St.Helens Council

KP-STH01

Various Sites – St Helens Area

TOPO GRAPHICAL AND GROUND PENETRATING RADAR SURVEY BRIEF

1.0 General

The survey is to be undertaken in accordance with the Department for Transport Standards for Highways Design Manual for Roads and Bridges Standard GS952 'Requirements for Topographical Surveys' and this specification. Where the requirements of this specification differ from the Department for Transport Standard, this specification shall apply.

2.0 Purpose and Scope

2.1 Locations:

Location	Topographical Survey	GPR Survey
Washway Lane/A571 Haresfinch View Roundabout	✓	
Muncaster Drive	✓	✓
Ormskirk Road	✓	
Parr Street Roundabout	✓	
Island Brow Canal Footpath	✓	

Please refer to Appendix H for locations of surveys to be undertaken.

2.2 Aim of the Project for which the Survey is required

The project is for highway improvement schemes.

2.3 Aim of the Survey

To carry out a Topographical Survey and Ground Penetrating Radar surveys of the areas shown on the Drawings to include the following:

Establish, locating and survey a framework of Permanent Ground Markers.
Prepare Digital String Ground Models as detailed in the specification chapters 7 and 13.
Prepare plans at 1:200 scale @ A1, without contours.

Establish, locating and survey existing underground apparatus with the survey extents. Detail survey type, depth and position. Prepare plans at 1:200 scale @ A1 separate to the topographical survey. Please refer to

CAD and PDF files to be supplied for both surveys

2.4 Brief Description of Survey Area

Survey area:

Various conditions of road – survey company to familiarise themselves with the locations detailed in 2.1 an Appendix H.

2.5 Use of the Survey Information

The survey information will be used for the following purposes:

Base plans for the detailed design of highway maintenance and improvement schemes.
Preparation of contract drawings.
Triangulation, contouring and volumetric analysis.

4.0 Project Information

4.1 Client

Kevin Pennington
Principal Engineer – Highways & Infrastructure
St Helens Council
Town Hall
Corporation Street
St Helens
WA10 1HP
kevinpennington@sthelens.gov.uk

Design Organisation: as Client

4.2 Survey Advisor: not applicable

4.3 Existing mapping: not applicable

4.4 Existing aerial photographs: not applicable

4.5 Landowners and Occupiers

4.5.1 The survey area is on public highway and land accessible to the public.

4.6 Access

Details of special access requirements in survey area – See Appendix D.

4.7 Restrictions

Details of restrictions to the survey programme – See Appendix D.

4.8 Contacts

See Appendix F.

4.9 Traffic Safety and Management

Details of requirements for traffic safety and management – See Appendix C.

4.10 Services

The survey is not expected to affect any public or private services or supplies. Any specific information is given in Appendix G.

4.11 Contract Drawings

Schedule of Contract Drawings – See Appendix H.

5.0 Project Control

5.2.4 Survey Grid

The planimetric control shall be related to an arbitrary plane rectangular local grid with the same orientation as Ordnance Survey National Grid. The relationship to the National Grid shall be stated in the control report. All coordinates shall be positive. Units of measurement shall be metres.

5.2.5 Spatial Accuracy Criteria

GS952 Table 4.3 Band C.

5.2.6 Schedule of Permanent Survey Control Stations

Hilti nails or equivalent suitably sited are acceptable.

A schedule shall be prepared giving the following information:

- Station designation;
- Plan co-ordinates;
- Level value; and
- Location plan.

5.3 Vertical Control

5.3.4 All levels shall be related to Ordnance Datum at Newlyn, Cornwall.

7.0 New Mapping

7.1.1 A survey shall be performed to produce new mapping at 1:200 scale.

7.2 Features/Detail to be Surveyed

As GS952, and more specifically as follows.

a. Pavements, kerbs, channels and centre line of roads to be surveyed at 5m intervals between cross-sections. Where the road surface is uneven or has a “summit and valley” profile, intermediate points shall be surveyed to give an accurate representation.
b. Carriageway quarter point crowns to be surveyed where the crossfall between centreline and channel is not uniform in order to represent the highway cross section accurately
c. Channel and crown lines at junctions to be surveyed at a general interval of 5m, including the projection of channel lines across the mouth of the junction.
d. Top of kerbs, locations of dropped kerbs and footway crossings, areas of tactile paving.
e. Base of boundary walls, face of hedges and fences to properties fronting the road at 5m general interval, including positions and levels of gateways on the highway boundary.
f. All gullies, manhole covers and other surface ironwork shall be surveyed, including levels, and identified. Actual size and orientation of manhole covers greater than 0.1 sq. m in area to be surveyed.
g. Communications cabinets and mobile phone masts shall be surveyed at actual size and identified.
h. Spot levels at 10m interval where not otherwise covered by the above.

