National Asset Delivery
Technical Surveys and Testing

Scope for 570135 M5 J19-20 Topographical Survey

CONTENTS AMENDMENT SHEET

Amend. No.	Revision No.	Amendments	Initials	Date
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1 PURPOSE OF THE SERVICES

1.1 Project Objectives

1.1.1 The principal objective of the project is to undertake a topographical survey on several structures on the M5, between junctions 19 and 20. The structures to be included in the survey are listed in Table 1, below.

Structure Number	Structure Name	Structure Key	Easting	Northing
M5/147.00	Clapton Road	1766	348930	174950
M5/148.40	Naish Hill	1767	347920	174000
M5/149.60/Q	Clapton Court Culvert	15553	346820	173450
M5/149.90/R	Median Retaining Wall No1	1953	346020	173000
M5/150.60	Clapton Footbridge	1769	346020	173000
M5/151.30B	Wynhol Viaduct Northbound	11071	345070	172890
M5/151.30/A	Wynhol Viaduct Southbound	1770	345060	172870
M5/152.00/R	Median Retaining Wall No2	1957	344390	172550
M5/152.20/R	Wynhol S/bound Retaining Wall Lower	11072	344530	172580

Table 1 - Structures for Topographical Survey

Crossover locations and the motorway extent are also to be surveyed along with the buffer area that surrounds them.

Items within the survey location to be included comprise the following:

- Overbridges and independent utility crossings;
- Underbridges (including sub-ways and underpasses);
- Gantries (details to be captured are similar to overbridges);
- Retaining walls;
- Culverts;
- Outfall structures;
- Sign bases;

- Closed circuit television (CCTV) mast bases;
- Environmental Sensor Station bases; and
- Acoustic and other environmental barriers.

1.1.2 The specification that applies to the *services* is included in Section 6.

1.2 Scope of *services*

The *services* to be provided under this contract are:

Undertake topographical surveys as detailed in this section and the Specification in Section 4. To determine the appropriate level of information, the *Consultant* shall perform the following investigations:

1) Topographical Survey of the motorway, structures, crossover locations and the buffer areas around them, as specified.

1.2.1 The scope of this survey is as follows:

1) Determine the dimensions, outlines and extents of the structures and their surroundings;

2) Accurately represent the areas of interest, showing all natural and manmade features;

3) Determine feature levels and three-dimensional points;

4) Produce drawings showing the survey area extents and features within the survey boundaries;

5) The topographical survey shall include survey of the land existing buildings and structures, boundary details, a grid of levels, ground surfaces, tree positions, drainage details and service cover positions. Additional details such as any features adjacent to the site or underground service can also be included;

6) Gather the information necessary to develop an accurate bill of quantities including the following:

   a. Extents and dimensions of the structures;

   b. Vegetation extents which are likely to be cleared.

7) All areas between marker posts 144.5 and 156.4 within the motorway extent that are not Key Areas, should be surveyed to medium accuracy. The motorway extent is defined as the carriageway plus 3 metres offside within each verge and the central reservation.

8) The elements of interest within the Key Areas, as identified by the boundaries shown in the Google Earth file included in the TST07 package,

should be surveyed to the highest achievable level of accuracy, both horizontally and vertically, as stated in the table below. Max and Medium accuracy categories are defined as follows:

Max

This shall represent a survey using a Total Station offering accuracy tolerance of +/- 5mm or better. Use of GPS survey techniques or other means not providing this level of accuracy shall not be permitted.

Medium

This shall represent items for which survey via total station is preferred but that use of GPS is not precluded. However, it is likely that use of GPS techniques will be limited to large areas of third party agricultural land or expansive highway verges.

9) Table 2 and Table 3, below describe the level of accuracy required to be recorded for each element surveyed. This shall not be taken as a complete list and any feature/items not specifically referenced shall also be recorded.

