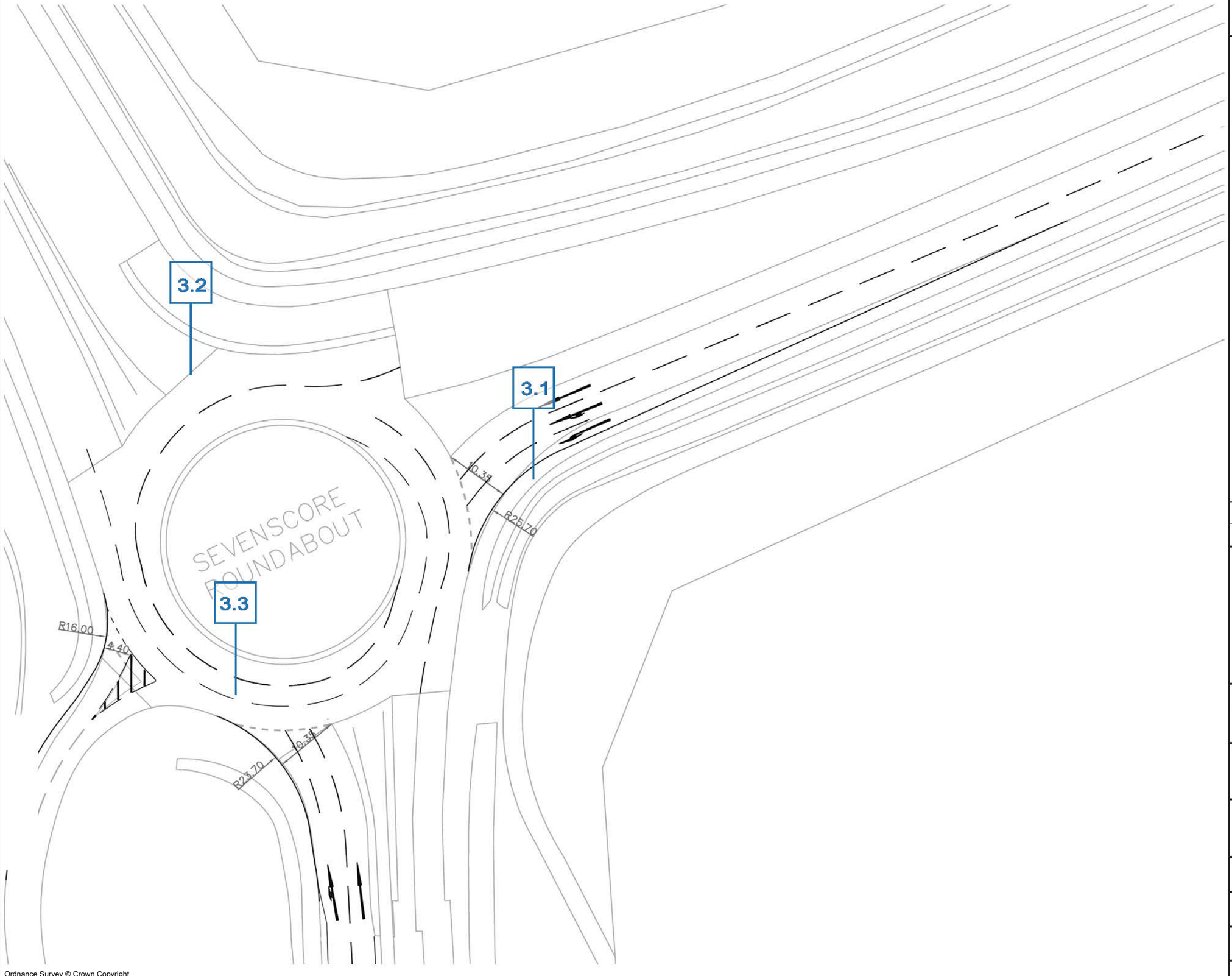
Project: Manston Airport

Title: Aerial Photo

Date	Status
23/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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Source: Site Location & Scheme

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Client: RSP

Project: Manston Airport

Title: Audit Plan

Date	Status
30/04/2019	FINAL
Scale	**Original Size**
NTS	A3
Drawn	**Checked**
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 3	-

Appendix TR3.24

APPENDIX 1

Road Safety Audit Brief

Ref: AS/0781
Date: 29th April 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	12/04/2019
Document Reference:	
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Junction A256/A299 Mitigation Proposal
Report title:	Manston Airport – Junction A256/A299 Mitigation Proposal - RSA Stage 1
PREPARED BY:	
Name:	Pranav Yadav
Signed:	
Organisation:	Wood
Date:	12/04/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Junction A256/A299 Mitigation Proposal – A299 (east), Richborough Way (A256), Cottington Link Road, A299 (north)			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
Road realignment and marking				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details		**Design Organisation Details**		
16 Charles II Street London SW1Y 4NW		Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK		
Police Contact Details (RSA3 Only)		**Maintaining Agent Contact Details**		
N/A		N/A		
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB and Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposal is for a scheme to improve the existing A256/A299 roundabout junction by providing road marking and aligning arms.

Entry width and radius will be amended of arms A299 (east), Richborough Way (A256) and Cottington Link Road. New road markings will be provided accordingly.

It is unknown when this junction would be constructed as this is to be agreed with KCC as part of ongoing discussions. Complete should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB and Traffic Signs Regulations and General Directions (TSRGD) have been used to design the proposed scheme.

Design Speeds
Provide details of applied and/or existing design speeds.

Existing:
A229 (east) – 70mph (at junction approach); Richborough Way (A256) – 70mph; Cottington Link Road – 60mph; A299 (north) – 70mph

Speed Limits
State whether mandatory or advisory, available speed data.

Existing:
A229 (east) – 70mph (at junction approach); Richborough Way (A256) – 70mph; Cottington Link Road – 60mph; A299 (north) – 70mph

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The traffic flow of the junction will be provided from the MCC taken at this junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the junction for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

There is no facility for non-motorist road users as this junction is located in a rural area.

Environmental Constraints
Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.

No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

Junction is located northwest of Cliffsend and surrounded by green fields.

General Description
Include road network, road type, relevant land uses etc.

A299 (east), Richborough Way (A256) and A299 (north) are standard dual carriageway. Cottington Link Road is a two-way single carriageway.

As this junction is located in a rural area without non-motorist demand, there is no facility for non-motorists.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Total six accidents have been recorded at the junction. These are accidents 35, 483, 488, 342, 493 and 501.

One of the six accidents was serious. This serious accident occurred when a motorbike lost its grip on the road.

Five of the six accidents were slight. Two of the slight accidents involved motorbike and occurred due to careless driving. The major cause for the slight accidents was driver's error.

The details of these accidents will be provided with this brief.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – A256-A299 – ATC results		12.04.2019
RSA – A256-A299 – future Year Traffic Flows (2039)		12.04.2019
RSA – A256-A299 – Accident Data		12.04.2019

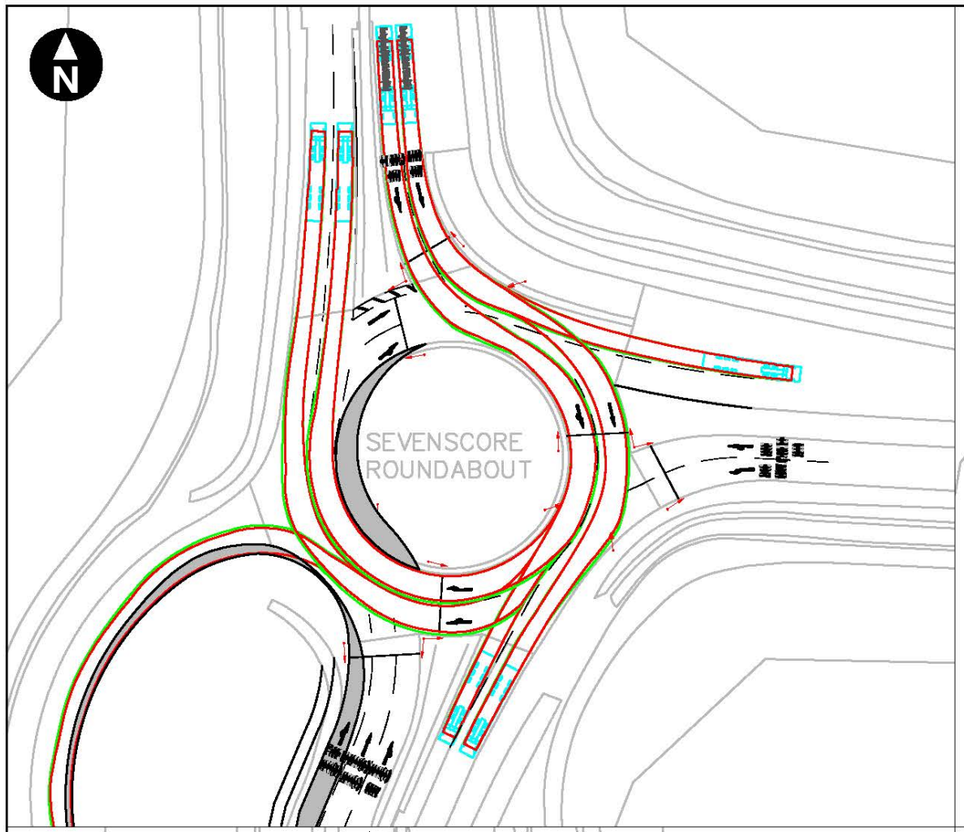
Drawings

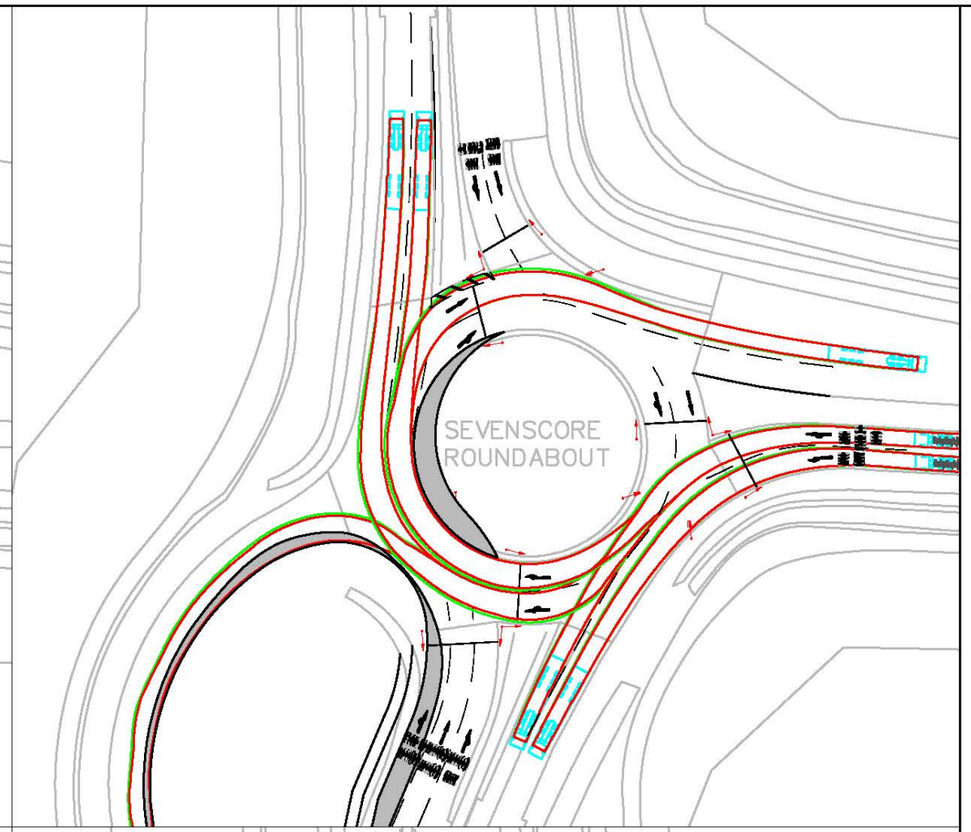
Reference/Revision	Title	Date
RSA – A256-A299 – Site Location and scheme		12.04.2019
RSA – A256-A299 – Cad file		12.04.2019

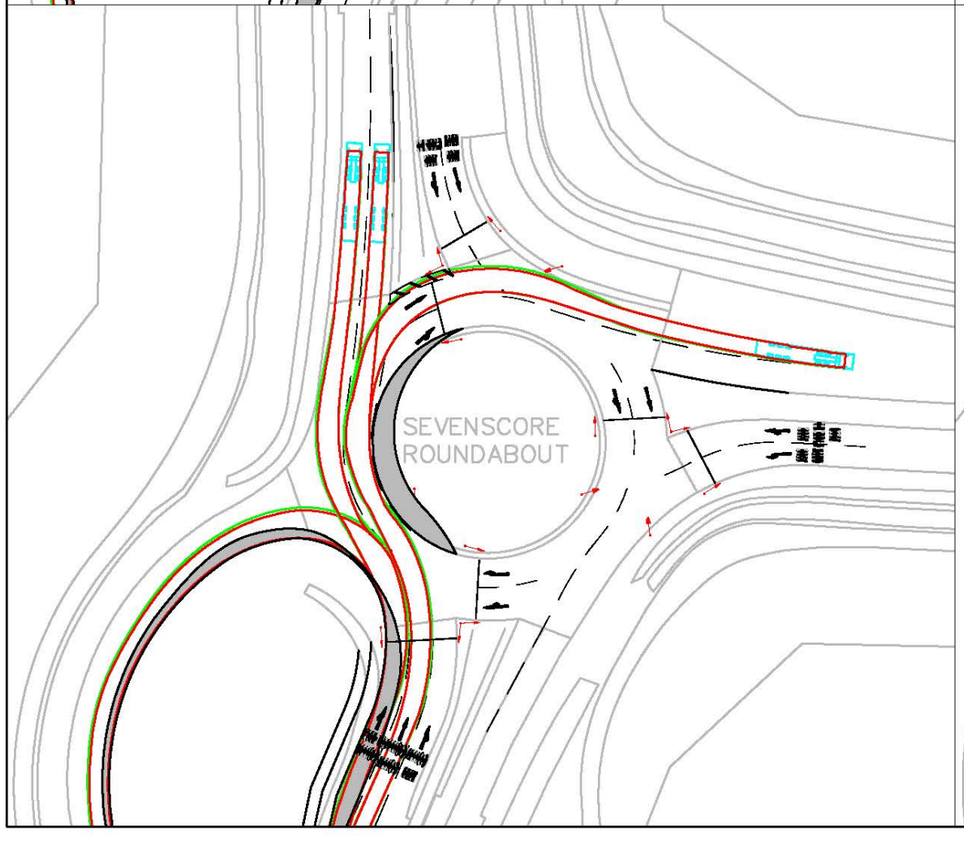
Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

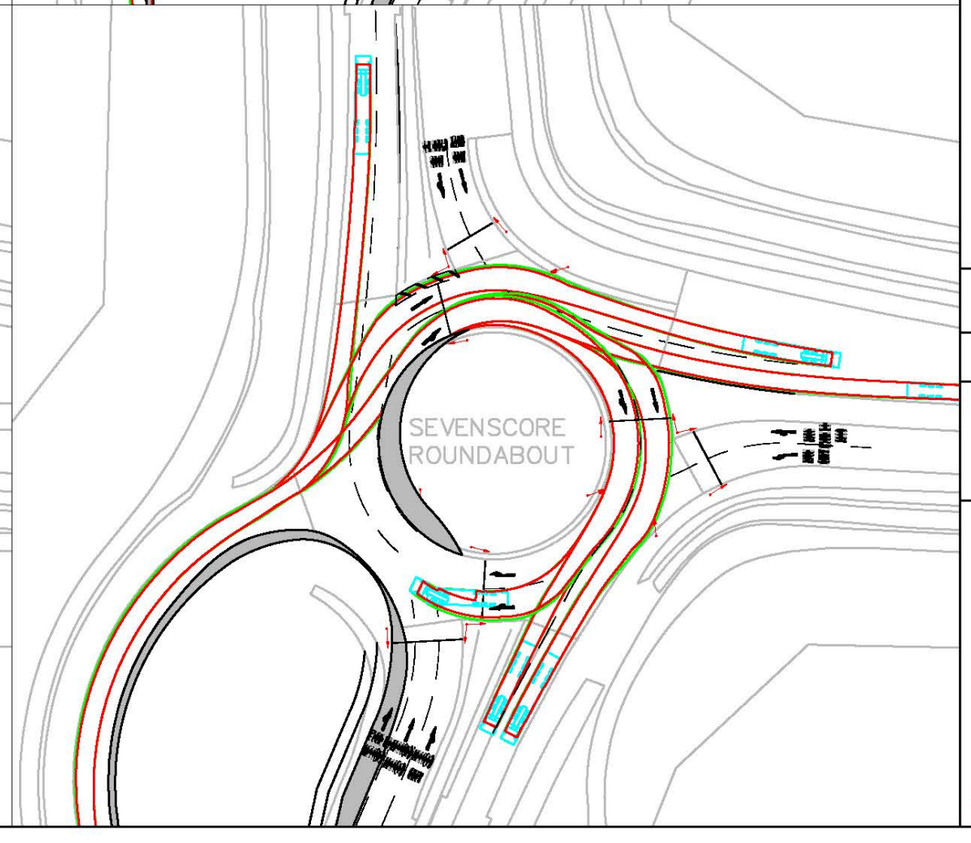
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Appendix B
Swept Path Assessment









□e□

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Proposed traffic signals
- Proposed new carriageway
- □ □eel o□tline
- □od□o□er□ang

Notes

1. All dimensions are in metres unless otherwise noted.
2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB) and Traffic Signs Regulations and General Directions (TSRGD).

Scale: 1:1000 at A3

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Client

RSP

Manston Airport DCO
RSA stage 1 - Designers Response

Appendix B - Swept path assessment

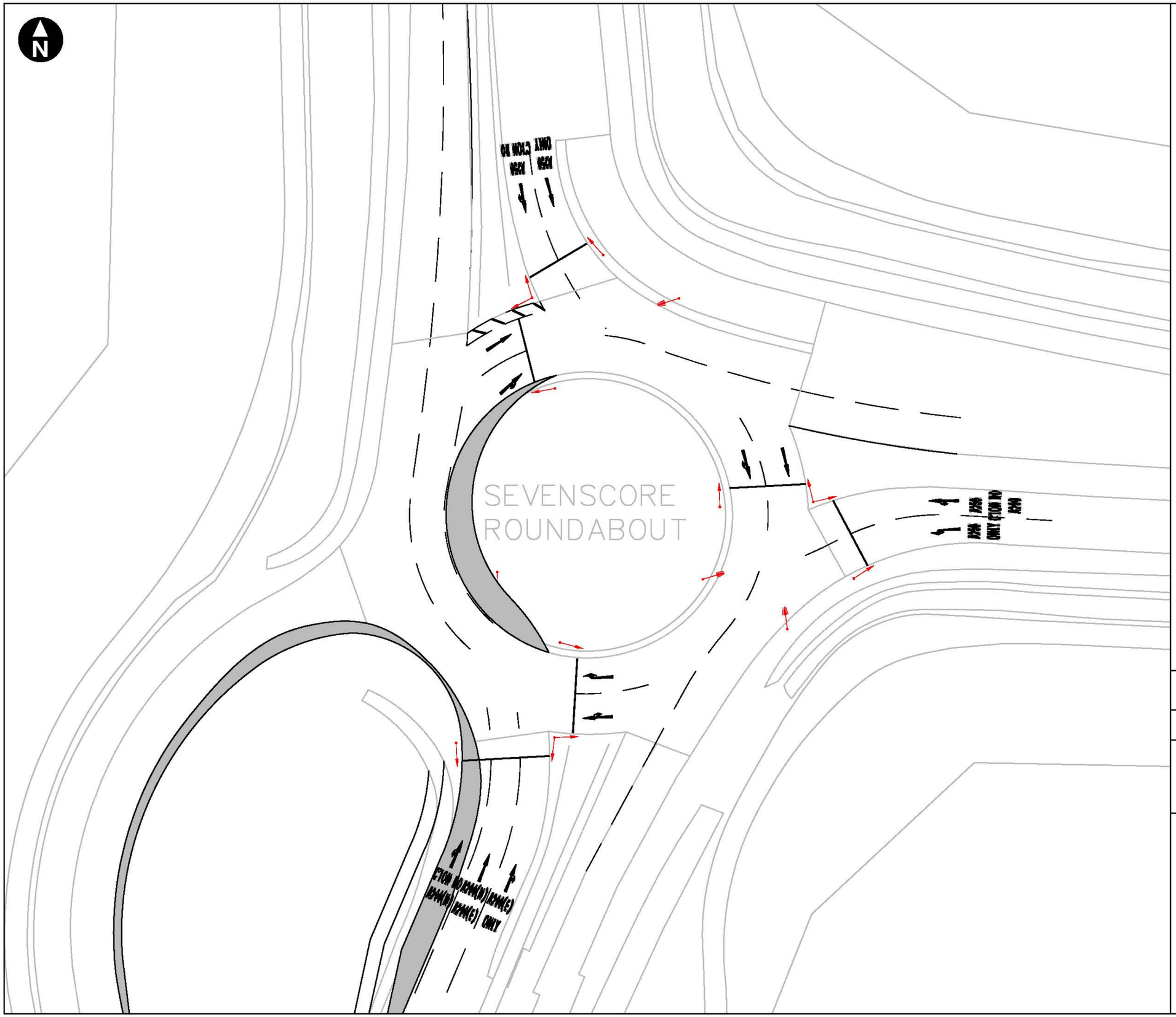
May 2019

wood.

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Appendix C
Proposed Scheme



Existing based on Ordnance Survey map

Proposed kerbline

Proposed road marking

Proposed traffic signals

Proposed new carriageway

Notes

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2. This drawing is not to be used for construction.
3. The proposed roads are designed in accordance with Design Manual for Roads and Bridges (DMRB) and Traffic Signs Regulations and General Directions (TSRGD).

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Client

RSP

Manston Airport DCO
RSA stage 1 - Designers Response

Appendix C - Revised Scheme

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Appendix TR3.24

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Road Safety Audit

Appendix TR3.24

A299/A256 Sevenscore Roundabout, Manston, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

22nd May 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

contact@badinghamuk.com

www.badinghamuk.com

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Appendix TR3.24

DOCUMENT ISSUE

Issue / Revision:	Issue 1	Issue 2			
Description / Status:	Final	Revised Audit Brief			
Date:	29/04/2019	22/05/2019			
Prepared:	A. R. J. Setter	A. R. J. Setter			
Signature	[redacted]				
Document Check:	D. F. Rogers	D. F. Rogers			
Signatur	[redacted]				
Technical Check:	D. F. Rogers	D. F. Rogers			
Signatu	[redacted]				
Authorised:	A. R. J. Setter	A. R. J. Setter			
Signatu	[redacted]				
File Reference:	0781 Manston Airport - 2 - RSA1 - Issue 1.docx	0781 Manston Airport - 2 - RSA1 - Issue 2.docx			

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SECTION 2:	ITEMS RAISED AT PREVIOUS AUDITS	3
SECTION 3:	ITEMS RAISED AT THIS AUDIT	4
SECTION 4:	AUDIT STATEMENT	5

FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo

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Audit Team

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D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

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Main Parties to the Audit

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- Design Organisation: Wood Plc

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SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 A Road Safety Audit Stage 1 (Issue 1) was prepared by Badingham in April 2019. A Designer's Response was prepared by Wood in May 2019 together with a subsequent revised Audit Brief. This Road Safety Audit Stage 1 (Issue 2) considers the proposed design revisions and response to the original audit (Issue 1). No matters are outstanding.

SECTION 3: ITEMS RAISED AT THIS AUDIT

3.1 No observations.

Appendix TR3.24

SECTION 4: AUDIT STATEMENT

4.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Sign [redacted] Date: 22nd May 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

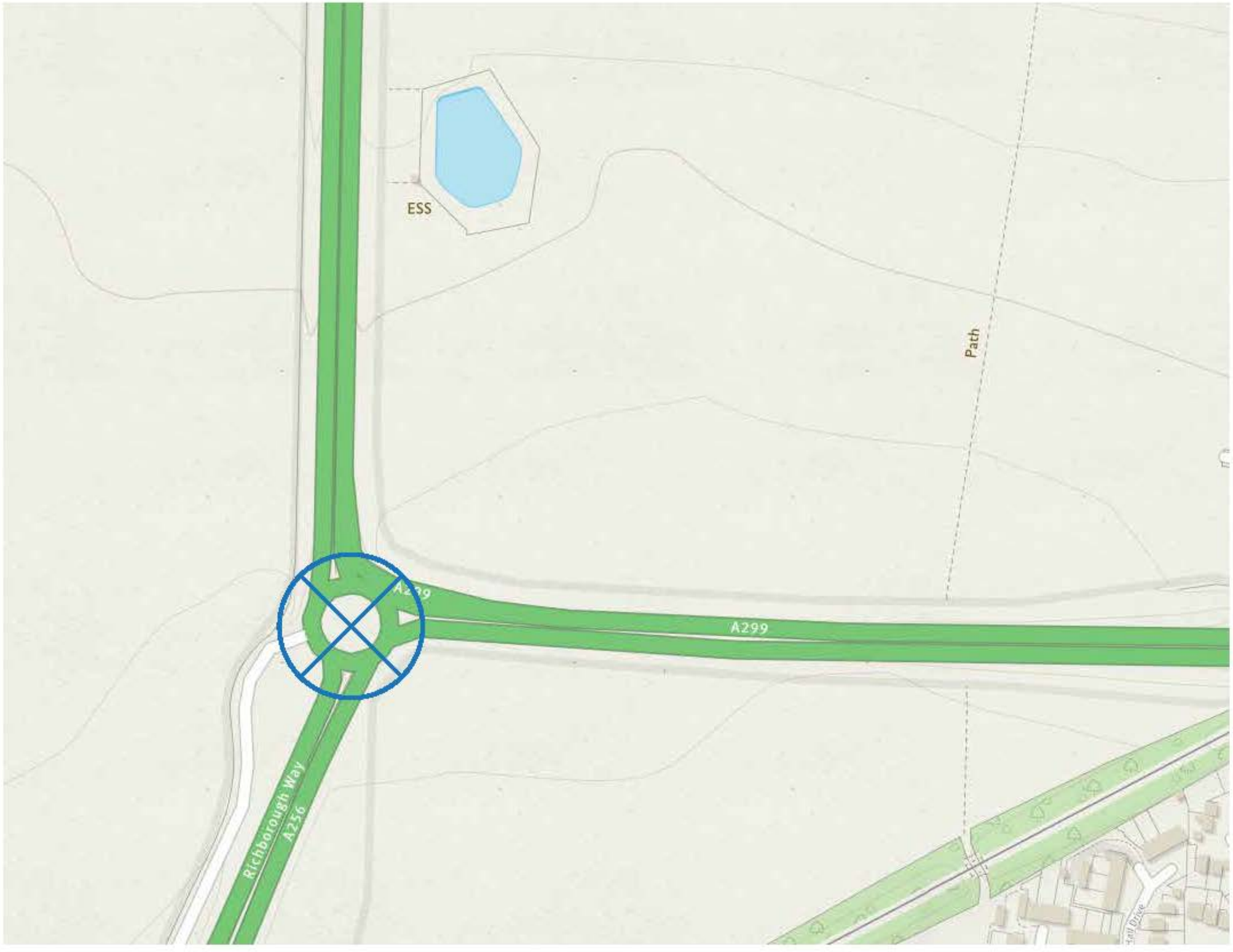
Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 22nd May 2019

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FIGURES



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Rev.	Date	Initials	Amendments

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Client: RSP

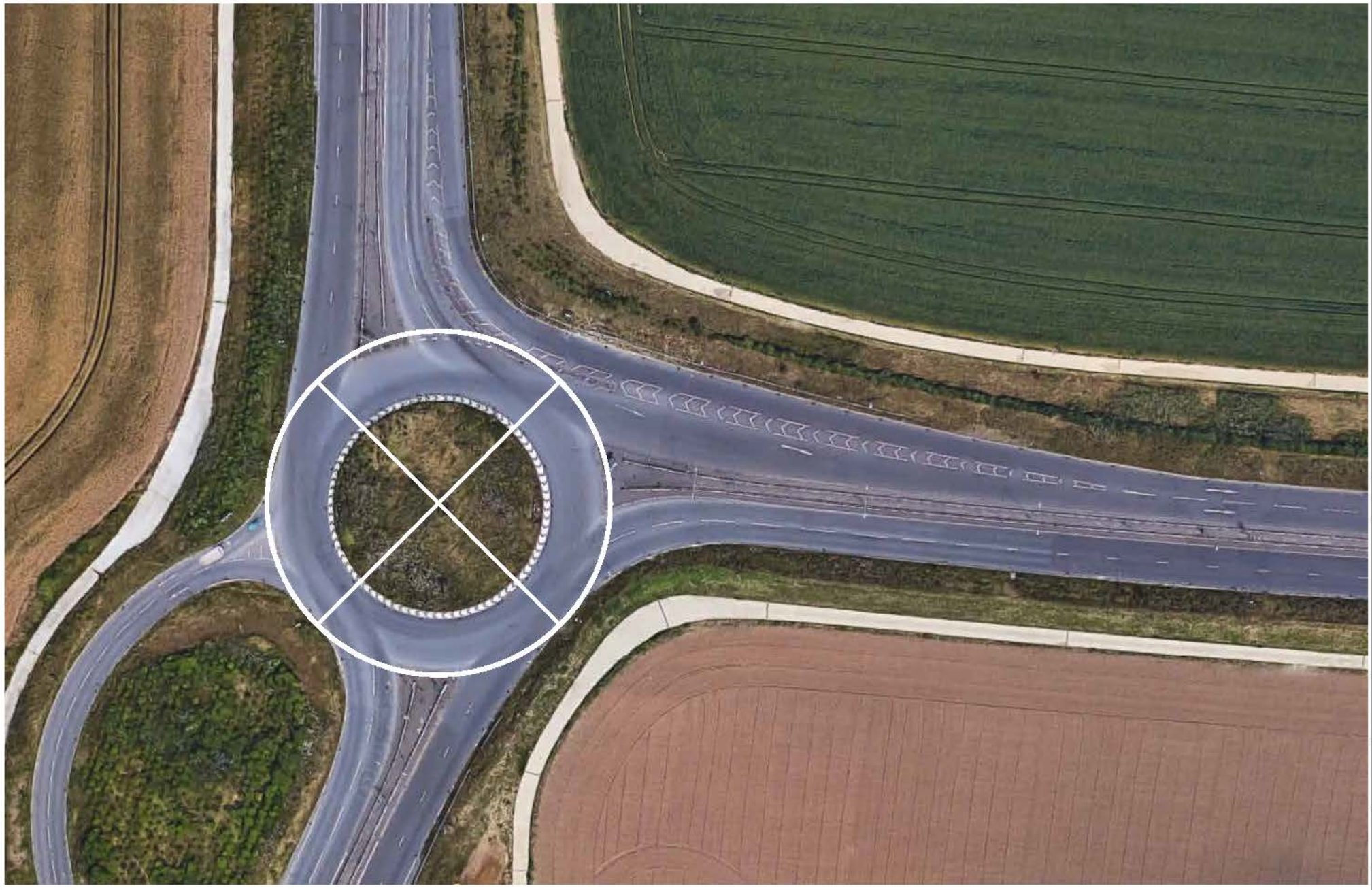
Project: Manston Airport

Title: Location Plan

Date	Status
23/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

Appendix TR3.24



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Client: RSP

Project: Manston Airport

Title: Aerial Photo

Date	Status
23/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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APPENDIX 1

Road Safety Audit Brief (Revised)

Ref: AS/0781
Date: 22nd May 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	22.05.2019
Document Reference:	
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Junction A256/A299 Mitigation Proposal
Report title:	Manston Airport – Junction A256/A299 Mitigation Proposal - RSA Stage 1
PREPARED BY:	
Name:	Glyn price
Signed:	
Organisation:	Wood
Date:	22.05.2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Junction A256/A299 Mitigation Proposal – A299 (east), Richborough Way (A256), Cottington Link Road, A299 (north)			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
Road realignment and marking				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Second iteration			
Overseeing Organisation Details		**Design Organisation Details**		
16 Charles II Street London SW1Y 4NW		Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK		
Police Contact Details (RSA3 Only)		**Maintaining Agent Contact Details**		
N/A		N/A		
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB and Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The scheme has been updated to reflect the RSA stage 1 safety audit. The circulatory carriageway and the A299 east arm have been reduced to two lanes. The change in the junction layout has required the junction to be signalised, appropriate lane markings have been added with respect to the change to signals.

A swept path assessment has been undertaken using a maximum legal length articulated HGV (UK 16.5m) to ensure the revised scheme can adequately and safely accommodate the vehicle for all movements within the revised scheme.

It is unknown when this junction would be constructed as this is to be agreed with KCC as part of ongoing discussions. Complete should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB and Traffic Signs Regulations and General Directions (TSRGD) have been used to design the proposed scheme.

Design Speeds
Provide details of applied and/or existing design speeds.

Existing:
A229 (east) – 70mph (at junction approach); Richborough Way (A256) – 70mph; Cottington Link Road – 60mph; A299 (north) – 70mph

Speed Limits
State whether mandatory or advisory, available speed data.

Existing:
A229 (east) – 70mph (at junction approach); Richborough Way (A256) – 70mph; Cottington Link Road – 60mph; A299 (north) – 70mph

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The traffic flow of the junction will be provided from the MCC taken at this junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the junction for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

There is no facility for non-motorist road users as this junction is located in a rural area.

Environmental Constraints
Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.

No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

Junction is located northwest of Cliffsend and surrounded by green fields.

General Description
Include road network, road type, relevant land uses etc.

A299 (east), Richborough Way (A256) and A299 (north) are standard dual carriageway. Cottington Link Road is a two-way single carriageway.

As this junction is located in a rural area without non-motorist demand, there is no facility for non-motorists.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Total six accidents have been recorded at the junction. These are accidents 35, 483, 488, 342, 493 and 501.

One of the six accidents was serious. This serious accident occurred when a motorbike lost its grip on the road.

Five of the six accidents were slight. Two of the slight accidents involved motorbike and occurred due to careless driving. The major cause for the slight accidents was driver's error.

