

**National Asset Delivery  
Technical Surveys and Testing**

**Site Information for 570127  
M4 J15-16 EB MP125.9 – Drainage  
Survey**

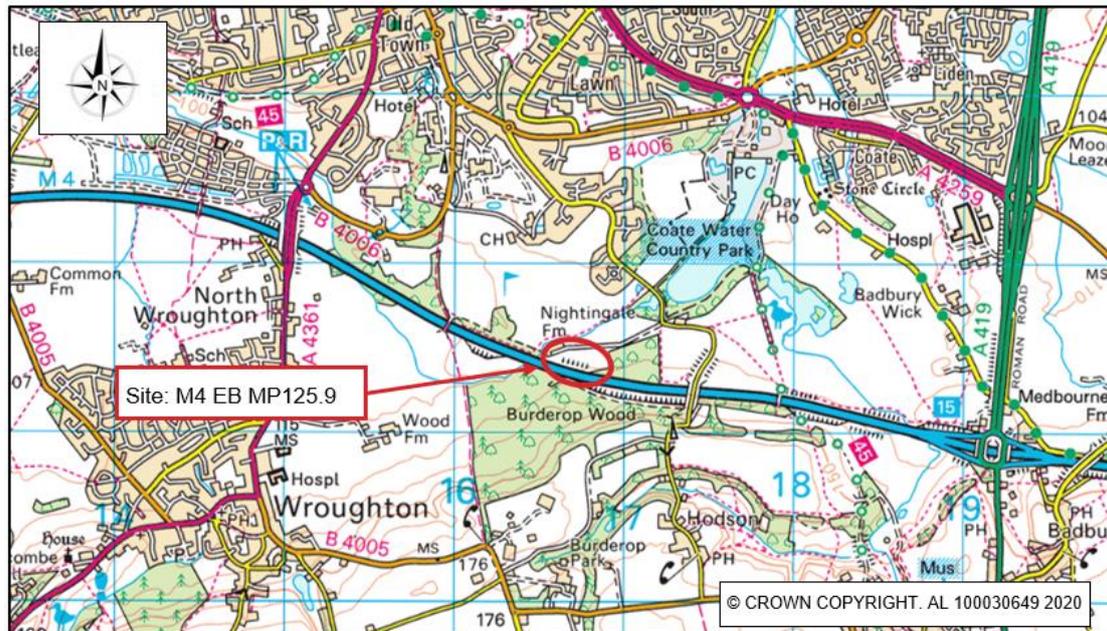
FOR INFORMATION ONLY

## 1 SITE INFORMATION

### 1.1 Site boundary, extents and access arrangements

This site is located on the M4 Eastbound, Junction 16 to 15, located at approximate MP125.9, south of Swindon, Wiltshire, as indicated in Figure 1 below. Approximate Ordnance Survey coordinates for the centre of the site are E416859, N181350.

Figure 1 – Site Location Plan



The motorway at the location is built on split level carriageways, with the eastbound carriageway on a shallow embankment, varying from less than 1m height at MP125.8 to 3.2m at MP126.0. The scheme aims to investigate the cause of hard shoulder cracking and subsidence, and kerb drainage dislocation, along approximately 60m centred at EB Marker Post MP125.9 (Figure 2).

Plate 2 – Overview of defect (February 2020)



For drainage survey purposes, the site extends from approximately MP125.8 to MP126.0 of the eastbound carriageway, and is to include all assets from the boundary fence to the central reservation (catchpits on central reservation are accessible from the eastbound carriageway).

Access to the site is via the M4 mainline and will require traffic management. The hard shoulder at the defect location is currently closed. There is no VRS along the eastbound verge. The central reservation has a double concrete barrier, at split levels.