Features	**Trunk Roads**	**Motorways**	**To be Included in Output drawings**	**Accuracy**	**3D feature type**
All Structure edges including bridge decks, supports, piers, abutments, edge beams, walls etc.	5m (2.5m on radii below ~12m)	10m	2D + 3D	Max within Key Areas Medium for non-Key Areas	String
All Overbridge edges including bridge decks, soffits above the pavement edges, supports, piers, abutments, edge beams, walls etc.	5m (2.5m on radii below ~12m)	10m	2D + 3D	Max within Key Areas Medium for non-Key Areas	String
Headroom of overbridges, measured at the kerb lines and pier/abutment faces for both elevations	All Areas	All Areas	2D + 3D	Max	Part of Overbridge string

Features	**Trunk Roads**	**Motorways**	**To be Included in Output drawings**	**Accuracy**	**3D feature type**
Retaining walls including levels and slopes both at the top and bottom	Footprint/Extents	Footprint/Extents	2D + 3D	Max within Key Areas Medium for non-Key Areas	String and 3D Contour
Culverts, including headwall position with soffit, invert and width	Footprint/Extents	Footprint/Extents	2D + 3D	Max within Key Areas Medium for non-Key Areas	String and 3D Contour
All Road edges (where no kerbs) including side roads, laybys, private access's etc.	5m (2.5m on radii below ~12m)	10m	2D + 3D	Max within Key Areas Medium for non-Key Areas	String
All Kerb lines at channels + Channel blocks including side roads, laybys, private access's and traffic islands	5m (2.5m on radii below ~12m)	10m	2D + 3D	Max within Key Areas Medium for non-Key Areas	String
All Kerb tops including side roads, laybys, private access's and traffic islands	5m (2.5m on radii below ~12m)	10m	2D + 3D	Max within Key Areas	String

Features	**Trunk Roads**	**Motorways**	**To be Included in Output drawings**	**Accuracy**	**3D feature type**
				Medium for non-Key Areas	
Location of drop kerbs and transition kerbs (each end)	All	All	2D + 3D	Medium	Part of kerb strings
Tactile paving and colour	Footprint	N/A	2D	Medium	-
Footway (each edge)	5m (2.5m on radii below ~12m)	5m	2D + 3D	Max within Key Areas	String
				Medium for non-Key Areas	
Other paved areas (extents / material type and changes)	Footprint (max 5m)	Footprint (max 5m) Enough levels to illustrate carriageway fall	2D + 3D	Max within Key Areas	String and 3D Contour
				Medium for non-Key Areas	
Zebra and signal controlled crossings	Position and extents	N/A	2D	Medium	-
All Road and footway crown lines	5m	10m	2D + 3D	Max within Key Areas	String
				Medium for non-Key Areas	
Steps including construction type and railings if present.	Position, extents and height of each step	Position, extents and height of each step	2D + 3D	Max within Key Areas	Strings

Features	Trunk Roads	Motorways	To be Included in Output drawings	Accuracy	3D feature type
				Medium for non-Key Areas	
Road markings – edge of carriageway / rib line, lane markings, give way markings and stop lines and directional arrows and text, traffic loops	5m	10m	2D	Max within Key Areas	-
				Medium for non-Key Areas	
Extents of High Friction Surfacing and colour surfacing including 'gateway features'	Footprint / extents	Footprint / extents	2D	Medium	-
Subways / underpasses / bridges including piers.	Footprint / extents	Footprint / extents	2D	Max within Key Areas	-
				Medium for non-Key Areas	
Bridge piers above ground level.	Cross section	Cross section	2D	Max within Key Areas	-
				Medium for non-Key Areas	
Bridge / structures expansion joints	Footprint / extents	Footprint / extents	2D	Max within Key Areas	-

Features	Trunk Roads	Motorways	To be Included in Output drawings	Accuracy	3D feature type
				Medium for non-Key Areas	
VRS and end connections	5m	10m	2D + 3D	Max within Key Areas	String
				Medium for non-Key Areas	
Parapets	5m	5m	2D + 3D	Max within Key Areas	String
				Medium for non-Key Areas	
Gullies and drainage features including weep holes, suspended drainage	Footprint / Extents	Footprint / extents	2D + 3D	Max within Key Areas	String
				Medium for non-Key Areas	
Overhead services and features	Footprint / extents	Footprint / extents	2D + 3D	Medium	String
Signs, sign bases including positions, levels, safety fences/VRS around sign	Footprint / Extents	Footprint / extents	2D + 3D	Max within Key Areas	String
				Medium for non-Key Areas	

Features	Trunk Roads	Motorways	To be Included in Output drawings	Accuracy	3D feature type
Gantry bases including positions, levels, safety fences/VRS in front of gantry base	Footprint / Extents	Footprint / extents	2D + 3D	Max within Key Areas Medium for non-Key Areas	String

Table 2 - Survey Detail Level required for Roads, Tracks, Footways and Road Markings

Additional notes:

- Quadrant radii kerbs to have start, middle and end points picked up.
- Bus kerbs shall be picked up in the same manner as drop kerbs.
- For road markings the centre of the lines shall be recorded.

