

Maintenance & Inspections Strategy:

# Carriageways, Footways & Cycleways

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# Maintenance & Inspections Strategy: Carriageway, Footway and Cycleway

# 1.1. Introduction

The Essex County Council Highways Carriageway, Footway and Cycleway 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 Essex County Council Highways Maintenance Policy sets out and describes the service levels relating to our risk-based approach to managing how it organises, inspects and maintains the Carriageway, Footway and Cycleway Network it is responsible for.

Alongside this strategy will be supporting documents that sets down the process & procedures to be operated.

This strategy covers the following key areas:

- Network Hierarchies
- Inspections
- Defect Investigatory levels
- Items for Inspection
- Defect Assessments
- Response times

# 1.2. Network Hierarchies

#### 1.2.1. Carriageway Hierarchy

The functional route hierarchy (County Road Network) placed the roads under the responsibility of Essex County Council Highways into three hierarchies:

- Primary Route 1(PR1)
- Primary Route 2 (PR2)
- Local Roads

These routes created a network that better reflected the asset usage in Essex compared to the national classifications, that enables the Council prioritisation of maintenance and network decisions with greater accuracy ensuring a better flow for commerce, goods and people.

Overleaf is a table outlining the national carriageway classification types and how they transpose into the County Road Network hierarchies

County/Local Route	County/Local Hierarchy	Category	Hierarchy Description	Type of Road General description	Description			
						Motorway	Limited access motorway regulations apply	Routes for fast moving long distance traffic. Fully grade separated and restrictions on use. These are not maintained by Essex County Council.
County Route		1	Radial Feeders	Final journey route into or out of town centres	These routes feed traffic to and from the interurban routes (to their final destination) and carry large volumes of traffic during the peak hours when people are trying to access/leave town centres. They will normally be developed areas in towns and village centres. It is essential that traffic on these routes remains free flowing, that they are maintained to the highest standards, and that unnecessary obstructions are removed promptly. They will normally have car park guidance systems and traffic signals to aid the flow of traffic and manage areas of conflict between the different modes and hierarchies. Therefore it will be necessary to check and, if required, adjust the systems regularly.			
		2	2	Strategic Route	Trunk and some Principal 'A' roads between primary destinations.	Routes for fast moving long distance traffic with little frontage access or pedestrian traffic. Speed limits are usually in excess of 40 mph and there are few junctions. Pedestrian crossings are either segregated or controlled and parked vehicles are generally prohibited.		
		3a	Main Distributor	Major Urban Network and Inter-Primary Links. Short – medium distance traffic.	Routes between Strategic Routes and linking urban centres to the strategic network with limited frontage access. In urban areas speed limits are usually 40 mph or less, parking is restricted at peak times and there are positive measures for pedestrian safety.			

		3b	Secondary Distributor	Classified Road (B and C class) and unclassified urban bus routes carrying local traffic with frontage access and frequent junctions.	In rural areas these roads link the larger villages and HGV generators to the Strategic and Main Distributor Network. In built up areas these roads have 30 mph speed limits and very high levels of pedestrian activity with some crossing facilities including zebra crossings. On-street parking is generally unrestricted except for safety reasons.
		2	Strategic Route	Trunk and some Principal 'A' roads between primary destinations	Routes for fast moving long distance traffic with little frontage access or pedestrian traffic.  Speed limits are usually in excess of 40 mph and there are few junctions. Pedestrian crossings are either segregated or controlled and parked vehicles are generally prohibited.
A	PR2 - The remaining County Routes as defined in the LSA.  Although not as important as the Priority 1 routes, the Priority 2 routes still perform an essential traffic management distributary function between the local network and Priority One County Routes. They will be accessed by a number of different types of user including local buses. Therefore, motorised vehicular traffic will generally take precedence over the other modes on these routes.	3a	Main Distributor	Major Urban Network and Inter-Primary Links. Short – medium distance traffic	Routes between Strategic Routes and linking urban centres to the strategic network with limited frontage access. In urban areas speed limits are usually 40 mph or less, parking is restricted at peak times and there are positive measures for pedestrian safety.
		3b	Secondary Distributor	Classified Road (B and C class) and unclassified urban bus routes carrying local traffic with frontage access and frequent junctions.	In rural areas these roads link the larger villages and HGV generators to the Strategic and Main Distributor Network. In built up areas these roads have 30 mph speed limits and very high levels of pedestrian activity with some crossing facilities including zebra crossings. On-street parking is generally unrestricted except for safety reasons.
		4a	Link Road	Roads linking between the Main and Secondary Distributor Network with frontage access and frequent junctions.	In rural areas these roads link the smaller villages to the distributor roads. They are of varying width and not always capable of carrying two way traffic. In urban areas they are residential or industrial inter-connecting roads with 30mph speed limits, random pedestrian movements and uncontrolled parking.

