

High Speed Rail (Crewe – Manchester)

Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement

Volume 5: Appendix CT-003-00000

Alternatives report

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Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

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Printed in Great Britain on paper containing 100% recycled fibre.

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1 Introduction

1.1 Background to High Speed Two (Crewe – Manchester) and the need for SES2 and AP2 ES

- 1.1.1 The High Speed Rail (HS2) (Crewe – Manchester) Bill ('the Bill') was submitted to Parliament together with an Environmental Statement (ES) ('the main ES')¹ in January 2022. If enacted by Parliament, the Bill will provide the powers to construct, operate and maintain the HS2 Phase 2b Western Leg.
- 1.1.2 This phase of HS2 will provide the section of the route between Crewe and Manchester, including: new stations at Manchester Airport and Manchester Piccadilly; a depot north of Crewe and maintenance facilities; a connection between the HS2 route and the West Coast Main Line (WCML) at Crewe, enabling future Northern Powerhouse Rail (NPR) services to connect with HS2; provision for future NPR routes to connect with HS2; works at locations beyond the Western Leg route corridor (referred to as 'off-route works') to enable HS2 trains to call at existing stations further north on the WCML; and depots to provide overnight stabling for HS2 trains serving the north of England and Scotland.
- 1.1.3 Following the deposit of the Bill, the need for changes to the design which do not require amendments to the Bill, changes to construction assumptions, new environmental baseline information and corrections² to the main ES were identified. These changes were reported in the Supplementary ES 1 ('the SES1'). The SES1 was accompanied by the Additional Provision 1 ES (the 'AP1 ES') which reported changes that required amendments to the Bill. The Additional Provision (referred to hereafter as 'AP1'), together with the ES ('the SES1 and AP1 ES')³ were deposited with Parliament in July 2022. The SES1 and AP1 ES included changes and amendments in the following community areas:
- MA01: Hough to Walley's Green;
 - MA02: Wimboldsley to Lostock Gralam;
 - MA03: Pickmere to Agden and Hulseheath;
 - MA04: Broomedge to Glazebrook; and

¹ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement*. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

² The need for a number of corrections to the contents of the main ES and SES1 and AP1 ES have been identified. These are set out in SES2 and AP2 ES Volume 5, Appendix: CT-009-00000, Corrections to Volume 5 of the January 2022 Environmental Statement and the July 2022 Supplementary Environmental Statement 1 and Additional Provision 1 Environmental Statement.

³ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Supplementary Environmental Statement 1 and Additional Provision 1 Environmental Statement*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-supplementary-environmental-statement-1-and-additional-provision-1-environmental-statement>.

- MA05: Risley to Bamfurlong.
- 1.1.4 Of particular note, the SES1 included removal of the HS2 WCML connection near Bamfurlong, included in the original scheme, from the Bill. This removed the community areas of Broomedge to Glazebrook (MA04) and Risley to Bamfurlong (MA05) from the HS2 scheme.
- 1.1.5 Since the submission of the SES1 and AP1 ES, the need for further changes in all community areas and for the off-route areas have been identified. Any new or different significant effects that are likely to result from these changes, where these do not require amendments to the Bill, are reported in the SES2.
- 1.1.6 Amendments which require changes to the Bill are reported in the AP2 ES. The AP2 ES reports the likely significant environmental effects of these amendments, having taken into account the environmental information in the SES2. Some of the AP2 ES amendments interact with or alter certain proposals included within AP1. Where this is the case, this is reported in the relevant volume report.
- 1.1.7 These design changes and amendments have arisen through ongoing discussions with stakeholders and as a result of design refinements.
- 1.1.8 The assessment of the original scheme and the assessment of the AP1 revised scheme assumed that construction would commence in 2025, with the start of operation in 2038. As a result of a change to construction assumptions the SES2 and AP2 ES assumes that the first year of construction will be 2026, with the first year of operation in 2039.
- 1.1.9 The SES2 and the AP2 ES are separate environmental statements but have been produced as combined volumes. The SES2 is presented first, and the AP2 ES follows.

1.2 Purpose of this report

- 1.2.1 The consideration of reasonable alternatives forms a statutory requirement of Environmental Impact Assessment (EIA) reporting and is also required under Parliamentary Standing Order 27A^{4, 5} in relation to an ES accompanying a bill authorising works. First, Standing Order 27A requires:
- “A report which identifies, describes and evaluates reasonable alternatives to the works authorised by the Bill, taking into account the objectives and geographical scope of the Bill.”
- 1.2.2 Standing Order 27A also requires the ES to provide the information included in regulation 18(3) of the Town and Country Planning (Environmental Impact Assessment) Regulations

⁴ House of Commons (2019), *Standing Order 27A relating to private business (environmental assessment)*, House of Commons. Available online at: <https://www.parliament.uk/business/publications/commons/sessional-orders-private1/>.

⁵ House of Lords (2018), *Standing Orders - Private Business*, House of Lords. Available online at: <https://www.parliament.uk/documents/publications-records/House-of-Lords-Publications/Standing-Orders-Private/privord02.pdf>.

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2017⁶ and any additional information in Schedule 4 to those Regulations relevant to the works in the Bill and the environmental features likely to be significantly affected. Paragraph 2 of Schedule 4 requires:

“A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects”.

- 1.2.3 This report describes the reasonable alternatives to the main elements of the SES2 design changes and AP2 amendments which have been studied. In each case, this report indicates the main reasons for selecting the chosen option over another, which ultimately resulted in the SES2 scheme and AP2 revised scheme.

⁶ *The Town and Country Planning (Environmental Impact Assessment) Regulations 2017* (SI 2017 No. 571), London, Her Majesty's Stationery Office. Available online at: http://www.legislation.gov.uk/uksi/2017/571/pdfs/uksi_20170571_en.pdf.

2 Alternatives considered for the SES2 scheme and AP2 revised scheme

2.1 Introduction

- 2.1.1 During the design development process for the Phase 2b Western Leg, a series of potential SES2 design changes and AP2 amendments have been identified and reviewed by relevant specialists. A comparison was conducted of design options, which included consideration of:
- potential environmental impacts: the likely magnitude and nature of potential environmental impacts (e.g. noise and vibration, landscape and visual);
 - engineering requirements: the degree of construction complexity of the alternatives and the impact this would have on construction durations; and
 - cost: whether the alternatives would be more cost effective or incur additional costs.
- 2.1.2 The following sections detail the reasonable alternatives to the main elements of the SES2 design changes and AP2 amendments, and the main reasons for selecting the option to be taken forward into the SES2 scheme and AP2 revised scheme. Options have been reported in terms of whether they are reasonable against environmental impacts, engineering and construction feasibility, and cost. All dimensions in the following sections are approximate.
- 2.1.3 In considering the environmental impacts of the alternatives, all EIA topics have been considered, however, only those environmental topics where there is a potential for likely significant environmental impacts are reported for the alternatives considered. In accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations, the main reasons for selecting the chosen SES2 design change or AP2 amendment are reported together with a comparison of the likely significant environmental effects of the reasonable alternatives presented against those of the SES2 design change or AP2 amendment. Detailed assessment of the SES2 scheme and AP2 revised scheme is presented in the SES2 and AP2 ES Volume 2, Community Area reports.

2.2 Pickmere to Agden and Hulseheath (MA03)

Additional land permanently required for the diversion of three high pressure gas pipelines near Millington Clough Ancient Woodland (AP2-003-003)

- 2.2.1 Consideration has been given to the realignment of two National Grid high pressure gas pipelines and one Cadent Gas high pressure gas pipeline which cross woodland north of Millington Clough. The diversion of the gas pipelines would result in the permanent loss of a

section of Millington Clough woodland recently added to the Ancient Woodland Inventory (AWI) by Natural England. Following engagement with utility providers, opportunities were considered to reroute the three diversions to avoid the Millington Clough AWI site.

2.2.2 Two options were taken forward to a detailed appraisal where environmental impacts, engineering and construction feasibility and cost were considered:

- Baseline option: the diversion of three high pressure gas pipelines would require the permanent removal of approximately 0.2ha (20%) of the Millington Clough AWI site and the remaining area would be isolated from other woodland habitats, but would avoid the adjacent Millington Clough deciduous woodland and would comprise:
 - diversion of an underground Cadent Gas 300mm high pressure gas pipeline 3.5km in length, 200m east of Bridleway Mere 1/1 accommodation underbridge;
 - diversion of an underground National Grid 900mm high pressure gas pipeline, 2.8km in length, to pass under the Hulseheath North embankment; and
 - diversion of an underground National Grid 900mm high pressure gas pipeline, 4.9km in length, to pass under the Hulseheath North embankment.
- Option 1: the diversion of the three high pressure gas pipelines would require the permanent removal of approximately 2.24ha of Millington Clough deciduous woodland, but would avoid the Millington Clough AWI site, and would comprise:
 - diversion of an underground Cadent Gas 300mm high pressure gas pipeline 2.4km in length, to pass under the Hulseheath North embankment;
 - diversion of an underground National Grid 900mm high pressure gas pipeline, 2.9km in length, to pass under the Hulseheath North embankment; and
 - diversion of an underground National Grid 900mm high pressure gas pipeline, 4.9km in length, to pass under the Hulseheath North embankment.

2.2.3 Option 1 was taken forward into the AP2 revised scheme (see SES2 and AP2 ES Volume 2, MA03 Map Book: Map Series CT-06, maps CT-06-319, D7 to CT-06-322a, E10) as it will not require the removal of an area of Millington Clough AWI site, an irreplaceable ancient woodland habitat, when compared to the Baseline option. However, whilst Option 1 will avoid the removal of ancient woodland from the Millington Clough AWI site, it will require the removal of approximately 2.24ha of Millington Clough deciduous woodland, which would not be affected by the Baseline option.