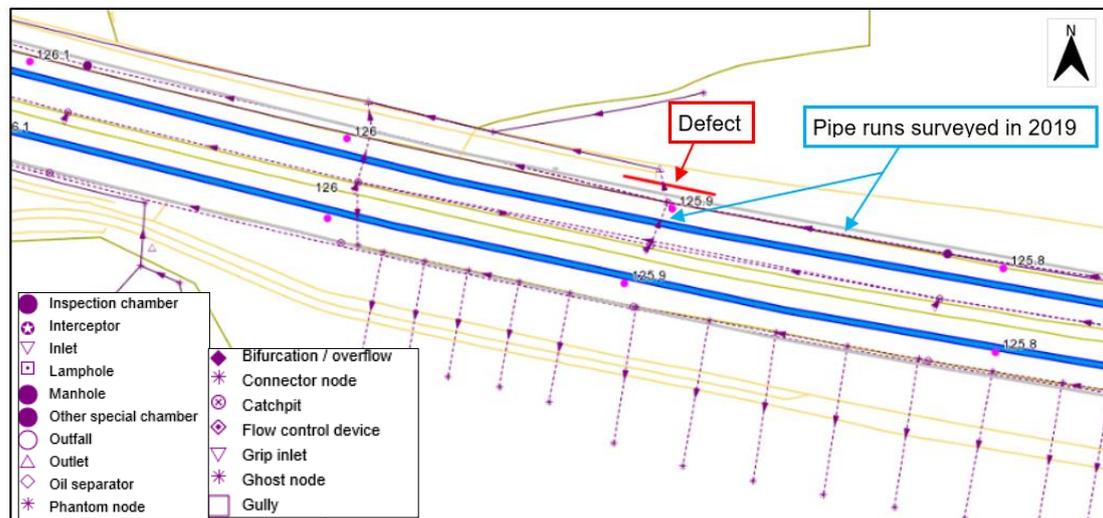
## 1.2 Pavement

As noted above and as shown in Plate 1, there is subsidence in the hard shoulder pavement and cracking between the pavement and the drainage channel.

## 1.3 Drainage

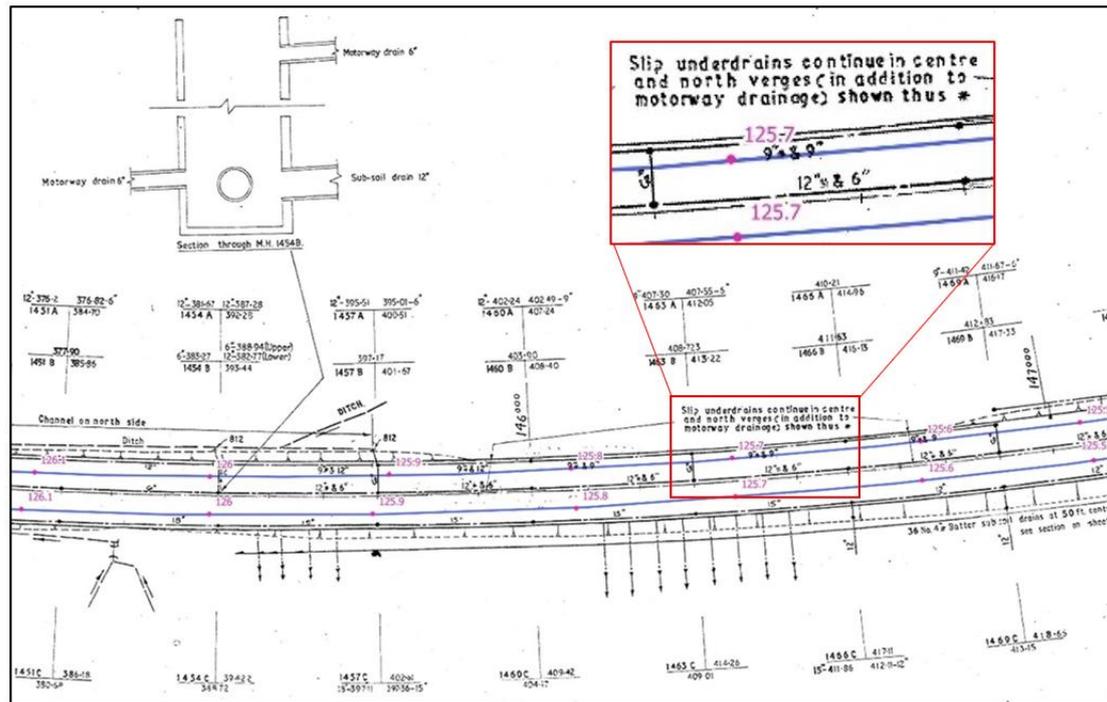
HA DDMS indicates kerb drainage at the location consists of a concrete surface water channel along the edge of the eastbound carriageway, outfalling into verge catchpits. A carrier pipe (Ø305mm) and a filter drain (Ø229mm) are recorded along the eastbound verge, both flowing towards west. Two carrier pipes (Ø300mm, Ø150mm) are also recorded within the central reservation flowing west. Cross carriageway pipework (Ø150mm) is present at the defect location (MP125.9) discharging the central reservation drainage into a catchpit within the verge and from this into the ditch at the toe of the embankment. A similar arrangement is indicated at MP126.0. Batter sub-soil drains at 5m intervals are present along the westbound verge – these do not flow in the direction of the arrows shown in the as-built drawing and replicated on HADDMS, but in the opposite direction, towards the batter toe due North. Drainage assets on HA DDMS are illustrated in Figure 2 below.

Figure 2– Drainage Assets (from HA DDMS)



The asset inventory and condition on HADDMS is indicated as recorded based on existing as-built information. Existing as built record drawing 3878/C2/69 (extract on Figure 3, a copy of the drawing is provided with this document), clarifies that the paired pipes through the central reserve and eastbound verge comprise an upper motorway drain and a lower sub-soil drain, connecting an old landslip area to the east (Burdorpe Wood landslip) to the catchpit and ditch outfall at MP126.0 (and possibly MP125.9).

