Maintenance & Inspections Strategy:

Intelligent Transport Systems (ITS)

February 2021

Essex County Council

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Contents

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1.1 Introduction

The Essex County Council (ECC) Intelligent Transport Systems (ITS) Maintenance & Inspections Strategy has been fundamentally reviewed with maintenance engineers, inspectors and other practitioners to take account of the recommendations and best practice set out in the October 2016 “Well-managed Highway Infrastructure: A Code of Practice”.

The Code of Practice is designed to promote the adoption of an integrated asset management approach to highway infrastructure based on the establishment of local levels of service through risk-based assessment.

This document supports the overarching ECC Highways Maintenance Policy and describes the service levels relating to the Council’s risk-based approach to managing how it organises, inspects and maintains the ITS assets that it is responsible for. The document will also set out the service levels and details of its risk based approach.

Alongside this strategy will be supporting documents that detail the processes & procedures to be operated.

This strategy covers the following key areas:

- ITS Assets
- Inspections
- Items for Inspection
- Defect Investigatory levels
- Defect Assessments
- Response times

1.2 ITS Network

Essex manages the following ITS equipment, where ITS equipment refers to any electronic system which controls, monitors traffic or provides information to drivers, numbers are approximate as of July 2019:-

- 220 Traffic signal junction installations
- 280 Pelican, Puffin, Pegasus, Toucan, Equestrian and PedEx crossings
- 4 Emergency Vehicle Wig Wag installations
- An Overheight vehicle detection secret sign system
- 80 Variable message signs (VMS)
- 27 Vehicle Actuated Signs (VAS) and associated equipment
- 400 School crossing flashing warning signs
- 32 Car park count systems

- Associated communication equipment (e.g. Remote Monitoring and UTC data transmission units – OMUs and OTUs).
- 48 CCTV Cameras
- Any other future ITS equipment as may be requested by the Contractor

1.2.1 ITS Asset Management System

ECC uses a dedicated asset management system for its ITS operations called Transportation Maintenance Management System (TRAMMS). Only ECC owned ITS assets are recorded on TRAMMS.

TRAMMS is regularly reviewed to ensure the data is kept current and accurate. The ITS team will ensure that details of any assets adopted by ECC are recorded on TRAMMS. This is essential to ensure that management of the maintenance process meets legal obligations.

TRAMMS also holds data that includes dated records of faults and repairs carried out including both periodic inspections and non-routine maintenance. Additionally, as faults are recorded they are sent direct to the Contractor.

1.3 ITS Inspections

1.3.1 General Principles

ECC shall carry out annual inspections using trained personnel in the manner deemed appropriate for the particular inspection type. The safety of personnel and the public will always be of paramount consideration when undertaking the inspection.

ITS covers a wide array of assets that require different management approaches and have individual inspection needs. These requirements will be set out in this document.

ITS assets are to be annually inspected. Inspections are to include both electrical testing and a detailed inspection of the asset.

Inspections fall into the following types:

- Electrical Inspection and Testing
- Visual inspection and Testing

In addition to the inspections listed above, traffic signal assets are also visually inspected for obvious signs of damage and condition as part of the routine safety inspections carried out by Highway Inspectors in accordance with the “Maintenance and Inspections Strategy: Carriageways, Footways & Cycleways”. The frequency of these inspections depend on the hierarchy and type of network on which the asset is situated and are inspected twice during growing season.

The growing season is to be considered is April – September. The first inspection is to take place in either April, May or June with the second inspection following on three months subsequent to the first.

Defects to be picked up by the highways inspectors include obvious signs of damage, signal head misalignment and vegetation obstructing traffic signals. These must be

raised by the inspector as a highway defect to the carriageways Asset Management System (AMS), Confirm. Obvious signs of damage and signal head misalignment defects must be phoned through to the ITS team to record and to take appropriate action as necessary. Any defects regarding foliage obstructing signal heads or missing/damaged chamber covers will be recorded on the AMS for the cyclical engineer/s to action.

Examples of obvious signs of damage include;

- Push button vandalism or not working
- Leaning poles
- Rusty/corroded poles

In the event of conditions that affect business continuity for example, severe weather events, the inspections may be suspended and re-programmed at the decision of the Inspections Manager/Specialist Design Manager as appropriate.

1.3.2 Inspection Frequency

The inspection frequency (table below) is aligned to various inspection requirements affecting ITS assets.