2.2.4 Option 1 will have greater landscape and visual impacts due to the permanent loss of a small area of the Millington Clough wooded landscape resulting in open views that will affect the character of Arley Lower Woodland Farmland Landscape Character Area (LCA). Option 1 will have slightly fewer impacts on agricultural land with the diversion route passing through woodland (classified as non-agricultural land) reducing the area of best and most versatile (BMV) agricultural land affected when compared to the Baseline option.

2.2.5 Table 1 provides a summary of the outcomes of the detailed appraisal of the baseline option compared to the AP2 revised scheme, as described above.

Table 1: Consideration of the local alternatives for the diversion of three high pressure gas pipelines near Millington Clough Ancient Woodland

Option	Outcome of analysis
Baseline option	Comparison of the Baseline option against the AP2 revised scheme: <ul style="list-style-type: none"> • greater ecological impacts as a result of the permanent removal of a small area of Millington Clough AWI site (0.2ha), an irreplaceable ancient woodland habitat, but would avoid the removal of deciduous woodland adjacent to Millington Clough AWI; • fewer permanent landscape and visual impacts due to the avoidance of the Agden Brook valley in the Arley Lower Wooded Farmland LCA; • slightly greater agricultural impacts during construction associated with the diversion route passing through numerous agricultural fields and farm holdings, including Ivy House Farm with over 80% of the land area required being classified as BMV agricultural land; • slightly greater historic environment impacts due to the loss of the Millington Clough AWI site slightly worsening the impacts on the Ashley Historic Character Landscape Area (HCLA); • greater temporary socio-economic impacts during construction due to potential for construction works to impact an equestrian business operating from Ivy House Farm; and • slightly shorter construction programme.
Option 1 (the AP2 revised scheme)	Comparison of the AP2 revised scheme against the Baseline option: <ul style="list-style-type: none"> • fewer ecological impacts due to avoidance of Millington Clough AWI site, an irreplaceable ancient woodland habitat, although there will be a loss of 2.24ha of Millington Clough deciduous woodland; • greater landscape and visual impacts due to the loss of 2.24ha of deciduous woodland and associated habitat adjacent to the Millington Clough AWI site that will permanently open up views and affect the character of Arley Lower Woodland Farmland LCA; • slightly fewer agricultural impacts during construction as the diversion route would pass through woodland (classified as non-agricultural land) and require less BMV agricultural land; • slightly fewer permanent historic environment impacts due to the preservation of Millington Clough AWI site resulting in slightly fewer impacts on the Ashley HCLA; • fewer temporary socio-economic impacts during construction due to works being located further away from Ivy House Farm; and • slightly longer construction programme due to the permanent removal of a larger area of Millington Clough deciduous woodland.

2.3 Hulseheath to Manchester Airport (MA06)

Additional land permanently required for a revised National Grid 400kV overhead power line diversion near Rycroft Covert LWS (AP2-006-006)

2.3.1 Consideration has been given to the redesign of a National Grid 400kV overhead power line diversion to avoid the permanent loss of woodland from Rycroft Covert Local Wildlife Site (LWS) part of which has been recently designated as Rycroft Covert Ancient Woodland Inventory (AWI) site.

2.3.2 Four options were taken forward to a detailed appraisal where environmental impacts, engineering and construction feasibility and cost were considered:

- Baseline option: diversion of the overhead power line, 1.9km in length, to cross Birkin Brook embankment 470m north-west of Birkin Farm. Construction would require the permanent removal of 0.4ha (10%) of deciduous woodland from Ryecroft Covert LWS of which 0.2ha (18%) is part of the Ryecroft Covert AWI site;
- Option A: diversion of the overhead power line, 3.4km in length, realigned to the north of Ryecroft Farm which would require the construction of a new overhead line to cross the M56, to the east of Ryecroft Covert LWS and AWI site. This option would avoid Ryecroft Covert LWS and AWI site;
- Option B: diversion of the overhead power line, 3.2km in length, realigned to the north of Ryecroft Farm which would require the construction of a new overhead line to cross the M56 to the east of Ryecroft Covert LWS and AWI site. This option would avoid Ryecroft Covert LWS and AWI site; and
- Option C: diversion of the overhead power line, 2.4km in length, realigning it to the south of Ryecroft Farm and would require the construction of a new overhead line to cross the M56 to the east of Ryecroft Covert LWS and AWI site. This option would avoid Ryecroft Covert LWS and AWI site.

2.3.3 Option A was taken forward into the AP2 revised scheme (refer to SES2 and AP2 ES Volume 2, MA06 Map Book: maps CT-06-353-L1, B5 to CT-06-354-R1, E3) it will avoid the permanent loss of a section of Ryecroft Covert AWI site, an irreplaceable ancient woodland habitat, and Ryecroft Covert LWS when compared to the Baseline option. This is similar to Options B and C, however Option A will have fewer ecological impacts than both Option B and C as it will also avoid a narrow strip of deciduous woodland on the Priority Habitat Inventory at Lambs Covert. Option A, like Option B and C will have greater flood risk impacts when compared to the Baseline option due to sections of the diversion route being located within Flood Zone 3 of the River Bollin/Birkin Brook.

2.3.4 Table 2 provides a summary of the outcomes of the detailed appraisal of the alternative options compared to the AP2 revised scheme, as described above.

Table 2: Consideration of the local alternatives for the revised National Grid 400kV overhead power line diversion near Ryecroft Covert Local Wildlife Site

Option	Outcome of analysis
Baseline option	Comparison of the Baseline option against the AP2 revised scheme: <ul style="list-style-type: none"> • greater ecological impacts as this option would require the permanent removal of a small section of irreplaceable ancient woodland habitat within Ryecroft Covert LWS and AWI site but avoids a small area of deciduous woodland on the Priority Habitat Inventory at Lambs Covert adjacent to the M56; • greater permanent landscape and visual impacts due to the overhead line diversion crossing through Ryecroft Covert LWS and AWI site. Fewer temporary landscape and visual impacts during construction as no works are required in the area to the north of the M56;

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Option	Outcome of analysis
	<ul style="list-style-type: none"> • fewer water resources and flood risk impacts due to a smaller section of the diversion route being located within Flood Zone 3 of the River Bollin/Birkin Brook; • fewer temporary noise and vibration impacts during construction due to works being located further away from Ryecroft Farm and Birkin Farm; • fewer agricultural impacts due to a shorter diversion route requiring less agricultural land; • fewer permanent historic environment impacts as the diversion route will be located further from a Grade II listed Outbuilding located approximately 100m east of Ryecroft Farmhouse; • slightly fewer land quality impacts during construction as the diversion route would avoid passing over a historic landfill site; • fewer traffic and transport impacts during construction as this option does not require the crossing of the M56 by the overhead power line; • slightly shorter construction programme; and • lower construction costs.
Option A (the AP2 revised scheme)	<p>Comparison of the AP2 revised scheme against the alternatives:</p> <ul style="list-style-type: none"> • fewer ecological impacts when compared to the Baseline option as it will avoid the loss of irreplaceable ancient woodland habitat within Ryecroft Covert AWI and avoid Ryecroft Covert LWS. In addition, fewer ecological impacts than Option B and Option C as this option also avoids a small area of deciduous woodland on the Priority Habitat Inventory at Lambs Covert adjacent to the M56; • fewer permanent landscape and visual impacts when compared to the Baseline option due to the diversion avoiding Ryecroft Covert AWI, but will have similar landscape and visual impacts to Option B and Option C. Greater temporary landscape and visual impacts during construction in the area north of the M56 when compared to the Baseline option but similar impacts to Option B and Option C; • greater water resources and flood risk impacts when compared to the Baseline option due to a section of the overhead power line diversion route being located within Flood Zone 3 of the River Bollin/Birkin Brook. Similar impacts to Option B and C; • greater noise and vibration impacts during construction when compared to the Baseline option due to works being located closer to Ryecroft Farm and Birkin Farm but similar impacts to Option B and Option C; • greater agricultural impacts when compared to the Baseline option due to a longer diversion route but similar impacts when compared to Option B and Option C; • greater historic environment impacts when compared to the Baseline option due to works being located closer to the Grade II listed Outbuilding, approximately 100m east of Ryecroft Farmhouse. Similar impacts when compared to Option B and Option C; • slightly greater land quality impacts during construction than the Baseline option and Option C due to the diversion crossing over a historic landfill site. Similar impacts when compared to Option B which also crosses over a historic landfill site; • greater traffic and transport impacts during construction when compared to the Baseline option due to the requirement for a new overhead power line to cross over the M56. Similar impacts to Option B and Option C; • slightly longer construction programme when compared to the Baseline option but similar to Option B and Option C; and • greater construction costs than the Baseline option and Option C, but similar to Option B.
Option B	<p>Comparison of Option B against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater ecological impacts due to the loss of a small area of deciduous woodland on the Priority Habitat Inventory at Lambs Covert adjacent the M56;

Option	Outcome of analysis
	<ul style="list-style-type: none"> • similar landscape and visual impacts associated with works in the area north of the M56; • similar water resources and flood risk impacts due to a section of the diversion route being located within Flood Zone 3 of the River Bollin/Birkin Brook; • similar noise and vibration impacts during construction due to works being located closer to Ryecroft Farm and Birkin Farm; • similar agricultural impacts due to a similar diversion route length; • similar historic environment impacts due to the location of the diversion route close to the Grade II listed Outbuilding, approximately 100m east of Ryecroft Farmhouse; • similar land quality impacts during construction as this option also crosses over a historic landfill site; • similar traffic and transport impacts during construction as this option also requires a new overhead line crossing the M56; • similar construction programme length; and • similar construction costs.
Option C	<p>Comparison of Option C against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater ecological impacts due to a loss of a small area of deciduous woodland on the Priority Habitat Inventory at Lambs Covert adjacent the M56; • similar water resources and flood risk impacts due to a section of the diversion route being located within Flood Zone 3 of the River Bollin/Birkin Brook; • similar noise and vibration impacts during construction due to works being located closer to Ryecroft Farm and Birkin Farm; • similar agricultural impacts due to a similar length of diversion route; • similar historic environment impacts due to its location close to the Grade II listed Outbuilding approximately 100m east of Ryecroft Farmhouse; • fewer land quality impacts during construction as this option does not pass through a historic landfill site; • similar landscape and visual impacts with construction activity in the area north of the M56; • similar traffic and transport impacts during construction as this option also requires a new overhead line crossing the M56; • similar construction programme length; and • slightly lower construction costs.