7.3 Accuracy

7.3.1 The planimetric coordinates of directly surveyed points shall be correct to ± 5mm rmse on carriageways and hard surfaces, and ± 10mm rmse on other surfaces, when checked from the nearest control point.
7.3.2 The levels of directly surveyed points shall be correct to within ±5mm rmse on carriageways and hard surfaces, and to within ±25mm rmse on other surfaces (except on ploughed or otherwise broken surfaces), when checked from the nearest control point.

7.4 Definition

7.4.1 The spacing of points on planimetric features shall be such that interpolated points are correct to within ±50mm on hard or well-defined surfaces, and to within ±100mm on other features.
7.4.3 The spacing of levels shall be such that interpolated points shall not deviate from the true ground surface by more than ±15mm on hard or well-defined surfaces, and to within ±50mm on other features.

12.0 Presentation of Drawings

12.1 Final drawings shall be produced entirely from the digital data file.

12.2 Final drawings shall be drawn at a nominal scale (for plotting) of 1:500 on A1 size sheets.

12.3 The grid shall be shown at 100m intervals by symmetrical crosses at grid intersections with ticks at the sheet edges. The grid values shall be shown at the sheet edges.

13.0 Presentation of Digital Data

The data shall be compatible with AutoCAD 2021, KeyTerra-Firma 8.21.

Level information shall be supplied both as 3-D model data and also as annotation on a separate drawing layer.

General Requirements

Continuous features shall be represented by continuous strings, such that a single string represents a continuous length of kerb, channel etc. Strings shall generally follow the same general direction, either West to East or South to North unless specified otherwise. Sufficient points shall be surveyed to enable the feature to be adequately represented in a three-dimensional ground model. On curved features, the number of observations shall be increased to achieve the definition stated in Clause 7.4. The use of curve fitting routines to generate large numbers of additional points at close intervals to represent curved features is not acceptable. Where features join, the surveyed data shall be checked for overshoots or undershoots, and the levels at the junction shall be rationalised.

Requirements for KeyTERRA-FIRMA Survey Data within AutoCAD

1. FORMAT
AutoCAD 2021 drawing file (.dwg) saved in Model Space with World UCS, that is to say on "real world" local or national grid with North "up the screen".

2. LAYERS
Different features shall be grouped on different AutoCAD layers to represent the following. Layer names shall relate to the types of features on each layer.

- Buildings;
- Carriageway edge;
- Centre lines, crown lines and other carriageway detail;
- Kerb tops;
- Dropped crossings;
- Footways;
- Verges;

- Fences;
- Walls;
- Street furniture, drainage channels, manholes etc;
- Hedges, trees, vegetation;
- Ditches;
- Spot levels;
- Text;
- Overhead lines;
- Survey stations;
- Survey grid;
- Other data.

Point features such as lamp columns, gullies, bollards etc. shall be represented by suitably annotated blocks.

3. 2D and 3D

The distinction between 2D and 3D data is most important. Both a 2D traditional detail drawing and 3D drawing with only 3D Polylines plus spot levels are required.

2D

2D drawing will have the traditional presentation within a drawing frame for plotting purposes, with all detail shown including hedges etc. All linear survey features should be represented as 2D polylines and NOT lines or arcs. The 2D polylines may have a Fit Curve applied by the "PEDIT" command (but NOT by the generation of additional vertices into the polyline). It will help to organise spot levels (on a field or car park for example) to be on a different layer to levels associated with manholes and feature strings etc. Levels are to be annotated at vertices on feature strings and spot levels.

3D

3D feature drawings are to include only 3D polylines to represent all linear survey features plus spot levels (PL blocks). Spot (or grid) levels may alternatively be represented as AutoCAD point entities (nodes) as KeyTERRA-FIRMA can create Ground Models from these and globally convert them to spot level blocks. Road Centrelines, tops of kerbs (surveyed as the back of kerb offset back from the channel by at least 100 mm) and changes in slope direction "in the field" should all be represented as 3D polylines on appropriate layers. 3D polylines must NOT be curve fitted - curved features should be directly surveyed at intervals to accurately represent the "feature" as required by Clause 7.4. Interpolated points generated by curve-fitting routines are not acceptable.

Model creation will respect 3D polylines as breaklines and report any crossing conditions - these should not exist in well-organised 3D data. Levels at crossing points should be verified as the same Similarly All vertices and spot levels should have "good" level values. If this is not possible a value of -999.000 will set this as a null level and will be ignored for model building.