	Local Roads - Local roads will comprise all roads not defined as County Routes. These roads will be diverse in nature and use but will fall into one of the following descriptions:  Urban – normally residential roads. These roads will be in towns	4a	Link Road	Roads linking between the Main and Secondary Distributor Network with frontage access and frequent junctions.	In rural areas these roads link the smaller villages to the distributor roads. They are of varying width and not always capable of carrying two way traffic. In urban areas they are residential or industrial inter-connecting roads with 30mph speed limits, random pedestrian movements and uncontrolled parking.
Local Route	and some residentially developed parts of villages. Their functional use is similar. i.e. mixed priority use, carrying local traffic only, routes leading to amenities and through residential areas.  Rural - all other roads will be in this category. They will generally be unclassified roads linking small areas of development such as hamlets, farms and tourist attractions to each other and the strategic vehicle routes. Their use will be local in a transportation function but these roads are likely to form parts of important cycling, horse riding or walking leisure routes.	4b	Local Access Road	Roads serving limited numbers of properties carrying only access traffic.	In rural areas these roads serve small settlements and provide access to individual properties and land. They are often only single lane width and unsuitable for HGVs. In urban areas they are often residential loop roads or cul-de-sacs.

# 1.2.2. Footway Hierarchy

The Essex Footway Network is a tailored functional route hierarchy that places the footway assets that the Council are responsible for into three hierarchies. These are:

- Primary Footway 1 (PF1)
- Primary Footway 2 (PF2)
- Primary Footway 3 (PF3)

The PF1 and PF2 hierarchies combined create the County Route Footway Network, this is the high footfall network of footways. PF3 footways create the Local Route Footway Network and are the low footfall footways in the County.

This hierarchy ensures all areas of the network are addressed appropriately, and allows the flexibility for the network to evolve, influenced by the changing needs of Essex and the highway users.

Below is a table outlining the national footway classification types and how they transpose into the Essex Footway Networks hierarchies.

	Essex Footway Hierarchy	Code of Practice Category	Category Name	Code of Practice Description	Essex Description	
	PF1	<b>1</b> a	Prestige Walking Zones	Very busy areas of towns and cities with high public space and street scene contribution.	Very busy areas of towns and cities with high public space and street scene contribution. Area not solely filled with shops or businesses, has other attraction for public.	
County Route (High Footfall)		1	Primary Walking Routes	Busy urban shopping and business areas and main pedestrian routes.	Busy urban shopping and business areas and main pedestrian routes.	
,	PF2	2	Secondary Walking Routes	Medium usage routes through local areas feeding into primary routes, local shopping centres, etc.	Medium usage routes through local areas feeding into primary routes, local shopping centres, railway stations, bus stations, schools, hospitals, public gardens, sports centres, and other public spaces, etc.	
Local Route	DE2	3	Link Footways	Linking local access footways throughout urban areas and busy rural footways.	Linking local access footways through urban areas and busy rural footways.	
(Low Footfall	PF3 —		4	Local Access Footways	Footway associated with low usage, short estate roads to the main routes and cul-de-sacs.	Footway associated with low usage, short estate roads to the main routes and cul-desacs.

# 1.2.3. Cycleway Network/Hierarchy

Cycleways are currently inspected at the same time as the carriageway they are on and to that same frequency. If they are on or adjoining a footway they are inspected at the same time as and to the frequency of that footway.