Additional land permanently required for watercourse diversions at Mobberley Road (AP2-006-010)

- 2.3.5 Consideration has been given to the need for modifications to the hydrology design in the Mobberley area required by flood risk and drainage standards to provide increased resilience to climate change and to mitigate a potential increase in flood risk.
- 2.3.6 Three options were taken forward to an appraisal where environmental impacts, engineering and construction feasibility and cost were considered:

- Baseline option: the permanent diversion of a section of Tributary of Birkin Brook 1 for 910m to the north and south of the realigned Mobberley Road and of the Ashley Road offline east culvert for 250m south of Mid-Cheshire Line and Mobberley Road viaduct;
- Option A: the permanent widening of a section of Tributary of Birkin Brook 1 to approximately 10m in width, upstream of the south culvert to the east of the Mid-Cheshire Line and downstream of the north culvert to the west of the Mid-Cheshire Line, and diversion for 910m to the north and south of the realigned Mobberley Road. Provision of a replacement 6ha floodplain storage area adjacent to the Mid-Cheshire Line and a drainage ditch, 340m long, 3m wide and 1.5m deep, parallel to the Mid-Cheshire Line. The existing north culvert would be replaced with seven new permanent culverts, each 15m long, under the Mid-Cheshire Line and seven new permanent culverts, each 22m long, under the realigned Ashley Road; and
- Option B: the permanent diversion of a section of Tributary of Birkin Brook 1 for 910m to the north and south of the realigned Mobberley Road with the construction of a weir on the Tributary of Birkin Brook 1 and a drainage ditch running between and parallel with the Mid-Cheshire Line and Tributary of Birkin Brook. The existing south culvert under Mid-Cheshire Line would be replaced with six permanent culverts, each 26.5m in length. There would be six permanent culverts under Mobberley Road, each 30m in length and the replacement of the existing north culvert under Mid-Cheshire Line, 25m in length, with a new permanent culvert, 21m in length.

2.3.7 Option B was taken forward to the AP2 revised scheme (refer to SES2 and AP2 ES Volume 2, MA06 Map Book: maps CT-06-354, H5 to CT-06-354-R1, H3) as, similar to Option A, it will remove the surface water flood risk to the Mid-Cheshire Line when compared with the Baseline option. Option B, similar to Option A, will have greater ecological impacts than the Baseline option due to the permanent loss of additional areas of irreplaceable ancient woodland habitat Arden House Wood AWI site (105m² for Option B and 100m² for Option A). Option B, like the Baseline option, will have fewer historic environment impacts when compared to Option A due to reduced construction activity near the Grade II listed Lower House Farm. Option B, like Option A, will have greater construction costs when compared to the Baseline option and a longer construction programme.

2.3.8 Table 3 provides a summary of the outcomes of the appraisal of the alternative options compared to the AP2 revised scheme.

Table 3: Consideration of the local alternatives for the provision of watercourse diversions at Mobberley Road

Option	Outcome of analysis
Baseline option	Comparison of the Baseline option against the AP2 revised scheme: <ul style="list-style-type: none"> • greater impacts on water resources and flood risk as this option would result in a greater flood risk on agricultural land to the east of the Mid-Cheshire Line and increase the flood risk to the Mid-Cheshire Line; • fewer ecological impacts as it would not require the additional permanent loss of 105m² of ancient woodland habitat at Arden House Wood AWI site;

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Option	Outcome of analysis
	<ul style="list-style-type: none"> • similar historic environment impacts when compared to the AP2 revised scheme due to likely impacts to the Grade II listed Lower House Farm by the movement of construction traffic; • slightly fewer agricultural impacts due to less agricultural land required at Kell House Farm, Sugar Brook Farm and Lower House Farm; • shorter construction programme; and • lower construction costs.
Option A	<p>Comparison of Option A against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • similar impacts on water resources and flood risk as the replacement flood storage and widened watercourse would remove the surface water flood risk to the Mid-Cheshire Line; • similar ecological impacts due to the permanent loss of an additional 100m² of ancient woodland habitat from Arden House Wood AWI site; • greater historic environment impacts as a result of potential increased impact on Lower House Farm Grade II Listed Building due to construction activity and temporary loss of the agricultural fields forming part of its setting; • slightly greater agricultural impacts due to a larger area of agricultural land required at Kell House Farm, Sugar Brook Farm and Lower House Farm; • similar construction programme; and • similar construction costs.
Option B (the revised AP2 scheme)	<p>Comparison of the AP2 revised scheme against the alternatives:</p> <ul style="list-style-type: none"> • fewer impacts on water resources and flood risk when compared to the Baseline option as the surface water flood risk on the Mid-Cheshire Line would be removed, with similar impacts to Option A; • greater ecological impacts in comparison to the Baseline option due to the permanent loss of an additional 105m² of ancient woodland from the Arden House Wood AWI site, with similar impacts to Option A; • fewer historic environment impacts when compared to Option A due to reduced construction activity near the Grade II listed Lower House Farm and similar impacts when compared to the Baseline option due to construction works affecting the setting of the Grade II listed Lower House Farm; • slightly greater agricultural impacts when compared to the Baseline option due to greater agricultural land required at Kell House Farm, Sugar Brook Farm and Lower House Farm, but slightly fewer impacts when compared to Option A due to slightly less agricultural land required; • longer construction programme when compared to the Baseline option and similar length when compared with Option A, and • greater construction costs when compared to the Baseline option, similar construction costs when compared to Option A.

Additional land permanently required to reconfigure M56 Junction 6 (AP2-006-014)

2.3.9 Consideration has been given to the need to provide greater operational flexibility and resilience at and around the M56 Junction 6 as a result of engagement with National Highways, and in response to issues raised by Greater Manchester stakeholders. The need for further highways works has been considered to accommodate the predicted substantial

future increases in traffic as a result of the construction of the HS2 scheme and future planned development in the area including Northern Powerhouse Rail, Manchester Airport and Greater Manchester Combined Authority's (GMCA) long term strategic plan for jobs, new homes and sustainable growth in the local area.

- 2.3.10 A multi-criteria analysis (MCA) was carried out to identify and appraise a long list of feasible options including 'do minimum' options with access from M56 Junction 5 or Thorley Lane, sustainable transport options and three different highway junction configurations. The three highway junction configurations considered were the two bridge (TB), dumb bell (DB) and free flow (FF) options which all comprised a new junction relocated to the west of the existing M56 Junction 6. The MCA was based on six criteria comprising: catalyst for growth; capacity and modal provisions; value for money; customer experience; health, safety and security; and sustainability and environment.
- 2.3.11 From the long list, a short list of six options were taken forward for further analysis based on their potential to meet the long term operational and resilience highway requirements for the new junction, whilst also providing improved connectivity to the Manchester Airport High Speed station and the wider local road network. The six short listed options comprised three variations of the TB highway configuration and three variations of the FF highway configuration. All DB options were removed from further analysis as they did not perform as well under analysis as the other options assessed in the MCA.
- 2.3.12 Following further engagement with National Highways to consider and assess the six short listed options, two final options were selected, one TB and one FF highway configuration, as on balance, they were considered to provide the best construction and operation flexibility for the reconfigured junction. The two short listed options, along with the Baseline (hybrid Bill) option, were taken forward for a detailed appraisal considering the environmental impacts, engineering and construction feasibility and cost. Given the complexity of the highway configuration, the description of each of the three options considered has been limited to the main design elements at and around the junction, as follows:
- Baseline option: highway improvements at the existing M56 Junction 6 connecting the realigned A538 Hale Road, the A538 Wilmslow Road and Runger Lane. The main works associated with this option would include:
 - realignment of the A538 Hale Road north-east of its current alignment, creating the A538 Hale Road/Station Access gyratory alignment in the southern direction;
 - provision of the A538 Hale Road overbridge and service road (north);
 - provision of the A538 Hale Road overbridge and service road (south);
 - provision of the M56/A538 Wilmslow Road offline underbridge, crossing underneath the M56;
 - closure of a section of Hasty Lane to the west of the HS2 route;
 - junction of the realigned A538 Hale Road, M56 Junction 6 northbound slip roads and A538 Wilmslow Road changed from a roundabout to a signalised crossroad;

