

## **M6 Junctions 16 to 19 Smart Motorway**

# **Environmental Assessment Report Non-Technical Summary**

**FINAL, Rev.0**

**October 2014**

M6 Junction 16 to 19 SM Scheme  
Environmental Assessment Report –  
Non-Technical Summary

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**CONTENTS**

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	PROJECT OVERVIEW .....	1
1.2	NEED FOR THIS ENVIRONMENTAL ASSESSMENT REPORT.....	2
<b>2</b>	<b>PROJECT BACKGROUND.....</b>	<b>3</b>
<b>3</b>	<b>PROJECT DESCRIPTION .....</b>	<b>4</b>
3.1	PROJECT OVERVIEW .....	4
3.2	CONSTRUCTION PROPOSALS .....	5
<b>4</b>	<b>ENVIRONMENTAL EFFECTS .....</b>	<b>7</b>
4.1	AIR QUALITY .....	7
4.2	ECOLOGY AND NATURE CONSERVATION .....	8
4.3	NOISE AND VIBRATION .....	9
4.4	VISUAL AMENITY.....	11
4.4.6	CULTURAL HERITAGE .....	12
<b>5</b>	<b>SUMMARY OF ENVIRONMENTAL EFFECTS.....</b>	<b>13</b>

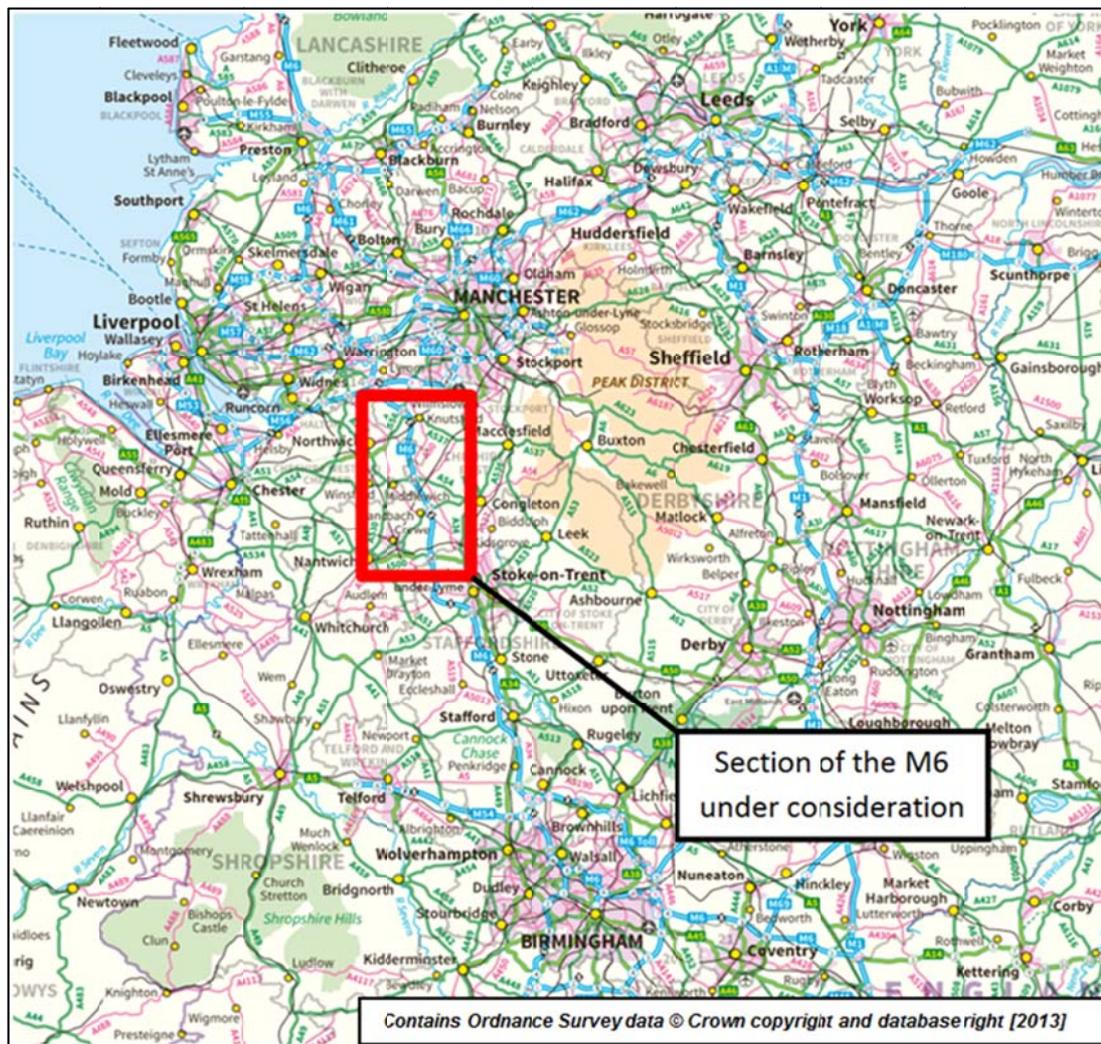
# 1 INTRODUCTION

## 1.1 Project Overview

1.1.1 The M6 between Birmingham and Manchester is a strategic route that forms part of the Trans-European Road Network (TERN) (Route E5) and is part of the Highways Agency Strategic Road Network connecting the Midlands, the North West of England, Scotland and Wales.

1.1.2 In summer 2013, a Smart Motorway (SM) Scheme on the M6 starting at Junction 16, Crewe and extending north for approximately 30 km to Junction 19, Knutsford (hereafter referred to as the M6 J16-19 SM Scheme) was selected to be designed and constructed in accordance with Interim Advice Note 161/13 – Managed Motorways All Land Running (HA, 2013a); subject to value for money and deliverability. Figure 1.1 below shows the location of the M6 under consideration.

**Figure 1.1 Scheme Extents**



1.1.3 The key deliverables associated with the delivery of the SM Scheme include:

- Provision of additional capacity by utilising the motorway hard shoulder;
- Making use of the existing infrastructure and where possible avoiding impacts outside the motorway boundary;

- Introduction of Smart Motorway infrastructure, including super span gantries and variable message signs to impose mandatory speed limits to manage traffic flows and improve journey times; and
  - The improvement of road safety during future maintenance works.
- 1.1.4 The M6 J16-19 SM Scheme will reduce congestion, reduce journey times and improve journey reliability and safety. These issues are expected to be further intensified by traffic volumes which are predicted to grow.