A review is in progress of the full cycleway network and a functional hierarchy is being created that will allow the Council to take a much more tailored and prioritised approach to the network.

# 1.3. Safety Inspection – Strategy and Service Levels

# 1.3.1. General Principles for completion of Safety Inspections

The council shall carry out safety inspections using trained personnel in the manner deemed appropriate for the particular inspection route. The safety of the highway Inspector will always be of paramount consideration in determining the method of inspection.

Inspections are either walked or driven. If driven, the inspection will be completed from a slow moving vehicle and will be double manned with a driver and an inspector, who is the passenger and observer. Where safe to do so, the vehicle speed shall not exceed 20 mph. Where this is unsafe, multiple passes can be made until the inspector is satisfied that all defects meeting investigatory level have been identified and recorded. Driven routes are identified within the Asset Management system, typical examples where inspections may be carried out from a slow moving vehicle are:

- Roads with no footway or pedestrian facilities
- Roads of a significant length where inspections on foot would not be practical.

On some roads the carriageway and adjacent footway will be of differing inspection frequencies. The inspections will be undertaken at frequencies appropriate for both carriageway and footway.

All driven inspections shall be driven in both directions where road traffic regulations permit.

Where there are footways or isolated sections of carriageways due for inspection but not visible from the vehicle these shall be walked at the appropriate inspection frequency. This may be carried out either at the start, end or during the inspection when it is practical and safe to do so.

Walked inspections of roads with footway facilities on both sides shall also be inspected in both directions.

In the event of severe conditions e.g. snow or emergency conditions that effect business continuity like outbreaks of illness the inspections may be suspended at the decision of the Inspections Manager.

The methodology and procedures for carrying out safety inspections are set out in supporting documents.

# 1.3.2. Safety Inspection Frequency

The inspection frequency (table below) is aligned with the network hierarchy. The hierarchy has been developed and assigned based on the nature and usage of the asset.

Feature	Hierarchy	Inspection frequency
Carriageway	County Road PR1 County Road PR2 Local Route	Monthly 3 Monthly 12 Monthly
Footway & Cycleway	County Route Primary Footway PF1 County Route Primary Footway PF2 Local Route Footway PF3 Cycleway PC	Monthly 3 Monthly 12 Monthly 12 Monthly

As far as possible Inspections are planned to maximise efficiency with all inspections undertaken within the calendar month that they are due. However, the programme will need to remain flexible due to holiday, sickness or other unforeseen events.

# 1.3.3. Ad Hoc Inspections

In addition to the safety inspections the council receives reports and enquiries from a number of sources regarding its highway assets. The Council operates systems that allow these to be received either electronically or via traditional methods, for example a letter/telephone call. It also operates a system to receive reports or enquiries of an emergency nature out of hours.

An enquiry is not considered to be a defect meeting the investigatory levels until it has been assessed on site by an inspector. Until that time it remains a query from the public. Reports can be taken online or via a phone call. Due to their nature urgent reports cannot be reported online. The website provides the contact number for the customer to call to report anything that in their opinion is urgent.

On receipt of the report the unconfirmed defect will be triaged, based on the information received, and assigned to one of the following two categories.

Urgent	Urgent enquiries will be assessed the same working day. *
Standard	Our aim is to have an average assessment response time of 28 days including site visit if required.

<sup>\*</sup>During periods of high demand such as the period after severe weather it may not be possible to comply with these response times.

# 1.4. Items to be inspected and their Investigatory Levels

The main purpose of a safety inspection is to identify defects that are likely to be a source of danger or of inconvenience to the highway user. The inspection can also be used to identify non-safety defects that have an impact on long term serviceability and sustainability of the highway asset.

Recording every minor defect or blemish on the highway network would not be reasonable or practical. Therefore lists of the common items that are inspected with their investigatory levels are set out below.

All defects listed below that meet or exceed the investigatory levels are recorded.

The items to be assessed during an inspection and the corresponding investigatory levels are set out below.