4. SCALE and UNITS

The scale must always be 1:1 with units in metres expressed to 3 decimal places. Angular orientation should be in degrees, minutes and seconds with 0 degrees North "up the screen" (i.e. Whole Circle Bearings) and clockwise rotation.

14.0 Products to be Delivered

14.1 Drawings
Plotted drawings are not required. CAD and PDF Files are required

14.2 Digital Data
AutoCAD release 2018 drawing files shall be supplied in the following forms:

- 2-dimensional drawing for plotting at a nominal scale of 1:500 (or 1:200 as appropriate to the intensity of information recorded) showing all detail and annotation including levels;
- 3-dimensional drawing containing ground model data, saved in model space (see KeyTerraFirma specification).

14.2.1 Data shall be supplied by email.

14.3 Survey Station and Control Report.

APPENDIX C REQUIREMENTS FOR TRAFFIC SAFETY & MANAGEMENT

Traffic Safety and Control (Traffic Safety) Measures

"When surveying work is being carried out on or close to an existing highway, the Contractor shall display suitable warning signs in accordance with Chapter 8 of the Traffic Signs Manual."

"Where work is carried out on or adjacent to a highway open to vehicles the Contractor shall ensure that the work force and site supervisory staff at all times wear high visibility warning clothing as specified in BS EN 471 : 1994."

Road name and reference number	Special requirements	Required by
All Locations (Topo)	It is assumed that all surveys can be carried out from the safety of a public footway/footpath. If the surveying company requires Traffic/Pedestrian management, they are to clearly note this within their tender return.	
Muncaster Drive (GPR)	It is envisaged that the survey company can carry out the GPR survey without the requirement for Traffic/Pedestrian management. If the surveying company requires Traffic/Pedestrian management, they are to clearly note this within their tender return. **NO SPRAY PAINT TO BE USED FOR THIS SURVEY.**	
All Routes	All routes must remain open to the public including footways and carriageways to carry out the works, unless the survey company specifically has any special requirements.	

APPENDIX D ACCESS REQUIREMENTS

Plot Name	Details of access requirements
N/A	N/A

APPENDIX F SCHEDULE OF CONTACTS

Organisation	Address, telephone and fax numbers	Name and position or rank of individual contacts
St Helens Council	Town Hall, Corporation Street, St Helens, WA10 1HP	Kevin Pennington Principal Project Manager
Police	College St, Saint Helens WA10 1TG Tel. 0151 709 6010	Traffic Section

APPENDIX G SCHEDULE OF EXISTING INFORMATION ON UNDERGROUND SERVICES

Service	Authority and Address	Drawing numbers and remarks

The work is not expected to affect underground or overhead services. A copy of the statutory undertakers plans will be given to the successful contractor