- 1.2 Need for this Environmental Assessment Report**
- 1.2.1 Though a statutory Environmental Impact Assessment (EIA) is not required, an Environmental Assessment Report (EAR) has been produced to meet the Highways Agency's responsibilities to identify, manage and monitor the effects of all its major developments.
- 1.2.2 The EAR was prepared by Jacobs UK Ltd and presents a statement of the likely effects on the environment and includes a description of mitigation measures envisaged in order to avoid, reduce and where possible remedy any significant environmental effects.
- 1.2.3 The EAR set outs the likely effects on the environment and includes a description of proposed mitigation measures for the following topics:
- Air Quality;
  - Cultural Heritage;
  - Ecology and Nature Conservation;
  - Noise and Vibration; and
  - Visual Amenity.
- 1.2.4 This Non-Technical Summary (NTS) provides a summary of the findings of the EAR.

## **2 PROJECT BACKGROUND**

- 2.1.1 The M6 between Birmingham and Manchester is a main route carrying high volumes of traffic and heavy goods vehicles which forms part of the Trans-European network of roads.
- 2.1.2 In June 2013 the Government made a commitment to fund a package of SM Schemes that included the M6 between Junctions 16 and 19.
- 2.1.3 A key objective of the project is to design a SM Scheme to reduce congestion, reduce journey times and to improve journey reliability and safety along the M6 between Junctions 16 and 19.

## 3 PROJECT DESCRIPTION

### 3.1 Project Overview

- 3.1.1 The M6 J16-19 SM Scheme comprises a total length of approximately 30 km, and will likely be divided into six links for delivery during construction. The construction works would be undertaken as a rolling programme of activity along the six discrete links.
- 3.1.2 Within each section, the first proposed construction activity is likely to be the installation of the RCB, to improve operational health and safety by replacing the existing central reserve steel barrier.
- 3.1.3 Following the RCB construction within a section, the second construction activity will be the installation of infrastructure to support the permanent conversion of the hardshoulder along the main line and intra-junctions, with the variable mandatory speed limits.
- 3.1.4 A summary of these works is given below. All construction details provided here are provisional, subject to confirmation upon appointment of a Contractor.