The details of these accidents will be provided with this brief.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – A256-A299 – ATC results		22.05.2019
RSA – A256-A299 – future Year Traffic Flows (2039)		22.05.2019
RSA – A256-A299 – Accident Data		22.05.2019
RSA – A256-A299 – Linsig		22.05.2019

Drawings

Reference/Revision	Title	Date
RSA – A256-A299 – Revised scheme		22.05.2019
RSA – A256-A299 – Swept Path analysis		22.05.2019
RSA – A256-A299 – Cad file		22.05.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

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Technical note:
RSA Stage 1:Designers Response- Minster Roundabout – Junction 4

1. Introduction

This Technical note forms the Designers Response to the Stage 1 Road Safety Audit (RSA) conducted by Badingham limited for works associated with a Mitigation Scheme to improve Minster Roundabout located in Thanet. The junction was identified to require mitigation works as part of the Manston Airport TA.

Badingham Limited has been provided with the latest preliminary mitigation scheme design. This designer's response includes a revised design that results in a requirement to retain two lane entry and circulatory carriageway as part of a signalised junction arrangement.

The designer's response to each of the issues raised by the safety audit team is provided in the following sections. The text included within the RSA has been transposed into this document, a full copy of the original RSA is provided within **Appendix A**.

2. Designers Response

Problem 3.1

Location: Minster Roundabout.

Summary: Potential collisions arising from large vehicle access.

No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions or over-running of the verge or footways, endangering users.

Recommendation: It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.

Designers Response: A swept path assessment has been undertaken on the junction design and is included as **Appendix B.** The assessments have been undertaken using the max legal largest articulated HGV of 16.5m.

It should be noted that the assessment has been undertaken on a revised circulatory carriageway layout which now only contains two lanes which has been revised to address the problems flagged RSA Stage 1 undertaken by Baddingham below. The requirement for a two lane circulatory carriageway necessitates the need to convert this junction to a signalised roundabout.

Problem 3.2

Location: Minster Roundabout/Smugglers Leap exit.

Summary: Potential for collisions.

The change to three lane entry at the approach may lead to a large vehicle on the nearside lane of the A299 and another in the central lane both attempting to turn north to the B2190. The HGV may obscure visibility for drivers egressing the (one-way) access from Smugglers Leap leading to possible collisions. The egress from Smugglers Leap directly into the roundabout junction is considered unsafe.

Recommendation: It is recommended that Smugglers Lane (one-way) exit is closed.

Designers Response: It is noted that two vehicles can currently exit the A299 and turn left into the B2190. This is an existing situation which the personal injury accident data supports as not having a significant accident issue. The recommendation to close Smugglers Lane (one-way) exit is not considered necessary based on the accident data, although if required vehicles could exit onto the B2190 and U-turn at the roundabout to the north. Amending the Smugglers Leap exit only access into the roundabout gyratory does not materially impact on the mitigation scheme and as such either option could be absorbed within the mitigation measure as required by the local highway authority.

Problem 3.3

Location: Minster Roundabout-A299 east approach.

Summary: Potential for tipping.

The change to three lane entry at the approach and widening will encroach closer to the existing services where there is a level difference. Without sufficient barrier restraint there is a risk that vehicles, particularly HGVs may leave the carriageway and proceed down the embankment resulting in collisions.

Recommendation: It is recommended that appropriate barrier restraint systems are located in this location.

Designers Response: **Appendix C** includes for a revised junction layout. This includes for a revision of the junction design to continue with the existing arrangement of a two-lane entry on the A299 East approach. This can be achieved as the proposals for the junction have been revised to allow for a signalised roundabout scheme.

Problem 4.1

Location: Minster Roundabout/B2190.

Summary: Crossing distance.

An existing uncontrolled crossing facility is provided across this arm. It links to a shared footway/cycleway facility on the northern side of the A299 east although no signs or markings are present. It appears there is a bus stop on the B2190 southbound with no connecting pedestrian links. The increase in crossing distance on the approach and change to three lanes makes this crossing hazardous, particularly for the visually or mobility impaired. A bollard in the central waiting area presents an obstruction to users, the crossing on the western side of the B2190 terminates within the access arrangement serving the smugglers leap car park and is considered unsafe. There is a risk of collisions between pedestrians/cyclists with vehicles egressing the roundabout and approaching from the north on the B2190 as well as traffic utilising the Smugglers Leap access.

Recommendation: It is recommended that a controlled crossing is introduced to the north of the present arrangement.

Designers Response: As set out in the response to problem 3.3 the junction design has been revised to return to a two-lane circulatory carriageway which is now a signalised arm. This results in the access widths remaining the same.

However, it is noted in this revised design that the informal crossing now crosses head of the stop line where cars could regularly be queuing which presents a safety concern.

As such the informal crossing has bee retained on this arm but the crossing route has been moved on the eastern element of this arm. It is proposed (as set out in the revised scheme design in **Appendix C**) to move the informal crossing to in front of the stop line. Pedestrians would cross in front of the stop line to the central island where a path north would link back to the original location of the crossing if the western side of the arm. As part of this the footway on the eastern element of the arm leading to the formal crossing location will be removed and the footpath would end at the new crossing point.

The bollard in the central reserve could be removed if required. The western side of this crossing is noted to be located between the left in / left out arrangement to access smugglers leap and whilst this is not considered to be a typical arrangement, it is not shown to be an accident hot spot. Should an improvement be required at this location a kerbed central reserve could be considered. It is noted that the proposed development is not likely to intensify the movements to/from this access and as such this existing form of access is considered not to be directly linked to the proposed development. The level of pedestrian flows using this courtesy crossing facility are considered to be low and as such not trigger the requirement for a signalled crossing.

Problem 4.2

Location: Footway/cycleway at Smugglers Leap accesses.

Summary: Unclear right-of-way.

It is unclear whether vehicles or non-motorised users have right-of-way at the access points serving the Residential Park. Confusion may lead to possible collisions between vehicles utilising the access and non-motorised users of the footway/cycleway.

Recommendation: It is recommended that measures are introduced to clarify which users have priority in this location.

Designers Response: The provision of entry treatment including for white line giveway markings to pedestrians could be implemented at this location as part of the detailed design if required. The current arrangement uses surface treatment (colour and surface change) to indicate there is a change of priority.

Problem 5.2

Location: A299 west of Minster Roundabout.

Summary: Lack of signing for cyclists.

Presumably, the facility on the north side of the A299 in this location is a shared footway/cycleway although there is no signing for cyclists to indicate as such. There is a risk of cyclists being “squeezed” by large vehicles turning left at the B2190 approach leading to collisions.

Recommendation: It is recommended that signing for cyclists are incorporated within the design.

Designers Response: As part of the detailed design package of works a signage strategy will be provided.

3. General Comments

Sections 5-7

As part of the detailed design package of works a signage, lighting and drainage strategy will be provided.



Chris Morris

Approved by



Bev Coupe

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Appendix A
Road Safety Audit – Stage 1

Appendix TR3.25

A299/B2190 Minster Roundabout, Manston, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

29th April 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

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DOCUMENT ISSUE

Issue / Revision:	Issue 1			
Description / Status:	Final			
Date:	29/04/2019			
Prepared:	A. R. J. Setter			
Signature:	[redacted]			
Document Check:	D. F. Rogers			
Signature:	[redacted]			
Technical Check:	D. F. Rogers			
Signature:	[redacted]			
Authorised:	A. R. J. Setter			
Signa	[redacted]			
File Reference:	0781 Manston Airport - 4 - RSA1 - Issue 1.docx			

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FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo
Figure 3	Audit Plan

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed modifications to the Minster Roundabout junction, Manston, Kent. The works are associated with the redevelopment of Manston Airport.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 11.45am and 12.00pm. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise modifications to entry widths and kerb radii together with the proposed introduction of spiral circulatory surface markings. The A299 is a bus route. Street lighting is provided and the junction lies within a 50mph speed limit. Gradients in the area are minimal. Services and a hotel are situated either side of Tothill Street to the south. A footway/cycle facility is provided on the western side of Tothill Street that links to a staggered toucan crossing on the western arm of the A299. The shared footway/cycleway continues north on the west side of the B2190. On the northwest quadrant of the junction is an access arrangement serving the Smugglers Leap Residential Park.

1.11 Nineteen collisions are recorded within the latest five-year period 2013-2018. One collision was fatal with six categorised as serious. There were 12 slight collisions. A total of seventeen casualties were involved. No highway deficiencies were noted as contributory factors. A cluster of eight collisions is noted around the A299 (West) roundabout entry and nine around the A299 (East) entry.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 No previous audits have been undertaken.

Appendix TR3.25

SECTION 3: VEHICULAR AND HIGHWAY ISSUES

3.1 PROBLEM

Location: Minster Roundabout.

Summary: Potential collisions arising from large vehicle access.

3.1.1 No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions or over-running of the verge or footways, endangering users.

RECOMMENDATION

3.1.2 It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.



Photo 1 - Large vehicle turning at Minster Roundabout.

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3.2 **PROBLEM**

Location: Minster Roundabout / Smugglers Leap exit.

Summary: Potential for collisions.

3.2.1 The change to three lane entry at the approach may lead to a large vehicle on the nearside lane of the A299 and another in the central lane both attempting to turn north to the B2190. The HGV may obscure visibility for drivers egressing the (one-way) access from Smugglers Leap leading to possible collisions. The egress from Smugglers Leap directly into the roundabout junction is considered unsafe.

RECOMMENDATION

3.2.2 It is recommended that the Smugglers Lane (one-way) exit is closed.



Photo 2 - Potential for HGVs to obstruct visibility at Smugglers Leap exit.

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Photo 3 - Smugglers Leap exit.

3.3 **PROBLEM**

Location: Minster Roundabout – A299 east approach.

Summary: Potential for tipping.

3.3.1 The change to three lane entry at the approach and widening will encroach closer to the existing services where there is a level difference. Without sufficient barrier restraint there is a risk that vehicles, particularly HGVs may leave the carriageway and proceed down the embankment resulting in collisions.

RECOMMENDATION

3.3.2 It is recommended that appropriate barrier restraint systems are located in this location.

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Photo 4 - Level difference on south side of A299 (east).

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SECTION 4: NON-MOTORISED USERS

4.1 PROBLEM

Location: Minster Roundabout / B2190

Summary: Crossing distance.

4.1.1 An existing uncontrolled crossing facility is provided across this arm. It links (presumably?) to a shared footway/cycleway facility on the northern side of the A299 east although no signs or markings are present. It appears there is a bus stop on the B2190 southbound with no connecting pedestrian links. The increase in crossing distance on the approach and change to three lanes makes this crossing hazardous, particularly for the visually or mobility impaired. A bollard in the central waiting area presents an obstruction to users. The crossing on the western side of the B2190 terminates within the access arrangement serving the Smugglers Leap Park and is considered unsafe. There is a risk of collisions between pedestrians/cyclists with vehicles egressing the roundabout and approaching from the north on the B2190 as well as traffic utilising the Smugglers Leap access.

RECOMMENDATION

4.1.2 It is recommended that a controlled crossing is introduced to the north of the present arrangement.



Photo 5 - View east across B2190.



Photo 6 - View north on the B2190

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4.2 **PROBLEM**

Location: Footway/cycleway at Smugglers Leap accesses.

Summary: Unclear right-of-way.

4.2.1 It is unclear whether vehicles or non-motorised users have right-of-way at the access points serving the Residential Park. Confusion may lead to possible collisions between vehicles utilising the access and non-motorised users of the footway/cycleway.

RECOMMENDATION

4.2.2 It is recommended that measures are introduced to clarify which users have priority in this location.



Photo 7 - Smugglers Leap access.

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SECTION 5: ROAD MARKINGS AND SIGNAGE

5.1 No signing details have been provided. A suitable package of signage information will need to be provided as part of any further detailed design.

5.2 **PROBLEM**

Location: A299 West of Minster Roundabout.

Summary: Lack of signing for cyclists.

5.2.1 Presumably, the facility on the north side of the A299 in this location is a shared footway/cycleway although there is no signing for cyclists to indicate as such. There is a risk of cyclists being 'squeezed' by large vehicles turning left at the B2190 approach leading to collisions.

RECOMMENDATION

5.2.2 It is recommended that signing for cyclists are incorporated within the design.



Photo 8 - View west on A299 (east) - note loose chippings.

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SECTION 6: STREET LIGHTING

6.1 No street lighting details have been provided. A suitable package of street lighting information will need to be provided as part of any further detailed design.

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SECTION 7: DRAINAGE

7.1 No drainage information is provided. A suitable package of drainage information will need to form part of any further detailed design.

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SECTION 8: AUDIT STATEMENT

8.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 29th April 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

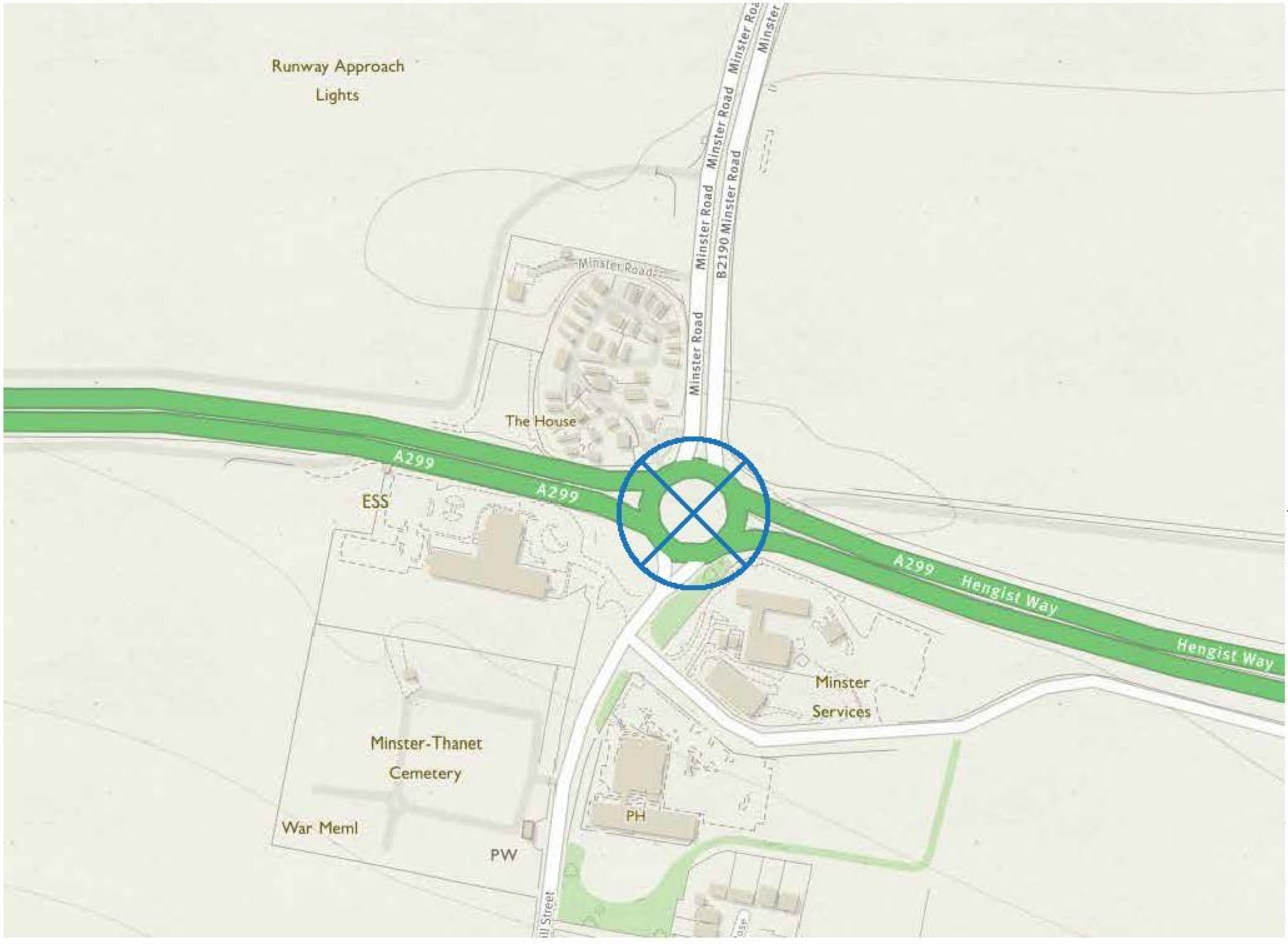
Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 29th April 2019

FIGURES

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Client: RSP

Project: Manston Airport

Title: Location Plan

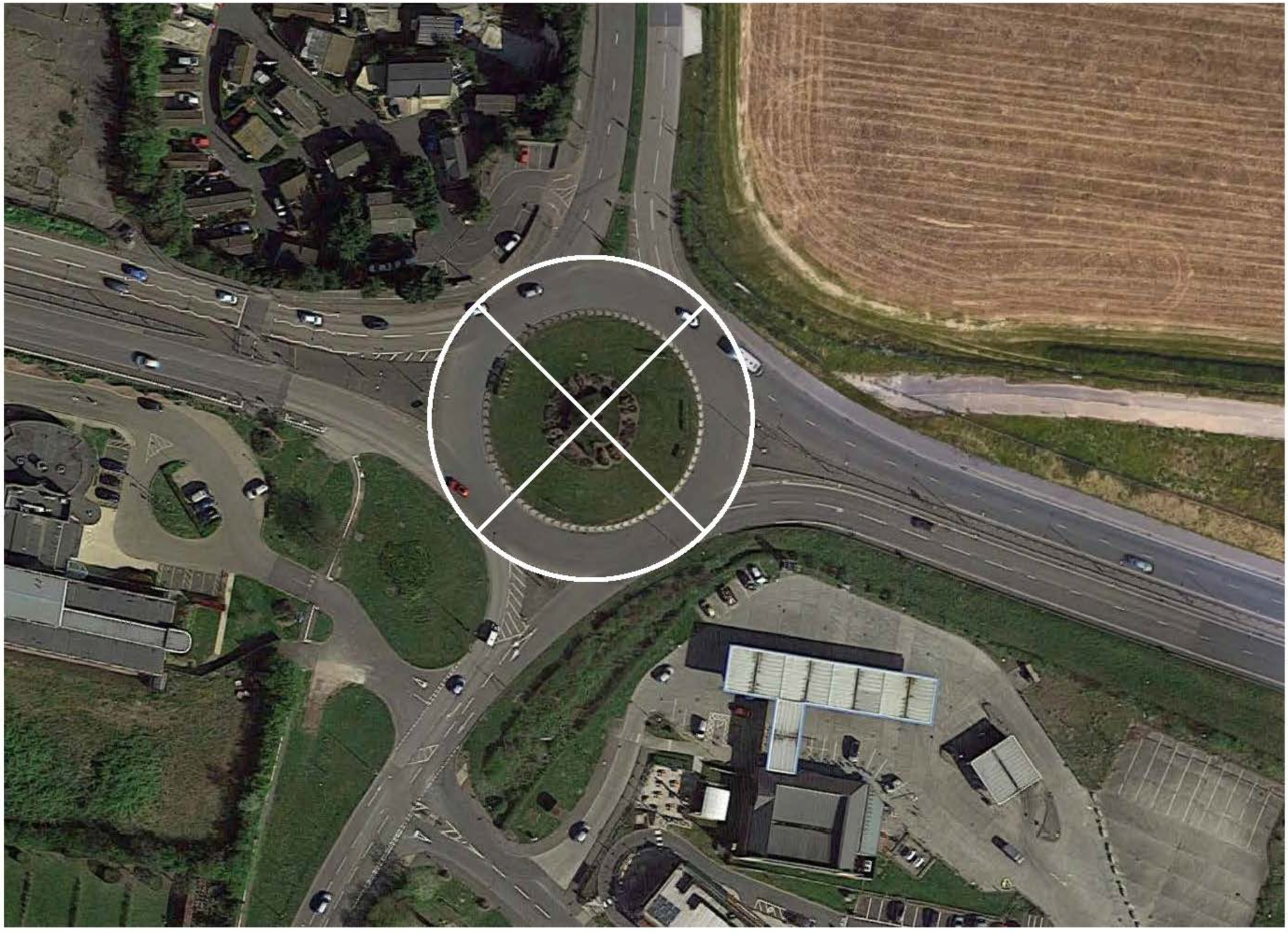
Date	Status
23/04/2019	FINAL

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Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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Client
RSP

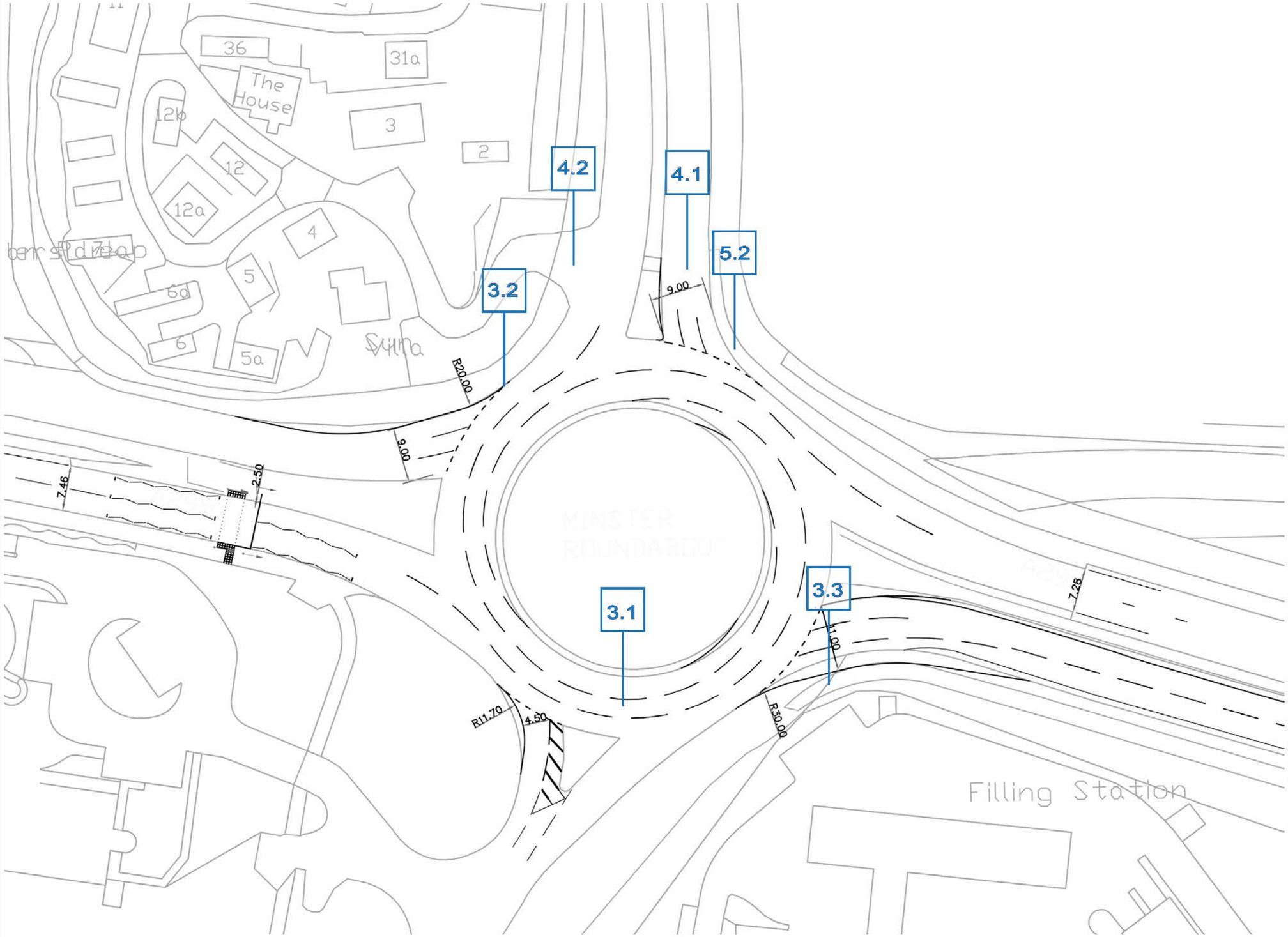
Project
Manston Airport

Title
Aerial Photo

Date	Status
23/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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North

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Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site.

Source: Site Location & Scheme

Rev.	Date	Initials	Amendments

Badingham
Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Audit Plan

Date	Status
29/04/2019	FINAL
Scale	**Original Size**
NTS	A3
Drawn	**Checked**
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 3	-

APPENDIX 1

Road Safety Audit Brief

Ref: AS/0781
Date: 29th April 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	12/04/2019
Document Reference:	
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Junction A299/B2190 Mitigation Proposal
Report title:	Manston Airport – Junction A299/B2190 Mitigation Proposal - RSA Stage 1
PREPARED BY:	
Name:	Pranav Yadav
Signed:	
Organisation:	Wood
Date:	12/04/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Junction A299/B2190 Mitigation Proposal – Hengist Way (A299), Tothill Street, A299 (west), Minster Road (B2190)			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
Road realignment and marking				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details		**Design Organisation Details**		
16 Charles II Street London SW1Y 4NW		Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK		
Police Contact Details (RSA3 Only)		**Maintaining Agent Contact Details**		
N/A		N/A		
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB and Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposal is for a scheme to improve the existing A299/B2190 roundabout junction by providing road marking and re-aligning arms.

The kerb lines of all the arms will be re-aligned and new road marking will be provided accordingly. The proposed alignment will affect the entry radius of arms Hengist Way (A299), Tothill Street, A299 (west).

It is unknown when this junction would be constructed as this is to be agreed with KCC as part of ongoing discussions. Completion should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB and Traffic Signs Regulations and General Directions (TSRGD) have been used to design the proposed scheme.

Design Speeds
Provide details of applied and/or existing design speeds.

50mph (at junction approach)

Speed Limits
State whether mandatory or advisory, available speed data.

50mph (at junction approach)

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The traffic flow of the junction will be provided from the MCC taken at this junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the junction for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

The existing pedestrian crossing at A299 (west) exit arm will be improved.

Environmental Constraints
Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.

No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

Junction is located north of Minster and surrounded by private properties and a green field.

General Description
Include road network, road type, relevant land uses etc.

Hengist Way (A299) is a standard dual carriageway with reduced speed at junction approach. Tothill Street is a two-way standard single carriageway. A299 (west) is a standard dual carriageway with reduced speed at junction approach. Minster Road (B2190) is a dual carriageway without crash barriers, grass verge separates the inbound and outbound traffic.

As this junction is in the rural area, there is limited facility for non-motorists.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Total fifteen accidents have been recorded at the junction. These are accidents 58, 82, 93, 109, 114, 138, 266, 270, 290, 298, 311, 411, 441, 494 and 502.

One of the fifteen accidents was fatal. The fatal accident occurred when a car collided with junction and street furniture due to loss of control.

Four of the fifteen accidents were serious. The serious accidents occurred due to driver's errors such as failed to stop in time, speeding and failure to negotiate the junction.

Ten of the fifteen accident were slight. Two of the accidents involved pedal cycle and occurred due to careless driving. The major cause of the slight accidents was driver's error.

The details of these accidents will be provided with this brief.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – A299-B2190 – MCC results		12.04.2019
RSA – A299-B2190 – future Year Traffic Flows (2039)	-	12.04.2019
RSA – A299-B2190 – Accident Data		12.04.2019

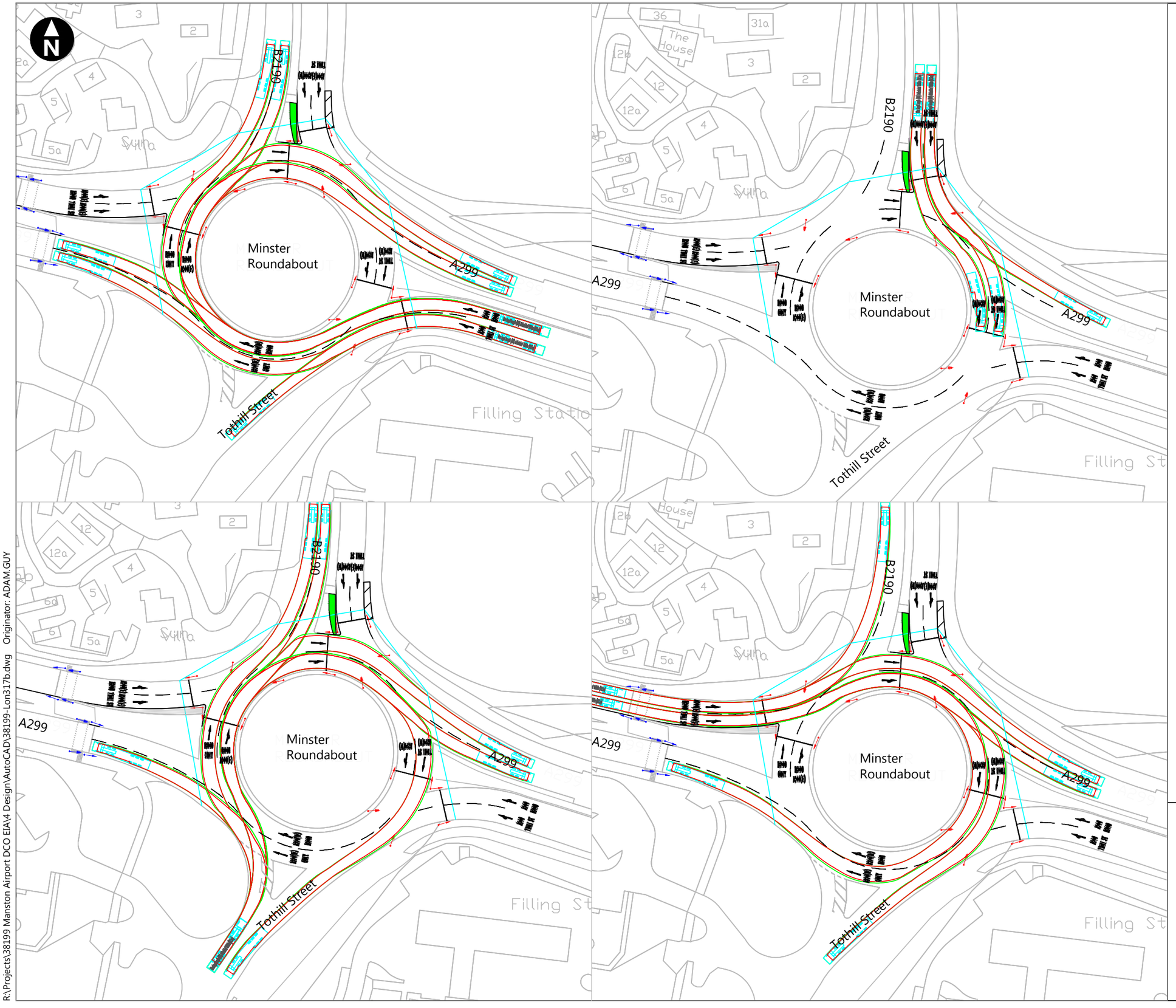
Drawings

Reference/Revision	Title	Date
RSA – A299-B2190 – Site Location and scheme		12.04.2019
RSA – A299-B2190 – Cad file		12.04.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

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Appendix B
Swept Path Assessment



Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Proposed traffic signal head
- Existing traffic signal head
- Wheel outline
- Body outline

0 m 50 m

Scale 1:1000 @ A3

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Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix B - Swept Path Analysis - Junction 4

May 2019

wood.

R:\Projects\38199 Manston Airport DCO EIA\4 Design\AutoCAD\38199-Lon317b.dwg Originator: ADAM.GUY

Appendix C
Proposed Scheme

Footway to be removed

New uncontrolled crossing ahead of the stop line and new footway to connect to uncontrolled crossing across B2190 northbound carriageway

B2190

A299

Minster Roundabout

A299

Tothill Street

Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed road marking
- Existing road marking
- Proposed traffic signal head
- Existing traffic signal head
- Additional island area
- Intervisibility

0 m 40 m

Scale 1:750 @ A3

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Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix C - Revised junction scheme - Junction 4

May 2019

wood.

R:\Projects\38199 Manston Airport DCO EIA\4 Design\AutoCAD\38199-Lon317b.dwg Originator: ADAM.GUY

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Road Safety Audit

Appendix TR3.25

A299/B2190 Minster Roundabout, Manston, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

22nd May 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

contact@badinghamuk.com

www.badinghamuk.com

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Appendix TR3.25

DOCUMENT ISSUE

Issue / Revision:	Issue 1	Issue 2			
Description / Status:	Final	Revised Audit Brief			
Date:	29/04/2019	22/05/2019			
Prepared:	A. R. J. Setter	A. R. J. Setter			
Signature:	[redacted]				
Document Check:	D. F. Rogers	D. F. Rogers			
Signatur	[redacted]				
Technical Check:	D. F. Rogers	D. F. Rogers			
Sig	[redacted]				
Authorised:	A. R. J. Setter	A. R. J. Setter			
Signature:	[redacted]				
File Reference:	0781 Manston Airport - 4 - RSA1 - Issue 1.docx	0781 Manston Airport - 4 - RSA1 - Issue 2.docx			

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Page No

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SECTION 1:	INTRODUCTION	1
SECTION 2:	ITEMS RAISED AT PREVIOUS AUDITS	3
SECTION 3:	ITEMS RAISED AT THIS AUDIT	4
SECTION 4:	AUDIT STATEMENT	5

FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed modifications to the Minster Roundabout junction, Manston, Kent. The works are associated with the redevelopment of Manston Airport.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 11.45am and 12.00pm. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise the introduction of signal control to the existing roundabout junction. The A299 is a bus route. Street lighting is provided and the junction lies within a 50mph speed limit. Gradients in the area are minimal. Services and a hotel are situated either side of Tothill Street to the south. A footway/cycle facility is provided on the western side of Tothill Street that links to a staggered toucan crossing on the western arm of the A299. The shared footway/cycleway continues north on the west side of the B2190. On the northwest quadrant of the junction is an access arrangement serving the Smugglers Leap Residential Park.

1.11 Nineteen collisions are recorded within the latest five-year period 2013-2018. One collision was fatal with six categorised as serious. There were 12 slight collisions. A total of seventeen casualties were involved. No highway deficiencies were noted as contributory factors. A cluster of eight collisions is noted around the A299 (West) roundabout entry and nine around the A299 (East) entry.