Resource	Inspection Type	Sub Feature	Frequency
ITS Maintenance Contractors	Electrical Inspection and Testing	48V (ELV) installation	6 Monthly or Annual for controller Annual for controller only and 5 Yearly for poles
		230V (LV) installation	
	Detailed Visual Inspection & Testing	All sites	6 Monthly or Annual – in accordance with manufacturers guidance
Highways Inspectors	Visual Inspection	Visual Inspection by Highways Inspector	As per functional route hierarchy and twice during growing season

The inspection of all school crossing flashing warning sign equipment, as carried out by the ITS maintenance contractors, shall be undertaken in the school summer holiday period each year to coincide with the programming of the operational timetable for the coming school year.

1.3.2.1 Electrical Dangerous Situations

During the course of electrical testing, if a situation is observed where immediate public danger is apparent then that hazard must be eliminated or guarded. That danger must also be immediately reported to the Distribution Network Operator (DNO) as appropriate.

1.3.2.2 Electrical testing requirements

All equipment shall be electrically tested in accordance with the appropriate clauses of the latest version of all relevant codes/standards.

1.3.2.3 Electrical Defects

While testing, any electrical defects found during the testing programme shall either be resolved at the time of the test where reasonably practicable or reported to the DNO.

1.3.3 Periodic Inspections

Periodic inspections will be carried out on all ITS assets to ensure that they are operating safely and efficiently. The periodic inspection will entail an overhaul, check, and functional test of the ITS equipment.

Periodic inspections are to be undertaken annually on all ITS assets with the exception of any Specialist VAS assets which are to be routinely inspected every 6 months.

Periodic Inspections are comprehensive inspections that include; electrical testing and a detailed visual inspection (DVI) of all components.

Any items deemed to have failed as a consequence of fair wear and tear will be repaired or replaced. Preventative maintenance is to be carried out where necessary including the adjustment and/or cleaning of components to obtain correct operation in accordance with the specification of the equipment.

Within 7 Days of each annual inspection, a detailed written report on all of the applicable inspection items shall be prepared and uploaded onto TRAMMS.

1.4 Defects

1.4.1 Defect Monitoring

ECC monitor the operation of ITS equipment via various electronic remote monitoring systems. Each system will detect key faults with the ITS equipment and, dependent on which system is connected to the on-street equipment, will report these to the operator via the appropriate communications means (e.g. broadband, GPRS/3G/4G mobile or dial-up GSM/PSTN).

Types of faults monitored include:-

Equipment	Reported Defects	Investigatory Level
Traffic Signals	Signals All Out	Defect present
	Signals Stuck	Defect present
	Lamp Fault	Defect present
	Detector Fault (Vehicle and Pedestrian)	Defect present
	Data Transmission Fault	Defect present

Equipment	Reported Defects	Investigatory Level
Driver / Car Park VMS	Power Failure	Defect present
	Sign Failure (No Display or Incorrect Display)	Defect present
	Dim/Bright Illumination Fault	Defect present
	Data Transmission Fault	Defect present
Car Park Count Equipment	Over/Under Count	Defect present
	Data Transmission Fault	Defect present

(Note: The above list of faults is not exhaustive but gives an indication of the most common faults reported via the ITS remote monitoring equipment).

As well as defects reported via the electronic remote monitoring systems, ECC also receive notification of possible ITS equipment faults from:-

- Highways Inspectors
- Highways Out of Hours Service
- Members of the Public
- Local Councillors
- Defects recorded during Periodic Inspections by the ITS Maintenance Contractor

1.4.2 Fault Categories

The categories for faults reported to the Centre shall be as follows. All categories refer to an urgency to respond. The response times associated with each category will be specified within this document.

Asset sub-group	Fault Category	Defects
Traffic Signals	Emergency Fault	Which shall comprise:- • Damaged or unsafe ITS equipment.
	Urgent Fault	Which shall comprise:- • All traffic signals unlit. • Traffic signals stuck on any phase. • Traffic signals omitting any phase.

Asset sub-group	Fault Category	Defects
		• Prohibited or non-prescribed traffic signal stage change. • Any defects, which in the opinion of the Contractor are causing serious delays to traffic. (e.g. permanent pedestrian demand). • Any red lamp failure on a traffic signal installation. • Any unidentified traffic signal lamp fault reported vial the Urban Traffic Control (UTC) system or Remote Monitoring System (RMS). • Failure to provide traffic signal safety timings such as intergreens, minimum greens or phase delays. • Loss of Split Cycle Offset Optimisation Technique (SCOOT) or Microprocessor Optimised Vehicle Actuation (MOVA) adaptive traffic signal control on a site (e.g. due to a communications or hardware failure). • Audible or tactile pedestrian indicators inoperative.