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- junction of the A538 Wilmslow Road, M56 Junction 6 southbound slip roads and Runger Lane changed from a signalised roundabout to a signalised crossroad;
- realignment of Thorley Lane 55m south of its current alignment crossing the route on Thorley Lane overbridge; and
- M56 East tunnel, 133m in length.
- Option TB10: permanent realignment of a 2.5km long section of the M56, up to 30m to the south of its current alignment and reconfiguration of Junction 6 with the introduction of a new grade-separated, six-arm gyratory located 600m to the south-west of the existing Junction 6. The main works associated with this option would include:
 - provision of M56 Junction 6 northbound and westbound exit and access slip roads;
 - provision of M56 Junction 6 roundabout overbridge west and the M56 Junction 6 roundabout overbridge east;
 - provision of M56 Junction 6 Hale Road link road which would run between the gyratory and the A538 Hale Road;
 - provision of M56 Junction 6 station link road which would provide access to the Manchester Airport High Speed station;
 - provision of M56 Junction 6 Wilmslow Road link road, which would run between the gyratory and the A538 Wilmslow Road/Runger Lane junction;
 - provision of M56 Junction 6 Hale Road link overbridge to provide access to the A538 Hale Road and the Manchester Airport High Speed station;
 - provision of Hale Road Station link road to provide access between the A538 Hale Road/Station Access gyratory and the northern side of the Manchester Airport High Speed station;
 - provision of Sunbank Lane overbridge over the HS2 route and over the M56 providing connectivity between Ringway and Warburton Green;
 - widening of the existing M56 River Bollin underbridge by up to 13m on both sides of carriageway; and
 - extension of the M56 East tunnel by 259m.
- Option FF10: permanent realignment of the M56, up to 30m to the south for a length of 1.4km and reconfiguration of Junction 6 with a new loop road configuration to the west of the existing Junction 6. The main works associated with this option would include:
 - provision of a grade separated link road over the A538 Hale Road to facilitate northbound access from the M56 to the Manchester Airport High Speed station;
 - provision of an overbridge to the east of the existing junction, over the M56 aligning with the new A538 Hale Road to facilitate westbound access from the M56 to the Manchester Airport High Speed station;
 - provision of two M56 southbound merge offline underbridges;
 - provision of M56 East tunnel maintenance access road overbridge;
 - provision of the A538 Hale Road overbridge;
 - provision of Manchester Airport High Speed station link road overbridge;

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- widening of the existing M56 River Bollin underbridge by up to 10m on both sides of carriageway; and
 - extension of the M56 East tunnel by 32m.
- 2.3.13 Option TB10 was taken forward into the AP2 revised scheme (refer to SES2 and AP2 ES Volume 2, MA06 Map Book: map CT-06-355-L1, C7 to J10, to map CT-06-356-R1, F1 to J1, to map CT-06-357a, A4 to G6). Compared to the Baseline and Option FF10, Option TB10 will have fewer operational traffic and transport impacts and will provide future network resilience by improving highway connectivity between the M56 and Manchester Airport High Speed station and will provide greater scope to accommodate the projected traffic growth and forecast traffic flows associated with planned future development in the area, including Manchester Airport, Northern Powerhouse Rail and GMCA strategic development plans. Option TB10 and Option FF10 would both have substantial traffic and transport impacts during construction due to a large increase in the amount of construction traffic using the existing M56 Junction 6.
- 2.3.14 Option TB10 will result in substantially greater ecological impacts when compared to the Baseline option due to the permanent removal of approximately 0.6ha of irreplaceable ancient woodland habitat (0.2ha of Sunbank Wood AWI, 0.1ha of Bollin Bank wood AWI and 0.3ha of Hennersley Bank AWI) but has similar impacts when compared to Option FF10. Option TB10, similar to Option FF10, will also result in the permanent removal of an additional 0.9ha of deciduous woodland (Sunbank Wood and Ponds Scientific Biological Importance (SBI) (0.7ha), Wood near Chapel Lane SBI (0.4ha) and Rossmill SBI (0.2ha)). Option TB10 and Option FF10 will also both result in the permanent removal of an additional 0.2ha of woodland habitat (Jacksons Bank East LWS (0.2ha) and Mill Wood, Castle Mill LWS (600m²) when compared to the Baseline option.
- 2.3.15 Similar to Option FF10, Option TB10 will result in greater water resources and flood risk impacts when compared to the Baseline option associated with the realignment and culverting of an approximate total of 1.4km of open watercourse tributaries of the River Bollin due to the widening of the existing M56 River Bollin underbridge.
- 2.3.16 Option TB10 will result in substantially greater landscape impacts and operation when compared to the Baseline option on the Altrincham and Hale Urban Fringe Farmland LCA, Manchester Airport LCA and the River Bollin Broad Urban Fringe Valley LCA. In addition, Option TB10 will have greater visual impacts when compared to the Baseline option, as a result of the permanent loss of existing landscape screening and an increase in the number of residential receptors in Hale Barns that will be located close to the reconfigured junction, which is similar to Option FF10.
- 2.3.17 When compared to the Baseline option, Option TB10 will have a substantially higher cost and an extended programme, which is similar to Option FF10.
- 2.3.18 Table 4 provides a summary of the outcomes of the appraisal of the alternative options compared to the AP2 revised scheme.

Table 4: Consideration of the local alternatives for the additional land permanently required to reconfigure M56 Junction 6

Option	Outcome of analysis
Baseline option	<p>Comparison of the Baseline option against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater operational traffic and transport impacts as it would provide less future network resilience due to a reduced highway connectivity between the M56 and Manchester Airport High Speed station and would provide less scope to accommodate the projected traffic growth and forecast traffic flows associated with planned future development in the wider area. Substantially less traffic and transport impacts during construction as a result of a reduced amount of construction traffic using M56 Junction 6; • substantially fewer ecological impacts with a smaller area of irreplaceable ancient woodland habitat permanently removed from Bollin Bank AWI (0.1ha) and Hennesley Bank AWI (700m²), and smaller areas of woodland removed from Sunbank Wood and Ponds SBI (0.3ha) and Mill Wood, Castle Mill LWS (0.4ha); • substantially fewer water resources and flood risk impacts to open watercourse tributaries; • substantially fewer landscape impacts with a reduction in impacts on Altrincham and Hale Urban Fringe Farmland LCA, Manchester Airport LCA and the River Bollin Broad Urban Fringe Valley LCA. Substantially fewer visual impacts due to reduced extent of construction and permanent works that would be visible to nearby residential receptors in Hale Barns; • fewer historic environment impacts as a result of reduced land required for construction and the retention of Keeper’s Cottage and Pigleystair Bridge; • fewer socio-economic impacts with no impact on parking at Amazon Fulfilment Centre on Sunbank Lane and no impact on the committed development for The Hut Group; and • substantially lower construction cost and shorter programme length.
Option TB10 (the AP2 revised scheme)	<p>Comparison of the AP2 revised scheme against the alternatives:</p> <ul style="list-style-type: none"> • fewer operational traffic and transport impacts when compared to the Baseline option and Option FF10 as it will provide future network resilience by improving highway connectivity between the M56 and Manchester Airport High Speed station, and provide greater scope to accommodate the projected traffic growth and forecast traffic flows associated with planned future development in the area. Substantially greater traffic and transport impacts during construction as a result of an increased amount of construction traffic that would need to use M56 Junction 6 when compared to the Baseline option and similar traffic and transport construction impacts when compared to Option FF10; • substantially greater ecological impacts when compared to the Baseline option due to an additional permanent loss of 0.6ha of irreplaceable ancient woodland habitat at the following AWI sites; Sunbank Wood (0.2ha), Bollin Bank (0.1ha) and Hennesley Bank (0.3ha). In addition, there will be additional permanent loss of areas designated as SBI, including; Sunbank Wood and Ponds (0.7ha), Wood near Chapel Lane (0.3ha) and Rossmill (0.2ha) and additional permanent loss of woodland habitat designated as LWS at Jacksons Bank East (0.2ha) and Mill Wood, Castle Mill LWS (600m²). Similar impacts when compared to FF10; • greater water resources and flood risk impacts associated with the realignment and culverting of an approximate total length of 1.4km of open watercourse tributaries of the River Bollin due to the widening of the existing M56 River Bollin underbridge. Similar impacts when compared to Option FF10; • substantially greater landscape impacts during when compared to the Baseline option on the Altrincham and Hale Urban Fringe Farmland LCA, Manchester Airport LCA and the River Bollin Broad Urban Fringe Valley LCA, which is similar to Option FF10. There will be greater visual impacts when compared to the Baseline option as a result of the permanent loss of existing landscape screening and an increase in the number of

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Option	Outcome of analysis
	<p>residential receptors in Hale Barns that will be located close to the reconfigured M56 ion. Similar impacts when compared to FF10;</p> <ul style="list-style-type: none"> • greater historic environment impacts when compared to the Baseline option associated with the additional land required for construction that will result in the removal of Keeper’s Cottage, Sunbank Lane and the partial removal of archaeological remains of Pigleystair Bridge across the River Bollin and the removal of Castle Mill (site of), Mill Lane and Leat, Castle Mill (site of). Similar impacts when compared to FF10; • greater socio-economic impacts when compared to the Baseline option due to the loss of parking at a committed development for The Hut Group and the existing Amazon Fulfilment Centre on Sunbank Lane. Similar socio-economic impacts when compared to Option FF10; and • substantially greater construction cost and programme duration than the Baseline option but similar construction cost and programme duration when compared to Option FF10.
Option FF10	<p>Comparison of Option FF10 against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater operational traffic and transport impacts as it would provide less future network resilience due to a reduced highway connectivity between the M56 and Manchester Airport High Speed station and would provide less scope to accommodate the projected traffic growth and forecast traffic flows associated with planned future development in the wider area. Similar traffic and transport impacts during construction as a result of an increased amount of construction traffic that would need to use M56 Junction 6; • similar ecological impacts with similar permanent losses of areas at Sunbank Wood, Bollin Bank and Hennersley Bank AWI sites, similar loss of SBI habitat at Sunbank Wood and Ponds, Wood near Chapel Lane and Ross Mill and similar loss of woodland at Jacksons Bank East and Mill Wood, Castle Mill LWS; • similar water resources and flood risk impacts associated with the realignment and culverting of an approximate total length of 1.4km of open watercourse tributaries of the River Bollin due to the widening of the existing M56 River Bollin underbridge; • similar landscape and visual impacts during with increased number of visual receptors in Hale Barns which will be located close to the reconfigured junction. There will be an increased visual impact on the River Bollin Broad Urban Fringe Valley LCA and substantially greater impacts with increased visibility of construction from residential areas in Hale Barns; • similar historic environment impacts associated with the additional land required for construction that will result in the removal of Keeper’s Cottage, Sunbank Lane and the partial removal of archaeological remains of Pigleystair Bridge across the River Bollin and the removal of Castle Mill (site of), Mill Lane and Leat, Castle Mill (site of); • similar socio-economic impacts due to the loss of parking at a committed development for The Hut Group and the existing Amazon Fulfilment Centre on Sunbank Lane; and • similar construction cost and programme duration.