Appendix TR3.25

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 A Road Safety Audit Stage 1 (Issue 1) was prepared by Badingham in April 2019. A Designer's Response was prepared by Wood in April 2019 together with a subsequent revised Audit Brief. This Road Safety Audit Stage 1 (Issue 2) considers the proposed design revisions and response to the original audit (Issue 1). No matters are outstanding.

SECTION 3: ITEMS RAISED AT THIS AUDIT

3.1 No observations.

Appendix TR3.25

SECTION 4: AUDIT STATEMENT

4.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 22nd May 2019

Audit Team Member

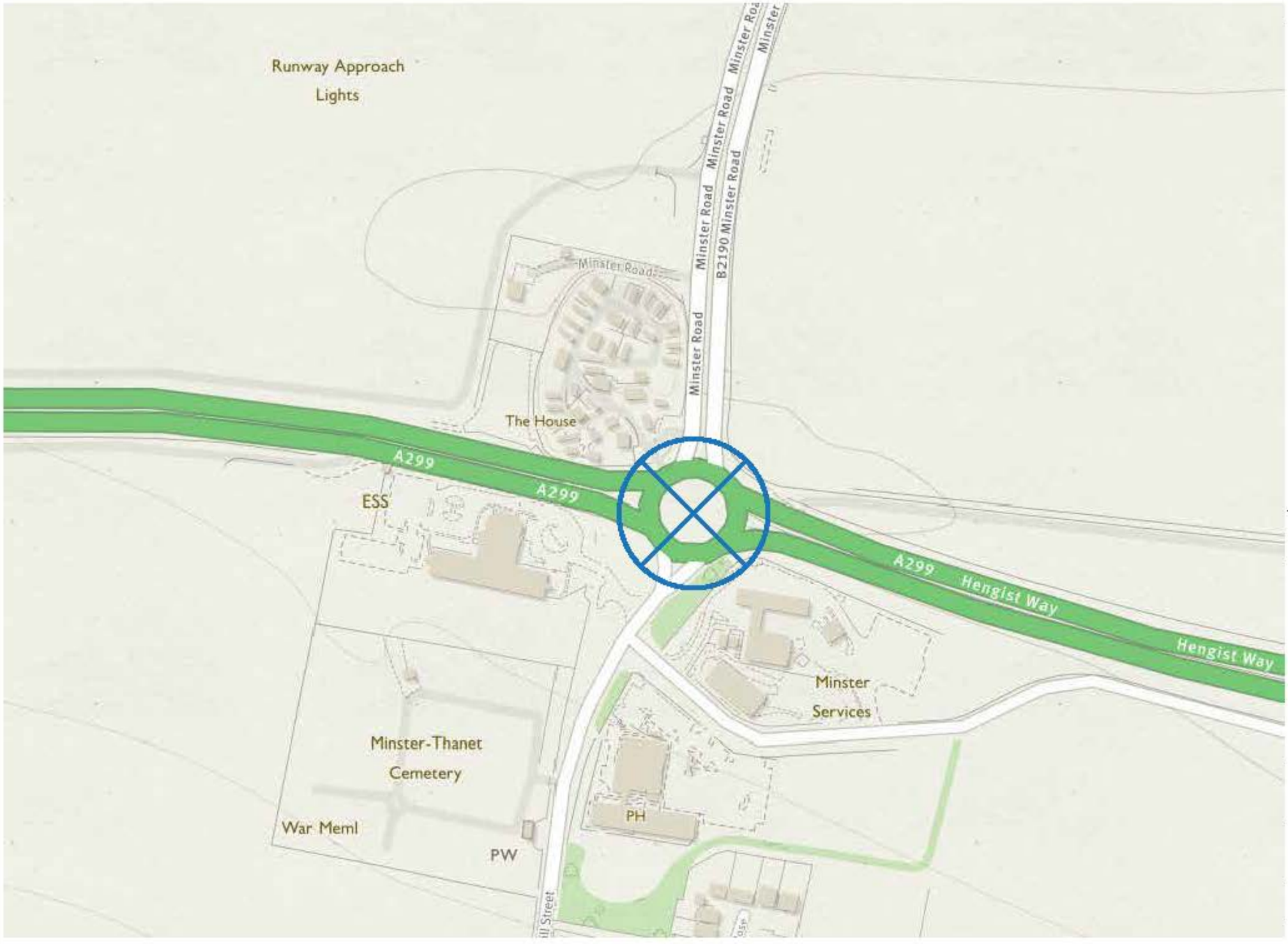
D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 22nd May 2019

FIGURES



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North

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Rev.	Date	Initials	Amendments

Badingham
Transport Planning
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Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Location Plan

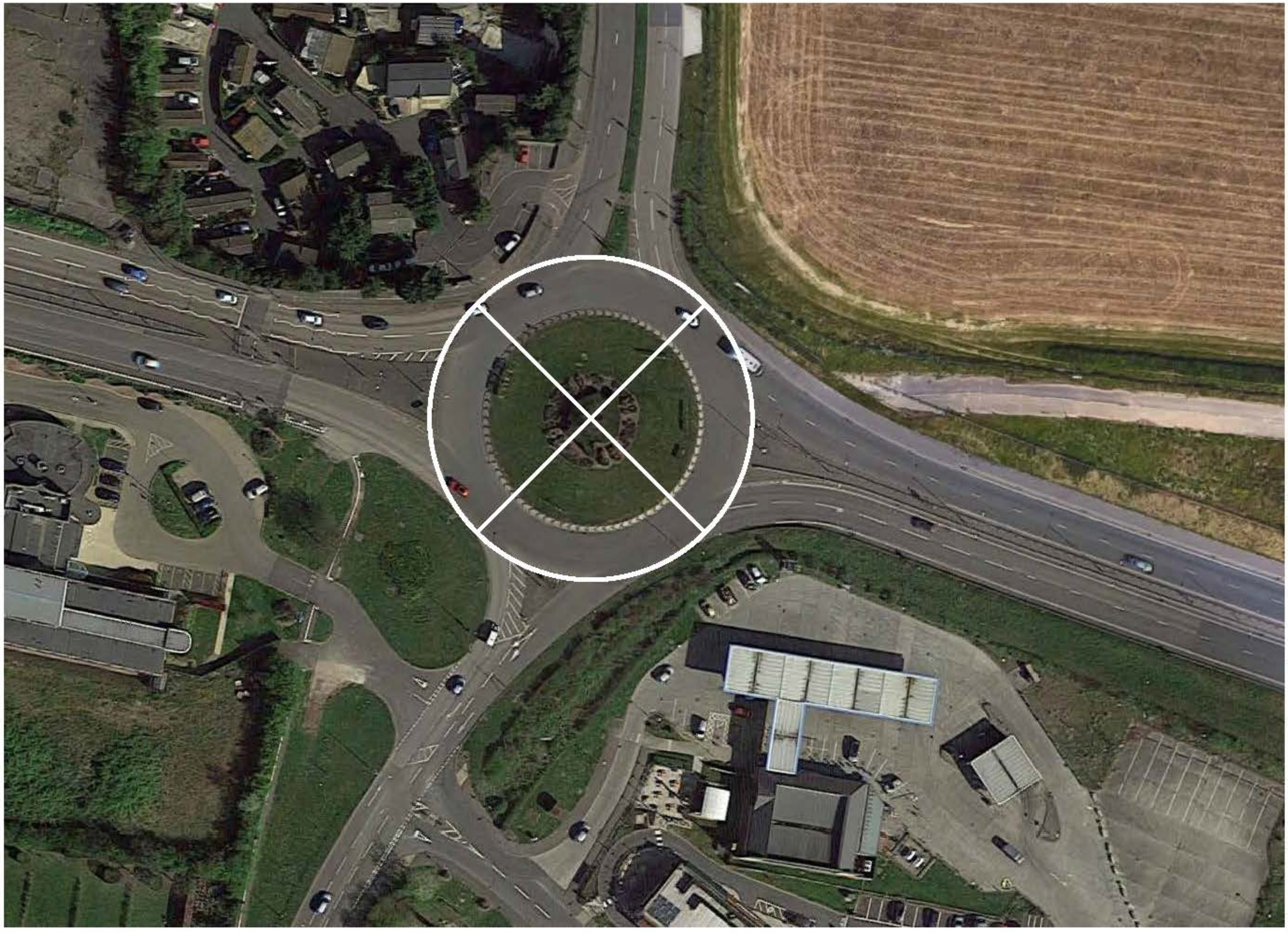
Date	Status
23/04/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

Appendix TR3.25



North

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Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site.

Rev.	Date	Initials	Amendments

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Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client
RSP

Project
Manston Airport

Title
Aerial Photo

Date	Status
23/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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APPENDIX 1

Road Safety Audit Brief (Revised)

Ref: AS/0781
Date: 22nd May 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	12/04/2019
Document Reference:	
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Junction A299/B2190 Mitigation Proposal
Report title:	Manston Airport – Junction A299/B2190 Mitigation Proposal - RSA Stage 1
PREPARED BY:	
Name:	Glyn Price
Signed:	
Organisation:	Wood
Date:	15.05.2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Junction A299/B2190 Mitigation Proposal – Hengist Way (A299), Tothill Street, A299 (west), Minster Road (B2190)			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
Road realignment and marking				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Second iteration			
Overseeing Organisation Details		**Design Organisation Details**		
16 Charles II Street London SW1Y 4NW		Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK		
Police Contact Details (RSA3 Only)		**Maintaining Agent Contact Details**		
N/A		N/A		
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB and Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposal is for a scheme to improve the existing A299/B2190 roundabout junction by providing road marking and re-aligning arms.

The kerb lines of all the arms will be re-aligned and new road marking will be provided accordingly. The proposed alignment will affect the entry radius of arms Hengist Way (A299), Tothill Street, A299 (west).

It is unknown when this junction would be constructed as this is to be agreed with KCC as part of ongoing discussions. Completion should take between 3-6 months.

The scheme has been updated to reflect the RSA stage 1 safety Audit. The circulatory carriageway and the B2190, A299 East and the A299 west approaches have all been reduced to two lane approaches. The change in the junction layout has required the junction to be signalised.
An uncontrolled crossing on the B2190 arm has been changed as part of the revised scheme. The footway on the eastern side of the B2190 approach is proposed to be removed after the signal head and pedestrians will be required to cross in front of the stop line to the central island where a footway will route to the old uncontrolled crossing alignment across the B2190 northbound carriageway.

A swept path assessment has been undertaken using a maximum legal length articulated HGV (UK 16.5m) to ensure the revised scheme can adequately and safely accommodate the vehicle for all movements within the revised scheme.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB and Traffic Signs Regulations and General Directions (TSRGD) have been used to design the proposed scheme.

Design Speeds
Provide details of applied and/or existing design speeds.

50mph (at junction approach)

Speed Limits
State whether mandatory or advisory, available speed data.

50mph (at junction approach)

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The traffic flow of the junction will be provided from the MCC taken at this junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the junction for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

The existing pedestrian crossing at A299 (west) exit arm will be improved.
Environmental Constraints *Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.*
No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

Junction is located north of Minster and surrounded by private properties and a green field.

General Description
Include road network, road type, relevant land uses etc.

Hengist Way (A299) is a standard dual carriageway with reduced speed at junction approach. Tothill Street is a two-way standard single carriageway. A299 (west) is a standard dual carriageway with reduced speed at junction approach. Minster Road (B2190) is a dual carriageway without crash barriers, grass verge separates the inbound and outbound traffic.

As this junction is in the rural area, there is limited facility for non-motorists.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Total fifteen accidents have been recorded at the junction. These are accidents 58, 82, 93, 109, 114, 138, 266, 270, 290, 298, 311, 411, 441, 494 and 502.

One of the fifteen accidents was fatal. The fatal accident occurred when a car collided with junction and street furniture due to loss of control.

Four of the fifteen accidents were serious. The serious accidents occurred due to driver's errors such as failed to stop in time, speeding and failure to negotiate the junction.

Ten of the fifteen accident were slight. Two of the accidents involved pedal cycle and occurred due to careless driving. The major cause of the slight accidents was driver's error.

The details of these accidents will be provided with this brief.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – A299-B2190 – MCC results		16.05.2019
RSA – A299-B2190 – future Year Traffic Flows (2039)	-	16.05.2019
RSA – A299-B2190 – Accident Data		16.05.2019
RSA – A299 –B2190 – LINSIG Model		16.05.2019
RSA – A299-B2190 – LINSIG outputs		16.05.2019

Drawings

Reference/Revision	Title	Date
RSA – A299-B2190 – Revised Scheme		16.05.2019
RSA – A299-B2190 – Swept path assessment		16.05.2019
RSA – A299-B2190 – Cad file		16.05.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

Appendix TR3.27

Appendix TR3.27

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Technical note:
RSA Stage 1:Designers Response- St Nicholas Roundabout

1. Introduction

This Technical note forms the Designers Response to the Stage 1 Road Safety Audit (RSA) conducted by Badingham limited for works associated with a Mitigation Scheme to improve St Nicholas Roundabout located in Thanet. The junction was identified to require mitigation works as part of the Manston Airport TA.

Badingham Limited has been provided with the latest preliminary mitigation scheme designs, at this junction the mitigation scheme is proposed to provide lane markings and signage to inform drivers of the lanes to use to travel through the junction to their desired route with the desire to achieve a more equal lane use on the approaches to the junction.

The designer's response to each of the issues raised by the safety audit team is provided in the following sections. The text included within the RSA has been transposed into this document, a full copy of the original RSA is provided within **Appendix A**.

2. Designers Response

Problem 5.1

Location: St Nicholas Roundabout.

Summary: Lack of lane direction arrows.

The proposed lane markings help drivers to select the correct lane position themselves in when approaching the junction. If the markings are blocked by slow moving or large vehicles they could be missed, leading to late braking decisions and possible skid, or loss of control type collisions.

Recommendation: It is recommended that the indicated lane markings are supplemented by additional arrow markings at each entry to further enhance the legibility and safety of the scheme.

Designers Response: The recommendation to additionally provide lane direction arrows as part of the scheme is noted and will be added through the detailed design. It is however noted that alongside the carriageway markings advanced warning signage detailing lane destinations are proposed to add information when the lanes are heavily trafficked. The detailed design will include for full road markings and a comprehensive signage strategy.

Problem 5.2

Location: St Nicholas Roundabout. High speed approaches,

Summary: Potential for collisions with sign posts.

New signs are proposed on the A299 approaches. The posts present a potential hazard to traffic if involved in a collision, particularly at high speed.

Recommendation: It is recommended that any new signs are of the passive safe variety.

Designers Response: The recommendation to use passive safe signage is noted and consideration for this type of signage can be made during detailed design.

3. General Comments

Sections 6 -7

As part of the detailed design package of works a lighting and drainage strategy will be provided.

Issued by

[redacted]

Chris Morris

Approved by

[redacted]

Bev Coupe

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Appendix A
Road Safety Audit – Stage 1

A299/A28 St Nicholas Roundabout, Manston, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

29th April 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

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Appendix TR3.27

DOCUMENT ISSUE

Issue / Revision:	Issue 1			
Description / Status:	Final			
Date:	29/04/2019			
Prepared:	A. R. J. Setter			
Signature:	[redacted]			
Document Check:	D. F. Rogers			
Signature:	[redacted]			
Technical Check:	D. F. Rogers			
Signa	[redacted]			
Authorised:	A. R. J. Setter			
Signature:	[redacted]			
File Reference:	0781 Manston Airport - 7 - RSA1 - Issue 1.docx			

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FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo
Figure 3	Audit Plan

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed modifications to the St Nicholas roundabout junction, Manston, Kent. The works are associated with the redevelopment of Manston Airport.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 12.15pm and 12.30pm. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise lane direction markings and associated signing. The A28 Canterbury Road (north) is a rural dual carriageway without physical barrier, subject to 50mph speed limit. The A299 (south) and Canterbury Road (south) are standard two-way single carriageway. A temporary off-road parking facility is located off Potten Street Road at northwest corner of the junction.

1.11 Street lighting is provided to this five-arm junction and gradients in the area are minimal. Potten Street Road is subject to a 50mph speed limit. The junction lies within a derestricted speed zone and approach speeds from the A229 in particularly were noted to be high, as well as circulatory speeds. Separate cycleways are provided either side of the A299 (south) although their presence is not obvious to users. Footways are provided around the junction with substandard (lack of tactile paving) crossings. It was noted during the site inspection that the busy junction and speed of traffic made use of the pedestrian crossings hazardous.

1.12 A total of thirteen collisions are recorded at this junction over the latest 5-year period. One was categorised as serious and involved a motorcyclist failing to stop in time and colliding with a moving vehicle. One of the slight collisions involved a motorcyclist losing control during bad weather. The major cause for the slight collisions was careless driving at the roundabout junction. No highway deficiencies were noted as contributory factors.

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SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 No previous audits have been undertaken.

Appendix TR3.27

SECTION 3: VEHICULAR AND HIGHWAY ISSUES

3.1 No observations.

Appendix TR3.27

SECTION 4: NON-MOTORISED USERS

4.1 No observations.

Appendix TR3.27

SECTION 5: ROAD MARKINGS AND SIGNAGE

5.1 PROBLEM

Location: St Nicholas Roundabout.

Summary: Lack of lane direction arrows.

5.1.1 The proposed lane markings help drivers to select the correct lane to position themselves in when approaching the junction. If the markings are blocked by slow moving or large vehicles they could be missed, leading to late braking decisions and possible skid, or loss-of-control type collisions.

RECOMMENDATION

5.1.2 It is recommended that the indicated lane markings are supplemented by additional arrow markings at each entry to further enhance the legibility and safety of the scheme.



Photo 1 - A229 northbound approach - lack of lane direction arrow markings.

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5.2 **PROBLEM**

Location: St Nicholas Roundabout. High speed approaches.

Summary: Potential for collisions with sign posts.

5.2.1 New signs are proposed on the A229 approaches. The posts present a potential hazard to traffic if involved in a collision, particularly at high speed.

RECOMMENDATION

5.2.2 It is recommended that any new signs are of the passive safe variety.



Photo 2 - Existing damaged sign.

Appendix TR3.27

SECTION 6: STREET LIGHTING

6.1 No street lighting details have been provided. A suitable package of street lighting information will need to be provided as part of any further detailed design.

Appendix TR3.27

SECTION 7: DRAINAGE

7.1 No drainage information is provided. A suitable package of drainage information will need to form part of any further detailed design.

Appendix TR3.27

SECTION 8: AUDIT STATEMENT

8.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Sign [redacted] Date: 29th April 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

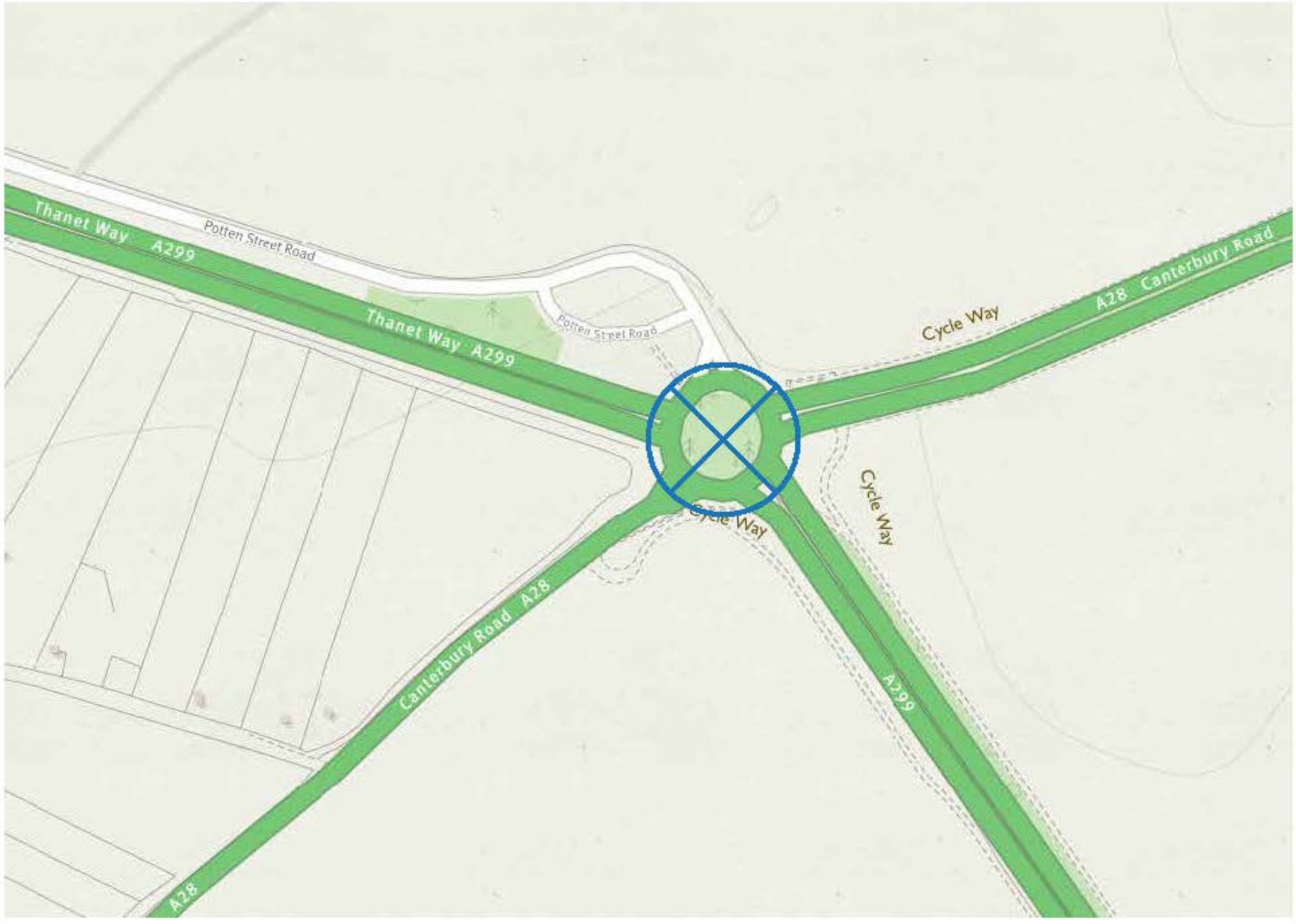
Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 29th April 2019

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FIGURES



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North

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Client: RSP

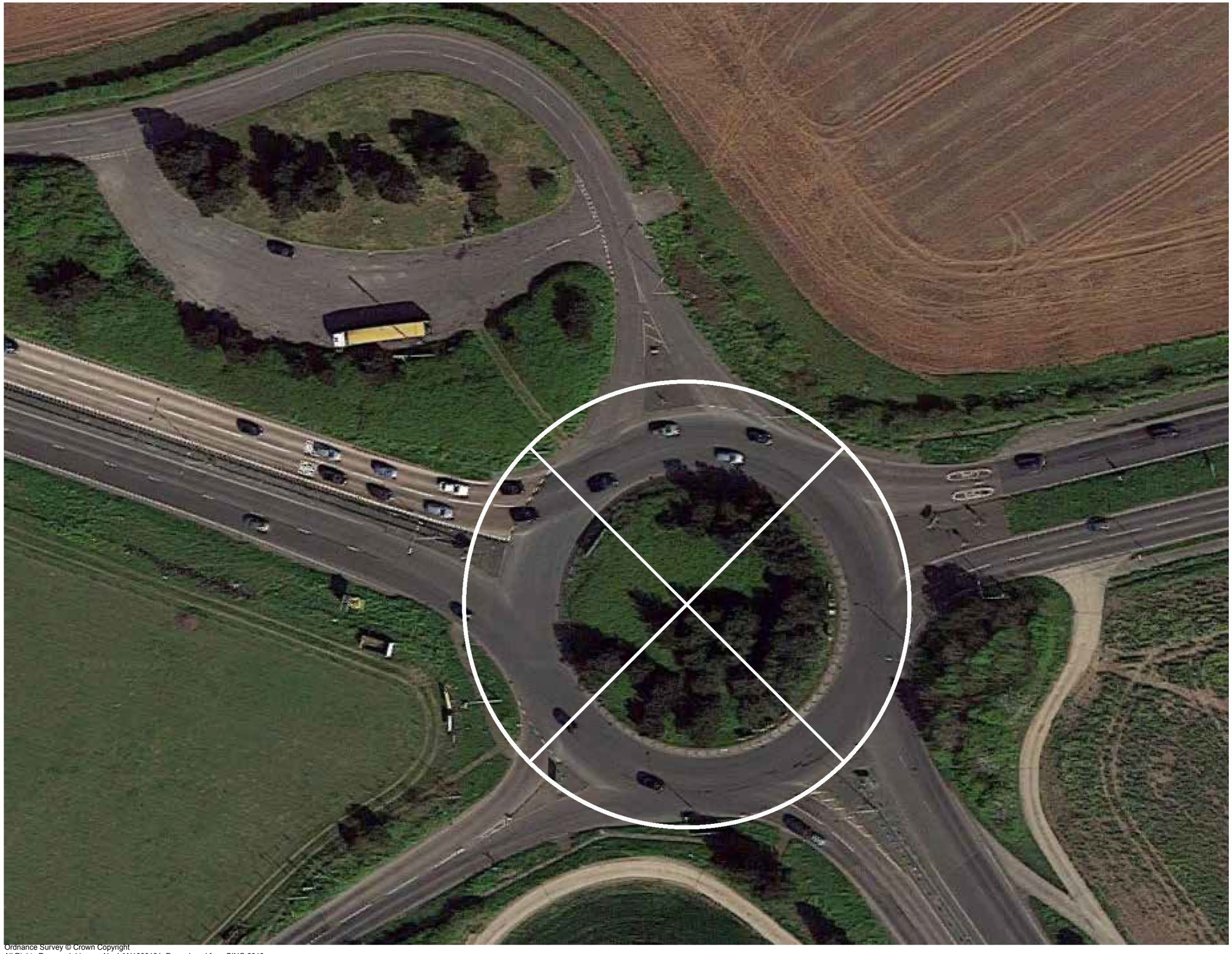
Project: Manston Airport

Title: Location Plan

Date	Status
23/04/2019	FINAL
Scale	**Original Size**
NTS	A3
Drawn	**Checked**
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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Client: RSP

Project: Manston Airport

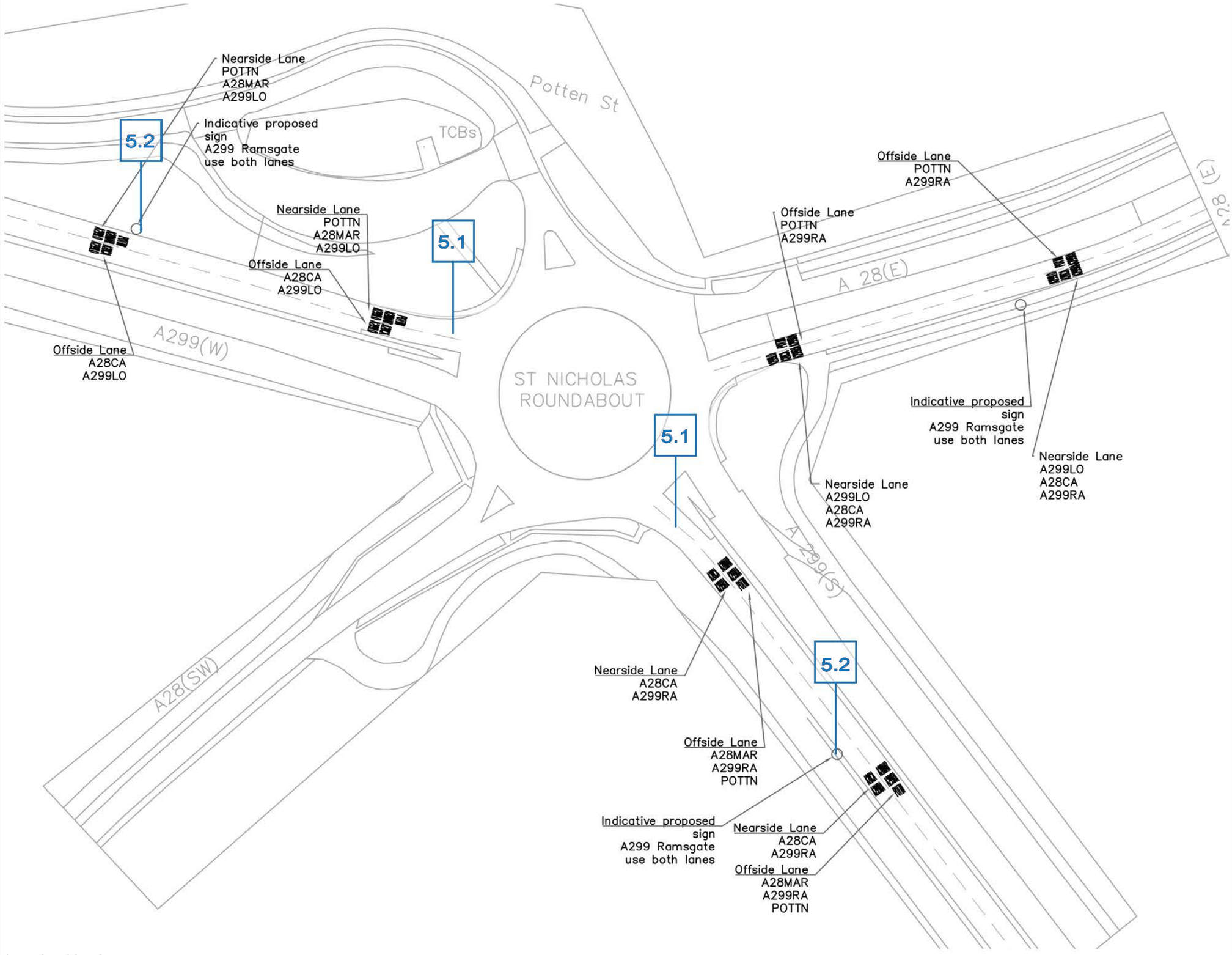
Title: Aerial Photo

Date	Status
23/04/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-



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North

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Source: Site Location & Access Design

Rev.	Date	Initials	Amendments

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www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Audit Plan

Date	Status
29/04/2019	FINAL
Scale	**Original Size**
NTS	A3
Drawn	**Checked**
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 3	-

APPENDIX 1

Road Safety Audit Brief

Ref: AS/0781
Date: 29th April 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	11/04/2019
Document Reference:	
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Junction A299/A28 Mitigation Proposal
Report title:	Manston Airport – Junction A299/A28 Mitigation Proposal - RSA Stage 1
PREPARED BY:	
Name:	Pranav Yadav
Signed:	
Organisation:	Wood
Date:	11/04/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Junction A299/A28 Mitigation Proposal – Canterbury Road (east), A299 (south), Canterbury Road (west), Thanet Way (A299), Potten Street Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
Junction improvement at the A299/A28 roundabout junction.				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details		**Design Organisation Details**		
16 Charles II Street London SW1Y 4NW		Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK		
Police Contact Details (RSA3 Only)		**Maintaining Agent Contact Details**		
N/A		N/A		
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
Traffic Signs Manual, Design Manual for Roads and Bridges TD16/07.				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposal is for a scheme to improve the existing A299/A28 roundabout junction by providing additional road markings and road signs.

Additional lane marking, and road signs will be provided to improve the traffic distribution to maximise the lane utilisation on Canterbury Road (east), A299 (south) and Thanet Road (A299).

At the moment it is unknown when construction will take place, there are ongoing discussions. Completion should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

Traffic Sings Manual from Department of Transport has been used to design the proposed scheme and TD16/07 of DMRB geometric design of roads and bridges.

Design Speeds
Provide details of applied and/or existing design speeds.

It is not proposed to change the speed limits on the approaches to the junction.

Speed Limits
State whether mandatory or advisory, available speed data.

Canterbury Road (east) – 50mph; A299 (south) – 70mph; Canterbury Road (west); Thanet Way (A299) – 70mph; Potten Road – 60mph.

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The traffic flow of the junction will be provided from the MCC taken at this junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the junction for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

In terms of non-motorist mode, there will be no physical change in the existing facilities.

Environmental Constraints
Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.

No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

Junction is located east of the St Nicholas At Wade and surrounded by green field.

General Description
Include road network, road type, relevant land uses etc.

Canterbury Road (east) is a dual carriageway without physical barrier, subject to 50mph speed limit. A299 (south) is a standard dual carriageway. Canterbury Road (west) is a standard two-way single carriageway. Thanet Way (A299) is a standard dual carriageway.

A temporary off-road parking facility is located off Potten Street Road at northwest corner of the junction.

As this junction is in the rural area, there is limited facility for non-motorists.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Total thirteen accidents have been recorded at the junction. These are accidents 19, 35, 51, 52, 148, 263, 288, 376, 380, 389, 497, 515 and 534.

One of the thirteen accidents was serious which involved a motorcycle. This accident occurred when a biker failed to stop in time and collided with a moving vehicle.

One of the slight accidents involved motorcyclist who lost control due to bad weather. The main cause for the slight accidents was careless driving.

The details of these accidents will be provided with this brief.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – A299/A28 – MCC results	-	11.04.2019
RSA – A299/A28 – Future Year Traffic Flows (2039)	-	11.04.2019
RSA – A299/A28 – Accident Data		11.04.2019

Drawings

Reference/Revision	Title	Date
RSA – A299/A28 – Site Location and Access design		11.04.2019
RSA – A299/A28 – Cad file		11.04.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

Appendix TR3.29

Appendix TR3.29

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Technical note:
RSA Stage 1: Designers' Response- Coffin House Corner Junction

1. Introduction

This Technical note forms the Designers Response to the Stage 1 Road Safety Audit (RSA) conducted by Badingham limited for works associated with a Mitigation Scheme to improve Coffin House Corner signal junction located in Thanet. The junction was identified to require mitigation works as part of the Manston Airport TA.

Badingham Limited has been provided with the latest preliminary mitigation scheme designs, at this junction the mitigation scheme is proposed to change the stage sequence following the removal of Nash road from the junction and to change to lane widths on the Shottendane Road approach to the junction and provide a road marking scheme.

The designer's response to each of the issues raised by the safety audit team is provided in the following sections. The text included within the RSA has been transposed into this document, a full copy of the original RSA is provided within **Appendix A**.

2. Designers Response

Problem 3.1

Location: Proposed junction and Nash Road turning head.

Summary: Potential collisions arising from large vehicle access.