Asset sub-group	Fault Category	Defects
		• Failure of School Crossing Warning Lights during School term time. • Any repeat fault last reported within seven days, irrespective of original fault category
	Non-Urgent Fault	Which shall comprise:- • All other faults (excluding chargeable works)
Overheight vehicle detection	Urgent Fault	Which shall comprise:- • Failure of any one or more Secret Sign or OHD
	Non-Urgent Fault	Which shall comprise:- • All other faults
Specialist VAS	All faults	All faults
CCTV	Urgent	Which shall comprise:- • Any fault occurring through fair wear and tear or defects in manufacture or maintenance
	Non-Urgent Fault	Which shall comprise:- • All other faults

1.4.3 Response Times

1.4.3.1 Response Times

Asset sub-group	Fault Category	Response	Response time
Traffic Signals	Emergency Fault	Attend/Make Safe	2hrs
	Urgent Fault	Full Repair	4hrs
	Non-Urgent Fault	Full Repair	8hrs*
	Chargeable Repairs	Full Repair	2 days**
Overheight Vehicle Detection	Urgent Fault	Full Repair	Next working day
	Non-Urgent Fault	Full Repair	Within two working days
Specialist VAS	All Faults	Attend	Next contract day

Asset sub-group	Fault Category	Response	Response time
CCTV	Urgent Fault	Full Repair	By 1800 next working day
	Non-Urgent Fault	Attend	Attendance by 1800 next working day. Confirmation of repair costs and lead time within five working days

* The full repair time for Non-Urgent faults shall only be measured between the hours of 08:00 to 18:00hrs every day

** The full repair time for Chargeable Repairs shall commence from the time that the Subcontractor receives all requisite health and safety information, permit and statutory undertakers' underground plant information to enable the works to proceed or at any other ti,e thereafter if agreed with ECC.

1.4.3.2 Contract Hours

Due to the varied and specialist nature of ITS assets, they are maintained and inspected by specialist sub-contractors. These specialist sub-contractors manage different ITS assets and have specific agreed contract hours to enable the defect response delivery tabled.

Asset / Asset group	Contract Hours
Traffic Monitoring CCTV System and Overheight Vehicle Detection	0800 – 1800, Mon-Fri excluding public holidays
Specialist VAS Maintenance	0800 – 1800, Mon-Fri
Traffic Signals and Remaining Assets	24-hours per day, every day

1.4.4 Recording of inspections and defects

All periodic inspections are to be electronically recorded within TRAMMS with the following information.

- Items inspected
- Date and time of inspection
- Identity of the lead inspector
- Type of inspection
- Notes of any issues or concerns noted by the inspector.

The fault record shall include -

- Time/date of fault report
- Origin of report
- Details of fault

- Category of fault
- Time of attendance on site
- Time work was completed
- Details of work carried out
- Details of further work required (including photographs of damage)
- Identity of maintenance technician

1.5 Routine Maintenance

There shall be an annual cleaning regime for all traffic signals and school flashing warning signs.

All signal aspects are to be annually cleaned and any high intensity lamps are to be proactively replaced.

Furthermore any repairable defects found during an inspection shall be rectified immediately. If the defect cannot be repaired at the time of inspection it shall be fixed within the terms of the appropriate equipment maintenance contract.

1.6 Performance Management

The number of ITS defects are managed via a Key Performance Indicator.

1.7 Key roles and Competencies

1.7.1 Maintenance Contractors

There are external maintenance contractors whose main function is undertaking routine maintenance and reactive ad hoc inspections in accordance with this Strategy. All members of the team are required to have received appropriate training for any tasks undertaken to ensure they meet the minimum standards for their role and specific task.

In addition, all site staff, supervisors, managers and as appropriate sub-contractors undertaking electrical inspections and testing shall be correctly registered to the relevant professional qualification body.

Furthermore all maintenance contractors shall complete risk assessments and method statements appropriate to the maintenance works being undertaken. These are to be submitted to the Specialist Design Manager as appropriate for formal approval prior to commencement of works.

1.7.2 Highways Inspectors

There is a dedicated team whose function is to undertake Visual Inspections in accordance with this Strategy. All members of the team will be assessed against a Highway Inspections Competency Framework to ensure they meet the minimum standards for their role.

The Competency Framework will set out the expected knowledge level against the relevant tasks or requirements for each role in the team.

This information is issued by:
Highways & Transportation

Contact us:
essexhighways.org
0345 603 7631

Highways & Transportation
Essex County Council
County Hall, Chelmsford
Essex, CM1 1QH.

Essex_CC
essexcountycouncil

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