2.3.19 Following the appraisal above, there has been a change to the assumptions related to night-time working for construction works on the M56, including works associated with the reconfigured Junction 6. This is assessed in the SES2 and AP2 ES Volume 2, Community Area report: Hulseheath to Manchester Airport (MA06). This update does not change the outcome of the appraisal described above and the selection of the option taken forward into the AP2 revised scheme.

Additional land permanently required for the realignment of an 11kV underground power line diversion along Shay Lane (AP2-006-016)

- 2.3.20 Consideration has been given to the underground realignment of a Scottish Power transmission 11kV overhead power line to avoid the use of Brooks Drive and the associated long-term access and maintenance impacts associated with the use of this private road.
- 2.3.21 Three options were taken forward to an appraisal where environmental impacts, engineering and construction feasibility and cost were considered:
- Baseline option: diversion of the Scottish Power transmission 11kV overhead power line, underground for 1.4km in length, following the realigned A538 Hale Road and along Brooks Drive, which is a private road, before re-joining the diversion route at the junction between Thorley Lane and Roaring Gate Lane;
 - Option 1: diversion of the Scottish Power transmission 11kV overhead power line underground, for 2.8km in length, west along the A538 Hale Road until the junction with Shay Lane in Hale Barns. The diverted underground cable would follow Shay Lane before re-joining the diversion route at the junction between Shay Lane and Roaring Gate Lane; and
 - Option 2: diversion of the Scottish Power transmission 11kV overhead power line underground, for 2.7km in length, east along the A538 Hale Road, across the M56 until the junction with Runger Lane. The diverted underground cable would follow Runger Lane north, until the junction with Thorley Lane where it will follow Thorley Lane west, crossing the M56 again, before re-joining the diversion route at the junction between Thorley Lane and Roaring Gate Lane.
- 2.3.22 Option 1 was taken forward into the AP2 revised scheme (refer to SES2 and AP2 ES Volume 2, MA06 Map Book: maps CT-06-356-L1, G3 to CT-06-357a-L1, F10) as it relocates the utility diversion from a private road onto a public highway which will avoid substantial long term operational and maintenance impacts that would be associated with the Baseline option. In addition, when compared to Option 2, Option 1 avoids the strategic road network and the operational complexity associated with the need to cross the M56 twice.
- 2.3.23 Option 1 will avoid temporary landscape and visual impacts on residential properties located on Brooks Drive during construction, however, it will have greater temporary impacts on properties along Shay Lane and the A538 Hale Road when compared to the Baseline option and Option 2. Option 1 will have similar temporary flood risk impacts during construction when compared to the Baseline option due to the potential for flooding at Brooks Drive from Timperley Brook. Option 1 will have greater temporary air quality and noise and vibration impacts during construction when compared to the Baseline option and Option 2 due to a higher number of properties and community facilities located along the section of public highways affected by the diversion.

2.3.24 Table 5 provides a summary of the outcomes of the appraisal of the alternative options compared to the AP2 revised scheme, as described above.

Table 5: Consideration of the local alternatives for the realignment of an 11kV underground power line diversion along Shay Lane

Option	Outcome of analysis
Baseline option	<p>Comparison of the Baseline option against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • substantially greater permanent operational and maintenance impacts as the utility diversion would be along Brooks Drive, a private road; • greater temporary landscape and visual impacts during construction on properties on Brooks Drive and the A538 Hale Road with no impact on residential properties on Shay Lane; • similar temporary water resources and flood risk impacts during construction as Brooks Drive is subject to flooding from Timperley Brook; • slightly fewer temporary air quality impacts during construction due to fewer residential properties and no community facilities along Brooks Drive; • slightly fewer temporary noise and vibration impacts during construction due to fewer residential properties and no community facilities along Brooks Drive; • slightly shorter construction programme length; and • lower construction costs due to shorter diversion length.
Option 1 (the AP2 revised scheme)	<p>Comparison of the AP2 revised scheme against the alternatives:</p> <ul style="list-style-type: none"> • substantially fewer permanent operational and maintenance impacts when compared to the Baseline option as it relocates the utility diversion from a private road onto a public highway. Fewer impacts during construction when compared to Option 2 as it avoids crossing the M56; • removes temporary landscape and visual impacts during construction on residential properties along Brooks Drive during construction, however, will have greater visual impacts during construction on properties along Shay Lane and the A538 Hale Road than the Baseline option and Option 2; • slightly greater temporary water resources and flood risk impacts during construction when compared to Option 2 due to part of Shay Lane being located in Flood Zone 3. Similar temporary flood risk impacts during construction when compared to the Baseline option due to the potential for flooding at Brooks Drive from Timperley Brook; • slightly greater temporary air quality impacts during construction than the Baseline option and Option 2 due to impacts on residential properties and community facilities, including properties on Shay Lane and the A538 Hale Road; Halecroft Grange care home facility, St Ambrose Preparatory School, St. Ambrose College and Hale Chapel Sunday School and Schoolmaster’s House; • slightly greater temporary noise and vibration impacts during construction than the Baseline option and Option 2 due to impacts on residential properties and community facilities, including properties on Shay Lane and the A538 Hale Road; Halecroft Grange care home facility, St Ambrose Preparatory School, St. Ambrose College and Hale Chapel Sunday School and Schoolmaster’s House; • similar construction programme when compared to Option 2 but slightly longer construction programme when compared to the Baseline option; and • higher construction costs than the Baseline option but similar costs when compared to Option 2.
Option 2	<p>Comparison of Option 2 against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater operational and maintenance impacts due to the diversion being close to the strategic road network, including a requirement to cross the M56 twice.

Option	Outcome of analysis
	<ul style="list-style-type: none"> • fewer temporary landscape and visual impacts during construction due to fewer residential properties affected along the A538 Hale Road during construction and the avoidance of impacts on properties located on Shay Lane; • fewer temporary water resources and flood risk impacts during construction with this option not being located within a flood zone; • slightly fewer temporary air quality impacts during construction due to fewer properties located close to the diversion; • slightly fewer temporary noise and vibration impacts during construction due to fewer properties located close to the diversion limited to residential properties along Hale Road and the Grade II listed Marriott Hotel affected; • similar construction programme length; and • similar construction cost.

2.4 Davenport Green to Ardwick (MA07)

Change to Bill powers required for relocation of vent shaft and headhouse from Palatine Road to The Hollies (AP2-007-003)

- 2.4.1 Consideration has been given to the relocation of the Palatine Road vent shaft and headhouse from its current location on part of the grounds of Withington Golf Course, which is located entirely within Flood Zone 2 and 3 and partly within the Didsbury flood storage basin. Since the main ES, further engagement with the Environment Agency has been carried out to consider the additional flood modelling that has been undertaken to identify measures to reduce the impact on peak flood levels at receptors in the area of the vent shaft. This engagement has, as far as reasonably practicable, identified that the relocation of the Palatine Road vent shaft and headhouse is the most appropriate mitigation measure.
- 2.4.2 Since the main ES, further design development has been undertaken to the Baseline option to manage flood risk via the provision of a flood wall and widening of the culvert that crosses under the B5167 Palatine Road and the retention of Withington Golf Course via replacement of golf holes. This design development produced the Baseline+ option and this has formed the basis for the detailed appraisal of the options set out below.
- 2.4.3 The optioneering process identified a short-list of five (excluding the Baseline+ option) feasible options for the relocation of the vent shaft and headhouse. These options were taken forward to a detailed analysis of the environmental impacts, engineering and construction feasibility and cost. Following this analysis, two out of the five options were short-listed, Option B1 and Option GC3, as they were shown to reduce the flood risk impacts when compared to the other options.
- 2.4.4 The two short listed options, along with the Baseline+ option, were taken forward for a detailed appraisal considering the environmental impacts, engineering and construction feasibility and cost:

- Baseline+ option: vent shaft and two headhouses would be located within the grounds of the Withington Golf Course with access from the B5167 Palatine Road. This option would require the provision of a flood defence wall bordering the north corner of Withington Golf Course, the B5167 Palatine Road and Ashfield Lodge, widening of the existing culverted watercourse beneath the B5167 Palatine Road and replacement floodplain storage area within the Didsbury flood storage basin in Withington Golf Course;
- Option B1: relocation of the vent shaft and two headhouses to derelict playing fields at the site of the former Hollies convent school, to the north-west of the Britannia Country House Hotel, with access from the A5145 Barlow Moor Road, through the Manchester Islamic Educational Trust Campus. This option would require the horizontal realignment of a section of the Manchester tunnel over a total length of approximately 11.5km between St Peter's Primary School and Longsight depot resulting in an increase in tunnel length of 111m. This option would not require the provision of a replacement flood storage area within the Didsbury flood storage basin in Withington Golf Course; and
- Option GC3: relocation of the vent shaft and two headhouses to the southwestern edge of Withington Golf Course with access provided from the B5167 Palatine Road, through existing woodland to the west of the site. This option would require a minor realignment of the Manchester tunnel over a length of approximately 3km. This option would require the provision of a large replacement flood storage area within the Didsbury flood storage basin in Withington Golf Course.