No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage type collisions or over-running of the verge or footways, endangering users. Nash Road may also experience large HGV traffic including waste collection and delivery vehicles. Insufficient turning head space may lead to over-running of the adjacent footways leading to collisions with pedestrians or damage-type collisions with parked vehicles.

Recommendation: It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.

Designers Response: The issues with the Nash Road turning head are within the design prepared by KCC and not part of the amendments related to the proposal for Manston Airport. KCC undertook work via consulting engineers which indicates the ability for vehicles to undertaken turning movements at the Nash Road turning head. This is provided in **Appendix B** (Drawing 14/011-005).

Wood have undertaken swept path assessments of the remaining elements of the revised junction and this is also provided in **Appendix B**. This has been undertaken by using the max league articulated HGV allowed on UK roads of 16.5m in length and indicated the junction arrangement can accommodate these movements.

Problem 4.1

Location: College Road.

Summary: Lack of facilities for cyclists.

The existing advanced cycle storage facility is proposed to be replaced with a pedestrian crossing. No facilities for cyclists are provided on this approach. There is a risk of collisions between cyclists and vehicles, particularly involving HGVs squeezing cyclists against barrier fencing when turning right.

Recommendation: It is recommended that facilities are incorporated within the design.

Designers Response: The local plan improvement scheme for this junction provides the same level of cycle advanced stop lines (ASLs) as the proposed KCC mitigation design. The KCC Local Plan mitigation scheme is provided in **Appendix B**. ASLs are provided on the southern and western approaches which is therefore considered acceptable.

3. General Comments

Sections 5-7

As part of the detailed design package of works a signage, lighting and drainage strategy will be provided.

[redacted] **Approved by**

[redacted] .....

Chris Morris **Bev Coupe**

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Appendix A
Road Safety Audit – Stage 1

Coffin House Corner, Margate, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

28th April 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

contact@badinghamuk.com

www.badinghamuk.com

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DOCUMENT ISSUE

Issue / Revision:	Issue 1			
Description / Status:	Final			
Date:	28/04/2019			
Prepared:	A. R. J. Setter			
Signature:	[redacted]			
Document Check:	D. F. Rogers			
Signature:	[redacted]			
Technical Check:	D. F. Rogers			
Signatur	[redacted]			
Authorised:	A. R. J. Setter			
Signat	[redacted]			
File Reference:	0781 Manston Airport - 15 - RSA1 - Issue 1.docx			

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SECTION 7:	DRAINAGE	8
SECTION 8:	AUDIT STATEMENT	9

FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo
Figure 3	Audit Plan

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed modifications to the Coffin House Corner signal junction, Margate, Kent. The works are associated with the redevelopment of Manston Airport.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 13.30pm and 13.45pm. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise modifications to the existing five-arm signal-controlled junction at Coffin House Corner including the closure of Nash Road. The junction is an unconventional layout arrangement with significant gradients on some approaches and one-way approach and exit arms. It lies within a 30mph speed limit. Footways and street lighting are provided. A school is situated a short distance west of the junction. Pedestrian crossing facilities are proposed across all arms.

1.11 Three collisions are recorded within the latest five-year period. All collisions were categorised as slight resulting in three casualties. No highway deficiencies were noted as contributory factors.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 No previous audits have been undertaken.

Appendix TR3.29

SECTION 3: VEHICULAR AND HIGHWAY ISSUES

3.1 PROBLEM

Location: Proposed junction and Nash Road turning head.

Summary: Potential collisions arising from large vehicle access.

3.1.1 No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions or over-running of the verge or footways, endangering users. Nash Road may also experience large HGV traffic including waste collection and delivery vehicles. Insufficient turning head space may lead to over-running of the adjacent footways leading to collisions with pedestrians or damage-type collisions with parked vehicles.

RECOMMENDATION

3.1.2 It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.



Appendix TR3.29

SECTION 4: NON-MOTORISED USERS

4.1 PROBLEM

Location: College Road.

Summary: Lack of facilities for cyclists.

4.1.1 The existing advanced cycle storage facility is proposed to be replaced with a pedestrian crossing. No facilities for cyclists are provided on this approach. There is a risk of collisions between cyclists and vehicles, particularly involving HGVS 'squeezing' cyclists against barrier fencing when turning right.

RECOMMENDATION

4.1.2 It is recommended that facilities for cyclists are incorporated within the design.



SECTION 5: ROAD MARKINGS AND SIGNAGE

5.1 No signing details have been provided. A suitable package of signage information will need to be provided as part of any further detailed design.

Appendix TR3.29

SECTION 6: STREET LIGHTING

6.1 No street lighting details have been provided. A suitable package of street lighting information will need to be provided as part of any further detailed design.

Appendix TR3.29

SECTION 7: DRAINAGE

7.1 No drainage information is provided. A suitable package of drainage information will need to form part of any further detailed design.

Appendix TR3.29

SECTION 8: AUDIT STATEMENT

8.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 28th April 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

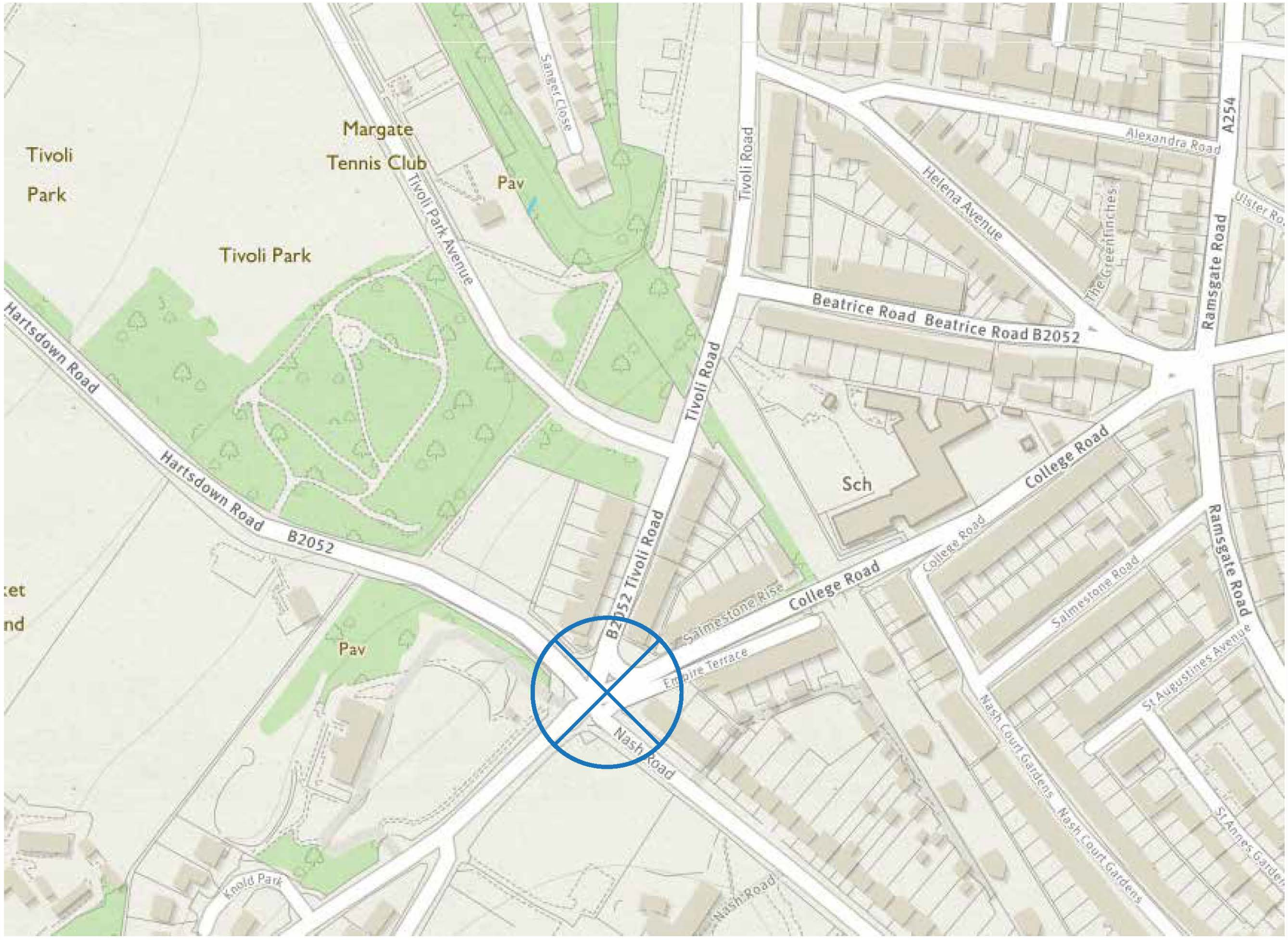
Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signe [redacted] Date: 28th April 2019

Appendix TR3.29

FIGURES



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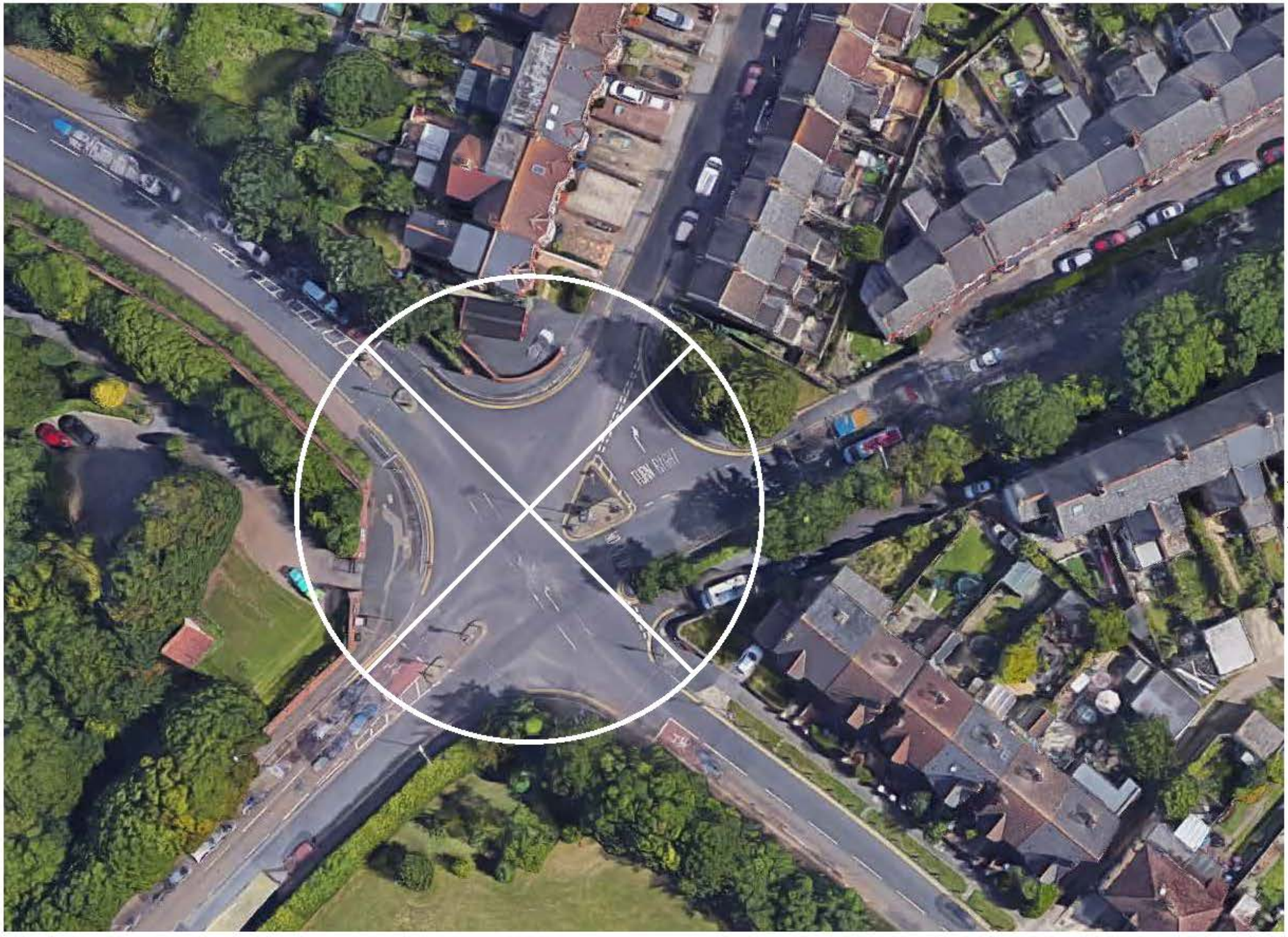
Project: Manston Airport

Title: Location Plan

Date	Status
24/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

Appendix TR3.29



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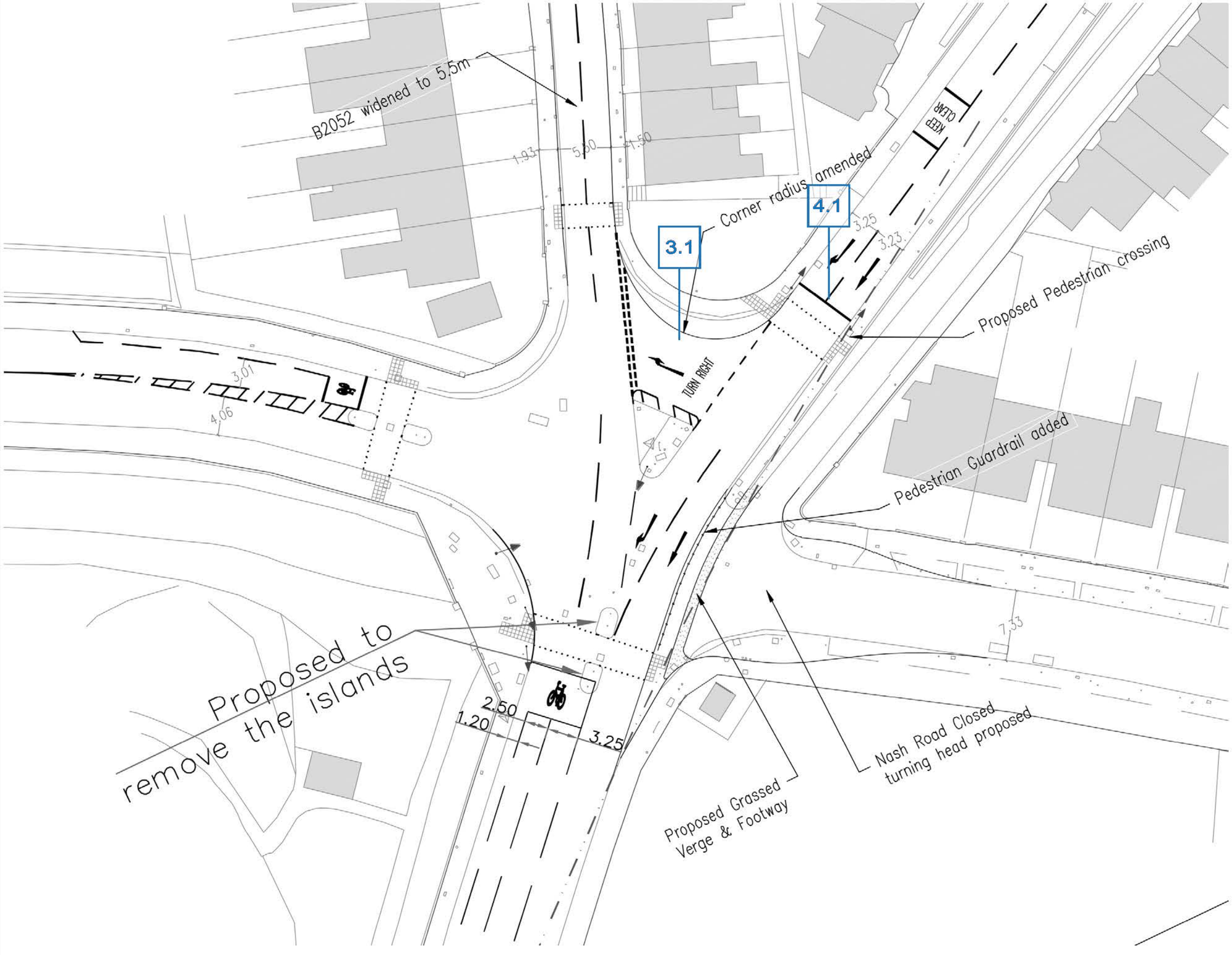
Project: Manston Airport

Title: Aerial Photo

Date	Status
24/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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Source: Site Location & Access Design

Rev.	Date	Initials	Amendments

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Client: RSP

Project: Manston Airport

Title: Audit Plan

Date	Status
29/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 3	-

Appendix TR3.29

APPENDIX 1

Road Safety Audit Brief

Ref: AS/0781
Date: 28th April 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	10/04/2019
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Nash Road/Shottendane Road Mitigation Proposal
Report title:	Manston Airport - Nash Road/Shottendane Road Mitigation Proposal - RSA Stage 1
PREPARED BY:	
Name:	Pranav Yadav
Signed:	
Organisation:	Wood
Date:	10/04/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Nash Road/Shottendane Road Mitigation Proposal – Nash Road, Shottendane Road, Hartsdown Road, Tivoli Road, College Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Roundabout Junction with the B2190				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details	**Design Organisation Details**			
16 Charles II Street London SW1Y 4NW	Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK			
Police Contact Details (RSA3 Only)	**Maintaining Agent Contact Details**			
N/A	N/A			
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB – TD 50/04 – The Geometric Layout of Signal-controlled Junctions and Signalised Roundabout				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposal is for a scheme to improve the existing Nash Road/Shottendane Road/Hartsdown Road/Tivoli Road/College Road signalised junction.

Junction access from Nash Road will be discontinued and layout of the junction will be modified accordingly.

It is unknown when this junction would be constructed as this is to be agreed with KCC as part of ongoing discussions. Complete should take between 3-6 months.

NOTE THAT THIS JUCNTION IS KNOWN LOCALLY AS COFFIN HOUSE CORNER

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB has been applied to the design of the proposed roundabout. DMRB TD 50/04 – The Geometric Layout of Signal-controlled Junctions and Signalised Roundabout

Design Speeds
Provide details of applied and/or existing design speeds.

30MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit around the junction is 30mph.

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The traffic flow of the junction will be provided from the MCC taken at this junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the junction for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

A pedestrian guardrail will be added at the side of closed Nash Road. A straight footway link between College Road and Shottendane Road will be established in the section of closed Nash Road. The existing pedestrian refuge island located at Shottendane Road arm will be removed. A new signal-controlled pedestrian crossing will be provided on College Road arm.

Environmental Constraints
Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.

No environmental constrains have been observed.

Appendix TR3.29

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

Junction is located southwest of the Margate and surrounded by private properties.

General Description
Include road network, road type, relevant land uses etc.

Nash Road, Shottendane Road and Hartsdown Road are two-way single carriageway. College Road is a one-way single carriageway with two-lane entry approach. Tivoli Road is also a one-way single carriageway which is an exit only arm of the junction.
Most of the corners of the junction is secured by guardrails. Footway and pedestrian crossing facilities are available at the junction.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Total seven slight accident have been recorded at the junction. These are accidents 10, 42 (additional year) 67, 194, 211, 216 and 255.

One of the accidents involved a pedestrian who was hit by wing mirror, when walking on the road in dark.

One of the accidents involved a cyclist who was hit by a car due to dazzling. Two of the slight accidents which involved motorcyclist, occurred due to careless driving.

Most of the accident occurred due to careless driving.

The details of these accidents will be provided with this brief.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – COFFIN HOUSE CORNER – MCC Results	-	11.04.2019
RSA – COFFIN HOUSE CORNER – future Year Traffic Flows (2039)	-	11.04.2019
RSA – COFFIN HOUSE CORNER – Accident Data		11.04.2019
RSA – COFFIN HOUSE CORNER – LINSIG output		11.04.2019

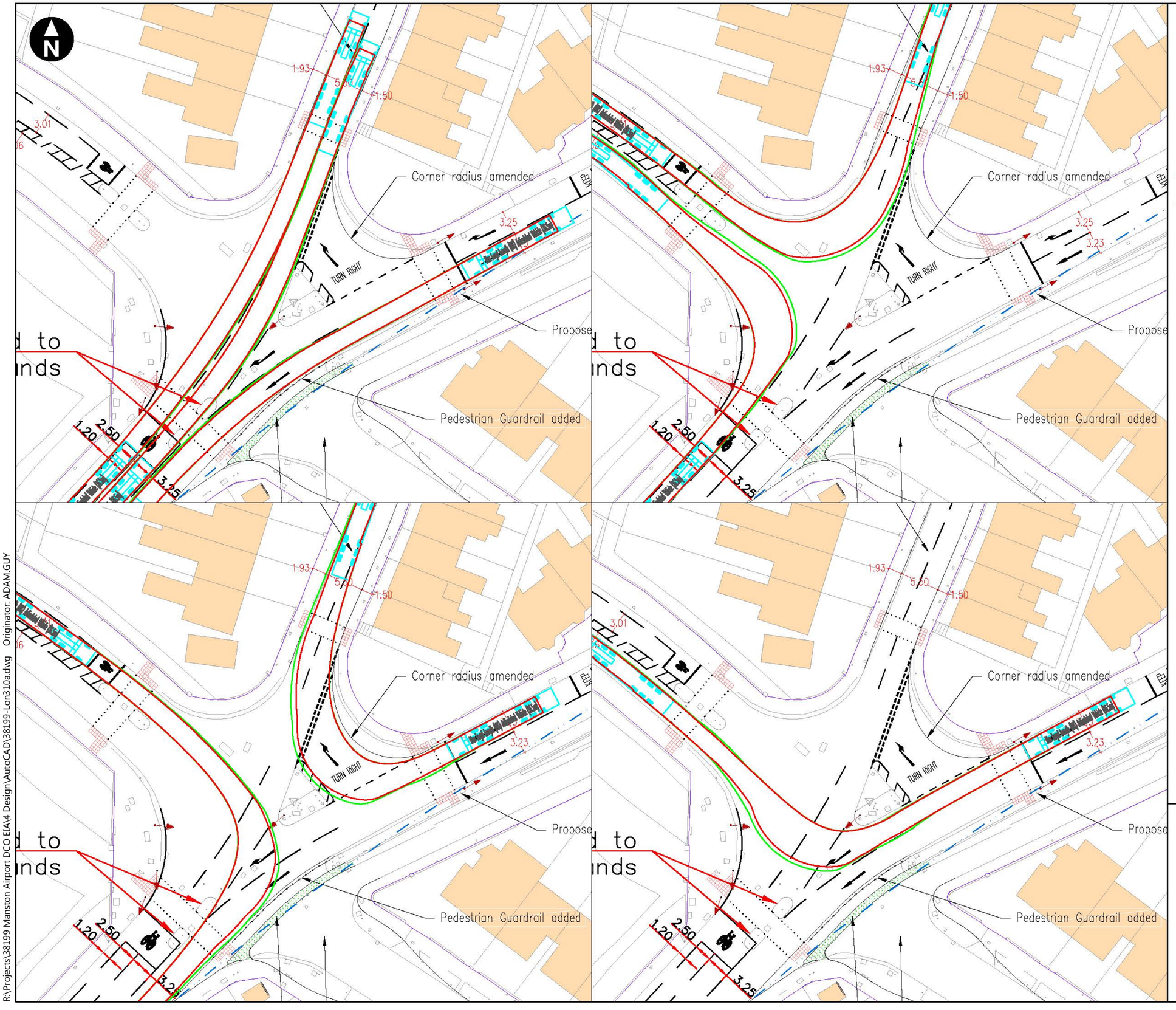
Drawings

Reference/Revision	Title	Date
RSA – COFFIN HOUSE CORNER – Site Location and Access design		11.04.2019
RSA – COFFIN HOUSE CORNER – Cad file		11.04.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan	✓	Scale Layout Plans	✓
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis	✓	Road Traffic Collision Plot	
Traffic Signal Staging	✓	Traffic Counts	✓
Speed Surveys	✓	Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	✓
Design Standards Used		Adjacent Land Uses	

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Appendix B
Local Plan Mitigation Scheme



Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed Road Marking
- Proposed secondary signal head with right turn indicative arrow
- Wheel outline
- Body outline

0 m 30 m

Scale 1:500 @ A3

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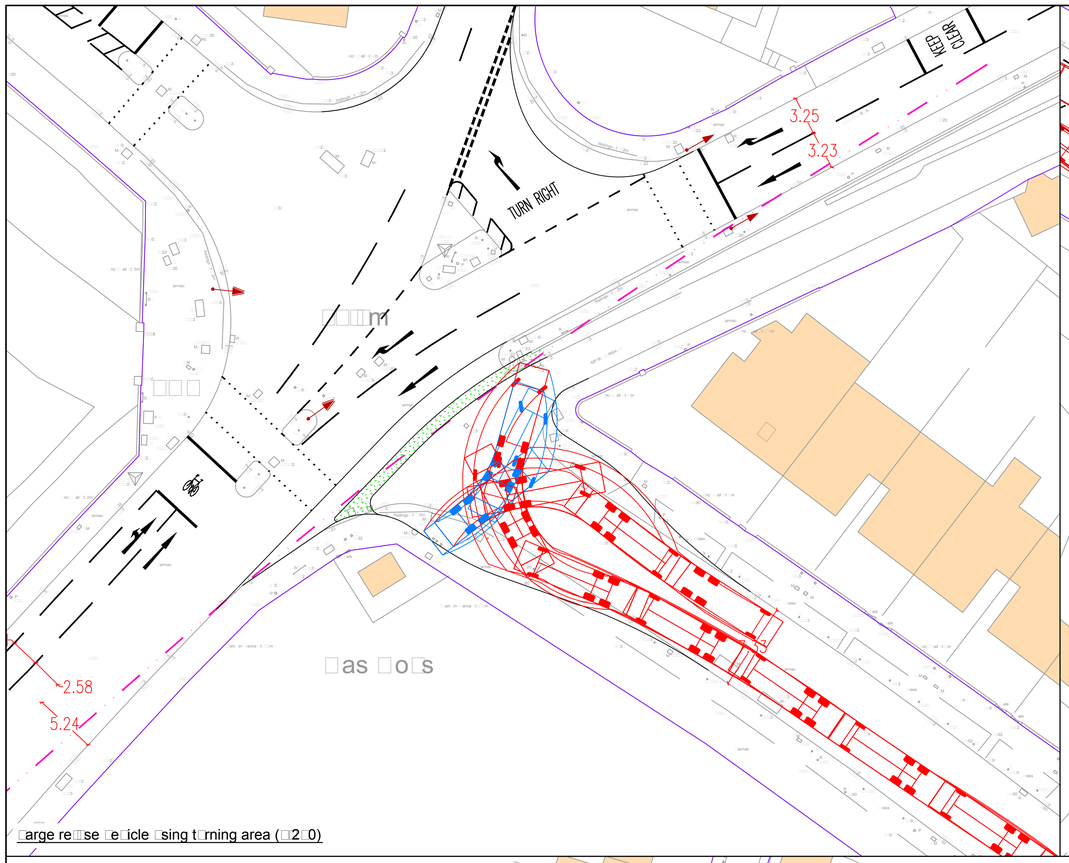
Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix B - Swept path assessment - Junction 15

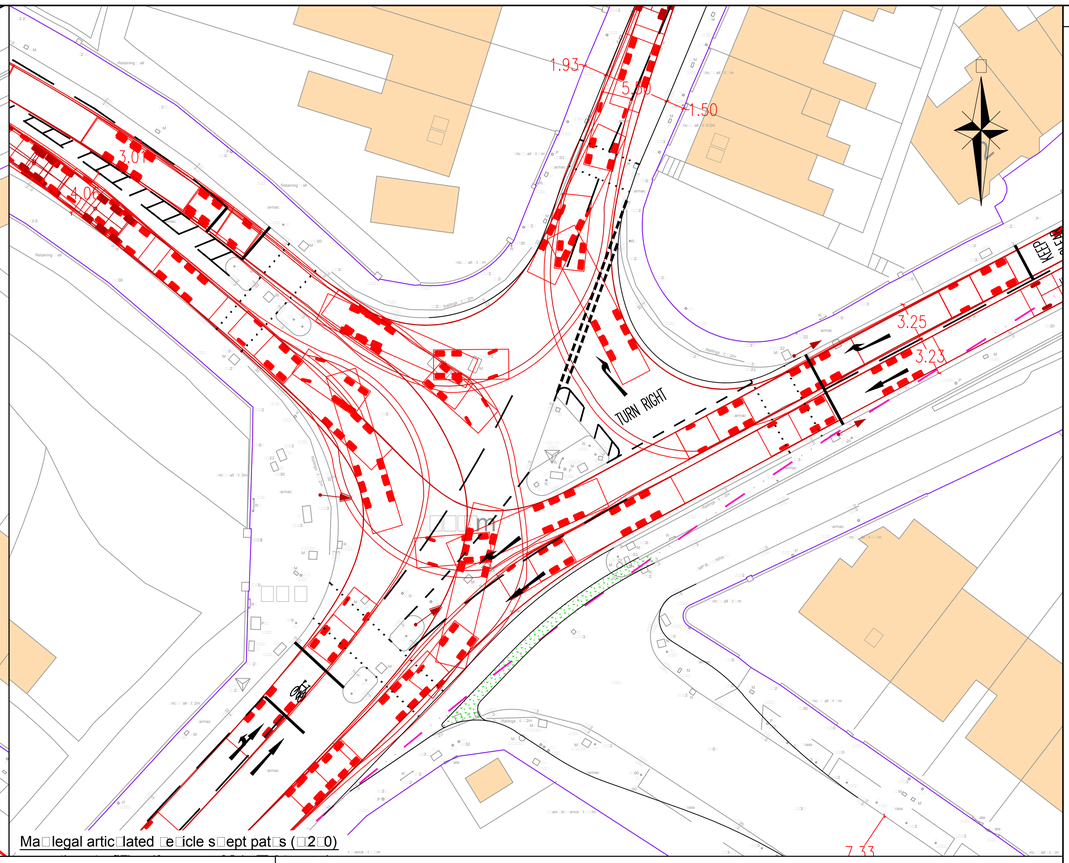
May 2019

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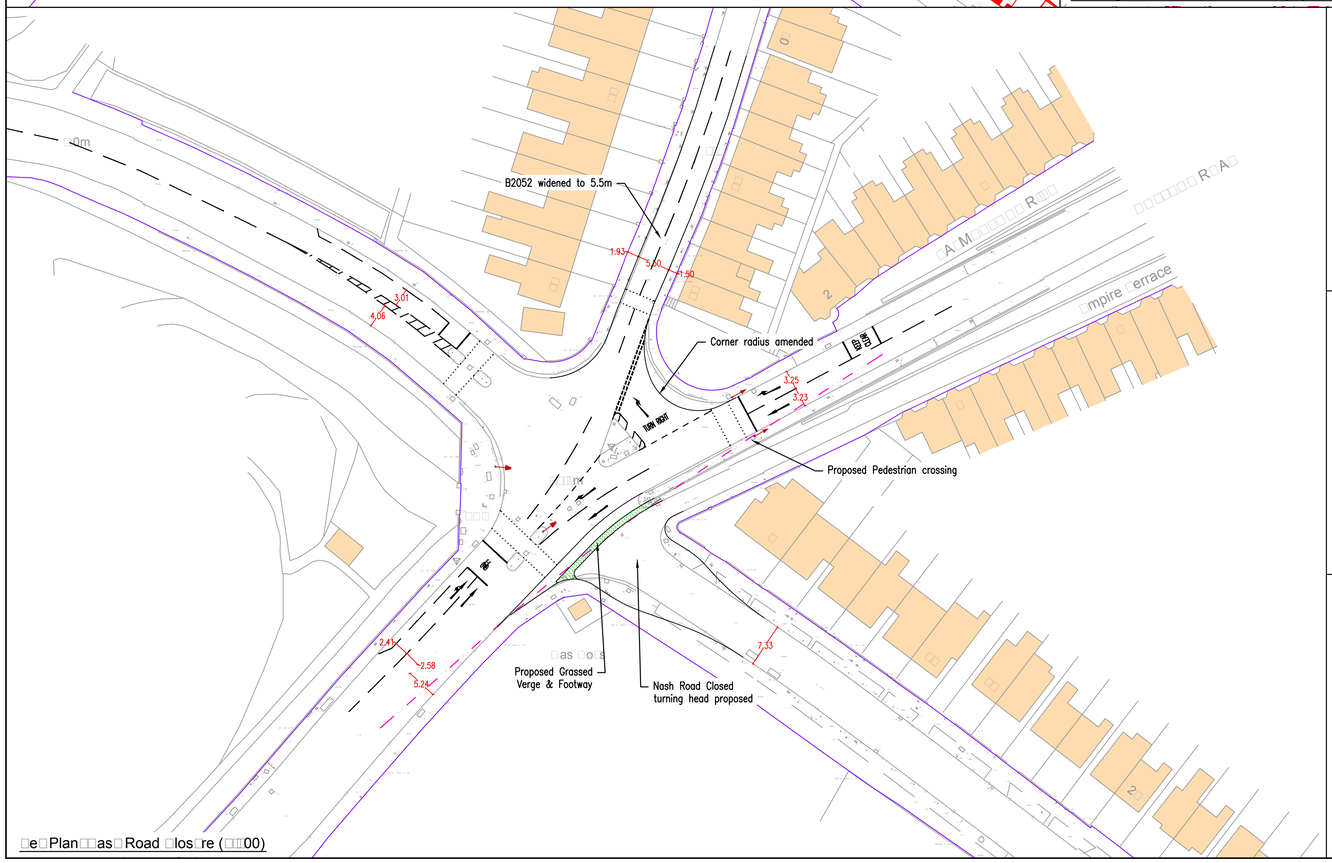
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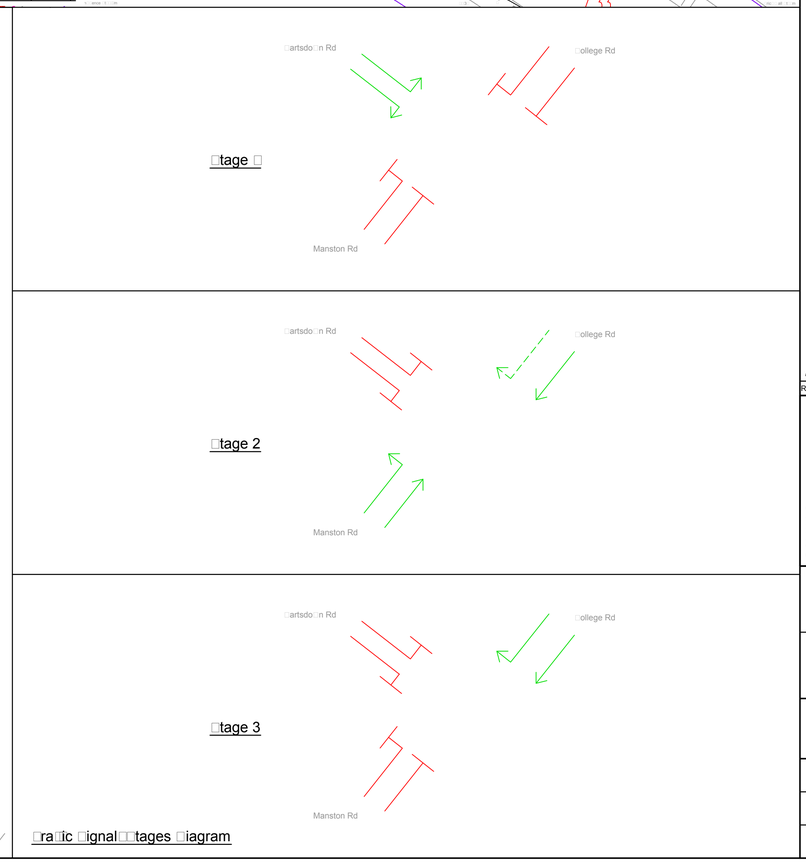
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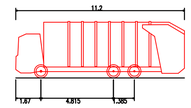
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70m FORWARD VISIBILITY IN ACCORDANCE WITH DMRB TD9/93 TABLE 3