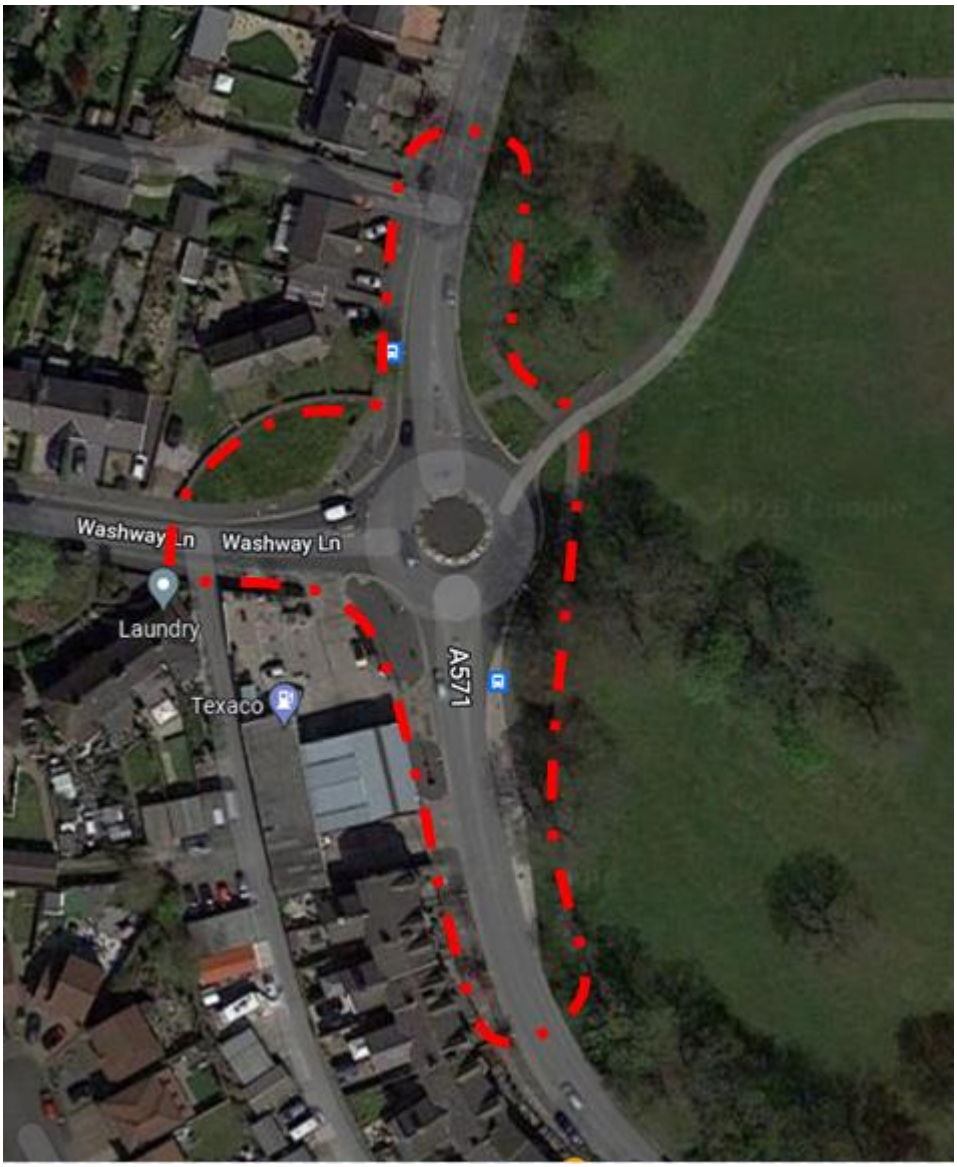
Notes
Information obtained from records should be treated with caution and further investigation is advised. In the absence of evidence to the contrary the routes of confirmed connections between manholes are assumed to be direct.

Underground services plotted from existing records are clearly identified on the plan.

APPENDIX H SCHEDULE OF SURVEY AREAS

Location	Topographical Survey	GPR Survey
Washway Lane/A571 Haresfinch View Roundabout	✓	
Muncaster Drive	✓	✓
Ormskirk Road	✓	
Parr Street Roundabout	✓	
Island Brow Canal Footpath	✓	

Washway Lane/Scafell Road
(Nearest address: 63 Haresfinch View, Saint Helens WA11 9LQ)



Muncaster Drive (including Old Hall Gardens)
(Address Muncaster Drive near to 37 Higher Ln, Rainford, Saint Helens WA11 8NT)

Including the area as shown below at the junction of Muncaster Drive/Higher Ln:

B5203 Ormskirk Road
(address: 190 Ormskirk Rd, Rainford, Saint Helens WA11 8SW)

Limits:
To 90m into Dairy Farm Road
To South-easy side of the MOT Garage
Junction to channel line of A570 Rainford Bypass