Figure 3 - Extract of drainage as-built drawing 3878/C2/069 (1972), with marker post layer overlay.



Very little post construction condition information is available on HADDMS and existing information relates mainly to the central reservation, indicating generally poor condition (Grade 5). No condition information is available for the eastbound verge buried assets, including connections to the toe ditch at MP125.9 and MP126. Outfalls at these locations are recorded as unvalidated.

Highways England commissioned a CCTV survey in November 2019 covering only the eastbound cross carriageway pipe at MP125.9 and the motorway drainage pipe along the verge between MP125.9 and MP125.8 (indicated on Figure 2). The survey indicated no defects on the  $\text{\O}300\text{mm}$  verge carrier drain (Structural Grade 1, Service Grade 1). The cross carriageway pipe ( $\text{\O}150\text{mm}$ ) was found in poor condition: Structural Grade 5, Service Grade 2. Significant debris causing up to 95% area loss was found requiring jetting to allow full survey. Significant structural defects were found, including holes at joints at 1.3m from the verge catchpit, under the failed section of hardshoulder, and at 4.4m, under Lane 1.

Recent site visits found significant debris accumulation at the outfall to the ditch at MP125.9 (Figure 4).

Figure 4 – View of embankment at MP125.9 EB. Debris accumulation at outfall (February 2020)



#### 1.4 Geotechnical

HAGDMS indicates the embankment fill to have been sourced from the Lower Greensand Group based on existing BGS mapping. The maximum height and steepest part of the embankment is 50m west from MP125.9 with HAGDMS recording 3.2m high and 31° slope. This is consistent with the available Lidar data.

The site and this section of the M4 are underlain by the solid geology of the Gault Formation, covered by Head deposits derived from Upper Greensand and weathered Gault clay. The M4 was originally built in a cut through this section which triggered two major slope failures, Burderop Wood and Hodson landslides, forcing extensive remedial measures, including changes in the motorway vertical alignment, adoption of sub-soil drainage measures and the current split-level carriageway profile. More information on the geology is provided in the Preliminary Sources Study Report for the scheme which is available on request.

#### 1.5 Soft Estate and Environment

The soft estate comprises generally medium to large trees to the east, where the M4 runs adjacent to Burderop Wood. Further west the embankment slope contains mainly grass and brambles, with the occasional tree.

The site has been identified as suitable for bird nesting and reptiles and amphibians, and as such ecological constraints are applicable to the site. Any vegetation clearance undertaken during winter months will require ecological supervision for hibernating reptiles and amphibians.

#### 1.6 Traffic Signs, Road Markings

The only sign present within the verge is the marker post sign at MP126.0 EB.

#### 1.7 Lighting

N/A

#### 1.8 Structures and Buildings

N/A

## 1.9 Tunnels

N/A

## 1.10 Technology

See 1.11 below for cabling associated with technology assets.

## 1.11 Statutory Undertakers

C2 returns and drawings showing the location of the statutory undertaker's plant have been obtained and these are provided as part of the technical survey package. The contractor shall contact the procurement lead if these have not been provided.

In summary, apart from the drainage asset, described above, only Highways England communications equipment are indicated to be present on site, with cables along both verges and a carriageway crossing at approximately MP126.0+10m. A detector loop with associated verge side equipment cabinets is present at MP126.0 Westbound.

## 1.12 Traffic

The M5 comprises a three lane section of motorway with no smart motorway or all-lane running capability.

The eastbound hard shoulder is currently closed through the extent of the proposed survey works due to the defect at MP125.9. Traffic management will be required to access the site.

2019 AADT counts for the section of the M4 are provided in Table below, retrieved from <http://webtris.highwaysengland.co.uk/>.

Table 1- Annual Average Daily Traffic counts for 2019 (MIDAS site at M4/3257B priority 1 on link 102005201; GPS Ref: 417049;181310; Eastbound)

Month	24hr			
	ADT	%>6.6m	AWT	%>6.6m
Jan	39227	13.5	41207	15.5
Feb	41960	13.2	43834	15.6
Mar	42781	12.9	44619	15.7
Apr	45230	12.2	46901	14.3
May	45311	12.8	47197	14.4
Jun	46322	12.1	47095	15
Jul	47715	12.7	48572	14.8
Aug	49075	11.6	50149	13.6
Sep	46248	12.4	46449	15.1
Oct	44406	13.2	45437	15.5
Nov	42470	12.9	44408	15.5
Dec	41278	11.5	41784	13.6
<b>Avg</b>	<b>44335</b>	<b>12.6</b>	<b>45637</b>	<b>14.9</b>