Feature	Trunk Roads	Motorways	To be Included in Output drawings	Accuracy	3D Feature type
Cuttings and embankments – crest and toe lines	5m	10m	2D + 3D	Medium	String
Retaining Walls or other level change without a slope such as raised planting beds.	Footprint (max 5m) Levels at top and bottom	Footprint (max 5m) Levels at top and bottom	2D + 3D	Max within Key Areas Medium for non-Key Areas	String
Localised changes of level such as mounds and swales.	Footprint (max 5m) Enough levels to illustrate form / shape	Footprint (max 5m) Enough levels to illustrate form / shape	2D + 3D	Medium	Strings and points as required
Drainage ditches and all other waterways. Footprint including embankments and bed plus levels of each element including water.	5m or less if required to accurately capture shape	10m or less if required to accurately capture shape	2D + 3D	Medium	String
Drainage headwalls / outfalls to include pipe size and soffit level	Footprint, levels at ditch bed, water, and top of walls	Footprint, levels at ditch bed, water, and top of walls	2D + 3D	Max within Key Areas Medium for non-Key Areas	Strings and points as required
Waterbodies such as ponds and lakes including water level	Footprint including any embankment	Footprint including any embankment	2D + 3D	Max	String
Line of filter / French drains	5m along run to both sides	10m along run to both sides	2D + 3D	Medium	String

Feature	Trunk Roads	Motorways	To be Included in Output drawings	Accuracy	3D Feature type
Open fields / soft verge	10m centres / grid pattern	10m centres / grid pattern	2D + 3D	Medium	Spots as blocks or points
Trees – Canopy extents, height and trunk where latter is greater than 0.5m diameter 1m above ground	All	All	2D	Medium	-
Small trees / Bushes / scrub / brambles etc. Extents and height	All areas	All areas	2D	Medium	-
Areas of overgrown vegetation	All areas	All areas	Where critical these will have been cleared prior to survey but where they remain every effort should be made to record ground level information around the full extent of inaccessible area to provide as reliable a representation of the ground levels as possible		

Table 3 - Survey Detail Level required for Verges, Earthworks and Other soft landscaping and vegetation

Additional notes:

- Street furniture shall only be included in the 3D CAD file where it has a direct effect on the topography / levels in the immediate vicinity.

10) Where the survey extends into third party land, the necessary permissions to enter the land shall be obtained, in advance.

1.3 Deliverables

The *Consultant* is required to produce the following deliverables:

1.3.1 The *Consultant* is required to present the findings of the topographical surveys (data model) in a series of drawings. These should be compatible for use with AutoCAD format in 2D and 3D and should accurately position survey points in both plan and elevations. A suitable layering system should be provided which includes the names of elements.

1.3.2 The drawings shall contain the Survey Consultant's title block and tables detailing the control stations used. A key should be also included, describing all symbols, blocks and hatches used.

1.3.3 The data should also be provided in PDF format.

2 EXISTING INFORMATION

2.1.1 Refer to the site information for details of existing site information including services plans, asbestos records, existing topographical surveys, record drawings, etc.

3 CONSTRAINTS ON HOW THE CONSULTANT PROVIDES THE SERVICES

3.1 General

3.1.1 The *Consultant* Provides the Services in such manner as to minimise the risk of damage or disturbance to or destruction of third party property.

3.1.2 The *Consultant* complies with the constraints and meets with the requirements outlined in Appendix 1 and the drawings included in the tender package.

3.1.3 The *Consultant* submits information detailing how the *Consultant* will provide the Services to the *Client* prior to the services commencing. This information will include any lifting plans, risk assessments, method statements, the *Consultant's* staff training information and any other relevant Health and Safety requirements.

3.2 Working hours & site specific constraints

3.2.1 Any required lane closures shall be deemed as taking place during night-time hours. Other works shall be deemed to take place during daylight hours.

3.2.2 The Traffic management is to be off peak lane closures. Night time working windows shall be assumed as Monday to Friday between the hours of 23:00hrs and 05:00 hrs (but will be subject to actual traffic conditions).