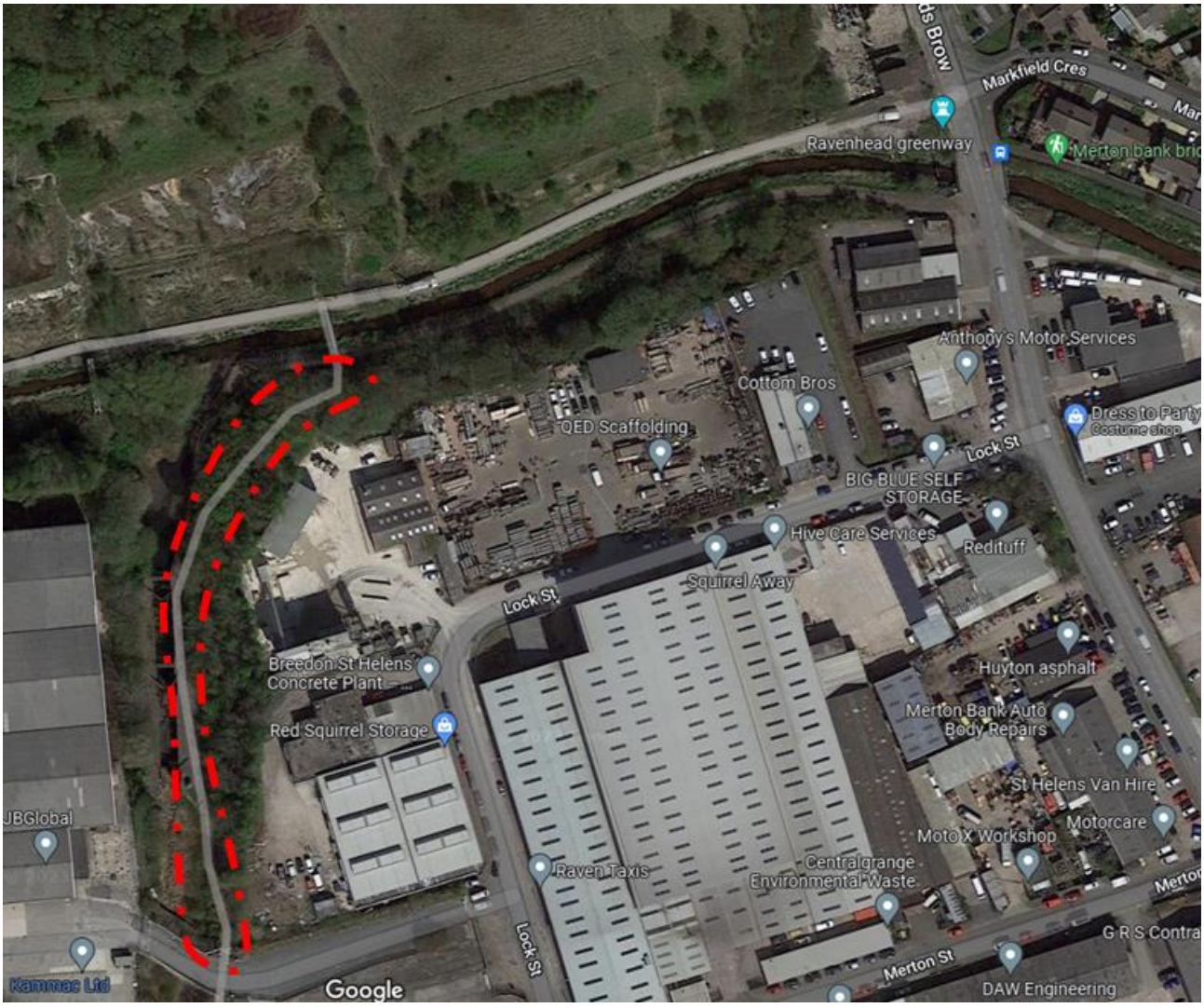
From hedge line to hedge line route to be surveyed.

Parr Street Roundabout

(Address: 34 Parr St, Saint Helens WA9 1JZ)

Island Brow Canal Footpath

Access via footway on south side of canal adjacent to Markfield Cres off Merton Bank Rd, St Helens, Saint Helens WA9 1HP



Currently the foopath is closed off adjacent to the footbridge but the area can be accessed via circumnavigating the fence as shown below. Please be aware that certain areas of the route maybe slippy but is accessible and also there are high drops adajecent to the canal.

APPENDIX I – GROUND PENETRATING RADAR SURVEY

Ground Penetrating Radar Survey Details

Undertaking a Ground Penetrating Radar survey in accordance with PAS128 at the proposed site extents as detailed within drawing *H22-014-100-001 - Survey Extents*.

Due to the nature of the site, the Contractor will be on and adjacent to a highway and live traffic. The Contractor must carry out their own risk assessment for the site and provide a detailed Risk Assessment and Method Statements for undertaking the survey before commencing work. The Contractor will be responsible for any traffic management which they deem necessary during the survey works.

The survey is required to be to quality Level B QL-B1P, deliverables to be provided in Autocad 2D and 3D (2013 version). The surveys will locate, trace and map all underground and overhead utilities on the site area shown on the plan below and drawing number T17-022-GPR-01 included. As part of the survey the Contractor is required to lift manholes and inspection chambers to obtain invert levels / duct depths for all utilities as part of their scope of works and illustrate details within the drawings provided. The Contractor is to provide photographs of duct networks at manholes/chambers.

The routes will be clearly laid onto topographic drawings as separate layers in AutoCAD format. Drawings are to be provided in electronic format (AutoCAD and pdf).

Surveys should be related to the OS grid and level datum.

The equipment and techniques utilised shall be suitable for the ground conditions in question and will employ electromagnetic and ground penetrating radar as appropriate.

On return of the quotation can you please indicate availability informing when the survey can be undertaken and the likely return of the finalised survey drawings following this; speed of issuing the survey information will be taken into account when assessing tenders.