Item	Defect	Investigatory level
Carriageway/	Pothole	≥ 50mm depth at
Cycleway Surface	100mm across in two perpendicular directions	lowest point
	Depressions or deformations or < 400mm in any width)	± 50mm depth from designed level
	Wheel track Rutting	± 50mm depth from designed level
	Longitudinal or transverse cracking (in carriageways of composite or ridged construction or at other construction joints)	50mm deep, ≥40mm in width
	Sudden Changes in level (i.e. at joints in composite or ridged construction joints) Defects found within a designated pedestrian crossing area within a carriageway (such as zebra crossing) will be recorded at the corresponding footway investigatory levels. All other areas will be treated as per the carriageway investigatory levels.	≥50mm
	Dedicated cycle lanes 75mm across in two perpendicular directions	≥50mm depth at lowest point
Footway Surface, (including Cycleway	Surface defect 75mm across	≥20mm

and shared surfaces)	Displaced Slab/block paving, Trip/Sudden level difference	≥20mm
	Rocking slab or block paving	≥20mm (of vertical movement)
	Gradient changes in surface levels e.g. due to iron works, tree roots	±30mm (from designed finished level)
	Broken or cracked flag paving (but still restrained)	Defect present
Kerbs (adjacent to	Missing/ displaced (unrestrained)	Defect present
Carriageway and Footway)	Loose/rocking (unrestrained movement when pressure is applied)	≥20mm of movement in any direction.
	Misaligned (but still restrained)	≥20mm in a vertical alignment and ≥50mm in horizontal alignment
	Chipped/damaged with a trip or sudden level difference on the top face	≥20mm
Kerbs (adjacent to Carriageway	Missing/displaced (unrestrained)	Defect present
only)	Loose/rocking (unrestrained movement when pressure is applied)	≥50mm of movement in any direction.
	Misaligned (but still restrained)	≥50mm in a vertical alignment and ≥50mm in horizontal alignment
	Chipped/damaged with a trip or sudden level difference on the top face	≥50mm depth and 75mm along the length of the kerb

Verges Soft Verges- Grass or Mud	Over run or sunken area adjacent to the edge of the carriageway pavement construction.	≥150mm in depth
	Over run or sunken area adjacent to the edge of the footway/cycleway pavement construction.	≥100mm in depth
Hard Verges- surfaced non- footway or	Damaged area of non-footway or non- carriageway area adjacent to a carriageway	≥150mm in depth
carriageway areas	Damaged area of non-footway or non- carriageway area adjacent to a footway	≥100mm in depth
Iron Works –	Gaps in framework (other than designed and manufactured)	≥40mm in width.
Carriageways	Level differences between covers and frame	± 40mm depth from designed level
	Rocking/noisy covers Cracked/broken Cover	Defect present
	Worn/polished covers	≥25% worn/polished
	Missing Cover	Defect Present
	Material reinstatement/surround failure	50mm deep, 100mm across in any horizontal direction
Iron Works – in Cycleways, Shared	Gaps in framework (other than designed and manufactured)	≥25mm in width.
surfaces and Footways	Level differences between covers and frame	± 20mm depth from designed level
	Rocking/noisy covers	Defect present
	Cracked/broken Cover	Defect Present

	Worn/polished covers	≥25% worn/polished
	Missing Cover	Defect present
Flooding/ Drainage	Substantial Standing water/flooding 2 hours after cessation of rainfall 1.5 meters from edge of carriageway	Defect Present
	Substantial Running water across the highway (other than by design i.e. Ford)	Defect Present
	Collapsed/blocked drainage system	Defect Present
	Blocked gully (silted above outlet)	Defect Present
Road Markings	Faded or worn markings - regulatory markings (Give Way, Stop, Zebra Crossings etc)	25% loss
	Faded or worn marking – all others	50% loss
Road Studs	Missing, displaced, lose or defective	Defect Present
Traffic Signs	Missing, damaged signs	Defect Present
	Dirty, faded or worn signs	25% loss
Vehicle Restraint Barriers, Pedestrian Barriers and fencing	Damaged, moving or misaligned.	Defect Present
Bollards	Damaged/missing or misaligned	Defect Present
	Dirty, faded.	25% loss
Street Lighting and	Not operating, malfunctioning,	Defect Present
lit items	Damaged or misaligned posts and other furniture,	Defect Present
	Exposed wiring	Defect present
Traffic Signals and other	Signals not operating, malfunctioning	Defect Present