- 2.4.5 Option B1 was taken forward into the AP2 revised scheme (refer to SES2 and AP2 ES Volume 2, MA07 Map Book: maps CT-06-360-L1, F8 to CT-06-360, J2) as it will have fewer water resources and flood risk impacts when compared to the Baseline option and Option GC3 due to the vent shaft and headhouse being located outside of the Didsbury flood storage basin, which is classified as a statutory reservoir. Option B1 will also provide a compliant flood-resilient emergency access route to the vent shaft and headhouse.
- 2.4.6 Option B1 will avoid impacts on Withington Golf Course but will have greater socio-economic and community impacts when compared to the Baseline option and Option GC3 as at the time of the options appraisal it was assumed demolition of the Manchester Islamic Educational Trust Campus would be required to accommodate the vent shaft access road and would result in the loss of educational facilities and potential loss of jobs.
- 2.4.7 Option B1 will have slightly greater landscape and visual impacts when compared to the Baseline+ option due to the impacts associated with the removal of vegetation in woodland adjacent to Mersey Meadows and impact on residential properties along with boundary with Mersey Meadows. Option B1 will have greater impacts when compared to Option GC3 due to impacts in Mersey Valley Managed Open Space LCA within the context of the M60 and existing overhead lines.
- 2.4.8 Option B1 will also have greater temporary noise and vibration impacts when compared to the Baseline+ option and Option GC3, on adjacent residential areas including Mersey Meadows, The Hollies, Mersey Road, Langham Court, The Beeches, Beeches Mews as well as the potential for impacts on the Britannia Country House Hotel.

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2.4.9 Option B1 will have similar construction costs but a shorter construction programme to the Baseline option and Option GC3.

2.4.10 Table 6 provides a summary of the outcomes of the appraisal of the alternative options compared to the AP2 revised scheme.

Table 6: Consideration of the local alternatives for the relocation of vent shaft and headhouse from Palatine Road to The Hollies

Option	Outcome of analysis
Baseline+ option	<p>Comparison of the Baseline+ option against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater water resources and flood risk impacts affecting residential and commercial properties, highways and utilities with this option being; • fewer community impacts as whilst there would be a negative community impact associated with the permanent loss of Withington Golf Course clubhouse, there would be no in-combination impacts on the residential properties along The Hollies, Mersey Meadows and Mersey Road. The site of the Manchester Islamic Educational Trust Campus and former West Didsbury Sure Start Centre would also be retained as an educational resource; • fewer socio-economic impacts due to the avoidance of the loss of educational facilities and jobs at the Manchester Islamic Educational Trust Campus and former West Didsbury Sure Start Centre; • slightly fewer landscape and visual impacts due to the Baseline+ option avoiding impacts associated with the removal of vegetation in woodland adjacent to Mersey Meadows and impacts on residential properties along the boundary with Mersey Meadows; • similar ecological impacts due to the removal of 1.8ha of woodland habitat at Withington Golf Course and the loss of the bat roost within the Withington Golf Course clubhouse; • fewer temporary noise and vibration impacts due to the nearest residential dwellings located approximately 90m north of the site; • slightly fewer temporary traffic and transport impacts during construction as construction traffic would be routed along Palatine Road with access via Withington Golf Course clubhouse car park; • similar constructions costs; and • longer construction programme.
Option B1 (the AP2 revised scheme)	<p>Comparison of the AP2 revised scheme with the alternatives:</p> <ul style="list-style-type: none"> • fewer water resources and flood risk impacts when compared to the Baseline+ option and Option GC3 due to the shaft and associated works being located in disused playing fields outside of the Didsbury flood storage basin and the provision of a compliant flood resilient emergency access route; • greater permanent community impacts when compared to the Baseline+ option and Option GC3 as whilst the Withington Golf Course clubhouse will be retained, there will be operational in-combination community impacts on residential properties along The Hollies, Mersey Meadows and Mersey Road as a result of noise and visual effects. Buildings of the Manchester Islamic Educational Trust Campus site will require demolition resulting in the loss of the facilities as an educational resource. The operation of the former West Didsbury Sure Start Centre will also be impacted during construction; • greater permanent socio-economic impacts when compared to the Baseline+ option and Option G3 due to the worst case basis of the loss of the Manchester Islamic Educational Trust Campus site as an education facility resulting in the potential loss of jobs and temporary construction impacts on the former West Didsbury Sure Start Centre; • slightly greater permanent landscape and visual impacts when compared to the Baseline+ option with both options directly affect the Mersey Valley Managed Open Space LCA but

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Option	Outcome of analysis
	<p>with Option B1 impacts associated with the removal of vegetation in woodland adjacent to Mersey Meadows and affect residential properties along the boundary with Mersey Meadows and greater impacts when compared to Option GC3;</p> <ul style="list-style-type: none"> • similar ecological impacts when compared to the Baseline+ option as whilst Option B1 will result in the retention of the known bat roost within the Withington Golf Course clubhouse, Option B1 will potentially result in the loss of woodland habitat. Slightly greater ecological impacts when compared to Option GC3 due to greater loss of woodland; • greater temporary noise and vibration impacts when compared to the Baseline+ option and Option GC3, on adjacent residential areas including Mersey Meadows, The Hollies, Mersey Road, Langham Court, The Beeches, Beeches Mews as well as the potential for impacts on the Britannia Country House Hotel; • slightly greater temporary traffic and transport impacts during construction when compared to the Baseline+ option due to higher HGV traffic flows on Barlow Moor Road along with the relocation of the existing pedestrian crossing on the A5145 Barlow Moor Road. Similar impacts when compared to Option GC3 due similar traffic flows; • similar construction costs; and • shorter programme length than the Baseline+ option and Option GC3.
Option GC3	<p>Comparison of Option GC3 against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater water resources and flood risk impacts due to this option being located within the Didsbury flood storage basin; • fewer permanent community impacts as the residential properties along The Hollies, Mersey Meadows and Mersey Road are not affected and the Manchester Islamic Educational Trust Campus and former West Didsbury Sure Start Centre would be retained as an educational resource; • fewer permanent socio-economic impacts due to the avoidance of loss of educational facilities and jobs at the Manchester Islamic Educational Trust Campus site; • fewer permanent landscape and visual impacts on the Mersey Valley Managed Open Space LCA due to impacts being perceived within the context of the M60 and existing overhead lines; • fewer ecological impacts as less woodland would be lost which would avoid the risk of impacts on bat species in the woodland that will be lost under the AP2 revised scheme as well as the known bat roost within the Withington Golf Course clubhouse would be retained; • fewer temporary noise and vibration impacts due to the nearest sensitive receptors, which are residential dwellings, being located approximately 90m north of the site; • similar temporary traffic and transport impacts; • similar construction costs; and • longer construction programme length.

2.4.11 Since the appraisal outlined above, The Manchester Islamic Education Trust have acquired full ownership of the Manchester Islamic Educational Trust Campus site and the adjacent former West Didsbury Sure Start Centre.

2.4.12 As a result of further design development following the appraisal detailed above and considering the expected change in ownership of the site of the Manchester Islamic Educational Trust Campus and former West Didsbury Sure Start Centre, the route of the access road to the vent shaft has been rerouted to avoid the existing college buildings but will now pass through the former West Didsbury Sure Start Centre building, which will

require demolition. The updated design and route of the access road is shown in SES2 and AP2 ES Volume 2, MA07 Map Book: map CT-06-360 L1, G10 to I8.

- 2.4.13 Since the appraisal outlined above and as part of the assessment of the AP2 revised scheme, detailed flood modelling has identified that there is a potential for new significant water resource and flood risk impacts downstream of the A5103 Princess Road. In addition, further design development has also identified that there will be a permanent loss of 0.9ha of marshy grassland, located to the southwest of Mersey Meadows, which will result in greater ecological impacts.
- 2.4.14 These impacts are reported in detail in SES2 and AP2 ES Volume 2, Community Area report: Davenport Green to Ardwick (MA07) and shown in SES2 and AP2 ES Volume 2, MA07 Map Book: map CT-06-360 L1. These updates do not change the outcome of the appraisal described above and the selection of the option taken forward into the AP2 revised scheme.

2.5 Manchester Piccadilly Station (MA08)

Relocation of North Block comprising Network Rail facilities at Manchester Piccadilly High Speed station (SES2-008-003)

- 2.5.1 Consideration has been given to the need to relocate the existing North Block, comprising Network Rail facilities, from its current location north-west of the existing Manchester Piccadilly Station to above the existing Network Rail Relay room. Since the main ES, it has been identified that access to this area of the viaduct will not be possible through the Network Rail maintenance depot and a new separate building is required that can be accessed without going through the Network Rail maintenance depot. Alternative locations have been considered for the re-provision of these facilities which are required to be fully operational in advance of the demolition of the existing facilities.
- 2.5.2 Four options were taken forward to a detailed appraisal where environmental impacts, engineering and construction feasibility and cost were considered:
- Baseline option: relocation of the existing North Block comprising Network Rail facilities north-west of the existing Manchester Piccadilly Station to above the existing Network Rail relay room;
 - Option 9a: relocation of the existing North Block facilities to a location under the Network Rail station within the existing undercroft structure by the southern entrance to the existing Manchester Piccadilly Station. Lowering of the ground floor would be required to increase the vertical space available and a mezzanine floor constructed to increase available floor space;
 - Option 11a: relocation of the existing North Block facilities to a new three-storey Network Rail building to be constructed on the existing Network Rail viaduct deck to the north-

west of the existing Manchester Piccadilly Station adjacent to the relay room. The existing Network Rail catering facilities would be relocated under the existing viaduct; and

- Option 11b: relocation of the existing North Block facilities to a new three-storey Network Rail building, on the existing Network Rail viaduct deck, west of the existing relay room. The new North Block building would incorporate the existing Network Rail catering facilities into the ground floor at viaduct level, accessible from the viaduct deck.