3.2.3 Bats have been recorded roosting in the viaduct. These include the Lesser Horseshoe Bat (Rhinolophus Hipposideros). This is a major colony with upwards of 100 bats observed. It is anticipated that services will adopt a precautionary approach, be restricted to avoid maternal and hibernating seasons and specific working hours with the following constraints:

(1) All bat access points will be retained and works are limited to temporary disturbance only.

(2) Refer to the Site Information for other bat mitigation measures that are typically required on this site.

3.2.4 Pipes associated with the structures are predominantly asbestos cement pipes. These pipes are not to be interfered with as part of these works. The *Consultant* will be provided with all asbestos information prior to the *Start Date.*

3.3 Health, Safety and Environment & Risk Management

<u>Health and Safety requirements</u>

3.3.1 In Providing the Services the *Consultant* meets the requirements of Annex 2 of the supplementary constraints in relation to health and safety duties.

3.3.2 When implemented, the *Consultant* shall comply with the requirements of Highways England's safety passport scheme and ensure that all employees, and any of his subcontractor's, are registered in accordance with the implementation of the scheme. Details on the scheme can be found here: http://www.highwayssafetyhub.com/safety-passport.html

3.3.3 For details of the CDM duty holders, refer below:

Client – Highways England

Principal Contractor – To be appointed by the *Client.* It is anticipated that Traffic Management will be provided by the Principal Contractor.

Consultant - *Consultant*

Principal Designer – Highways England (*Client)*

Before commencing the construction phase of the services, the *Consultant* shall confirm to the *Client* that adequate welfare facilities are in place. Where the facilities detailed in section 5 are not deemed adequate, the *Consultant* provides all necessary facilities to Provide the Services and to comply with the minimum requirements set out in HSE guidance document L153*.*

Environmental requirements

3.3.4 In Providing the Services the Consultant meets the requirements of Annex 2 of the supplementary constraints in relation to environmental duties.

Risk Management

3.3.5 The *Consultant* identifies, manages and mitigates risks in accordance with the principles of ISO 31000.

3.3.6 The *Consultant* submits a risk register, which captures all risks associated with the delivery of the *services* including those identified by the *Client*, with their tender and maintains it for the contract period.

4 REQUIREMENTS FOR THE PROGRAMME

4.1.1 The Consultant submits programme to the Client with his tender.

4.1.2 The *Consultant* Provides the Services taking into account the following programme constraints:

(i) The starting date and completion date and any post site works, reporting and review period

(ii) The services and other things provided by the Client (see Section 5)

4.1.3 The programme should be in the form of an activity and time related bar chart, produced as a result of a critical path analysis.

4.1.4 The programme should preferable be provided in either a PDF or MS Excel format and cover the full contract period including post site activities. Activities should be clearly defined and named and the programme should detail the following:

(i) Dates and times associated with the project, including the starting date, completion date & Consultant's planned completion, and any other dates or times that will specifically impact the delivery of the project

(ii) Activities associated with delivering the project

4.1.5 The Consultant should provide details of the proposed resources (plant, labour, subcontractors etc.) expected to deliver each activity. This information can either be shown on the programme itself or provided in an associated resource statement included in the Proposal for Providing the Services.

4.1.6 The Consultant submits an updated programme to the Client upon request.

5 SERVICES AND OTHER THINGS PROVIDED BY THE CLIENT

5.1.1 The following temporary traffic management will be provided by the *Client* to allow the *Consultant* to Provide the Services:

(i) Where traffic management is needed, it will be in the form of night-time lane closures. Full details will be finalised during mobilisation with the successful contractor.

(ii) Welfare facilities will be provided by the Principal Contractor.

6 SPECIFICATION FOR THE SERVICES

The *Consultant* shall undertake the works in accordance with:

6.1.1 The local grid referencing system used should be in line with Interim Advice Note IAN 99/07;

6.1.2 The RICS Professional Guidance on Measured Surveys of Land, building and utilities should be adhered to;

6.1.3 The survey should be in line with the Highways England Smart Motorway Survey Guide Annex F1.02;

6.1.4 GG 184 – Specification for the use of Computer Aided Design should be adhered to

6.1.5 All survey works should be carried out by experienced and competent surveyors;

6.1.6 The data should be exported and processed by experienced and competent technicians.