#### Rigid Concrete Barrier (RCB)

- 3.1.5 A rigid concrete barrier would run the full length of the central reservation between Junctions 16 and 19. The RCB would be typically 542 mm wide at the base, 900 mm high and 200 mm wide at the top. The working area would be an approximately 8 m wide easement for the entire length of the RCB (4.2 m in the central reservation and 1.9 m of lane 3 on both carriageways). As part of the construction work, a minimum 0.5 m either side of the central reserve RCB would be paved for support.

#### Structures

- 3.1.6 There are a total of 36 overbridges between Junctions 16 and 19 with supports in the central reserve which will interface with the proposed RCB. Where the existing central supports are leaf (wall type) piers, the RCB will tie into each end of the pier. Where the existing central supports are composed of discrete concrete columns, these will generally be encapsulated (encased in concrete and strengthened as necessary) to form a continuous concrete barrier which provides the road restraint system. Encapsulation will generally be to the full height of the pier. For bridges where pier encapsulation is unfeasible on technical grounds, the RCB will instead bifurcate around the central reserve columns.
- 3.1.7 The piers on seven of the overbridges have also been identified by the Highways Agency's managing agent as being in poor condition, requiring urgent attention. The two bridges identified as the highest priority, Congleton Road Bridge and Malkins Bank Lane Bridge, will be encapsulated and strengthened in advance of the Smart Motorway Scheme by the Managing Agent. The remaining five bridges will be repaired, strengthened and modified as necessary, comprising works to the piers in the verges and the central reserve.
- 3.1.8 There are also a total of 14 underbridges and culverts between Junctions 16 and 19 carrying the Smart Motorway. Seven of these are bridges which require some degree of modification or localised strengthening in order to accommodate a central RCB and four lanes of traffic. In all cases, the appearance of the underbridges will not significantly change.

#### Drainage Strategy

- 3.1.9 Surface water channels, linear drainage, kerb and gully or any other edge of carriageway water collection features in the nearside verge would be designed to accommodate a 1 year design storm without surcharge and a 5 year storm with

surcharge. Existing chambers within the hardshoulder would be covered over and connected to adjacent verge side chambers or replaced with larger chambers, to allow for maintenance, flow control and attenuation requirements.

3.1.10 Where drainage is required in the central reserve, all existing central reserve drainage would be removed and replaced with new surface water channels or, at pinch points, with longitudinal and sub-surface drains. New drainage would connect to existing cross carriageway drains.

3.1.11 Where required, new roadside barriers would be installed for any permanent risks associated with adjacent watercourses.

#### Emergency Refuge Areas

3.1.12 Emergency Refuge Areas (ERAs) will be provided throughout the SM Scheme at up to 2.5 km spacings.

3.1.13 Emergency roadside telephones are to be co-located with the ERAs along a 1.2 m wide footpath parallel to the motorway, in the soft verge.

#### Gantries

3.1.14 The existing portal gantry signing is to be retained in their current locations, but the signing will be upgraded. One new superspan gantry and 11 superspan cantilevers are required to support the SM Scheme. Long lengths of carriageway would also be resurfaced.

3.1.15 Temporary Traffic Management Signs will be installed to support maintenance works by providing warning in advance of the coned areas. Ground re-profiling up to the Highways Agency boundary or provision of a retaining wall may be required where new gantries are located within a cutting or existing embankment.

#### Signs and Cameras

3.1.16 The M6 J16-19 SM Scheme requires full coverage from CCTV, supported by infra-red illumination. Where possible, cameras will be located on gantries, but some cameras on new remote masts will be required. Speed enforcement cameras will also be installed across the scheme.

3.1.17 For cabling to new infrastructure, the existing ducts will be used where possible. Replacement of some existing duct will be required due to other works in the verge and additional cabinets, chambers and ducts will be required to connect to new equipment.