- 2.5.3 Option 11b was taken forward into the AP2 revised scheme (refer to SES2 and AP2 ES Volume 2, MA08 Map Book: maps CT-06-365b, G5 to H6). Similar to the Baseline option, Option 11b will retain the Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station making the arches available for potential commercial reuse in accordance with the aspirations of Network Rail’s Piccadilly Station Masterplan. This would enable active commercial frontages which would result in fewer likely adverse socio-economic impacts when compared to Option 9a and 11a.
- 2.5.4 Option 11b, like Option 11a, will have greater historic environment impacts when compared to the Baseline option due to the construction of a larger building on top of the viaduct reducing the visual dominance of the Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station. Option 11b will avoid works to lower the ground level and therefore will have fewer direct impacts on the Grade II listed Train Shed and Undercroft and buried archaeology when compared to Option 9a.
- 2.5.5 Option 11b, like the Baseline option and Option 11a will have fewer ecological impacts when compared to Option 9a due to the lower risk of impacts on roosting bat and black redstart habitats during construction. Option 11b will have lower cost for infrastructure maintenance than the Baseline option with similar costs to Option 11a and greater costs than Option 9a.
- 2.5.6 Option 11b will have similar permanent landscape and visual impacts on Manchester Piccadilly Station compared to the Baseline option and Option 11a. It would have greater impacts compared to Option 9a as the facilities would be located to the south resulting in impacts on the viewpoint at the station and the existing blocks adjacent to the platforms would be demolished opening up the views from the station.
- 2.5.7 Table 7 provides a summary of the outcomes of the appraisal of the alternative options compared to the AP2 revised scheme.

Table 7: Consideration of the local alternatives for the relocation of North Block facilities at Manchester Piccadilly High Speed station

Option	Outcome of analysis
Baseline option	Comparison of the Baseline option against the AP2 revised scheme: <ul style="list-style-type: none"> • similar permanent socio-economic impacts due to the retention of the arches and Grade II listed Train shed and Undercroft making them available for potential active commercial use in accordance with the aspirations of Network Rail’s Piccadilly Station Masterplan; • fewer historic environment impacts due to the proposed North Block building being located further from the Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station and lower and less visible from the approach to Manchester Piccadilly Station;

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Option	Outcome of analysis
	<ul style="list-style-type: none"> • similar ecological impacts associated with the loss of habitat for black redstarts and roosting bats both of which have been recorded in commercial properties and the viaducts at Manchester Piccadilly Station; • similar landscape and visual impacts on the setting of the Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station and views towards Manchester Piccadilly Station for residents along Baird Street and Portugal Street, similar landscape and visual impacts during operation on one view from Manchester Piccadilly Station; and • greater construction costs.
Option 9a	<p>Comparison of Option 9a against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater permanent socio-economic impacts due to the reduction/removal of the arches and the Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station and provision of less potential retail space for commercial use; • greater historic environment impacts with the risk of harm to the Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station and buried archaeology as a result of construction works to lower the existing ground level; • greater ecological impacts due to the risk of loss of habitat for black redstarts and roosting bats both of which have been recorded in commercial properties and the viaducts at Manchester Piccadilly Station; • greater landscape and visual impacts due to locating plant, locker rooms, storage and toilet facilities to the south of the station with the existing blocks adjacent to the platforms being removed to open up views, fewer operational landscape and visual impacts on one viewpoint on the A6 London Road; and • lower construction cost.
Option 11a	<p>Comparison of Option 11a against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater permanent socio-economic impacts due to the reduction/removal of the arches and the Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station reducing the available potential retail space for commercial use; • similar historic environment impacts with the construction of a larger building on top of the viaduct which would be visually obtrusive and higher than the existing Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station; • similar ecological impacts associated with works to the station and potential loss of habitat for black redstarts and roosting bats both of which have been recorded in commercial properties and the viaducts at Manchester Piccadilly Station; • similar landscape and visual impacts on residents along Baird Street and Portugal Street, and similar landscape and visual impacts during operation with one landscape and visual view from Manchester Piccadilly Station affected; and • similar construction costs.
Option 11b (the AP2 revised scheme)	<p>Comparison of the AP2 revised scheme with the alternatives:</p> <ul style="list-style-type: none"> • fewer socio-economic impacts in comparison to Option 9a and 11a due to this option retaining the arches of the Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station making them available for potential commercial use in accordance with the aspirations of Network Rail's Piccadilly Station Masterplan. Similar socio-economic impacts when compared to the Baseline option; • greater historic environment impacts when compared to the Baseline option due to the construction of a larger building on top of the viaduct which would be visually obtrusive and higher than the existing Grade II listed Train Shed and Undercroft at Manchester Piccadilly Station. Similar impacts when compared to Option 11a and fewer impacts when compared to Option 9a due to the avoidance of works to lower the ground level which would impact the Grade II listed Train Shed and Undercroft and buried archaeology;

Option	Outcome of analysis
	<ul style="list-style-type: none"> • fewer ecological impacts than Option 9a due to the reduced risk of the loss of habitat for black redstarts and roosting bats both of which have been recorded in commercial properties and the viaducts at Manchester Piccadilly Station. Similar ecological impacts to the Baseline option and Option 11a; • similar permanent landscape and visual impacts on Manchester Piccadilly Station compared to the Baseline option and Option 11a, greater impacts compared to Option 9a as the facilities would be located to the south resulting in impacts on the viewpoint at the station and the existing blocks adjacent to the platforms would be demolished opening up the views from the station; and • lower construction cost than the Baseline option, similar cost to Option 11a and greater cost than Option 9a.

Additional land permanently required for modifications to the multi-modal transport hub (AP2-008-003)

2.5.8 Consideration has been given to the integration of pedestrian, cycle and bus facilities and the need for taxi, car parking, station staff parking and coach facilities at the multi-modal transport hub for Manchester Piccadilly High Speed station, located around the Piccadilly triangle area. Since the main ES, further engagement with Greater Manchester stakeholders has been undertaken to consider further options to relocate the car parks away from New Sheffield Street to maximise development opportunities and improve the quality of the public realm and multi-modal transport facilities.

2.5.9 Five options were taken forward to a detailed appraisal where environmental impacts, engineering and construction feasibility and cost were considered:

- Baseline option:
 - two new multi storey car parks, providing approximately 2,000 parking spaces, located on New Sheffield Street, with one car park located west of Adair Street and the other car park located east of Adair Street;
 - taxi pick-up/drop-off area for taxis, private hire vehicles and private vehicle drop-off and pick-up facilities at both New Sheffield Street to the north and the multi-modal transport hub to the east comprising taxi/private hire pick-up bays, taxi/private hire waiting bays, private vehicle pick-up bays and private vehicle drop-off bays;
 - two public cycle parking areas, one located on New Sheffield Street opposite Store Street; and one located in the eastern pedestrian and cycle thoroughfare, accessible from New Sheffield Street and the B6469 Fairfield Street. Additional cycle stands provided within the public realm areas along New Sheffield Street and next to the eastern entrance to Manchester Piccadilly High Speed station; and
 - areas of public realm, comprising hard and soft landscaping, green walls, tree and ornamental planting around the multi-modal transport hub at the eastern extent of Manchester Piccadilly High Speed station car parks.

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- Option 2a:
 - a new single multi storey car park, providing approximately 1,000 car parking spaces, located at the south-east of the Manchester Piccadilly High Speed station and accessed via Fairfield Street;
 - taxi pick-up/drop-off located on New Sheffield Street with access from the ring road (Great Ancoats Street) to the north via Adair Street or from the east via Fairfield Street;
 - private vehicle pick-up and drop-off and taxi pick-up facilities are located between the HS2 and Network Rail stations on a diverted section of Travis Street and are accessible from the east and west via Fairfield Street; and
 - cycle hub located to the east of the Manchester Piccadilly High Speed station between the multi-modal hub and Helmet Street.
- Option 3x:
 - two new multi-storey car parks, providing approximately 2,000 parking spaces in total, with one car park located on New Sheffield Street, accessed by Great Ancoats Street via Adair Street, and the other car park at the south-east of the Manchester Piccadilly High Speed station, accessed via Fairfield Street;
 - taxi pick-up/drop-off facilities located on New Sheffield Street;
 - private vehicle pick-up/drop-off facilities adjacent to the Fairfield Street car park; and
 - a cycle hub located east of the Manchester Piccadilly High Speed station between the multi-modal hub and Helmet Street.
- Option 3m:
 - one new multi-storey car park, providing approximately 1,000 parking spaces, located on New Sheffield Street, accessed from Great Ancoats Street via Adair Street;
 - a coach station with coach bays and an additional number of parking spaces located south-east of the station on Fairfield Street;
 - coach waiting and staff facilities area within the eastern part of Manchester Piccadilly High Speed station;
 - a cycle hub located east of the Manchester Piccadilly High Speed station between the multi-modal hub and Helmet Street;
 - private vehicle pick-up/drop-off facilities located adjacent to the coach station; and
 - taxi drop-off and pick-up facilities located on New Sheffield Street.
- Option 3a:
 - two new multi storey car parks, providing approximately 2,000 parking spaces in total, located on New Sheffield Street, with one car park located west of Adair Street and the other car park located east of Adair Street;
 - coach station with coach bays and a small number of additional of parking spaces at the south-east of the station at Fairfield Street;
 - coach waiting and staff facilities area within the eastern part of the Manchester Piccadilly High Speed station;