PROPOSED PRIMARY SIGNAL

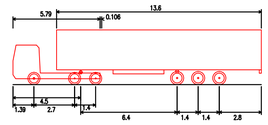
PROPOSED SECONDARY SIGNAL

HIGHWAY BOUNDARY



Phoenix 2 Duo (P2-15W with Elite 6x4 chassis)

Overall Length	11.200m
Overall Width	2.530m
Overall Body Height	3.751m
Min Body Ground Clearance	0.304m
Track Width	2.500m
Lock to Lock Time	4.00s
Curb to Curb Turning Radius	9.500m



Max Legal Articulated Vehicle (16.5m)

Overall Length	16.500m
Overall Width	2.500m
Overall Body Height	3.632m
Min Body Ground Clearance	0.396m
Max Track Width	2.500m
Lock to Lock Time	6.00 sec
Kerb to Kerb Turning Radius	6.870m

Re	Amendments	□m	App	□ate
A	Ped crossing north of College Road added & KCC Refuse tracked	DH	FM	JW	Mar 17

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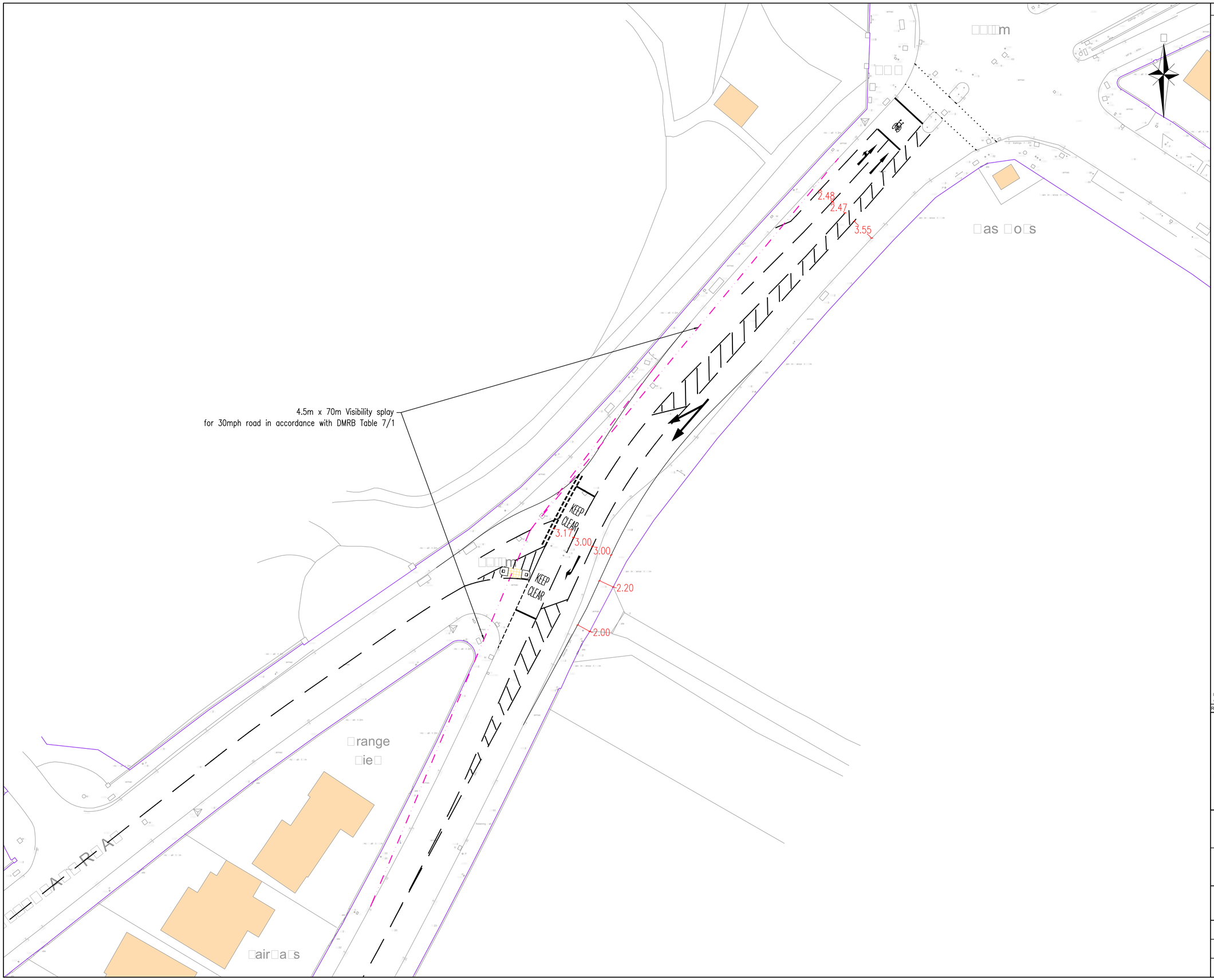
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Appendix TR3.29



Re:	Amendments	□n	□□	App	□ate
B	Kerb amended to provide deflection & ped refuge island introduced	DH	FM	JW	Mar 17
A	Keep Clear road markings added	DH	FM	JW	Oct 16

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Appendix TR3.29

Coffin House Corner, Margate, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

21st May 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

contact@badinghamuk.com

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Appendix TR3.29

DOCUMENT ISSUE

Issue / Revision:	Issue 1	Issue 2			
Description / Status:	Final	Revised Audit Brief			
Date:	28/04/2019	21/05/2019			
Prepared:	A. R. J. Setter	A. R. J. Setter			
Signatu	[redacted]				
Document Check:	D. F. Rogers	D. F. Rogers			
Signa	[redacted]				
Technical Check:	D. F. Rogers	D. F. Rogers			
S	[redacted]				
Authorised:	A. R. J. Setter	A. R. J. Setter			
Sign	[redacted]				
File Reference:	0781 Manston Airport - 15 - RSA1 - Issue 1.docx	0781 Manston Airport - 15 - RSA1 - Issue 2.docx			

CONTENTS

Page No

TEXT

SECTION 1:	INTRODUCTION	1
SECTION 2:	ITEMS RAISED AT PREVIOUS AUDITS	3
SECTION 3:	ITEMS RAISED AT THIS AUDIT	4
SECTION 4:	AUDIT STATEMENT	5

FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo

APPENDICES

Appendix 1	Road Safety Audit Brief (Revised)

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed modifications to the Coffin House Corner signal junction, Margate, Kent. The works are associated with the redevelopment of Manston Airport.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 13.30pm and 13.45pm. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise modifications to the existing five-arm signal-controlled junction at Coffin House Corner including the closure of Nash Road. The junction is an unconventional layout arrangement with significant gradients on some approaches and one-way approach and exit arms. It lies within a 30mph speed limit. Footways and street lighting are provided. A school is situated a short distance west of the junction. Pedestrian crossing facilities are proposed across all arms.

1.11 Three collisions are recorded within the latest five-year period. All collisions were categorised as slight resulting in three casualties. No highway deficiencies were noted as contributory factors.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 A Road Safety Audit Stage 1 (Issue 1) was prepared by Badingham in April 2019. A Designer's Response was prepared by Wood in April 2019 together with a subsequent revised Audit Brief. This Road Safety Audit Stage 1 (Issue 2) considers the proposed design revisions and response to the original audit (Issue 1). No matters are outstanding.

SECTION 3: ITEMS RAISED AT THIS AUDIT

3.1 No observations.

Appendix TR3.29

SECTION 4: AUDIT STATEMENT

4.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 21st May 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

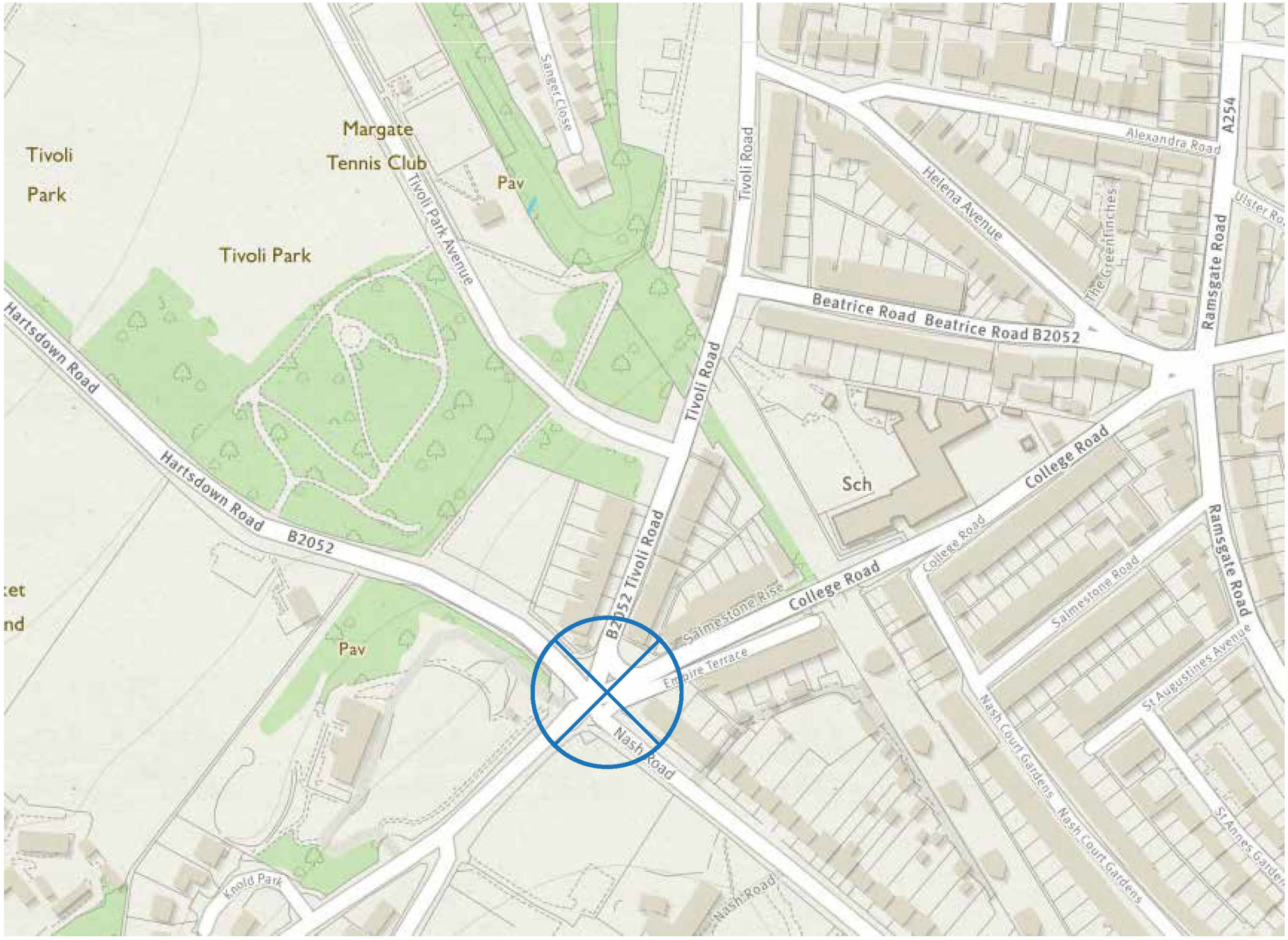
Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signe [redacted] Date: 21st May 2019

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FIGURES



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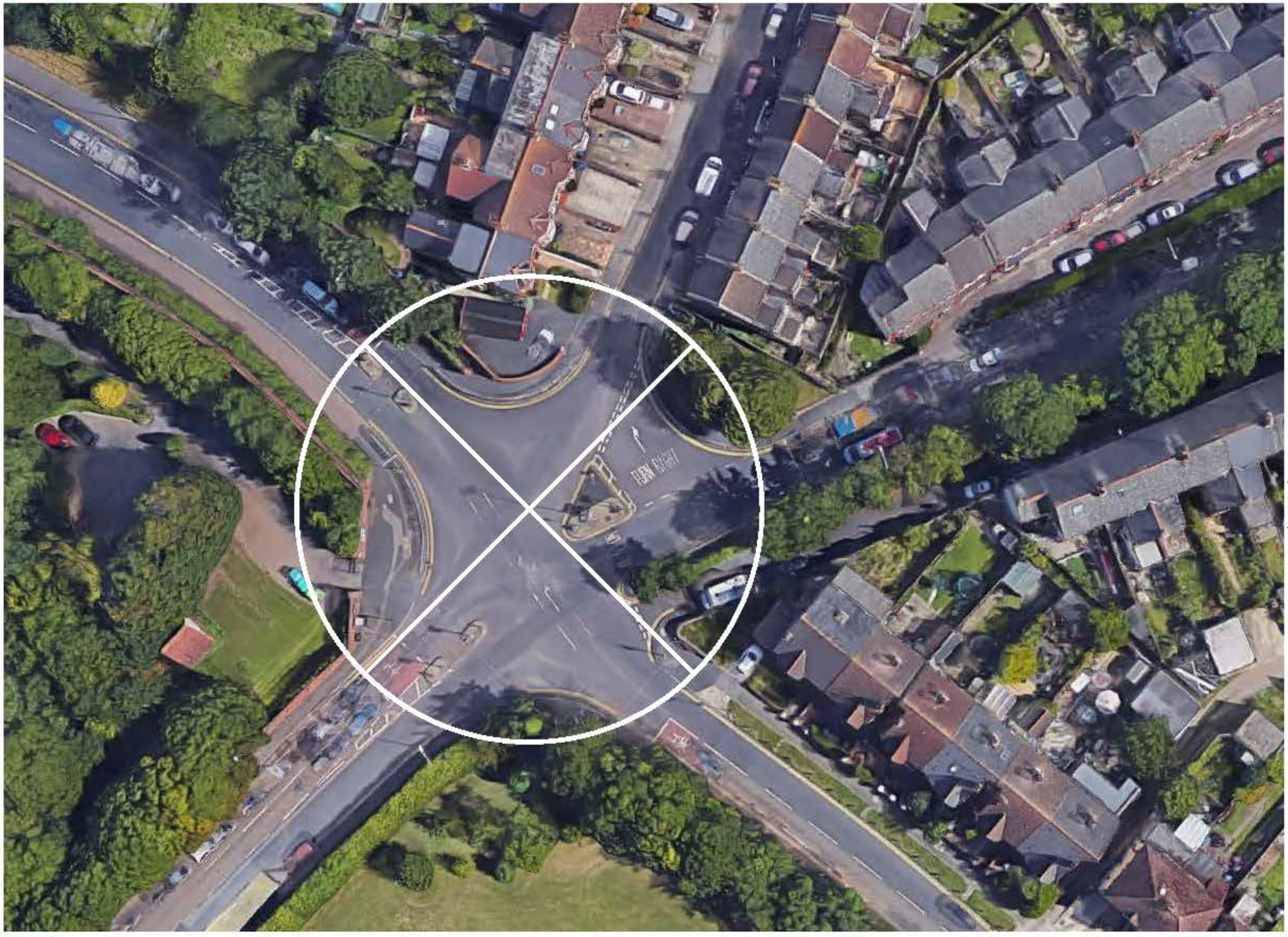
Project: Manston Airport

Title: Location Plan

Date	Status
24/04/2019	FINAL
Scale: NTS	Original Size: A3
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Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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Project: Manston Airport

Title: Aerial Photo

Date	Status
24/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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APPENDIX 1

Road Safety Audit Brief (Revised)

Ref: AS/0781
Date: 21st May 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	10/04/2019
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Nash Road/Shottendane Road Mitigation Proposal
Report title:	Manston Airport - Nash Road/Shottendane Road Mitigation Proposal - RSA Stage 1
PREPARED BY:	
Name:	Pranav Yadav
Signed:	
Organisation:	Wood
Date:	15.05.2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Nash Road/Shottendane Road Mitigation Proposal – Nash Road, Shottendane Road, Hartsdown Road, Tivoli Road, College Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Roundabout Junction with the B2190				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details	**Design Organisation Details**			
16 Charles II Street London SW1Y 4NW	Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK			
Police Contact Details (RSA3 Only)	**Maintaining Agent Contact Details**			
N/A	N/A			
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB – TD 50/04 – The Geometric Layout of Signal-controlled Junctions and Signalised Roundabout				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposal is for a scheme to improve the existing Nash Road/Shottendane Road/Hartsdown Road/Tivoli Road/College Road signalised junction.

Junction access from Nash Road will be discontinued and layout of the junction will be modified accordingly.

It is unknown when this junction would be constructed as this is to be agreed with KCC as part of ongoing discussions. Complete should take between 3-6 months.

NOTE THAT THIS JUCNTION IS KNOWN LOCALLY AS COFFIN HOUSE CORNER

Visibility requirements that have been used at this junction have been based on the guidance within DMRB. A swept path assessment has been undertaken using the maximum legal length articulated HGV (UK 16.5m) to ensure the design can accommodate the vehicle adequately and safely for all turning movements.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB has been applied to the design of the proposed roundabout. DMRB TD 50/04 – The Geometric Layout of Signal-controlled Junctions and Signalised Roundabout

Design Speeds
Provide details of applied and/or existing design speeds.

30MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit around the junction is 30mph.

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The traffic flow of the junction will be provided from the MCC taken at this junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the junction for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

A pedestrian guardrail will be added at the side of closed Nash Road. A straight footway link between College Road and Shottendane Road will be established in the section of closed Nash Road. The existing pedestrian refuge island located at Shottendane Road arm will be removed. A new signal-controlled pedestrian crossing will be provided on College Road arm.

Environmental Constraints *Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.*
No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

Junction is located southwest of the Margate and surrounded by private properties.

General Description
Include road network, road type, relevant land uses etc.

Nash Road, Shottendane Road and Hartsdown Road are two-way single carriageway. College Road is a one-way single carriageway with two-lane entry approach. Tivoli Road is also a one-way single carriageway which is an exit only arm of the junction.
Most of the corners of the junction is secured by guardrails. Footway and pedestrian crossing facilities are available at the junction.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Total seven slight accident have been recorded at the junction. These are accidents 10, 42 (additional year) 67, 194, 211, 216 and 255.

One of the accidents involved a pedestrian who was hit by wing mirror, when walking on the road in dark.

One of the accidents involved a cyclist who was hit by a car due to dazzling. Two of the slight accidents which involved motorcyclist, occurred due to careless driving.

Most of the accident occurred due to careless driving.

The details of these accidents will be provided with this brief.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – COFFIN HOUSE CORNER – MCC Results	-	15.05.2019
RSA – COFFIN HOUSE CORNER – future Year Traffic Flows (2039)	-	15.05.2019
RSA – COFFIN HOUSE CORNER – Accident Data		15.05.2019
RSA – COFFIN HOUSE CORNER – LINSIG output		15.05.2019

Drawings

Reference/Revision	Title	Date
RSA – COFFIN HOUSE CORNER – Site Location and Access design		15.05.2019
RSA – COFFIN HOUSE CORNER – Swept path assessment		15.05.2019
RSA – COFFIN HOUSE CORNER – Cad file		15.05.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan	✓	Scale Layout Plans	✓
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis	✓	Road Traffic Collision Plot	
Traffic Signal Staging	✓	Traffic Counts	✓
Speed Surveys	✓	Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	✓
Design Standards Used		Adjacent Land Uses	

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Technical note:
RSA Stage 1:Designers Response- Monkton Roundabout

1. Introduction

This Technical note forms the Designers Response to the Stage 1 Road Safety Audit (RSA) conducted by Badingham limited for works associated with a Mitigation Scheme to improve Monkton Roundabout located in Thanet. The junction was identified to require mitigation works as part of the Manston Airport TA.

Badingham Limited has been provided with the latest preliminary mitigation scheme design. This designers response includes a revised design that results in a requirement or retain two lane entry and circulatory carriageway as part of a signalised junction arrangement.

The designer's response to each of the issues raised by the safety audit team is provided in the following sections. The text included within the RSA has been transposed into this document, a full copy of the original RSA is provided within **Appendix A**.

2. Designers Response

Problem 3.1

Location: Monkton Roundabout.

Summary: Potential collisions arising from large vehicle access.

No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions when over-running narrow spiral circulatory markings, endangering users, particularly motor cyclists.

Recommendation: It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.

Designers Response: A swept path assessment has been completed and is included as **Appendix B**.

Problem 3.2

Location: Monkton Roundabout.

Summary: Potential for collisions arising from high speeds.

The long straight horizontal alignment of the A299 in particular encourages drivers to approach this junction at speed, which is continued through the roundabout, which has a large central island. High circulatory speeds were noted during the site inspection, making crossing of the various arms hazardous. This is a risk if

late braking, sliding and loss-of –control type collisions on the approaches and side-swipe damage-type collisions on the circulatory carriageway.

Recommendation: It is recommended that measures are introduced to reduce vehicles speeds approaching and through the junction.

Designers Response: The recommendation to explore the use of speed reduction measures the approaches to the A299 and A253 has been noted. A package of measures, including for anti-skid surfacing / rumble strips and advanced signage, which are noted to assist in speed reduction will be investigated through the detailed design process.

Problem 3.3

Location: Monkton Roundabout.

Summary: Three-lane circulatory potential for collisions.

The change to three lane entries and circulatory markings is considered unsafe. There is potential for drivers to attempt to negotiate the junction at speed. Three lanes increase the opportunities for weaving manoeuvres and side impact type collision, particularly on the egress merge.

Recommendation: It is recommended that a two lane circulatory is introduced and two-lane entries maintained on the approaches.

Designers Response: The design proposed for a mitigation scheme at this junction has been revised to include for the retention of a two-lane circulatory carriageway and entry to the junction. To achieve this and maintain acceptable capacity, the junction mitigation scheme has now been converted into a signalised roundabout. A revised junction layout is included in **Appendix C.**

Problem 4.1

Location: Monkton Roundabout.

Summary: Crossing distance.

Increasing approach entries to three lanes increases the complexity and difficulty for non-motorised users to cross, particularly for the mobility and visually impaired. High traffic speeds make judging safe gaps to cross difficult, which would be more difficult if three circulatory traffic streams are involved,. No tactile paving is provided at the existing arrangements and the crossing on the A299 east does not align, which can create difficulties for some users. There is a risk of collisions between vehicles and non-motorised users at the crossings, particularly as drivers will be concentrating on the merge on egress from three lanes to two.

Recommendation: It is recommended that two lane entries and circulatory is maintained and that tactile paving introduced at the existing pedestrian crossings, which should be aligned correctly.

Designers Response: As set out in the response to problem 3.3 the junction design has been revised to return to a two-lane circulatory carriageway and with retained two lane entry arms. At two of the arms the informal crossing points are ahead of the proposed stop lines and this is considered acceptable.

However, it is noted in the revised design that the informal crossing on the A299 East arm now crosses behind the stop line where cars could regularly be queuing which presents a safety concern.

As such the informal crossing has been retained on this arm but the crossing route has been moved southern element of this arm. It is proposed (as set out in the revised scheme design in **Appendix C**) to move the informal crossing to in front of the stop line. Pedestrians would cross in front of the stop line to the central island where a path east would link back to the original location of the crossing on the northern side of the

arm. As part of this scheme the footway on the south side of the carriageway will have a short section removed.

The addition of tactile paviors could be implemented within the design at the crossing locations. The crossing widths remain the same or have reduced slightly resulting in no material effect to walk distances at crossing locations.

Problem 5.2

Location: Monkton Roundabout.

Summary: Worn markings.

Segregated lane markings on the footway/cycle ways are worn and indistinct reducing their efficacy. There is a risk of collisions between pedestrians and cyclists.

Recommendation: It is recommended that the lane markings are refreshed.

Designers Response: The segregated foot/cycleway lane markings are not proposed to be altered as part of the mitigation scheme. The existing condition of these markings are the responsibility of the local highway authority and should be updated as part of their maintenance programme.

General Comments

Sections 5-7

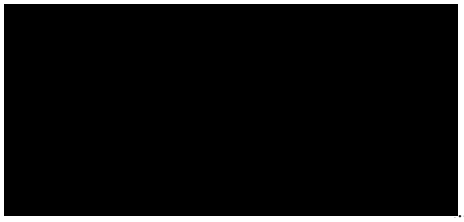
As part of the detailed design package of works a signage, lighting and drainage strategy will be provided.

Issued by



Chris Morris

Approved by



Bev Coupe

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Appendix A
Road Safety Audit – Stage 1

A299/A253 Monkton Roundabout, Manston, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

29th April 2019

Badingham

Transport Planning & Highway Engineering Consultants

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Ramsbury, Marlborough

Wiltshire

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DOCUMENT ISSUE

Issue / Revision:	Issue 1			
Description / Status:	Final			
Date:	29/04/2019			
Prepared:	A. R. J. Setter			
Sign [redacted]				
Document Check:	D. F. Rogers			
Sig [redacted]				
Technical Check:	D. F. Rogers			
Signat [redacted]				
Authorised:	A. R. J. Setter			
Signat [redacted]				
File Reference:	0781 Manston Airport - 6 - RSA1 - Issue 1.docx			

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FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo
Figure 3	Audit Plan

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed modifications to the Monkton Roundabout junction, Manston, Kent. The works are associated with the redevelopment of Manston Airport.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 12.00pm and 12.15pm. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise modifications to entry widths and kerb radii together with the proposed introduction of spiral circulatory surface markings. The A299 (east) is a standard dual carriageway. Willetts Hill is a two-way narrow single carriageway, most of the section of this road has no central road marking. Canterbury Road (A253) is a standard two-way single carriageway. A299 (northwest) is a standard dual carriageway. Seamark Road is a two-way single carriageway. This junction is in the rural area with some facilities for non-motorists. It lies within a derestricted speed limit zone. There is a general gradient falling from the northeast to southwest. Street lighting is provided. A footway/cycleway is provided on the west side of Willetts Hill that leads to a similar facility on the south side of the A299 west and continues to the west side of Seamark Road.

1.11 A total of fifteen collisions are recorded at this junction over the latest 5-year period. Five were categorised as serious. Two involved motorbikes and one involved a pedal cycle. The serious collisions occurred due to driver error. Ten collisions were slight with three involving a motorbike and one a pedal cycle. The major cause for the slight collisions was careless driving at the roundabout junction. No highway deficiencies were noted as contributory factors.

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SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 No previous audits have been undertaken.

Appendix TR3.26

SECTION 3: VEHICULAR AND HIGHWAY ISSUES

3.1 PROBLEM

Location: Monkton Roundabout.

Summary: Potential collisions arising from large vehicle access.

3.1.1 No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions when over-running narrow spiral circulatory markings, endangering users, particularly motor cyclists.

RECOMMENDATION

3.1.2 It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.



Photo 1 - Potential for HGVs to straddle circulatory markings.

Appendix TR3.26

3.2 PROBLEM

Location: Monkton Roundabout

Summary: Potential for collisions arising from high speeds.

3.2.1 The long straight horizontal alignment of the A299 in particular encourages drivers to approach this junction at speed, which is continued through the roundabout, which has a large central island. High circulatory speeds were noted during the site inspection, making crossing of the various arms hazardous. This is a risk of late braking, skidding and loss-of-control type collisions on the approaches and side-swipe damage-type collisions on the circulatory carriageway.

RECOMMENDATION

3.2.2 It is recommended that measures are introduced to reduce vehicle speeds approaching and through the junction.



Photo 2 - Straight horizontal alignment encourages fast approach speeds.

Appendix TR3.26

3.3 PROBLEM

Location: Monkton Roundabout

Summary: Three-lane circulatory potential for collisions.

3.3.1 The change to three-lane entries and circulatory markings is considered unsafe. There is potential for drivers to attempt to negotiate the junction at speed. Three lanes increase the opportunities for weaving manoeuvres and side-impact type collisions, particularly on the egress merge.

RECOMMENDATION

3.3.2 It is recommended that a two-lane circulatory is introduced and two-lane entries maintained on the approaches.



Photo 3 – Three-lane circulatory creating potential hazard at egress.

Appendix TR3.26

SECTION 4: NON-MOTORISED USERS

4.1 PROBLEM

Location: Minster Roundabout / B2190

Summary: Crossing distance.

4.1.1 Increasing approach entries to three lanes increases the complexity and difficulty for non-motorised users to cross, particularly for the mobility and visually impaired. High traffic speeds make judging safe gaps to cross difficult, which would be made more difficult if three traffic circulatory traffic streams are involved. No tactile paving is provided at the existing arrangements and the crossing on the A299 east does not align, which can create difficulties for some users. There is a risk of collisions between vehicles and non-motorised users at the crossings, particularly as drivers will be concentrating on the merge on egress from three lanes to two.

RECOMMENDATION

4.1.2 It is recommended that two lane entries and circulatory is maintained and that tactile paving introduced at the existing pedestrian crossings, which should be aligned correctly.



Photo 4 - No tactile paving and misaligned crossing.



Photo 5 - Lack of tactile paving.

Appendix TR3.26

SECTION 5: ROAD MARKINGS AND SIGNAGE

5.1 No signing details have been provided. A suitable package of signage information will need to be provided as part of any further detailed design.

5.2 **PROBLEM**

Location: Monkton Roundabout.

Summary: Worn markings.

5.2.1 Segregated lane markings on the footway/cycleways are worn and indistinct reducing their efficacy. There is a risk of collisions between pedestrians and cyclists.

RECOMMENDATION

5.2.2 It is recommended that the lane markings are refreshed.



Photo 6 - Worn surface markings.

Appendix TR3.26

SECTION 6: STREET LIGHTING

6.1 No street lighting details have been provided. A suitable package of street lighting information will need to be provided as part of any further detailed design.

Appendix TR3.26

SECTION 7: DRAINAGE

7.1 No drainage information is provided. A suitable package of drainage information will need to form part of any further detailed design.