3.1.18 For a few locations, where power supplies do not currently exist, there may be a need to connect to nearby power supplies. At the time of preparing this EAR, designs for eight electrical installations (EIs) for the scheme were under preparation. These proposals are the responsibility of the DNO and will be permitted under a separate approvals process; however, they have been considered as part of the EAR to capture primary and secondary effects of the M6 SM Scheme.

## **3.2 Construction Proposals**

### *Construction Delivery Programme*

3.2.1 A detailed construction delivery programme would be prepared and managed by the Contractor, in liaison with the Highways Agency.

3.2.2 The construction works would be undertaken as a rolling programme of activity along 6 discrete links. Work on the 6 links would likely commence with Link 1 and the expected links are as follows:

- Link 1: J19-J18 Northern (includes Knutsford Services);

- Link 2: J19-J18 Southern;
- Link 3: J18-J17 Northern;
- Link 4: J18-J17 Southern;
- Link 5: J17-J16 Northern (includes Sandbach Services); and
- Link 6: J17-J16 Southern.

3.2.3 For each link, prior to any construction works there would be a 2 month period of preparation works, anticipated to involve hard shoulder remedial works and vegetation clearance, followed by traffic management, site inspection and site clearance works.

3.2.4 The works associated with installing the RCB would be undertaken first within a link, and anticipated to last approximately 6 months.

3.2.5 Works in the verge to develop the all lane running would follow and last approximately 10 months; the works would include the remediation works on overbridge and underbridge structures, the installation of gantries, cantilevers, drainage, signs, cameras, lighting and development of the ERAs.

3.2.6 The installation and commissioning of the communications infrastructure which will be undertaken in the final 7 months of the programme for each link. The actual delivery programme may vary depending on the weather and completion of sequential, integrated activities. The overall construction programme is estimated to be upwards of 36 months.

#### *Land Use Requirements*

3.2.7 In order to support construction of the SM Scheme, areas of land outside the M6 J16-19 motorway corridor would be required to provide a main compound, satellite compounds and laydown areas.

#### *Traffic Management*

3.2.8 Traffic management would be required during the construction period, which is likely to last upwards of 36 months. Traffic management would typically comprise lane closures, lane narrowing and speed restrictions for the duration of the works, with supporting temporary CCTV cameras. Along the whole 30 km length of the M6 J16-19 SM Scheme, there would be narrow lanes for the duration of the scheme.

3.2.9 No diversionary routes are required during the construction and operation of the SM Scheme. There may be occasional night time closures of slip roads to facilitate works and these closures will be managed by the appointed Contractor.

## 4 ENVIRONMENTAL EFFECTS

### 4.1 Air Quality

- 4.1.1 The air quality assessment identifies the potential effects by predicting the changes in air quality pollutant concentrations which would result from the combination of background concentrations with the contributions from the roads in the study area, including the proposed scheme.
- 4.1.2 Within the study area, two types of receptors have been considered; residential properties and other sensitive receptors (such as schools, nursing homes, etc.), and nature conservation sites designated at International, European or National level.
- 4.1.3 With best practice dust control measures in place, the construction phase of the SM Scheme is not predicted to cause any significant dust nuisance. The following mitigation measures have been proposed for the construction phase:
- Preparation of a statement of commitment to control off-site environmental effects including fugitive dust emissions;
  - Preparation of an environmental management system to ensure procedures are monitored and controlled on a regular basis; and
  - Ensuring that all site workers receive adequate training in environmental control procedures including the control of dust and other airborne emissions that might cause off-site effects.
- 4.1.4 For the Opening Year 2017, it is predicted that the proposed SM Scheme would lead to small and medium magnitude increases in nitrogen dioxide concentrations that are below the lower guidelines considered to represent significant effects. There is one large magnitude increase, which is at the lowest end of the large magnitude concentration range.
- 4.1.5 It is also predicted that the proposed SM Scheme would lead to small improvements in nitrogen dioxide concentrations that are below the lower guidelines considered to represent significant effects.
- 4.1.6 The predicted effects are lower still for the 2022 scenario, where the A556 Improvements Scheme has the speed limit increased from 60 mph to 70 mph.
- 4.1.7 Overall, based on the Highways Agency guidance for evaluating significant effects, the SM Scheme is not considered to lead to a significant local air quality effect.
- 4.1.8 Although there are localised negligible changes to fine particulate matter (PM<sub>10</sub>) concentrations, there would be no significant effects related to PM<sub>10</sub> concentrations as a result of the SM Scheme.