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- a cycle hub located east of the Manchester Piccadilly High Speed station between the multi-modal hub and Helmet Street;
 - private vehicle pick-up/drop-off facilities located adjacent to the coach station; and
 - taxi drop off and pick-up facilities located on New Sheffield Street.
- 2.5.10 Option 3x was taken forward into the AP2 revised scheme (refer to Volume 2, MA08 Map Book: map CT-06-365b, F4 to J7) as it will provide suitable intermodal facilities for station passenger and staff operation, will relocate one of the two car parks (and hence approximately half of the 2,000 parking spaces) away from New Sheffield Street which will improve the quality of the public realm and will provide additional land for future development when compared to the Baseline option and Option 3a.
- 2.5.11 Option 3x, similar to Option 2a and Option 3m, will have less impact on the historic environment when compared to the Baseline option and Option 3a as the former St Andrew’s Church and disused graveyard and it there is the potential for the below ground archaeological remains to be partially retained as a result of the relocation of car park 2. There will still be an impact on the below ground archaeological remains from the construction of retaining walls and the associated reduction in ground levels at this location.
- 2.5.12 Option 3x will have a longer construction programme length when compared to the Baseline option and Option 3a but a similar length to Option 2a and Option 3m. Option 3x will have a similar cost when compared to the Baseline option and Option 3a but greater costs when compared to Option 2a and Option 3m due to these options providing approximately half of the 2,000 car parking spaces.
- 2.5.13 Table 8 provides a summary of the outcomes of the appraisal of the alternative options compared to the AP2 revised scheme.

Table 8: Consideration of the local alternatives for modifications to the multi-modal transport hub

Option	Outcome of analysis
Baseline option	Comparison of the Baseline option against the AP2 revised scheme: <ul style="list-style-type: none"> • similar operational traffic and transport impacts as it provides suitable intermodal facilities for station passenger and staff operations and a similar number of parking spaces and pick up/drop-off facilities around the Manchester Piccadilly High Speed station; • greater historic environment impacts on the former St Andrew’s Church and disused graveyard due to the removal of all below-ground archaeological remains as a result of construction of car park 2, the public realm along New Sheffield Street and associated reduction of ground levels; • similar operational water resources and flood risk impacts due to a potential for groundwater flooding in the basement levels of the car parks; • greater permanent socio-economic impacts due to the two multi-storey car parks occupying land that has been identified as having opportunities for future commercial development with additional impacts on the quality of the public realm along New Sheffield Street; • similar permanent community impacts as the construction of the car parks, taxi and private vehicle drop off and pick up facilities and bus stops will require the demolition of

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Option	Outcome of analysis
	<p>several community buildings including; Manchester Action on Street Health (MASH) and Manchester Offenders: Diversion Engagement Liaison (MO:DEL);</p> <ul style="list-style-type: none"> • similar land quality impacts during construction due to historical land uses and potential for encountering land contamination during construction of the two car parks; • similar temporary and permanent noise and vibration impacts at the Aeroworks offices on Adair Street; • shorter construction programme length; and • similar costs.
Option 2a	<p>Comparison of Option 2a against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater operational traffic and transport impacts as it does not provide suitable intermodal facilities for station passenger and staff operations, provides half of the parking spaces and would concentrate parking and pick up/drop off facilities at the south-east of the Manchester Piccadilly High Speed station; • similar historic environment impacts due to the potential for partial retention of below-ground archaeological remains due to the relocation of car park 2 away from the site of the former St Andrew's Church and disused graveyard; • fewer water resources and flood risk impacts as there will be less potential for groundwater flooding due to the single car park basement levels being located to the south east of the station; • slightly fewer permanent socio-economic impacts due to the relocation of car parking away from New Sheffield Street and the provision of an additional area for future development but only provides approximately half of the parking spaces; • similar permanent community impacts due to land requirements being similar resulting in the demolition of several community buildings including MASH and MO:DEL; • slightly fewer land quality impacts during construction as less excavation required resulting in a reduced potential for encountering land contamination during construction of the car park basement; • slightly fewer temporary and permanent noise and vibration impacts due to the car park being located away from sensitive receptors; • similar construction programme length; and • lower programme costs.
Option 3x (the AP2 revised scheme)	<p>Comparison of the AP2 revised scheme against the alternatives:</p> <ul style="list-style-type: none"> • fewer operational traffic and transport impacts when compared to Option 2a as it provides suitable intermodal facilities and parking for station passenger and staff operation and relocates approximately half of the parking spaces away from New Sheffield Street. Similar impacts overall when compared to the Baseline option, Option 3m and Option 3a; • fewer permanent historic environment impacts when compared to the Baseline option and Option 3a due to the potential for partial retention of below-ground archaeological remains as a result of the relocation of car park 2 away from the site of the former St Andrew's Church and disused graveyard. Similar impacts when compared to Option 2a, and Option 3m; • similar water resources and flood risk impacts when compared to the Baseline option, Option 3m and Option 3a and greater impacts when compared to Option 2a due to the potential for groundwater flooding as result of the basement levels of the car parks penetrating the glacial till aquifer; • fewer permanent socio-economic impacts when compared to the Baseline option and Option 3a as an additional area of land for future development will be provided as a result of relocating car park 2 to the southeast of the Manchester Piccadilly High Speed

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Option	Outcome of analysis
	<p>station, which will also improve the quality of the public realm on New Sheffield Street. Similar impacts to Option 3m but slightly worse when compared to Option 2a, which provides a greater area of land for future development adjacent to New Sheffield Street;</p> <ul style="list-style-type: none"> • similar permanent community impacts when compared to the Baseline option, Option 2a and Option 3m due to the demolition of several community buildings including MASH and MO:DEL. Fewer community impacts when compared to Option 3a due to less land required for the coach station; • slightly greater land quality impacts during construction when compared to Option 2a and 3m due to excavation requirements for the construction of two car parks resulting in a greater potential for encountering land contamination. Similar impacts when compared to the Baseline option and Option 3a; • slightly greater temporary and permanent noise and vibration impacts when compared to Option 2a due to the potential for construction works to impact the Aeroworks offices on Adair Street and similar impacts when compared to the Baseline option, Option 3m and Option 3a; • greater construction programme length when compared to the Baseline option and Option 3a and similar length to Option 2a and Option 3m; and • similar cost when compared to the Baseline option and Option 3a but greater costs when compared to Option 2a and Option 3m.
Option 3m	<p>Comparison of Option 3m against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • greater operational traffic and transport impacts as it does not provide suitable intermodal facilities for station passenger and staff operations due to a reduced provision of parking spaces. This option accommodates additional coach parking facilities to the south-east of the Manchester Piccadilly High Speed station. • similar historic environment impacts due to the potential for partial retention of below-ground archaeological remains as a result of relocation of the car park away from the site of St Andrew's Church and disused graveyard; • similar water resources and flood risk impacts due to a potential for groundwater flooding as a result of the basement levels of the car parks penetrating the glacial till aquifer; • similar socio-economic impacts as an additional area of land for future development will be provided as a result of removing one of the car parks from New Sheffield Street. In addition, it would improve the quality of the public realm on New Sheffield Street but only provides approximately half the parking spaces; • similar community impacts due to land requirements being similar resulting in the demolition of several community buildings including MASH and MO:DEL; • slightly fewer land quality impacts as less excavation required to construct the basement for one car park with a reduced potential for encountering land contamination; • similar temporary and permanent noise and vibration impacts at the Aeroworks offices on Adair Street; • similar construction programme length; and • lower programme costs.
Option 3a	<p>Comparison of Option 3a against the AP2 revised scheme:</p> <ul style="list-style-type: none"> • similar operational traffic and transport impacts overall as it provides suitable intermodal facilities for station passenger and staff operations and a similar number of parking spaces and pick up/drop-off facilities around the Manchester Piccadilly High Speed station. This option also accommodates additional coach parking facilities to the south-east of the Manchester Piccadilly High Speed station; • greater historic environment impacts on the former St Andrew's Church and disused graveyard due to the removal of all below-ground archaeological remains as a result of

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Option	Outcome of analysis
	<p>construction of the car park on the site, the public realm along New Sheffield Street and associated reduction of ground levels;</p> <ul style="list-style-type: none"> • similar water resources and flood risk due to a potential for groundwater flooding due to the basement levels of the car parks penetrating the glacial till aquifer; • slightly greater socio-economic impacts due to the two multi-storey car parks occupying land that has been identified as having opportunities for future commercial development with resulting impacts on the quality of the public realm along New Sheffield Street; • greater community impacts due to the requirement for more land to construct the coach parking facilities, taxi and private vehicle drop off and pick up facilities and bus stops resulting in greater impacts on community buildings, including MASH and MO:DEL; • similar land quality impacts due to excavation requirements for the construction of two car parks which would result in a potential for encountering land contamination; • similar temporary and permanent noise and vibration impacts due to proximity to Aeroworks offices on Adair Street; • shorter construction programme length; and • similar programme costs.

2.5.14 As a result of further design development following the appraisal detailed above, additional historic environment impacts have been identified on the former St Andrew’s Church and disused graveyard as a result of the development of the public realm along New Sheffield Street. This will include construction of new retaining walls and a reduction in existing ground levels which will result in the complete permanent removal of the below-ground archaeological remains from the former St Andrew’s Church and disused graveyard. This means that Options 2x, 3x, 3m and 3a would all have similar impacts to the Baseline option. These effects are reported in SES2 and AP2 ES Volume 2, Community Area report: Manchester Piccadilly Station (MA08). This design update does not change the outcome of the appraisal described above and selection of the option taken forward into the AP2 revised scheme.

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