Appendix TR3.26

SECTION 8: AUDIT STATEMENT

8.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Signed: [redacted] Date: 29th April 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

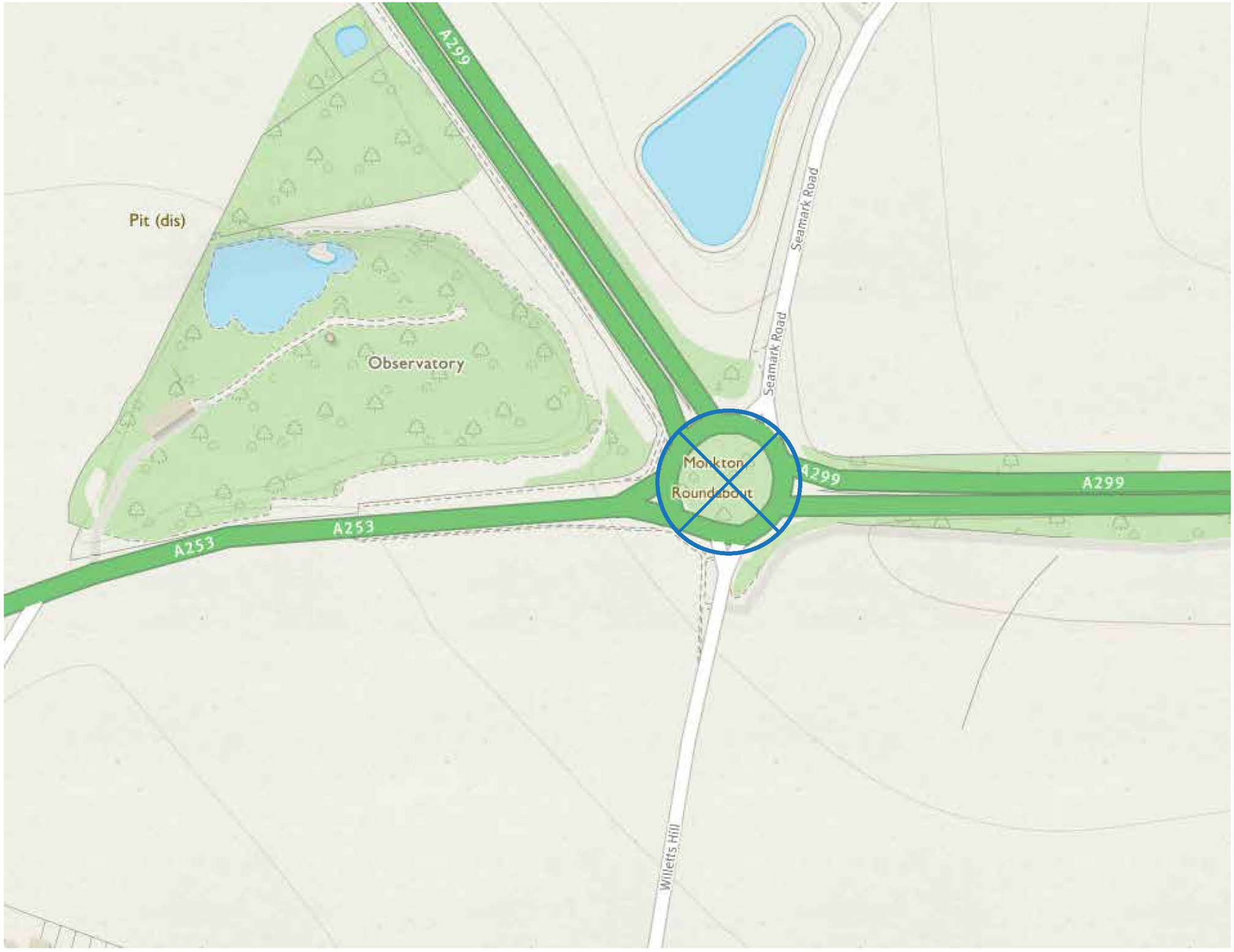
Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 29th April 2019

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FIGURES



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Client: RSP

Project: Manston Airport

Title: Location Plan

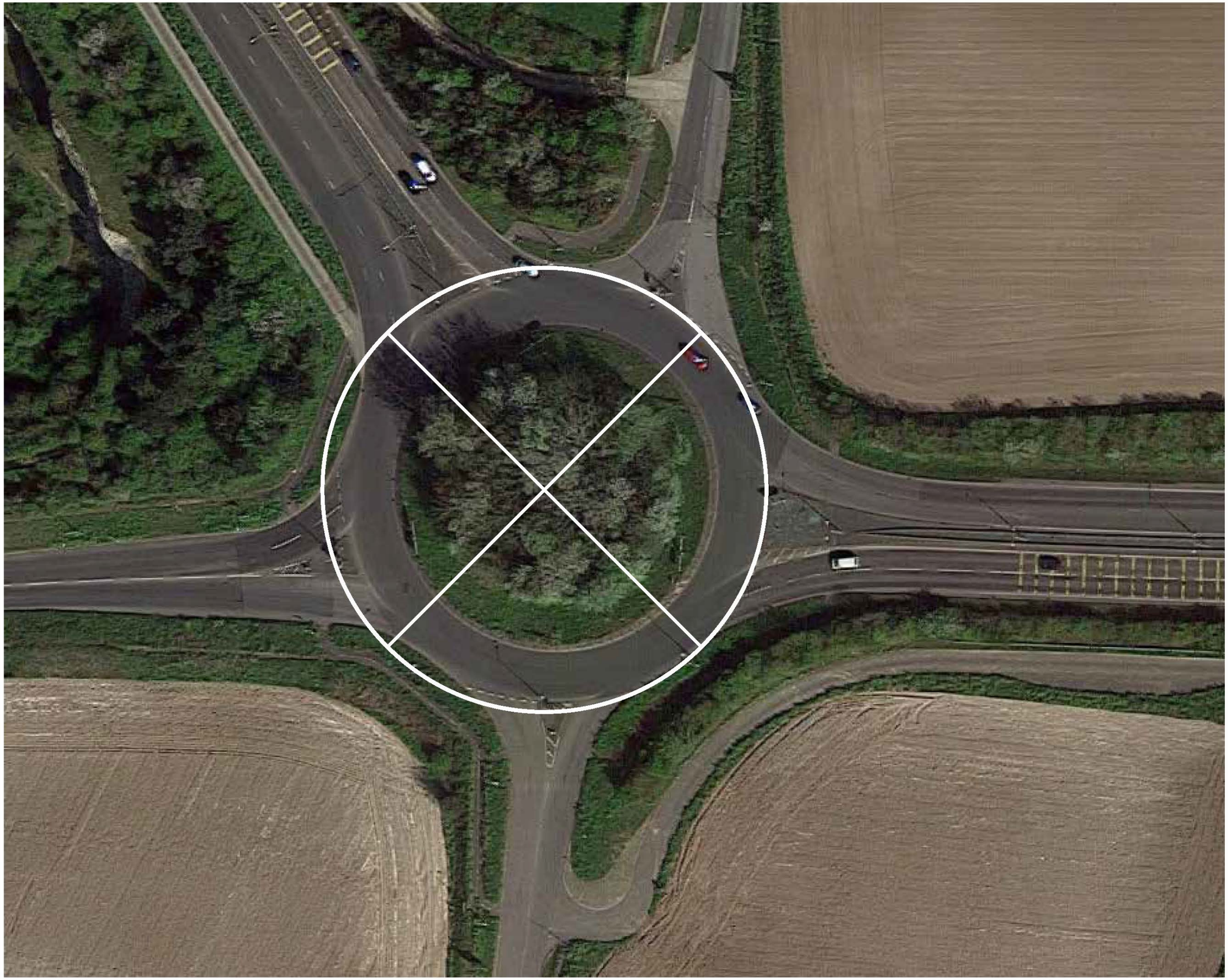
Date	Status
23/03/2019	FINAL

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NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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Client: RSP

Project: Manston Airport

Title: Aerial Photo

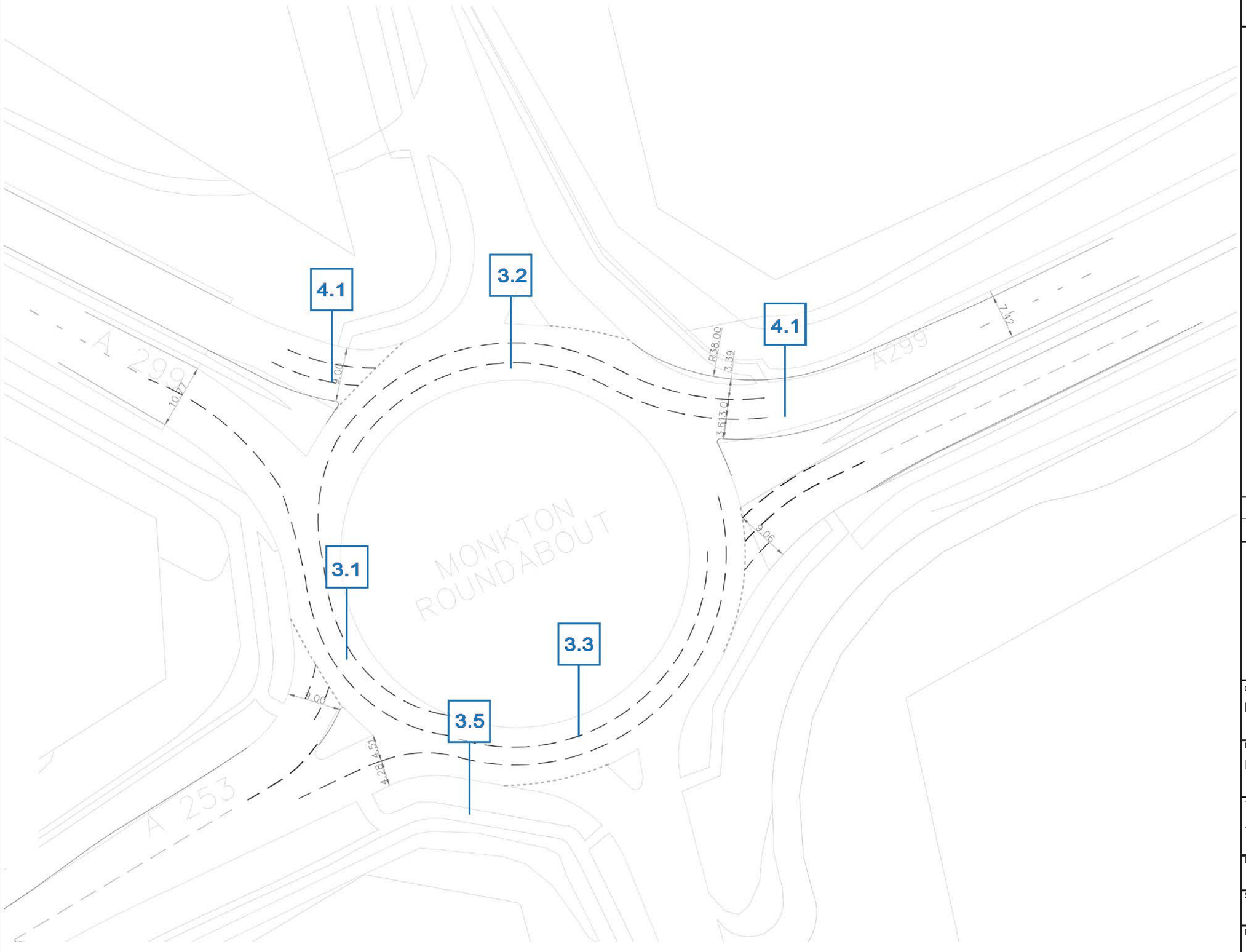
Date	Status
23/08/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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North

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Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site.

Source: Site Location & Access Design

Rev.	Date	Initials	Amendments

Badingham
Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Audit Plan

Date	Status
29/04/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 3	-

Appendix TR3.26

APPENDIX 1

Road Safety Audit Brief

Ref: AS/0781
Date: 29th April 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	11/04/2019
Document Reference:	
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Junction A253/A299 Mitigation Proposal
Report title:	Manston Airport – Junction A253/A299 Mitigation Proposal - RSA Stage 1
PREPARED BY:	
Name:	Pranav Yadav
Signed:	
Organisation:	Wood
Date:	11/04/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Junction A253/A299 Mitigation Proposal – A299 (east), Willetts Hill, Canterbury Road (A253), A299 (northwest), Seamark Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
Road realignment and marking				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details	**Design Organisation Details**			
16 Charles II Street London SW1Y 4NW	Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK			
Police Contact Details (RSA3 Only)	**Maintaining Agent Contact Details**			
N/A	N/A			
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB and Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposal is for a scheme to improve the existing A253/A299 roundabout junction by providing road marking and re-aligning arms.

The kerb lines of arms A299 (east), Canterbury Road (A253) and A299 (northwest), will be adjusted.

It is unknown when this junction would be constructed as this is to be agreed with KCC as part of ongoing discussions. Complete should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB and Traffic Signs Regulations and General Directions (TSRGD) have been used to design the proposed scheme.

Design Speeds
Provide details of applied and/or existing design speeds.

Existing speed limit of relevant arms:
A299 (east) – 70mph; Cantebury Road (A253) – 60mph; A299 (northwest) – 70mph

Speed Limits
State whether mandatory or advisory, available speed data.

A299 (east) – 70mph; Willetts Hill – 60mph; Cantebury Road (A253) – 60mph; A299 (northwest) – 70mph; Seamark Road

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The traffic flow of the junction will be provided from the MCC taken at this junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the junction for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

In terms of non-motorist mode, there will be no physical change in the existing facilities apart from slight changes where footway touches the road kerbs which will be realigned slightly.

Environmental Constraints
Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.

No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

Junction is located north of Monkton and surrounded by green fields.

General Description
Include road network, road type, relevant land uses etc.

A299 (east) is a standard dual carriageway. Willetts Hill a two-way narrow single carriageway, most of the section of this road has no central road marking. Canterbury Road (A253) is a standard two-way single carriageway. A299 (northwest) is a standard dual carriageway. Seamark Road is a two-way single carriageway. The section of this road located further east of the junction is narrow and doesn't have centre road marking.

As this junction is in the rural area, there is limited facility for non-motorists.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Total fifteen accidents have been recorded at the junction. These are accidents 4, 6, 50, 79, 80, 103, 105, 204, 354, 386, 441, 463, 477, 503 and 526.

Five of fifteen accidents were serious. Two of serious accidents involved motorbikes and one involved pedal cycle. The serious accidents were occurred due to the driver's error such as careless driving, failed to look properly, failed to stop in time.

Ten of fifteen accidents were slight. Three of the slight accident involved motorbike and one involved pedal cycle. The major cause for the slight accidents was careless driving at the roundabout junction.

The details of these accidents will be provided with this brief.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – A253-A299 Monkton – MCC results		12.04.2019
RSA – A253-A299 Monkton – future Year Traffic Flows (2039)		12.04.2019
RSA – A253-A299 Monkton – Accident Data		12.04.2019

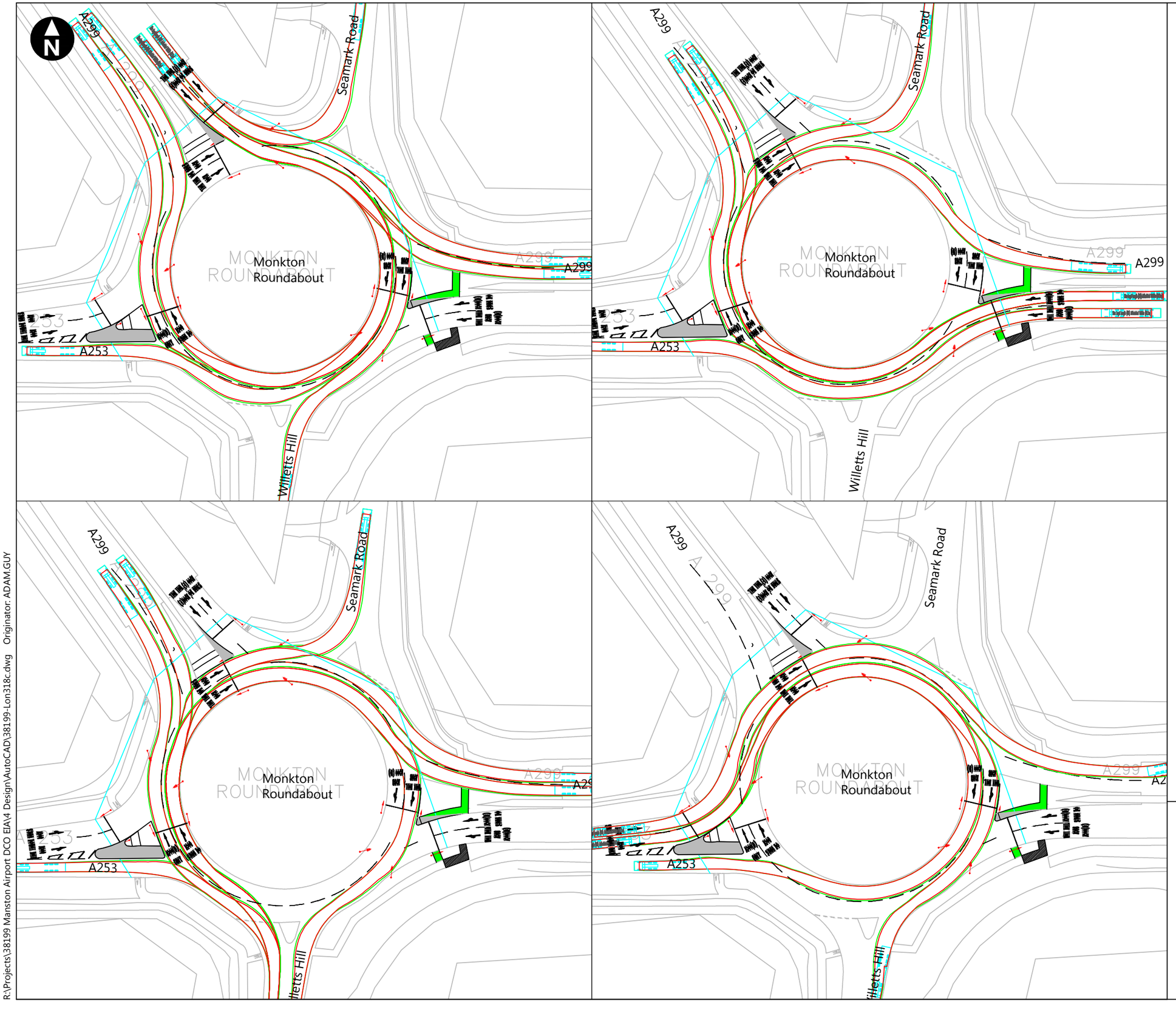
Drawings

Reference/Revision	Title	Date
RSA – A253-A299 Monkton – Site Location and Access design		25.03.2019
RSA – A253-A299 Monkton – Cad file		25.03.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan		Scale Layout Plans	
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis		Road Traffic Collision Plot	
Traffic Signal Staging		Traffic Counts	
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	
Design Standards Used		Adjacent Land Uses	

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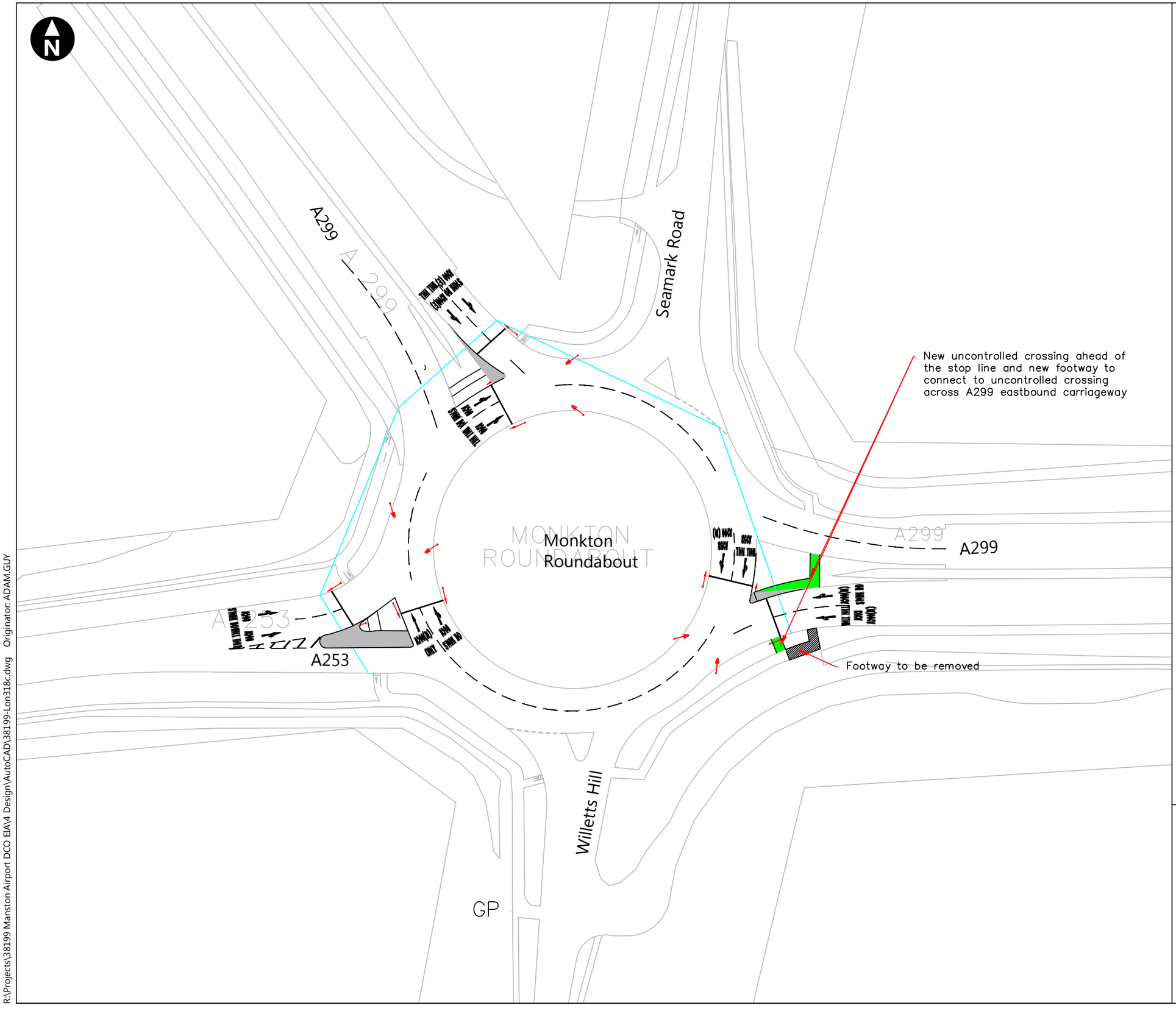
Appendix B
Swept Path Assessment



Appendix TR3.26

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Appendix C
Proposed Scheme



Key

- Existing based on Ordnance Survey mapping
- Proposed kerbline
- Proposed road marking
- Proposed traffic signals head
- Additional island area required

0 m 40 m

Scale 1:750 @ A3

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Manston Airport DCO
RSA Stage 1 - Designers Response

Appendix C -Revised scheme- Junction 6

May 2019

wood.

R:\Projects\38199 Manston Airport DCO EIA\4 Design\AutoCAD\38199-Lon318c.dwg Originator: ADAM.GUY

Appendix TR3.26

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Road Safety Audit

Appendix TR3.26

A299/A253 Monkton Roundabout, Manston, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

21st May 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

SN8 2QE

T. +44(0)1672 521320

contact@badinghamuk.com

www.badinghamuk.com

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Appendix TR3.26

DOCUMENT ISSUE

Issue / Revision:	Issue 1	Issue 2			
Description / Status:	Final	Revised Audit Brief			
Date:	29/04/2019	21/05/2019			
Prepared:	A. R. J. Setter	A. R. J. Setter			
Signature:	[redacted]				
Document Check:	D. F. Rogers	D. F. Rogers			
[redacted]					
Technical Check:	D. F. Rogers	D. F. Rogers			
[redacted]					
Authorised:	A. R. J. Setter	A. R. J. Setter			
Signat	[redacted]				
File Reference:	0781 Manston Airport - 6 - RSA1 - Issue 1.docx	0781 Manston Airport - 6 - RSA1 - Issue 2.docx			

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Page No

TEXT

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SECTION 2:	ITEMS RAISED AT PREVIOUS AUDITS	3
SECTION 3:	VEHICULAR AND HIGHWAY ISSUES	4
SECTION 4:	AUDIT STATEMENT	5

FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed modifications to the Monkton Roundabout junction, Manston, Kent. The works are associated with the redevelopment of Manston Airport.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has not been made aware of any departures from standard.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 12.00pm and 12.15pm. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise the signalisation of the roundabout junction. The A299 (east) is a standard dual carriageway. Willetts Hill is a two-way narrow single carriageway, most of the section of this road has no central road marking. Canterbury Road (A253) is a standard two-way single carriageway. A299 (northwest) is a standard dual carriageway. Seamark Road is a two-way single carriageway. This junction is in the rural area with some facilities for non-motorists. It lies within a derestricted speed limit zone. There is a general gradient falling from the northeast to southwest. Street lighting is provided. A footway/cycleway is provided on the west side of Willetts Hill that leads to a similar facility on the south side of the A299 west and continues to the west side of Seamark Road.

1.11 A total of fifteen collisions are recorded at this junction over the latest 5-year period. Five were categorised as serious. Two involved motorbikes and one involved a pedal cycle. The serious collisions occurred due to driver error. Ten collisions were slight with three involving a motorbike and one a pedal cycle. The major cause for the slight collisions was careless driving at the roundabout junction. No highway deficiencies were noted as contributory factors.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 A Road Safety Audit Stage 1 (Issue 1) was prepared by Badingham in April 2019. A Designer's Response was prepared by Wood in April 2019 together with a subsequent revised Audit Brief. This Road Safety Audit Stage 1 (Issue 2) considers the proposed design revisions and response to the original audit (Issue 1). No matters are outstanding.

SECTION 3: ITEMS RAISED AT THIS AUDIT

3.1 No observations.

Appendix TR3.26

SECTION 4: AUDIT STATEMENT

4.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Sig [redacted] Date: 21st May 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

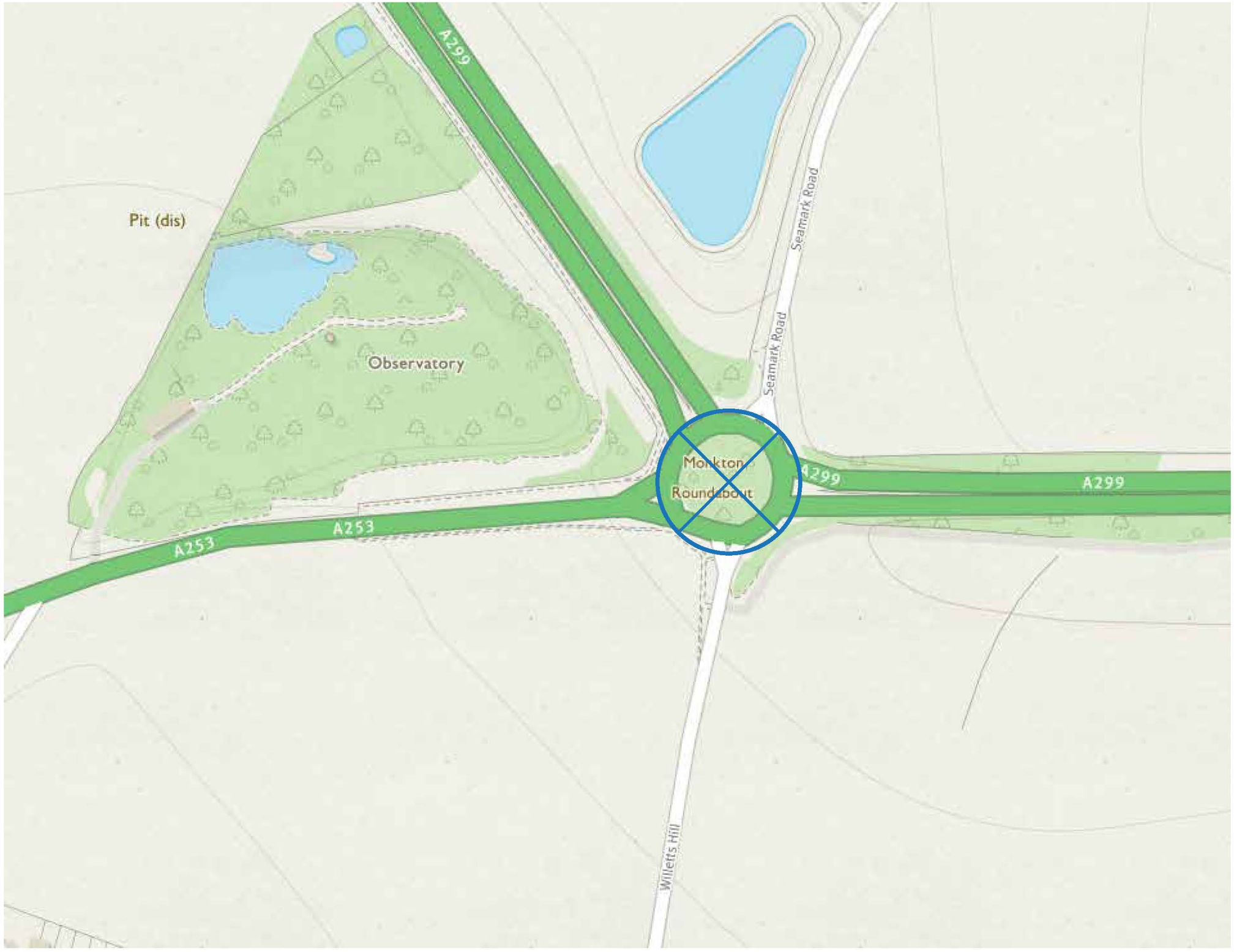
Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 21st May 2019

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FIGURES



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North

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Rev.	Date	Initials	Amendments

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www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Location Plan

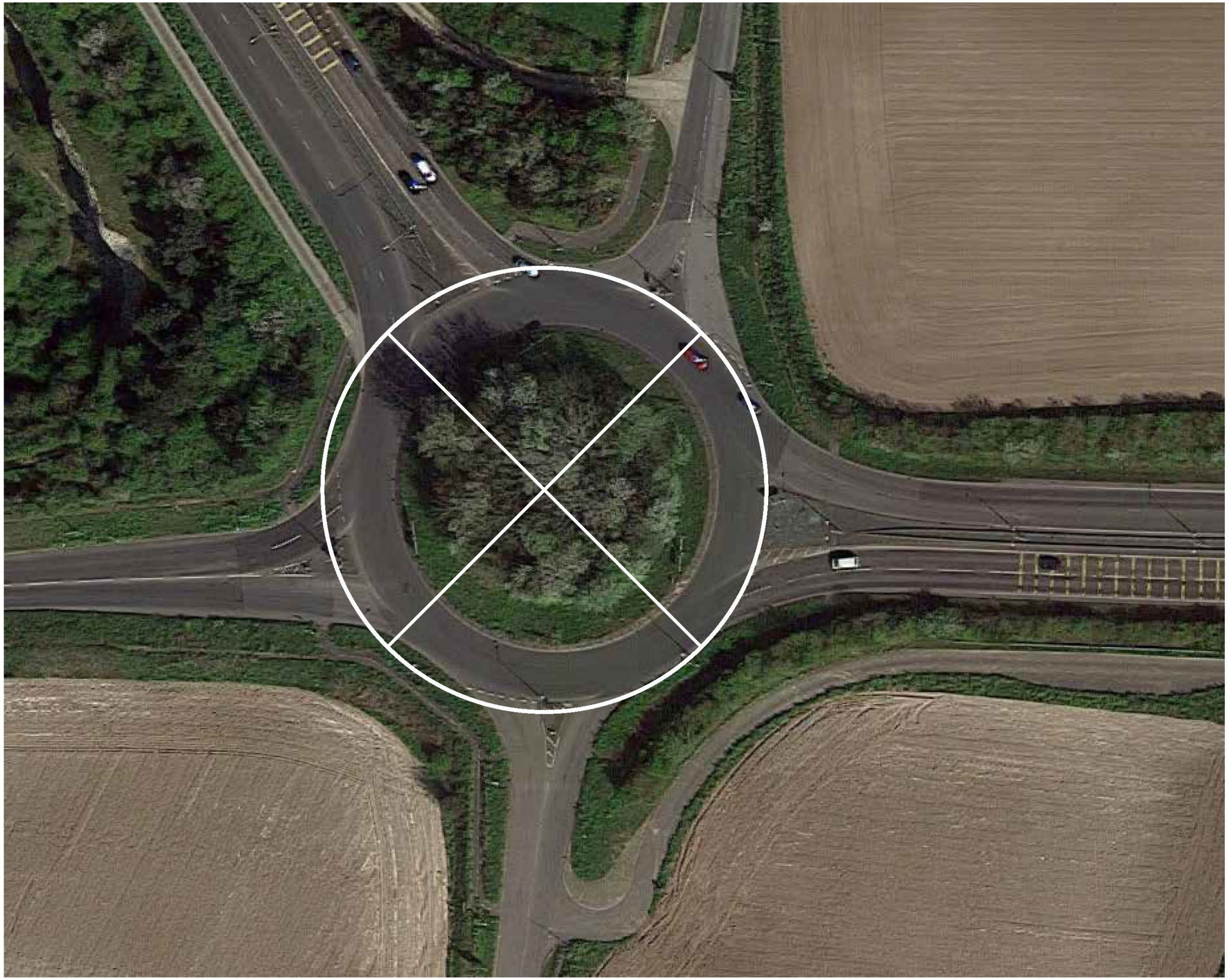
Date	Status
23/03/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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North

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Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site.

Rev.	Date	Initials	Amendments

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Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Aerial Photo

Date	Status
23/08/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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APPENDIX 1

Road Safety Audit Brief (Revised)

Ref: AS/0781
Date: 21st May 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	11/04/2019
Document Reference:	Road Safety Audit Brief
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport – Junction A253/A299 Mitigation Proposal
Report title:	Manston Airport – Junction A253/A299 Mitigation Proposal - RSA Stage 1
PREPARED BY:	
Name:	Glyn Price
Signed:	
Organisation:	Wood
Date:	16.05.2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Junction A253/A299 Mitigation Proposal – A299 (east), Willetts Hill, Canterbury Road (A253), A299 (northwest), Seamark Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
Road realignment and marking				
RSA Stage *Tick as appropriate ✓*	1 ✓	2	3	4
	Second Iteration			
Overseeing Organisation Details		**Design Organisation Details**		
16 Charles II Street London SW1Y 4NW		Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK		
Police Contact Details (RSA3 Only)		**Maintaining Agent Contact Details**		
N/A		N/A		
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB and Traffic Signs Regulations and General Directions (TSRGD)				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposal is for a scheme to improve the existing A253/A299 roundabout junction by providing road marking and re-aligning arms.

The kerb lines of arms A299 (east), Canterbury Road (A253) and A299 (northwest), will be adjusted.

It is unknown when this junction would be constructed as this is to be agreed with KCC as part of ongoing discussions. Complete should take between 3-6 months.

The scheme has been updated to reflect the RSA stage 1 safety audit. The circulatory carriageway and the A253, A299 east and the A299 north west approaches have all been reduced to two lanes. The change in the junction layout has required the junction to be changed to a signalised junction.

An uncontrolled crossing on the A299 east arm has been amended as part of the revised scheme. The footway on the southern side of the arm will be removed beyond the stop line on this approach. Pedestrians will be required to cross in front of the stop line to central island where a footway will route to the old controlled crossing alignment across west bound traffic.

A swept path assessment has been undertaken using a maximum legal length articulated HGV (UK 16.5m) to ensure the revised scheme can adequately and safely accommodate the vehicle for all movements within the revised scheme.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB and Traffic Signs Regulations and General Directions (TSRGD) have been used to design the proposed scheme.

Design Speeds
Provide details of applied and/or existing design speeds.

Existing speed limit of relevant arms:
A299 (east) – 70mph; Canterbury Road (A253) – 60mph; A299 (northwest) – 70mph

Speed Limits
State whether mandatory or advisory, available speed data.

A299 (east) – 70mph; Willetts Hill – 60mph; Canterbury Road (A253) – 60mph; A299 (northwest) – 70mph; Seamark Road

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

The traffic flow of the junction will be provided from the MCC taken at this junction.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the junction for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

In terms of non-motorist mode, there will be no physical change in the existing facilities apart from slight changes where footway touches the road kerbs which will be realigned slightly.
Environmental Constraints *Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.*
No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

Junction is located north of Monkton and surrounded by green fields.

General Description
Include road network, road type, relevant land uses etc.

A299 (east) is a standard dual carriageway. Willetts Hill a two-way narrow single carriageway, most of the section of this road has no central road marking. Canterbury Road (A253) is a standard two-way single carriageway. A299 (northwest) is a standard dual carriageway. Seamark Road is a two-way single carriageway. The section of this road located further east of the junction is narrow and doesn't have centre road marking.