## **4.2 Ecology and Nature Conservation**

- 4.2.1 The SM Scheme corridor is 30km in length and habitats in the wider landscape include arable, grazed pasture, ponds, residential conurbations, hedgerows and woodlands.
- 4.2.2 The desk study identified twelve European designated sites within 30 km of the scheme and identified 5 UK statutory designated sites, 45 non-statutory and thirteen parcels of Ancient Woodland within 2 km of the SM Scheme.
- 4.2.3 A Phase 1 Habitat survey identified habitat types and the potential for badgers, bats, birds, water vole, otter, great crested newt, reptiles and other notable species.
- 4.2.4 There is no anticipated direct habitat loss at statutory or non-statutory designated sites of nature conservation value during the construction phase as all of the works are within the highways boundary of the soft estate. However the construction of the SM Scheme would result in the loss of semi-natural habitats through land take for temporary construction compounds, ERAs and infrastructure (e.g. gantry installation, cameras, signs, etc.).
- 4.2.5 On-site mitigation, including possible acquisition of a licence from Natural England, would be required in advance of and during construction of the SM Scheme to minimise any risk to badgers or great crested newts.
- 4.2.6 The construction of the scheme would not result in the loss of any bat roosts and no significant negative effects are anticipated.
- 4.2.7 Vegetation loss would reduce the foraging habitat and potential nest sites available to the local bird population during the breeding season. However, due to the availability of similar habitat outside the construction area a significant negative effect on the local bird population is not anticipated.
- 4.2.8 Mitigation measures to reduce the impacts on ecology and nature conservation include:
- The use of best practice during construction to minimise the effects associated with light, noise and disturbance;
  - Following the Pollution Prevention Guidelines (PPGs) produced by the Environment Agency;
  - Dust mitigation measures to minimise dust levels; and
  - Agreeing mitigation measures for badgers and great crested newts with Natural England for implementation prior to and during construction.
- 4.2.9 No significant residual impacts are anticipated on the basis that the mitigation measures detailed within the EAR are implemented successfully.

### 4.3 Noise and Vibration

- 4.3.1 The noise environment within the study area is generally dominated by road traffic noise. In some locations there may be contributions from other noise sources, including rail and aircraft noise.
- 4.3.2 A series of baseline noise surveys were conducted to establish existing noise levels at representative sensitive receptors within the study area. The locations chosen included some of the nearest properties to the existing M6 motorway, so the likely worst affected by the proposed M6 J16-19 SM Scheme.
- 4.3.3 Significant daytime noise impacts during the proposed construction works are not anticipated at nearby sensitive receptors. Existing baseline noise levels in the area are high and temporary lane closures and speed restrictions offset much of the noise increase attributable to the construction activities. In two instances noise levels could be greater than the daytime SOAEL during construction: White Moss Farm would see a 1 dB reduction over current levels, whilst 223 Heath Road would experience noise levels 1 dB higher.
- 4.3.4 During the night-time, there is more potential for significant noise impacts at the closest residential properties to the scheme. Current baseline noise levels are well above the night-time SOAEL for those properties closest to the M6. During night-time construction works, noise levels would continue to be well above the night-time SOAEL, with increases of up to 3 dB for the closest properties during worst-case overnight Resurfacing Works.
- 4.3.5 Significant vibration impacts during construction are not anticipated, whilst the risk of cosmetic building damage or annoyance to occupants of residential properties is low.
- 4.3.6 Mitigation measures to reduce the impacts of noise and vibration during construction include:
- Use of 'best practicable means' during all construction activities;
  - Switching off plant and equipment when not in use for longer periods;
  - Agreeing with the local authority appropriate controls for undertaking significantly noisy works or vibration-causing operations close to receptors;
  - Programming works so the requirement for working outside normal working hours is minimised (taking into account the highway authority's statutory duties under the Traffic Management Act 2004);
  - Use of low noise emission plant where possible;
  - Piling will be bored to protect sensitive sites;
  - Use of temporary noise screens around particularly noisy activities; and
  - Regular plant maintenance.
- 4.3.7 During operation, the majority of the sensitive receptors are predicted to experience a negligible adverse noise impact or no change in the short term daytime scenario and in the long term daytime and night time scenarios, which would not be considered perceptible. However, without mitigation, perceptible noise increases would be anticipated at four receptors (1, 2-3 and 4 Mistletoe Cottages and Garth Cottage) on scheme opening.
- 4.3.8 In terms of First Priority Locations, seven sample receptors are predicted to experience adverse noise impacts on scheme opening, whilst nine sample receptors are predicted to experience adverse noise impacts in the long term; with 1 Mistletoe Cottages the worst affected.