As this junction is in the rural area, there is limited facility for non-motorists.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

Total fifteen accidents have been recorded at the junction. These are accidents 4, 6, 50, 79, 80, 103, 105, 204, 354, 386, 441, 463, 477, 503 and 526.

Five of fifteen accidents were serious. Two of serious accidents involved motorbikes and one involved pedal cycle. The serious accidents were occurred due to the driver's error such as careless driving, failed to look properly, failed to stop in time.

Ten of fifteen accidents were slight. Three of the slight accident involved motorbike and one involved pedal cycle. The major cause for the slight accidents was careless driving at the roundabout junction.

The details of these accidents will be provided with this brief.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction will be provided with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

N/A

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – A253-A299 Monkton – MCC results		16.05.2019
RSA – A253-A299 Monkton – future Year Traffic Flows (2039)		16.05.2019
RSA – A253-A299 Monkton – Accident Data		16.05.2019
RSA- A253-A299 Monkton – LINSIG		16.05.2019
RSA – A253-A299 Monkton – LINSIG Output		16.05.2019

Drawings

Reference/Revision	Title	Date
RSA – A253-A299 Monkton – Revised Scheme		16.05.2019
RSA – A253-A299 Monkton - Swept path assessment		16.05.2019
RSA – A253-A299 Monkton – Cad file		16.05.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan	✓	Scale Layout Plans	✓
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports	✓	Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis	✓	Road Traffic Collision Plot	✓
Traffic Signal Staging		Traffic Counts	✓
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	✓
Design Standards Used	✓	Adjacent Land Uses	

Appendix TR3.28

Appendix TR3.28

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Technical note:
RSA Stage 1:Designers Response- Spitfire Way/Manston Road

1. Introduction

This Technical note forms the Designers Response to the Stage 1 Road Safety Audit (RSA) conducted by Badingham limited for works associated with a Mitigation Scheme to improve Spitfire Way/Manston Road junction located in Thanet. The junction was identified to require mitigation works as part of the Manston Airport TA.

Badingham Limited has been provided with the latest preliminary mitigation scheme designs, at this junction the mitigation scheme is proposed to change the junction from a staggered priority junction to a signal controlled four arm junction, this will require realignment of the junction and arms and the addition of a road mark scheme to compliment the new layout and signal controls.

The designer's response to each of the issues raised by the safety audit team is provided in the following sections. The text included within the RSA has been transposed into this document, a full copy of the original RSA is provided within **Appendix A**.

2. Designers Response

Problem 3.1

Location: Proposed junction.

Summary: Potential collisions arising from large vehicle access.

No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions or over-running of the verge/crossings.

Recommendation: It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.

Designers Response: A swept path assessment has been undertaken for the junction for the largest road legal HGV (16.5m in length). This has indicated that all appropriate turning movements can be accommodated, and this is provided as **Appendix B**.

The SPA work has been undertaken on a slightly revised version of the design, upon final review it was noted an element of the previous design for the northern Manston Road arm had strayed into a plot of land that needed to be avoided. As such the length of two-lane carriageway approaching the junction on this arm has bee reduced and a small section of pavement needs to be width restricted for a small distance to a minim of 1.26m. This is set out as a revised junction layout in **Appendix C. Appendix C** also includes for the relevant junction inter-visibility splays.

Problem 3.2

Location: Proposed junction.

Summary: Short central stacking length.

The central stacking length within the junction, particularly from the west, appears short and is situated on a curve, there appears to be insufficient storage for an HGV such as an articulated vehicle, which may lead to blocking back into the approach and damage type collisions as vehicles attempt to travel ahead or left.

Recommendation: It is recommended that sufficient storage is provided within the junction or the signal staging modified to allow removal if the storage area completely.

Designers Response: It is not uncommon for a HGV movement to block a right turn storage area within a signalled junction. The regularity of such an event is considered to be such that the impact on the junction performance is considered to be low. To put this into context during the future year AM peak hour one HGV is estimated to use this facility, with none estimated to use this during the PM peak hour. It is therefore not considered to be a matter of significance.

Problem 4.1

Location: Proposed junction.

Summary: Lack of facilities for cyclists.

No facilities for cyclists are provided. There is a risk of collisions between cyclists and vehicles, particularly involving HGVs squeezing cyclists when turning left.

Recommendation: It is recommended that facilities for cyclists are incorporated within the design.

Designers Response: The recommendation to provide facilities for cyclists at the junction has been noted and consideration for providing facilities within the design will be considered at the detailed design stage. Consideration of the likely number of cyclists and the high frequency routes will help to inform where best placed facilities such as advance stop lines could be located, noting the existing constraints, should the local highway authority deem these are required.

3. General Comments

Sections 5-7

As part of the detailed design package of works a signage, lighting and drainage strategy will be provided.

Issued by	Approved by
[redacted]	[redacted]
Chris Morris	**Bev Coupe**

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Appendix TR3.28

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Appendix A
Road Safety Audit – Stage 1

B2190 Spitfire Way/B2050 Manston Road, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

26th April 2019

Badingham

Transport Planning & Highway Engineering Consultants

16 Ashley Piece

Ramsbury, Marlborough

Wiltshire

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Appendix TR3.28

DOCUMENT ISSUE

Issue / Revision:	Issue 1			
Description / Status:	Final			
Date:	26/04/2019			
Prepared:	A. R. J. Setter			
[redacted]				
Document Check:	D. F. Rogers			
S [redacted]				
Technical Check:	D. F. Rogers			
Signa [redacted]				
Authorised:	A. R. J. Setter			
Signatur [redacted]				
File Reference:	0781 Manston Airport - 12 - RSA1 - Issue 1.docx			

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FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo
Figure 3	Audit Plan

APPENDICES

Appendix 1	Road Safety Audit Brief

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed highway works at the B2190 Spitfire Way/B2050 Manston Road associated with the redevelopment of Manston Airport, Kent.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has been made aware of a departure from standard relating to part of an intervisibility zone being outside of the highway boundary.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 10.50am and 11.05am. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise the proposed conversion of an existing uncontrolled staggered crossroads arrangement to a signalised crossroads junction. Manston Road (north) is subject to a 30mph speed limit and is a single carriageway with double-yellow line restrictions. There is a footway on the western side of the carriageway. Manston Road (east) also has double-yellow line restrictions and is subject to a 40mph speed limit beyond the junction. It has a straight approach alignment. No footways are provided. Manston Road (west) bends to the north at the junction. A footway is provided on its southern side. Bus stops are situated to the south of the junction on the single carriageway Spitfire Way. No footways are provided on either side of the highway leading from the junction although a short section is provided leading to Belle-Davies Drive beyond which the speed limit changes to 60mph. Gradients in the area are minimal. Controlled crossing facilities are to be provided across the Manston Road (east) and Spitfire Way arms.

1.11 Nine collisions are recorded for the latest 5-year period 2013-2018. Two were serious and seven are categorised as slight. A total of 12 casualties resulted. The highway was not identified as a contributory factor in any of the collisions.

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SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 No previous audits have been undertaken.

Appendix TR3.28

SECTION 3: VEHICULAR AND HIGHWAY ISSUES

3.1 PROBLEM

Location: Proposed junction.

Summary: Potential collisions arising from large vehicle access.

3.1.1 No swept path assessment is provided. The junction is likely to experience a significant number of large HGV movements that without sufficient carriageway space, particularly when turning, may lead to damage-type collisions or over-running of the verge/crossings.

RECOMMENDATION

3.1.2 It is recommended that a swept path assessment is undertaken for the largest typical vehicles anticipated to regularly and frequently use the junction to demonstrate safe and efficient access.



Photo 1 - Manston Road view west.

Appendix TR3.28

3.2 **PROBLEM**

Location: Proposed junction.

Summary: Short central stacking length.

3.2.1 The central stacking length within the junction, particularly from the west, appears short and is situated on a curve. There appears to be insufficient storage for an HGV such as an articulated vehicle, which may lead to blocking back into the approach and damage-type collisions as vehicles attempt to travel ahead or left.

RECOMMENDATION

3.2.2 It is recommended that sufficient storage is provided within the junction or the signal staging modified to allow removal of the storage area completely.



Photo 2 - Manston Road view east.

Appendix TR3.28

SECTION 4: NON-MOTORISED USERS

4.1 PROBLEM

Location: Proposed junction.

Summary: Lack of facilities for cyclists.

4.1.1 No facilities for cyclists are provided. There is a risk of collisions between cyclists and vehicles, particularly involving HGVS 'squeezing' cyclists when turning left.

RECOMMENDATION

4.1.2 It is recommended that facilities for cyclists are incorporated within the design.



Photo 3 -Manston Road view west.

Appendix TR3.28

SECTION 5: ROAD MARKINGS AND SIGNAGE

5.1 No signing details have been provided. A suitable package of signage information will need to be provided as part of any further detailed design.

Appendix TR3.28

SECTION 6: STREET LIGHTING

6.1 No street lighting details have been provided. A suitable package of street lighting information will need to be provided as part of any further detailed design.

Appendix TR3.28

SECTION 7: DRAINAGE

7.1 No drainage information is provided. A suitable package of drainage information will need to form part of any further detailed design.

Appendix TR3.28

SECTION 8: AUDIT STATEMENT

8.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Sign [redacted] Date: 26th April 2019

Audit Team Member

D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

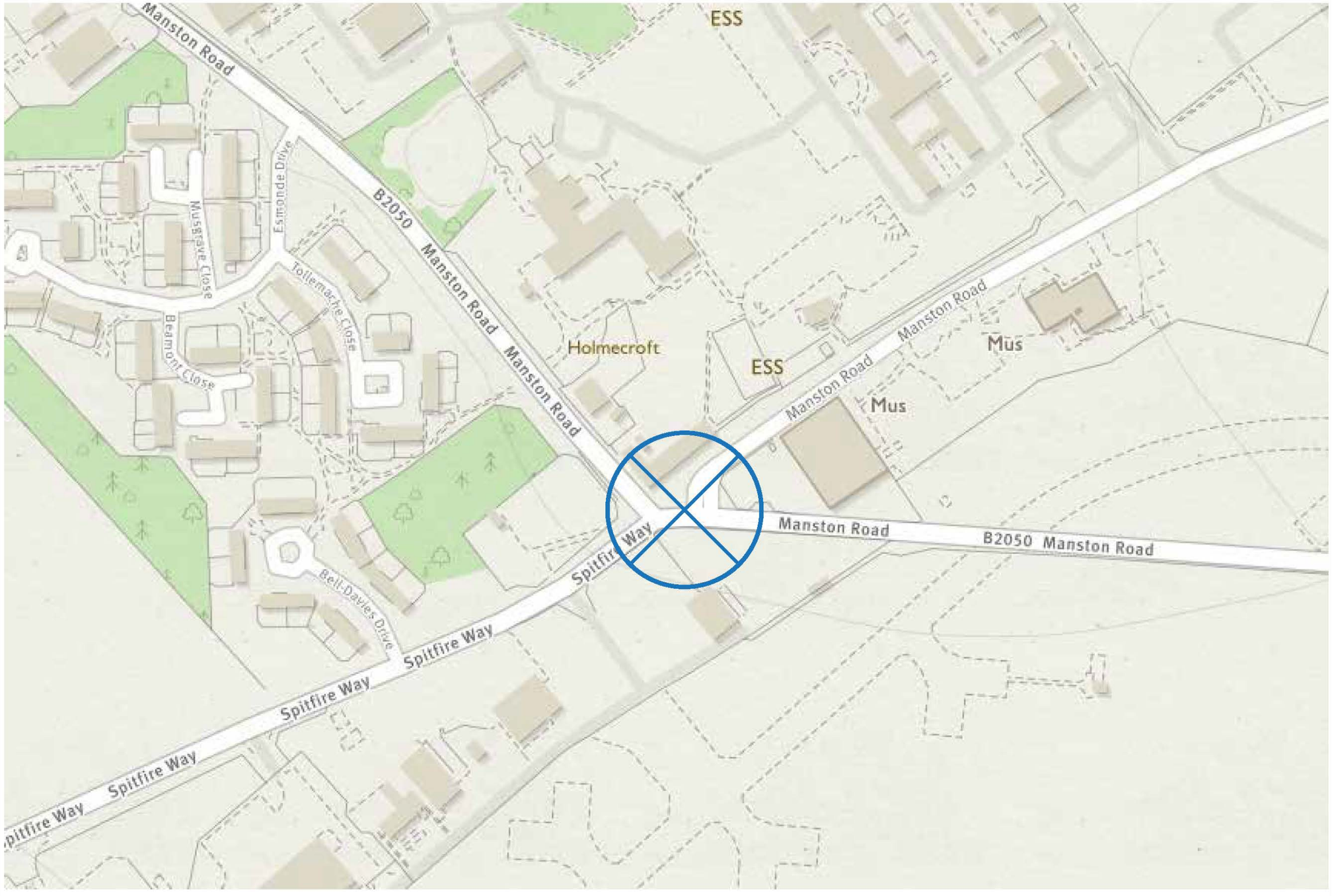
Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed: [redacted] Date: 26th April 2019

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FIGURES



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North

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Client: RSP

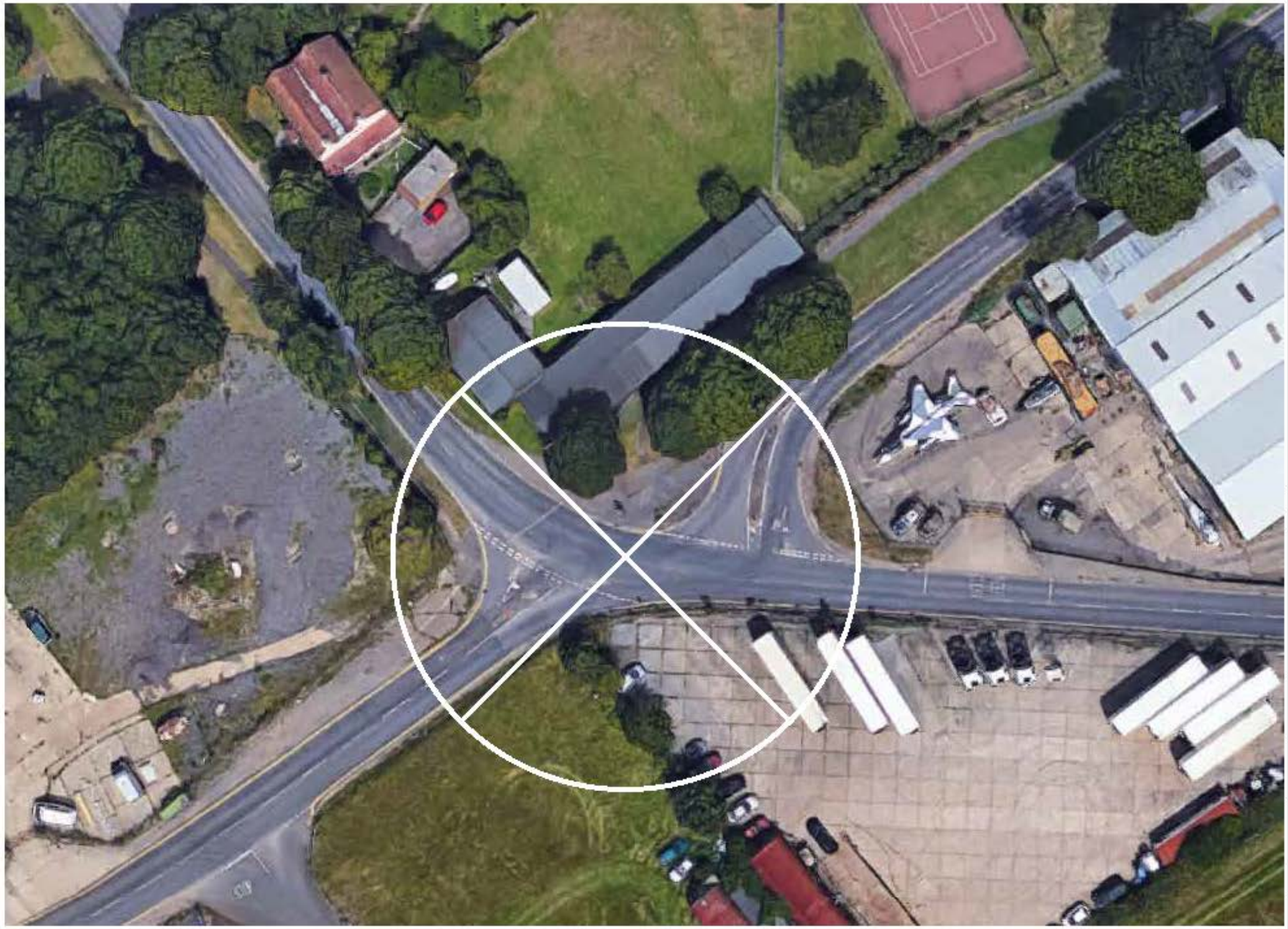
Project: Manston Airport

Title: Location Plan

Date	Status
24/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

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Client: RSP

Project: Manston Airport

Title: Aerial Photo

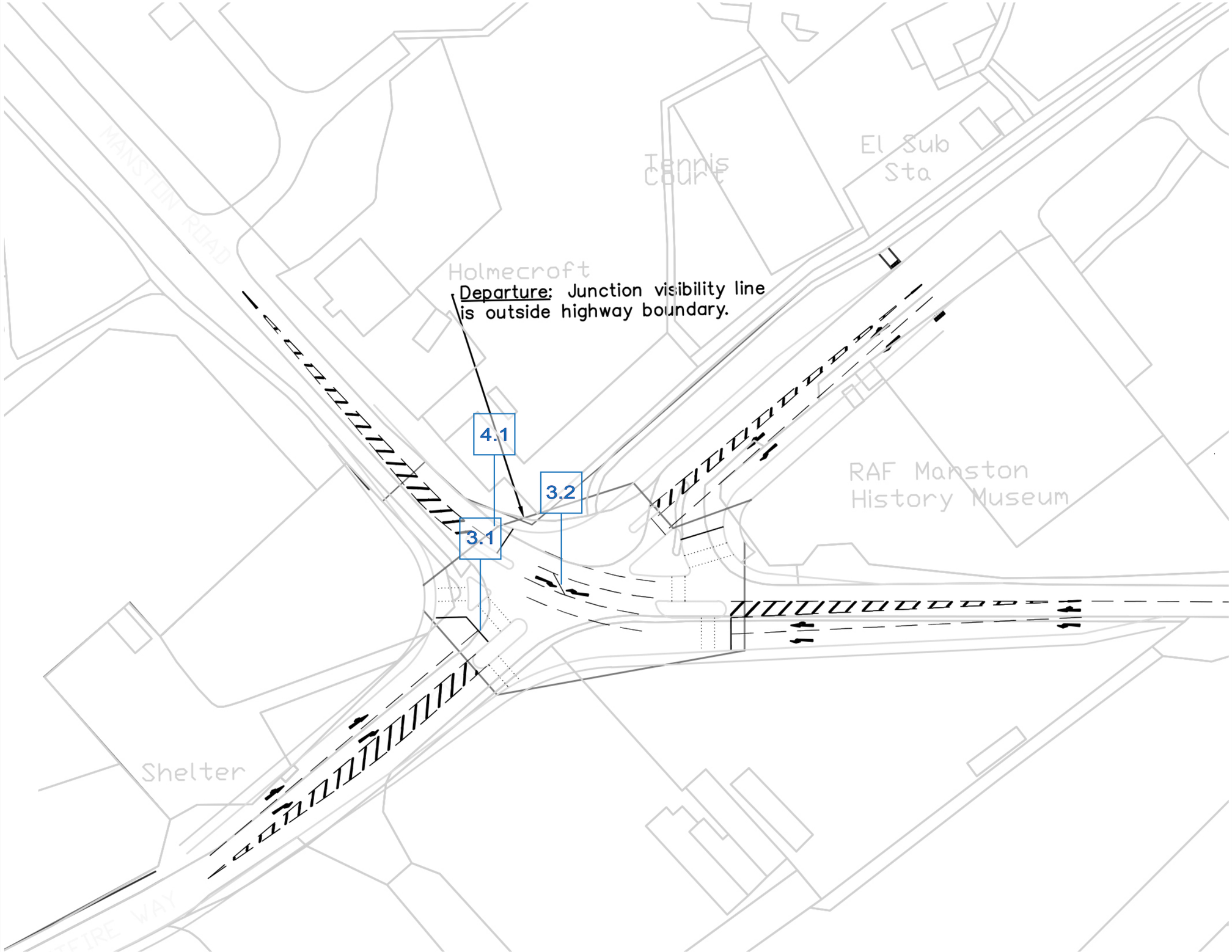
Date	Status
24/04/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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North

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Source: Site Location & Access Design

Rev.	Date	Initials	Amendments

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Transport Planning
&
Highway Engineering
Concept | Consult | Construct
www.badinghamuk.com

Client: RSP

Project: Manston Airport

Title: Audit Plan

Date	Status
24/04/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 3	-

Appendix TR3.28

APPENDIX 1

Road Safety Audit Brief

Ref: AS/0781
Date: 26th April 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	22/03/19
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport DCO
Report title:	Manston Airport - B2190 Spitfire Way/B2050 Manston Road/Manston Road Junction
PREPARED BY:	
Name:	Glyn Price
Signed:	
Organisation:	Wood
Date:	22/03/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Spitfire Way/Manston Road – Signlaised Cross Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Roundabout Junction with the B2190				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details	**Design Organisation Details**			
16 Charles II Street London SW1Y 4NW	Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK			
Police Contact Details (RSA3 Only)	**Maintaining Agent Contact Details**			
N/A	N/A			
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB – TD50/04 THE GEOMETRIC LAYOUT OF SIGNALCONTROLLED JUNCTIONS AND SIGNALISED ROUNDABOUTS				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposals are for a new signalised junction layout at the existing B2190 Spitfire Way/B2050 Manston Road/Manston Road junction.

The extent of the design is shown on drawing 38199-Lon155 provided in the pack of information for this junction, this includes the revised junction layout and approaches.

The objectives of this scheme are to provide an improved junction in terms of capacity and safety as this junction forms part of the route into the proposed Manston Airport development AND would form he southern junction of the Manston to Haine Link Road.

Construction would be proposed within the early years of the project (2-4) life cycle which will be 2021-2023 depending on the approvals process of a DCO that is going through examination. Completion should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB and Traffic signs regulations and general directions have been used in the design of this junction.

Design Speeds
Provide details of applied and/or existing design speeds.

30MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit at the B2190 Spitfire Way/B2050 Manston Road junction is 30 mph. it is not proposed to change this as part of the proposed scheme at the junction.

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

MCC Traffic Turning Counts were taken at the junction 2017 and the results of these counts will be provided. This also included queue information.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the access for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

The proposed design provided for in drawing 38199-Lon155 set out that pedestrian movements will be accommodated across the junction, with signalised crossings as necessary.

Environmental Constraints
Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.

No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

The proposed junction is proposed at the existing location of the Manston Road/Spitfire Way Junction, slightly off set.

General Description
Include road network, road type, relevant land uses etc.

The existing Spitfire Way carriageway is a two-lane carriageway. There are no footways either side of the carriageway and the road is subject to the NSL.

Manston Road is a two-lane carriageway. There are no footways either side of the carriageway.

The existing junction is an offset staggered cross roads junction (Priority) there are no footways on the junction and no dedicated pedestrian crossing points.

The junction is on the boundary of the Manston Airport site.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

At the existing Manston Road/Spitfire Way junction 8 accidents have been recorded which in assessment within the Manston Airport Transport Assessment triggered further detailed assessment and the need for a highways safety mitigation scheme. As such the design of the proposed junction has been provided to improve road safety as well as provide additional capacity.

The details for accidents the 8 accidents are provided.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction that has been recorded will be included with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

This is a key strategic junction for the Manston Airport Development as it forms one of the key junctions for access to the passenger terminal and northern grass area. As such the design has been prepared along with junction modelling to balance road safety improvement requirements and needed capacity improvements.

The junction would also form the southern element of a proposed Manston to Haine Link Road which also increases traffic at the junction so consideration of the this was also required. KCC propose that this junction should be a roundabout junction but RiverOak have also through this design attempted to show that a signalised layout can work in this location also.

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – Manston Road/Spitfire Way – MCC results		11.04.2019
RSA – Manston Road/Spitfire Way – future Year Traffic Flows (2039)		11.04.2019
RSA – Manston Road/Spitfire Way – Accident ZIP		11.04.2019
RSA – Manston Road/Spitfire Way - LINSIG		11.04.2019

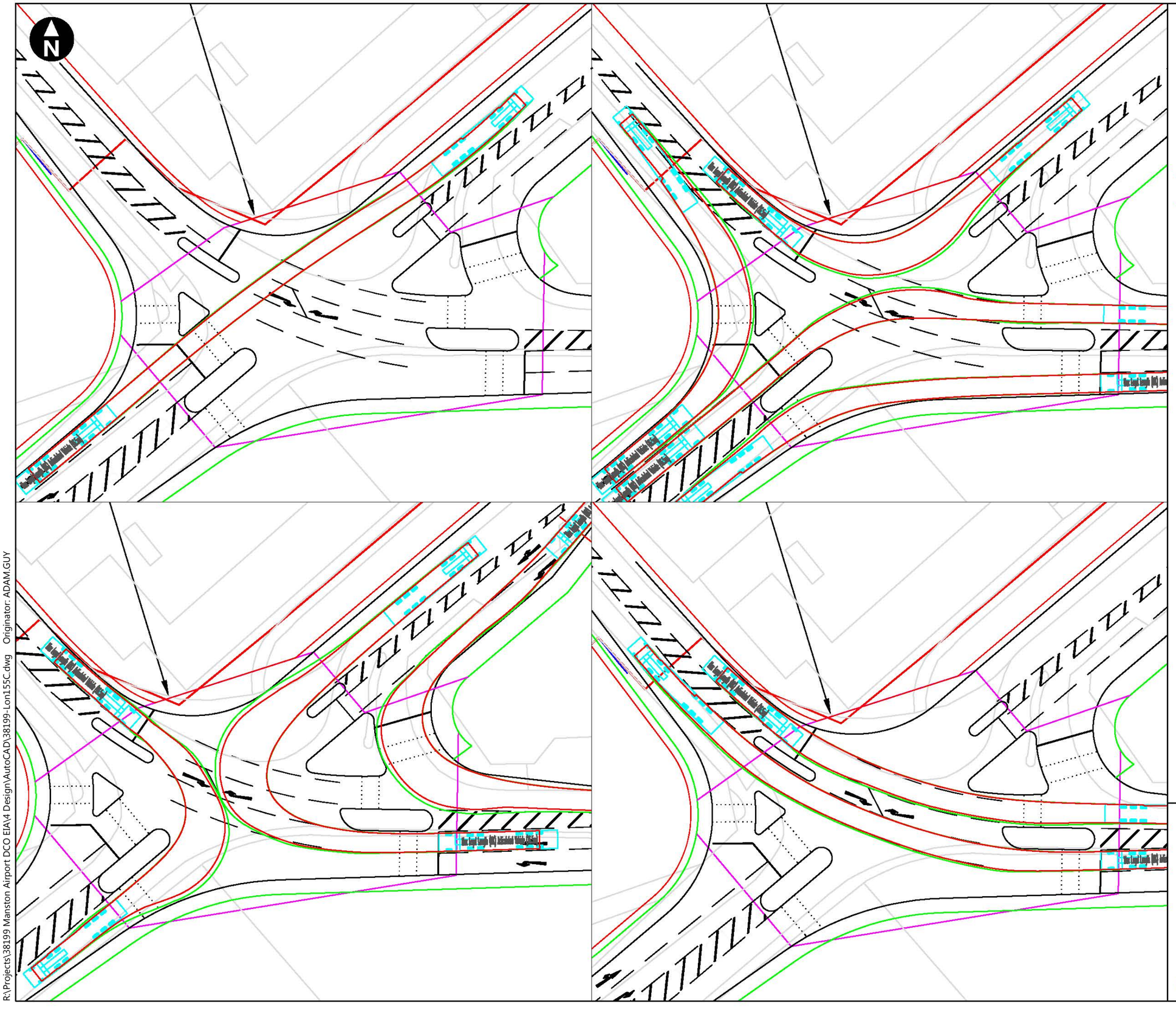
Drawings

Reference/Revision	Title	Date
RSA – Manston Road/Spitfire Way – Site Location and Access design		11.04.2019
RSA – Manston Road/Spitfire Way – Cad file		11.04.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan	✓	Scale Layout Plans	✓
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis	✓	Road Traffic Collision Plot	
Traffic Signal Staging	✓	Traffic Counts	✓
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	✓
Design Standards Used		Adjacent Land Uses	✓

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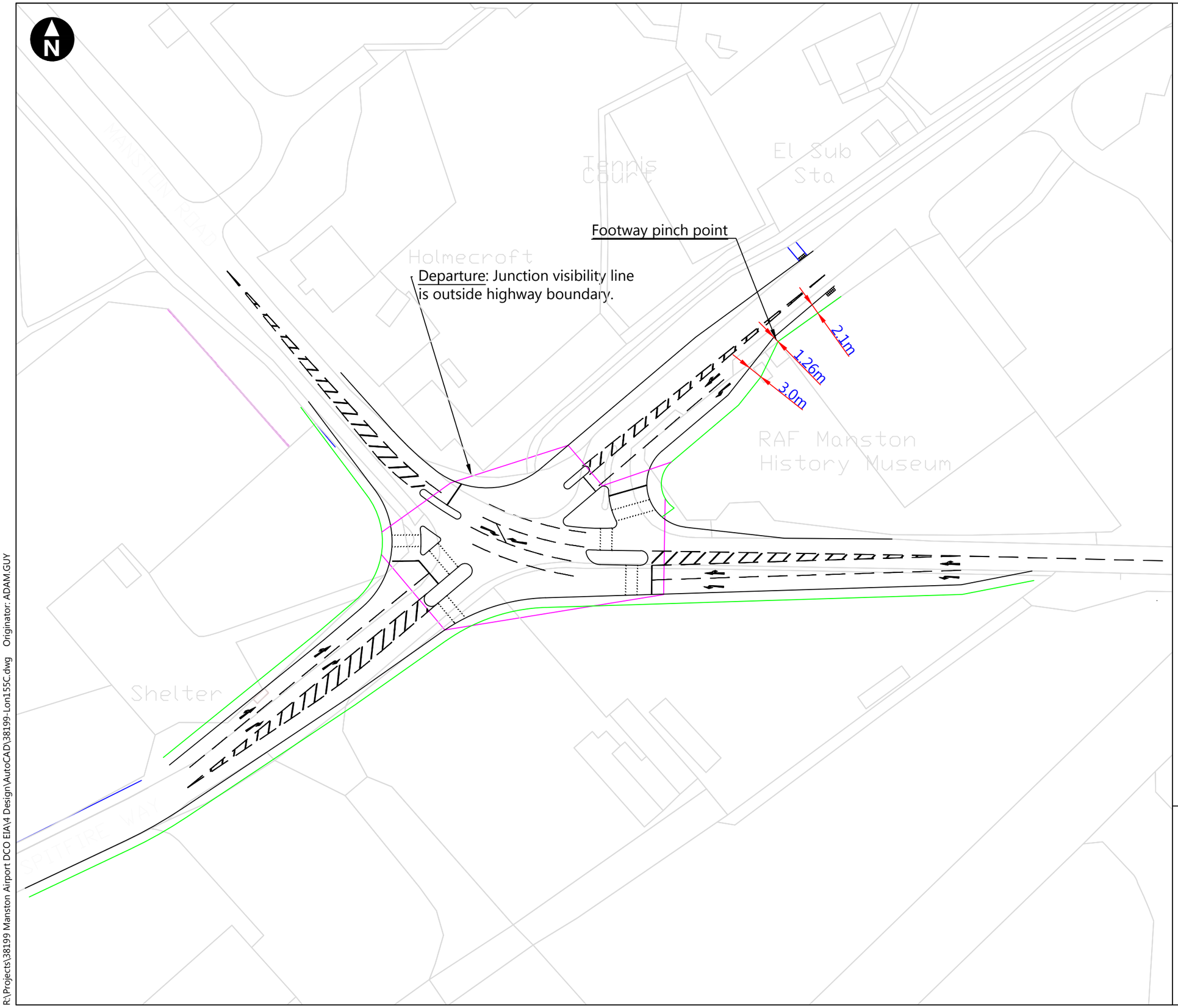
Appendix B
Swept Path Assessment



Appendix TR3.28

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Appendix C
Proposed Scheme



Key

- Existing based on Ordnance Survey map
- Proposed kerbline
- Proposed Road Marking
- Proposed Footway
- Proposed secondary signal head with right turn indicative arrow
- Intervisibility area

0 m 40 m

Scale 1:750 @ A3

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Manston Airport DCO
RSA stage 1 - Designers Reponse

Appendix C - Revised junction layout - Junction 12

May 2019

wood.

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B2190 Spitfire Way/B2050 Manston Road, Kent
Proposed Highway Works

Road Safety Audit – Stage 1
(Preliminary Design)

Client: RSP

21st May 2019

Badingham

Transport Planning & Highway Engineering Consultants

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Appendix TR3.28

DOCUMENT ISSUE

Issue / Revision:	Issue 1	Issue 2			
Description / Status:	Final	Revised Audit Brief			
Date:	26/04/2019	21/05/2019			
Prepared:	A. R. J. Setter	A. R. J. Setter			
Signa [redacted]					
Document Check:	D. F. Rogers	D. F. Rogers			
Sign [redacted]					
Technical Check:	D. F. Rogers	D. F. Rogers			
S [redacted]					
Authorised:	A. R. J. Setter	A. R. J. Setter			
Sig [redacted]					
File Reference:	0781 Manston Airport - 12 - RSA1 - Issue 1.docx	0781 Manston Airport - 12 - RSA1 - Issue 2.docx			

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FIGURES

Figure 1	Site Location Plan
Figure 2	Aerial Photo

APPENDICES

Appendix 1	Road Safety Audit Brief (Revised)

SECTION 1: INTRODUCTION

General

1.1 This Road Safety Audit Stage 1 (Preliminary Design) report has been undertaken at the request of the Highway Authority. It has been prepared on behalf of RSP and relates to proposed highway works at the B2190 Spitfire Way/B2050 Manston Road associated with the redevelopment of Manston Airport, Kent.

1.2 Thanet District Council is the local planning authority. Kent County Council is the local highway authority for the area.

Audit Team

1.3

A. R. J. Setter	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC Badingham Limited
D. F. Rogers	JP CEng BEng (Hons) MICE FIHE MSoRSA Ashburn Partnership

Audit Brief

1.4 The Road Safety Audit has been undertaken in accordance with the Road Safety Audit Brief contained in Appendix 1.

1.5 The terms of reference for this Road Safety Audit are described in GG119. The Audit Team has been made aware of a departure from standard relating to part of an intervisibility zone being outside of the highway boundary.

1.6 The Road Safety Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

Main Parties to the Audit

1.7 The following are the main parties to the audit:

- Client Organisation: RSP
- Overseeing Organisation: Kent County Council
- Design Organisation: Wood Plc

1.8 The Audit Team visited the site together on Tuesday 26th March 2019 between 10.50am and 11.05am. The weather was fine and surfaces were dry. There were no adverse traffic conditions to affect the audit. Photographs of the site and surrounding area are included where relevant.

1.9 The location of the site is shown on Figure 1 Site Location Plan and Figure 2 Aerial Photo. The area of the audit extends solely to the works shown on the drawings included in the Audit Brief. Any issues identified are cross-referenced by paragraph number to the Audit Plan (Figure 3).

1.10 The works comprise the proposed conversion of an existing uncontrolled staggered crossroads arrangement to a signalised crossroads junction. Manston Road (north) is subject to a 30mph speed limit and is a single carriageway with double-yellow line restrictions. There is a footway on the western side of the carriageway. Manston Road (east) also has double-yellow line restrictions and is subject to a 40mph speed limit beyond the junction. It has a straight approach alignment. No footways are provided. Manston Road (west) bends to the north at the junction. A footway is provided on its southern side. Bus stops are situated to the south of the junction on the single carriageway Spitfire Way. No footways are provided on either side of the highway leading from the junction although a short section is provided leading to Belle-Davies Drive beyond which the speed limit changes to 60mph. Gradients in the area are minimal. Controlled crossing facilities are to be provided across the Manston Road (east) and Spitfire Way arms.

1.11 Nine collisions are recorded for the latest 5-year period 2013-2018. Two were serious and seven are categorised as slight. A total of 12 casualties resulted. The highway was not identified as a contributory factor in any of the collisions.

SECTION 2: ITEMS RAISED AT PREVIOUS AUDITS

2.1 A Road Safety Audit Stage 1 (Issue 1) was prepared by Badingham in April 2019. A Designer's Response was prepared by Wood in April 2019 together with a subsequent revised Audit Brief. This Road Safety Audit Stage 1 (Issue 2) considers the proposed design revisions and response to the original audit (Issue 1). No matters are outstanding.

SECTION 3: ITEMS RAISED AT THIS AUDIT

3.1 No observations.

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SECTION 4: AUDIT STATEMENT

4.1 This audit has been undertaken in accordance with DMRB Standard GG119.

Road Safety Audit Team Leader

A. R. J. Setter BA (Hons) MSc CMILT MCIHT AMICE MSoRSA CoC

Director - Badingham Limited

16 Ashley Piece, Ramsbury, Marlborough, Wiltshire, SN8 2QE

Sig [redacted] Date: 21st May 2019

Audit Team Member

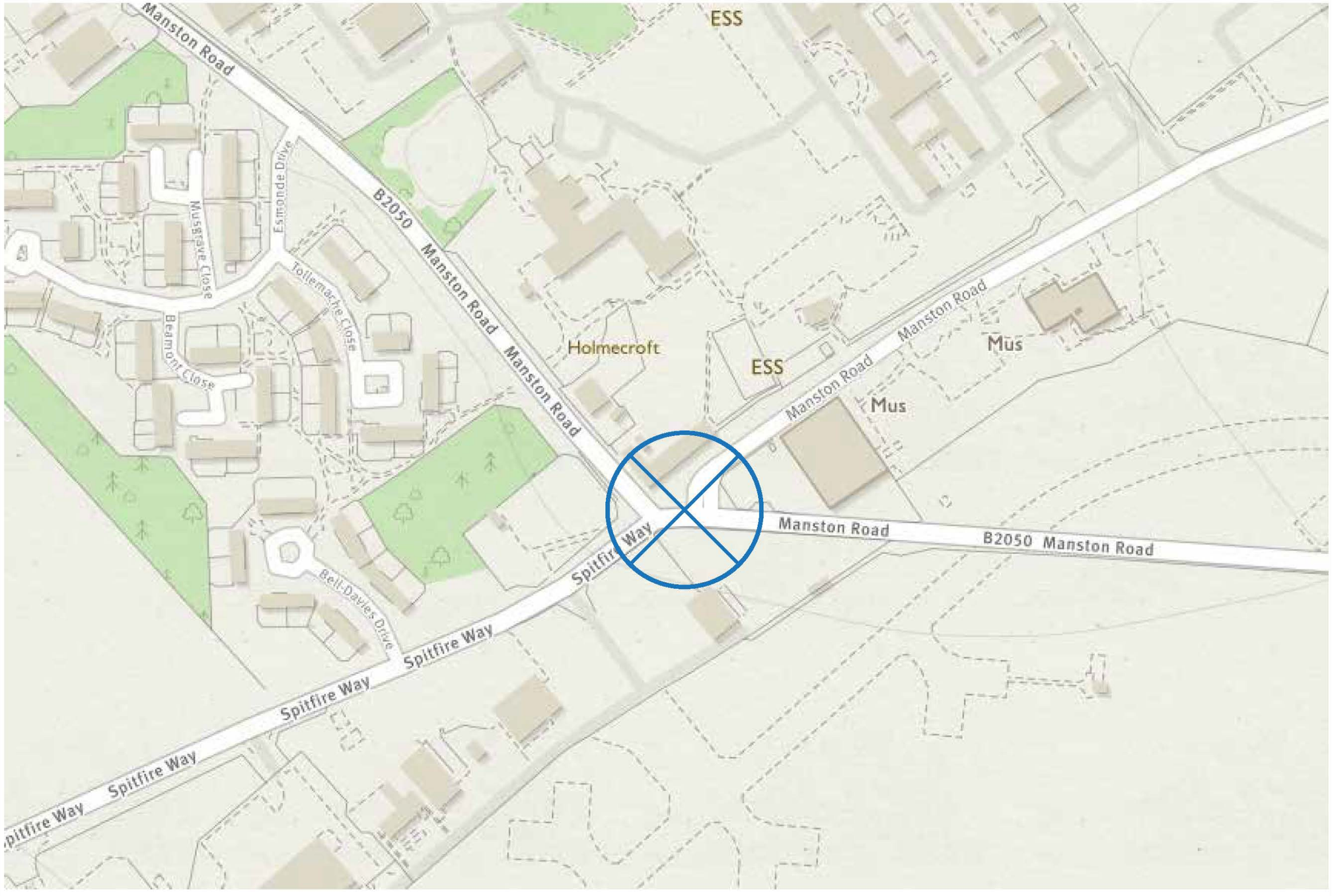
D. F. Rogers JP CEng BEng (Hons) MICE MSoRSA FIHE

Partner - Ashburn Partnership

5 Mayfield, Upper Wanborough, Swindon, SN4 0ED

Signed [redacted] Date: 21st May 2019

FIGURES



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North

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Notes:

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2. All dimensions must be checked on site.

Rev.	Date	Initials	Amendments

Badingham
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Client: RSP

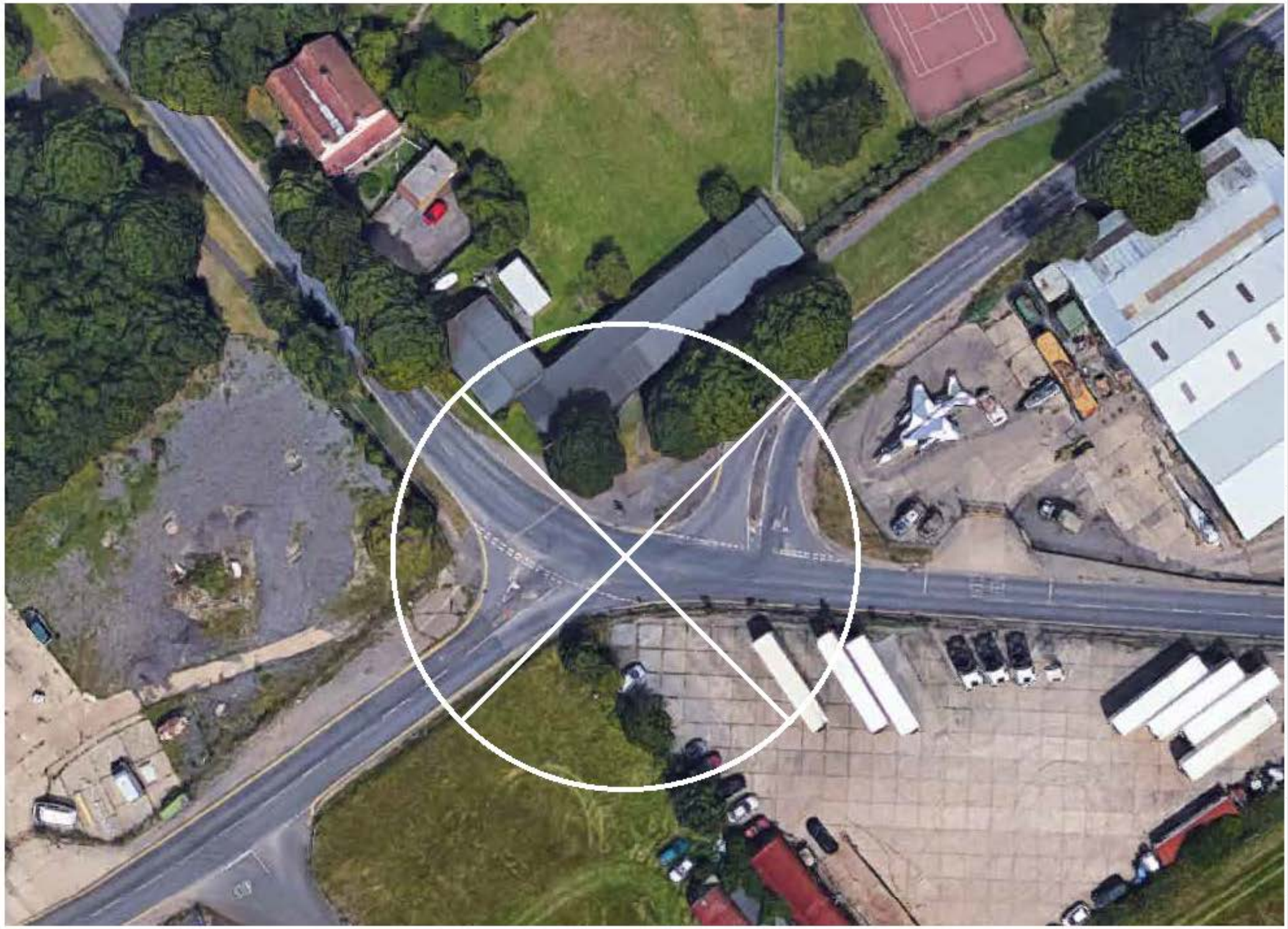
Project: Manston Airport

Title: Location Plan

Date	Status
24/04/2019	FINAL
Scale: NTS	Original Size: A3
Drawn: AS	Checked: AS

Job No.	Drawing No.	Rev.
0781	FIGURE 1	-

Appendix TR3.28



North

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Client: RSP

Project: Manston Airport

Title: Aerial Photo

Date	Status
24/04/2019	FINAL

Scale	Original Size
NTS	A3

Drawn	Checked
AS	AS

Job No.	Drawing No.	Rev.
0781	FIGURE 2	-

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APPENDIX 1

Road Safety Audit Brief (Revised)

Ref: AS/0781
Date: 21st May 2019

ROAD SAFETY AUDIT BRIEF

Project Summary	
Date:	22/03/19
Document Reference:	N/A
Prepared by:	Wood
On Behalf of:	RiverOak Strategic Partners
AUTHORISATION SHEET	
Project:	Manston Airport DCO
Report title:	Manston Airport - B2190 Spitfire Way/B2050 Manston Road/Manston Road Junction
PREPARED BY:	
Name:	Glyn Price
Signed:	
Organisation:	Wood
Date:	22/03/2019
I APPROVE THE RSA BRIEF AND INSTRUCT THE RSA TO TAKE PLACE ON BEHALF OF THE OVERSEEING ORGANISATION:	
Name:	Tony Freudmann
Signed:	
Organisation:	RiverOak Strategic Partners
Date:	

General Details				
Highway Scheme Name & Road Number	Manston Airport – Spitfire Way/Manston Road – Signlaised Cross Road			
Type of Scheme *e.g. new road scheme, smart motorway, junction improvement, traffic signs and road markings improvement, traffic calming, etc.*				
New Roundabout Junction with the B2190				
RSA Stage *Tick as appropriate ✓*	1 √	2	3	4
	Interim			
Overseeing Organisation Details	**Design Organisation Details**			
16 Charles II Street London SW1Y 4NW	Wood Glyn Price Associate Director Canon Court, Abbey Lawn, Abbey Forgate, Shrewsbury, SY2 5DE, UK			
Police Contact Details (RSA3 Only)	**Maintaining Agent Contact Details**			
N/A	N/A			
RSA Team Membership				
A.R.J. Setter (Team Leader)	BA (Hons) MSc CMILT MCIHT AMICE MSoRSA Highways England Certificate of Competence & Compliant with EU Directive 2008/96/EC Badingham Limited			
D. F. Rogers (Team Member)	JP, CEng BEng (Hons) MICE MSoRSA FIHE Ashburn Consultants			
Terms of Reference *Make reference to relevant DMRB documents and other guidance where appropriate.*				
DMRB – TD50/04 THE GEOMETRIC LAYOUT OF SIGNALCONTROLLED JUNCTIONS AND SIGNALISED ROUNDABOUTS				

Scheme Details

Scheme Description/Objective

General
Define the extents of the RSA, include a brief scheme description, the scheme objectives, a start date for construction if known and a completion date. In addition, for stage 4 RSAs, confirm when all related traffic management has been removed.

The proposals are for a new signalised junction layout at the existing B2190 Spitfire Way/B2050 Manston Road/Manston Road junction.

The extent of the design is shown on drawing 38199-Lon155 provided in the pack of information for this junction, this includes the revised junction layout and approaches.

The objectives of this scheme are to provide an improved junction in terms of capacity and safety as this junction forms part of the route into the proposed Manston Airport development AND would form he southern junction of the Manston to Haine Link Road.

Construction would be proposed within the early years of the project (2-4) life cycle which will be 2021-2023 depending on the approvals process of a DCO that is going through examination. Completion should take between 3-6 months.

Design Standards Applied to the Scheme Design
For example, DMRB.

DMRB and Traffic signs regulations and general directions have been used in the design of this junction.

Design Speeds
Provide details of applied and/or existing design speeds.

30MPH

Speed Limits
State whether mandatory or advisory, available speed data.

The existing speed limit at the B2190 Spitfire Way/B2050 Manston Road junction is 30 mph. it is not proposed to change this as part of the proposed scheme at the junction.

Existing Traffic Flows/Queues
To include current automatic traffic counter (ATC) data, up-to-date turning count and queue information etc.

MCC Traffic Turning Counts were taken at the junction 2017 and the results of these counts will be provided. This also included queue information.

Forecast Traffic Flows
Where available and relevant, provide future traffic flow data including vehicle proportions.

Future Traffic flows at the access for the AM and PM Peak will be provided in a matrix format.

Pedestrian, Cyclist & Equestrian Desire Lines
Include details of pedestrian, cyclist and equestrian movements in the vicinity of the scheme and, when applicable the relevant walking, cycling and horse-riding assessment and review reports HD 42/17 [Ref 7.1].

The proposed design provided for in drawing 38199-Lon155 set out that pedestrian movements will be accommodated across the junction, with signalised crossings as necessary.

Environmental Constraints
Include all environmental constraints within the scheme extents, for example sites of special scientific interest (SSSI), conservation areas, listed properties etc.

No environmental constrains have been observed.

Locality

Description of Locality
Include all environmental constraints within the scheme extents, e.g. (SSSI), conservation areas, listed properties etc.

The proposed junction is proposed at the existing location of the Manston Road/Spitfire Way Junction, slightly off set.

General Description
Include road network, road type, relevant land uses etc.

The existing Spitfire Way carriageway is a two-lane carriageway. There are no footways either side of the carriageway and the road is subject to the NSL.

Manston Road is a two-lane carriageway. There are no footways either side of the carriageway.

The existing junction is an offset staggered cross roads junction (Priority) there are no footways on the junction and no dedicated pedestrian crossing points.

The junction is on the boundary of the Manston Airport site.

Relevant Factors Which May Affect Road Safety
Factors known to the Design Organisation and considered as part of the design. This should also include anything that would not be immediately obvious to the RSA Team – such as school crossing patrols and large events, for example.

At the existing Manston Road/Spitfire Way junction 8 accidents have been recorded which in assessment within the Manston Airport Transport Assessment triggered further detailed assessment and the need for a highways safety mitigation scheme. As such the design of the proposed junction has been provided to improve road safety as well as provide additional capacity.

The details for accidents the 8 accidents are provided.

Analysis

Collision Data Analysis
Stages 1,2, and 3 provide a summary of road traffic collision data covering both the extent of the scheme and the adjoining sections of highway. As a minimum, the most recent 36 month of data. At Stage 4, provide 12 months of post-opening validated road traffic collision data. Raw data should be provided as an appendix.

Accident data for the junction that has been recorded will be included with this brief.

Departures from Standards
Include status details, i.e. approved/pending/rejected, and any design strategy records produced for improvements to existing trunk roads and motorways.

N/A

Previous Road Safety Audit Stage Reports, Road Safety Audit Response Reports & Evidence of Agreed Actions
Attach previous reports to the RSA Brief, or provide an explanation where these are not available.

N/A

Strategic Decisions
Includes items outside the scope of this RSA, which will not change irrespective of the RSA, for example route choice, junction type, approved departures from standard.

This is a key strategic junction for the Manston Airport Development as it forms one of the key junctions for access to the passenger terminal and northern grass area. As such the design has been prepared along with junction modelling to balance road safety improvement requirements and needed capacity improvements.

The junction would also form the southern element of a proposed Manston to Haine Link Road which also increases traffic at the junction so consideration of the this was also required. KCC propose that this junction should be a roundabout junction but RiverOak have also through this design attempted to show that a signalised layout can work in this location also.

List of Included Documents and Drawings
For example: previous RSA reports; Design Responses; Departures; Road Traffic Collision Data; Walking, Cycling and Horse-Riding Assessment and Reviews. This could include any relevant operational data such as damage-only collision data or incident logs.
This list could be included as an attachment to the RSA Brief or a hyperlink to a shared electronic location where the RSA Brief information has been collated.

Documents

Reference/Revision	Title	Date
RSA – Manston Road/Spitfire Way – MCC results		11.04.2019
RSA – Manston Road/Spitfire Way – future Year Traffic Flows (2039)		11.04.2019
RSA – Manston Road/Spitfire Way – Accident ZIP		11.04.2019
RSA – Manston Road/Spitfire Way - LINSIG		11.04.2019

Drawings

Reference/Revision	Title	Date
RSA – Manston Road/Spitfire Way – Site Location and Access design		11.04.2019
RSA – Manston Road/Spitfire Way – Cad file		11.04.2019

Checklist			
Tick all that are included and provide reasons for those that are not included.	✓		
Site Location plan	✓	Scale Layout Plans	✓
Departures and Relaxations from Standards		Construction/Typical Details	
Previous RSA Reports		Previous RSA Response Reports & Evidence of Agreed Actions	
Collision Data and Collision Data Analysis	✓	Road Traffic Collision Plot	
Traffic Signal Staging	✓	Traffic Counts	✓
Speed Surveys		Pedestrian, Cyclist, Horse-Riding Desire Lines & Volumes	
Walking, Cycling and Horse-Riding Assessment & Reviews		Items Outside the Scope of the RSA/Strategic Decisions	
Other Factors that may Impact Upon Road Safety		Design Speeds/Speed Limits	✓
Design Standards Used		Adjacent Land Uses	✓

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Technical note:
Strategic Road Network Assessment

1. Introduction

RiverOak Strategic Partners Limited (hereafter referred to as 'RiverOak') is seeking to secure the future of Manston Airport (the 'Proposed Development') as a valuable regional and national asset by re-developing the existing Manston Airport site as a freight airport. The proposals will provide much needed additional air freight capacity to the United Kingdom and serve to relieve pressure from other, already heavily congested, London and South-East airports.

Under the *Planning Act 2008* (the '2008 Act') the re-development of Manston Airport as a freight airport is considered a Nationally Significant Infrastructure Project (NSIP). RiverOak made an application under the 2008 Act for a permission known as a 'Development Consent Order' (DCO) to reopen and operate Manston Airport. The application was submitted to the Planning Inspectorate on 17 July 2018 and was accepted for examination on 14 August 2018. The Examination began on 9 January 2019.

A Transport Assessment (TA) [APP-060, 061] was submitted in support of the DCO application. Scoping consultation with Highways England to inform the TA had identified the need to consider the following two junctions:

- M2 Junction 7 – Brenley Corner some 40km to the east of the Proposed Development; and
- A2/A258 roundabout - Duke of York Roundabout some 30km to the south of the Proposed Development.

Chapter 8 of the TA included consideration of the development impact on the Strategic Road Network (SRN) and showed the distribution of traffic in the AM and PM peak hours in Figures 8.2 and 8.3. It was concluded that there was not a significant impact.

This Technical Note has been produced in response to Highways England's continued request to consider the impact of the Proposed Development at Brenley Corner. It provides the results of the impact of the Proposed Development flows on the merge/diverge lanes off the A299 and M2. An assessment of the roundabout itself is not required as development traffic stays on the A299 and M2 and does not route onto or off the roundabout.

It is noted that Highways England's response to the Examination at Deadline 6 included the need to consider the A2/A56 junction known as Whitfield Roundabout. This had not been previously identified and it has not been possible to collect traffic data at the junction within the timescales. However, consideration has been given to the proportional impact at the junction based on publicly available data.

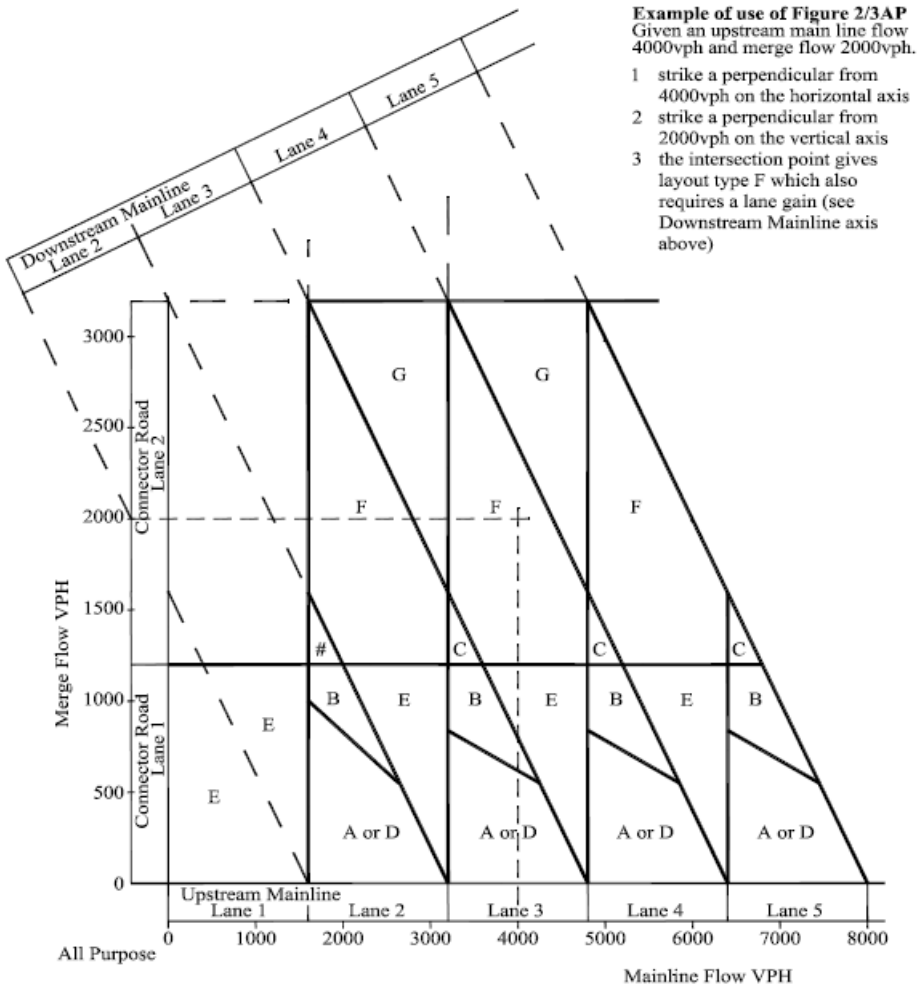
2. M2 Junction 7 – Brenley Corner

Brenley Corner is located to the east of Faversham and is in Swale District. It is a grade separated roundabout at the intersection of the A2(M2)/A299 where the M2 motorway, which forms the southern arm of the junction, terminates and becomes the A299 Thanet Way heading north east. The A2 (E), towards Faversham and Sittingbourne, and the A2 (W), towards Canterbury, are accessed via a grade separated roundabout above the M2/A299.

Basepoint Data was commissioned to undertake classified traffic counts and queue length surveys of the merge and diverge lanes and the A299 and M2 lanes. These took place on Wednesday 9th May 2019 between 07:00 and 19:00. The results show that the AM peak hour is 07:00 – 08:00 and the PM peak hour is 17:00 – 18:00.

2.1 Merge / Diverge Assessment

An assessment of the impact of the Proposed Development on the merge/diverge lanes at Brenley Corner in the AM and PM peaks has been undertaken based on Figure 2.3 in TD 22/06 - L*ayout of grade separated junctions* from the Design Manual for Roads and Bridges (DMRB), as shown below.



Notes:

\# Area of uncertainty – In this area the choice will depend on the downstream provision. If there is a lane gain then use Layout E or F.

See paragraph 2.29 and the example above, for explanation of the usage of this diagram.

Figure 2/3 AP All-Purpose Road Merging Diagram

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This takes into account mainline flows and the interaction with merge and diverge flows.

Highways England's requirements for assessment periods are set out in the Department for Transport (DfT) Circular 02/2013 *The Strategic Road Network and the delivery of sustainable development* and *The strategic road network: Planning for the future*, September 2015, Highways England. These identify the following regarding assessment requirements:

- The opening year assuming full build out and occupation which is used for the determination of impact mitigation needs.
- A review period of either a date ten years after the date of registration of the associated planning application or the end of the Local Plan period (whichever is the greater). This to determine the risk which will transfer to Highways England, not to identify mitigation.

An assessment of the opening year (2021) assuming full build out has been undertaken. A growth assumption of 103.7% has been assumed which is in line with estimated growth between 2015 and 2017 for a traffic count site (ref 26009) on the M2 south of the junction (https://www.dft.gov.uk/traffic-counts/cp/Kent#26009).

The assessment has been based on the peak hour flows for the development, which are 08:00 – 09:00 and 17:00 – 18:00. As noted earlier, the baseline AM peak is between 07:00 – 08:00, when the development traffic flows are lower. Therefore the assessment has taken a robust approach.

An assessment of ten years later or up to end of the Local Plan period has not been undertaken as it is not possible to ascertain likely growth during this period, as the Swale Local Plan is currently under five year review and includes major growth in Faversham directly to the west of the junction and the Thanet Local Plan is at Examination stage.

Figure 2.1 shows the merge/diverge lanes, referenced as A to D.

Figure 2.1 Brenley Corner Merge/Diverge Lanes



Table 2.1 summarises the traffic flows and merge / diverge requirements with and without the development. For the purposes of displaying the vehicle increases all flow has been added to the nearside mainline for simplicity, in reality this will be spread across both mainline lanes.

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Table 2.1 Merge/Diverge Assessment

Ref	Type	Form	Dir.	Description		AM Peak Hour			Requirement			PM Peak Hour			Requirement		
					Lane	2019 Base	2021 Future Base	2021 + Dev	2019	2021 Future Base	2021 + Dev	2019 Base	2021 Future Base	2021 + Dev	2019	2021 Future Base	2021 + Dev
A	Merge	B	W/B	Onslip to M2	On-Slip	1123	1164	1164	E	B	B	971	1007	1007	A or D	E	E
					Nearside Mainline	1123	1164	1231				958	993	1028			
					Offside Mainline	2144	2223	2223				1071	1111	1111			
B		A	E/B	Onslip to M2	Slip	328	340	340	E	E	E	560	581	581	A or D	A or D	A or D
					Nearside Mainline	832	862	908				1369	1420	1466			
					Offside Mainline	484	501	501				1066	1105	1105			
C	Diverge	A	W/B	Offslip from A299	Off-Slip	572	593	593	A	A	A	453	470	470	N/A	N/A	N/A
					Nearside Mainline	643	643	734				614	637	672			
					Offside Mainline	1501	1557	1557				444	460	460			
D		C	E/B	Offslip from M2	Off-Slip	1124	1166	1166	N/A	N/A	N/A	1183	1227	1227	A	A	A
					Nearside Mainline	658	682	728				623	646	692			
					Offside Mainline	330	342	342				1252	1298	1298			

Notes:

- Assessment based on Fig 2.3 in TD 22/06. DMRB
- The AM peak hour comprises the traffic survey data from between 07:00 and 08:00, and the AM peak development traffic which occurs between 08:00 and 09:00.
- The PM peak of the mainline flow coincides with the PM peak of the development flow.
- A growth factor of 1.036 has been applied based estimated growth between 2015 and 2017 for a traffic count site (ref 26009) on the M2 south of the junction (https://www.dft.gov.uk/traffic-counts/cp/Kent#26009).

.

The results show that the required form of the merges and diverges is not altered by the addition of the development traffic.

It is noted that in some of the baseline situations the merge/diverge provision does not always accord with the DMRB requirement due to the volume of traffic flows. However, the development traffic does not make the situation worse.

It should be noted that for the purpose of this exercise, the additional through flow has been added to the nearside lane. In reality, this flow is likely to be weighted towards the offside lane due to the absence of interaction with the merging traffic. Taking this into account, the level of additional development trips interacting with the merge or diverges is considered to be low and does not warrant an improvement scheme.

2.2 Proportional Impact Assessment

An additional assessment has been made of the proportional impact of the development in 2039 on the basis that changes of less than 5% will be within the typical daily variation of traffic flows at any one junction and will not have a severe impact, as defined by NPPF, on the highway network. The 2019 traffic count data has been growthed by 1.0185 p.a. based on the DfT traffic count data. Tables 2.2 and 2.3 show the results.

Table 2.2 Percentage Impact of Development Traffic – AM Peak Hour (08:00 – 09:00)

	Devt traffic	A299 (North of M2 J7)			A299 - M2 (beneath M2 J7)			M2 (South of M2 J7)		
		2019	2039*	% Impact	2019	2039*	% Impact	2019	2039*	% Impact
NB	46	1438	1956	2.4%	1060	1442	3.2%	2101	2857.4	1.6%
SB	67	2180	2965	2.3%	1519	2066	3.2%	2503	3404.1	2.0%

Table 2.3 Percentage Impact of Development Traffic – PM Peak Hour (17:00 – 18:00)

	Devt traffic	A299 (North of M2 J7)			A299 - M2 (beneath M2 J7)			M2 (South of M2 J7)		
		2019	2039*	% Impact	2019	2039*	% Impact	2019	2039*	% Impact
NB	46	2435	3312	1.4%	1875	2550	1.8%	3058	4159	1.1%
SB	35	1511	2055	1.7%	1058	1439	2.4%	2029	2759	1.3%

The results show that the development traffic will be less than 5% of the 2039 flows in both the AM and PM peaks at all points on the A299 and M2. The development traffic is also less than 5% of existing traffic flows. Therefore the development traffic is well within the typical daily variation of flows and will not have a severe impact.

3. Whitfield Roundabout

Whitfield Roundabout is located north of Dover and is a grade separated dumbbell interchange comprising two roundabouts at the intersection of the A2 and the A256. The A2 is part of the SRN and routes underneath the interchange and is accessed via merge/diverge lanes.

3.1 Proportional Impact Assessment

As set out in the introduction above, it has not been possible to undertake a traffic survey at the junction within the timescales, however, reference has been made to publicly available traffic data on the DfT traffic count site. The nearest traffic count site to the Whitfield Roundabout on the A256 is site 6824 some 7.8km north of the junction - https://www.dft.gov.uk/traffic-counts/cp/Kent#6824. There are also count sites on the A2, however, it would not be possible to derive the flows using the slips roads onto/off the roundabout, so this has been discounted.

The site 6824 traffic data provides average annual daily flows (AADF) for an 18 year period between 2000 and 2017 based on traffic counts and estimations. The 2017 data has been derived from a traffic count. The average annual traffic growth is approximately 1.0133. In order to make an estimation of the proportional impact of the development traffic, it has been necessary to estimate the peak hour flow. This has been based on 10% of the AADF. It is highlighted that this is only one arm of traffic at the junction, there will also be traffic from the A2 and A256 South arm.

Table 3.1 presents a calculation of the proportional impact of the development traffic on the A256.

Table 3.1 Percentage Impact of Development Traffic

2017 AADF	Peak Hour Traffic[1]	2039 Peak Hour[2]	Peak hour Development Traffic[3]	% impact 2017 traffic data	% impact 2039 traffic
12451	1245	1609	51	4.1%	3.2%

Notes
1 Assumes peak hour flows are 10% of AADF
2 Assumes annual growth of 1.0133 based on the historical data from count site 6824
3 Based on PM peak two way flow of 51 vehicles, the highest peak hour flow

The results show that the proportional impact is 4.1% of the 2017 traffic flows and 3.2% of the estimated 2039 flows. Taking into account the traffic from the other arms that enter and exit the roundabouts, the proportional impact would be considerably less.

It is concluded that the development traffic is well within 5%, the typical daily variation of flows, and will not have a severe impact.

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Chris Morris



Bev Coupe

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