- 4.3.9 Mitigation measures to reduce the impacts of noise and vibration during the operation phase include the installation of noise barriers as a practical means of reducing noise levels. Nine individual noise barriers have been proposed for the SM Scheme, which will remove all predicted perceptible increases at noise sensitive receptors as a result of the scheme. The exact locations of these noise barriers would be subject to the detailed design process, to ensure that there is sufficient room, without conflict with drainage, communications or other associated structures, to erect a barrier in the preferred locations.
- 4.3.10 On scheme opening, with the scheme and proposed mitigation measures in place, no sensitive receptors are expected to experience a perceptible noise increase. Thirteen sensitive receptors are predicted to experience perceptible noise benefits, including some of the worst affected Defra Noise Important Areas. Four residential dwellings are expected to experience major noise benefits, one dwelling is expected to experience a moderate noise benefit, and eight dwellings and one other receptor are predicted to experience minor noise benefits.
- 4.3.11 Daytime noise levels in the opening year and long term would remain above the daytime SOAEL at Moss Farm, New Farm, The Haven and Pine Cottage (and in long term only for The Grange). Noise levels remain well above the night-time SOAEL at Moss Farm, 219 Heath Road, New Farm, The Haven, Pine Cottage and The Grange. The proposed noise barriers have reduced noise levels to below the daytime SOAEL at 219 Heath Road (and in long term only for The Grange). At Brindley Cottage, noise levels would remain above the daytime SOAEL and would be slightly increased; by 0.8 dB on scheme opening and by 1.7 dB in the long term. Noise levels would also remain above the night-time SOAEL at Brindley Cottage and would be slightly increased by 1.5 dB at night.
- 4.3.12 Only at Brindley Cottage, do daytime noise levels remain above the daytime SOAEL and see an increase, by 0.8 dB on scheme opening and 1.7 dB in the long term. Night-time noise levels at Brindley Cottage also increase; by 1.5 dB. Whilst not a perceptible increase, this should still be considered a concern as levels remain well above the daytime SOAEL. Consideration has been given to a noise barrier to benefit this property, but installation of a noise barrier at this location would be problematical due to the location of an existing ditch, crash barrier and communications ducting in this area.

## **4.4 Visual Amenity**

- 4.4.1 The proposed scheme would not affect the whole of the local landscape character areas found in the study area. Effects would occur rather more locally and in areas closest to the motorway. Generally, effects on landscape character would be greatest during construction but because of their localised nature, they would not be that notable.
- 4.4.2 The proposed scheme would create a change for several visual receptors; for example, in some cases vegetation loss would open up views towards construction works and traffic on the motorway, elsewhere receptors with existing views of the motorway would be adversely affected by the construction of the RCB, signage and gantries. The greater the change in the view, the more notable the effect on the visual receptor. As for landscape character, effects on visual receptors would be greatest during construction.
- 4.4.3 By the Opening Year, construction works would have finished, which would reduce the number of visual detractors in the landscape and improve visual amenity. The principal changes remaining in views would occur due to the clearance of vegetation, the removal of certain gantries and the introduction of new gantries. Much of the road infrastructure such as the RCB, drainage works and ERAs would blend in with the existing road corridor. Noise barriers would help to screen lower level views of traffic in places.
- 4.4.4 By the Future Year, mitigation vegetation would have established to help improve landscape character and visual amenity for many receptors. The vegetation would restore screening to some views or provide extra screening of new gantries and traffic on the motorway.
- 4.4.5 The mitigation measures proposed include:
- Retention of woodland, individual trees and hedgerows;
  - Woodland, woodland edge or native shrub planting within the highway boundary;
  - Low maintenance grassland, open grassland and wildflowers within the highway boundary;
  - Scattered tree planting; and
  - Hedgerow planting along the highway boundary.

#### **4.4.6 Cultural Heritage**

- 4.4.7 Trenches for EIs are proposed to be 600 mm deep by 500 mm wide, and located within areas such as existing cable trenches, roadside verges or within the motorway boundary, all of which are likely to have been previously disturbed resulting in the disturbance or removal of any archaeological remains present.
- 4.4.8 In the two locations where EI trenches would pass through greenfield land for a short distance, review of data from the Cheshire Historic Environment Record has not identified any archaeological assets to be present.
- 4.4.9 Where an overhead pole power supply is under consideration, the overhead poles would be screwed into the ground, resulting in a minimal construction footprint which would not be available for archaeological inspection.
- 4.4.10 A total of nine locations have been provisionally identified as potential site compound locations for the construction works. The final sites will be confirmed upon appointment of a Contractor.
- 4.4.11 Potential impacts on potential archaeological remains, historic buildings and the historic landscape of the SM Scheme have been identified in detail in the EAR. Impacts primarily relate to the potential disturbance of unidentified archaeological remains, the removal of vegetation and trees which screen historic buildings from the M6 and noise and visual disturbance from construction and operation of the SM Scheme
- 4.4.12 To mitigate these potential impacts the following mitigation measures have been proposed:
- If any of the potential Compound Sites adjacent to the A54 are selected by the appointed contractor a geophysical (magnetometer) survey to identify the presence or absence of archaeological remains.
  - Archaeological monitoring is also recommended during topsoil stripping and drainage excavations within some of the potential Compound Sites, to mitigate potential impacts on any unknown archaeological remains.
  - To mitigate impacts on the setting of Plumtree Farm a belt of shrubs and trees has been proposed to be planted along the highway boundary, to screen the motorway and reduce visual intrusion on the building's setting as far as possible.
- 4.4.13 The predicted residual effects of construction and operation of the SM Scheme are assessed as slight or neutral.

## 5 SUMMARY OF ENVIRONMENTAL EFFECTS

5.1.1 The following table provides a brief summary of the key identified environmental effects and proposed mitigation measures. Full details are provided in the Environmental Assessment Report.

Topic	Effect	Mitigation
Air Quality	Dust / PM <sub>10</sub> / NO <sub>2</sub> increases	Minimise potential emissions of fugitive dust during the construction phase by adopting best practice measures in the Construction Environmental Management Plan, thus minimising potential for dust nuisance.
Ecology and Nature Conservation	Temporary disturbance of terrestrial habitat and watercourses  Direct impact of temporary land take and habitat loss  Disturbance to species (badgers, bats, GCN, birds)	Where significant effects to ecological receptors have been identified, mitigation measures to avoid, reduce or compensate for significant effects have been identified including: <ul style="list-style-type: none"> <li>• Use of best practice during construction.</li> <li>• Implementation of the Environment Agency Pollution Prevention Guidelines (PPGs).</li> <li>• Dust mitigation measures to minimise dust levels.</li> <li>• Agreeing mitigation measures for badgers and great crested newts with Natural England Temporary for implementation prior to and during construction.</li> </ul>
Noise and Vibration	Noise and vibration level increases	All work would be undertaken to the guidance detailed in BS 5228: 2009 - Code of Practice for noise and vibration control on construction and open sites, Part 1: Noise and Part 2: Vibration. The installation of noise barriers in nine locations.
Visual Amenity	Visual impact	Adoption of the landscape mitigation measures as detailed within the EAR, including tree, hedgerow and shrub planting.
Cultural Heritage	Archaeological finds	Use of a geophysical survey to evaluate archaeological potential.  Archaeological monitoring is recommended during topsoil stripping and drainage excavations within the Windmill Pub Land, Land next to the A54 Plots # 1-4 or Walnut Tree Farm Land Compound Sites.  Any remains identified through archaeological monitoring would be excavated and recorded in line with best practice and in consultation with the Historic Environment Planning Officer for Cheshire East County Council.