electronic	Damaged or misaligned posts and other	Defect Present		
items	furniture			
	Exposed wiring	Defect present		
	Obscured/dirty/faded signal lights	25% loss		
Trees, Hedges and vegetation	Unstable tree (or hedge) fallen or in danger of falling onto the highway	Defect present		
	Overhanging tree leading to loss of height clearance	≤ 2.1m over Footway ≤ 2.4m over Cycle Way ≤5.1m over Carriageway		
	Encroachment on to the highway	Defect Present		
	Obstructing visibility spays/lines	Defect Present		
	Obstructing signs, lighting and traffic signal	Defect Present		
Highway general condition	Oil/fuel/debris/mud/stone/gravel at a level likely to be a hazard	Defect Present		
	Fire Damage	Defect Present		
	Damaged/missing street furniture	Defect Present		
	Illegal signs	Defect Present		
	Obstructions	Defect Present		
	Obstructed sight lines	Defect Present		
	Offensive graffiti	Defect Present		
	Illegal vehicle crossing	Defect Present		
Other	Other issues that an inspector identifies during an inspection that they consider should be recorded as part of the inspection.	Defect Present		

#### 1.5. Defect assessment

Recorded defects are risk assessed during the inspection on a site specific basis. This allows other considerations that the inspector feels relevant to be factored into the risk assessment and is used to determine the level of response.

The process and methodology applied by the inspector is set out below.

When a defect meets investigatory level, it is risk assessed. The risk shall be assessed in two parts;

#### 1.5.1. Consequence

The Inspector will conduct an assessment which considers the most likely outcome if there is an interaction by a highway user with the defect.

Examples of factors that an Inspector will consider are:

- The type of highway user likely to interact with the defect e.g. a pedestrian or cyclist, who would be more vulnerable to be caused personal injury
- Any other circumstances that would increase the likely consequence of an interaction e.g. a trip defect located at the top of steps

The likely consequence of an interaction by a highway user will be quantified by the Inspector using their experience and judgement on a scale of 1 to 4:

- 1. Negligible consequence e.g. minor jarring to the occupants of a vehicle
- 2. Minor consequence e.g. dented or scuffed wheel rim on a vehicle
- 3. Noticeable consequence e.g. a burst tyre on the vehicle
- 4. Serious consequence e.g. vehicle incurs major damage

#### 1.5.2. Likelihood

The likelihood of a highway user interacting with the defect shall be quantified on a scale of 1 to 4.

Considerations will include the following:

- Its location in the highway, considering all highway users
- Local facilities e.g. schools, hospitals
- Other factors within the knowledge of the inspector
  - 1. Very Low likelihood (up to 40% of users)
  - 2. Low likelihood (41 to 60% of users)
  - 3. Medium likelihood (61 to 80% of users)
  - 4. High likelihood (over 80% of users)

		Likelihood				
Consequence		Very Low 1 (up to 40%)	Low 2 (41-60%)	Medium 3 (61-80%)	High 4 (over 80%)	
	Negligible 1	1	2	3	4	
	Minor 2	2	4	6	8	
	Noticeable 3	3	6	9	12	
	Serious 4	4	8	12	16	

# 1.5.3. Risk Factor Score

The risk factor is the combination of likelihood and consequence assessments multiplied together. This will produce a range of scores from 1 to 16. It is this score that identifies the seriousness of the risk and consequently that appropriate level of response.

The level of response can be correlated with the risk factor scores via the Risk matrix overleaf.

# 1.6. Defect response times

Defects will be defined as follows;

Priority 1 and 2 defects are those that following risk assessment may be potentially so dangerous to the public that they require urgent attention because they represent an immediate or imminent safety hazard or because there is a risk of short-term structural deterioration.

Priority 3 and 4 defects are those that following risk assessment are of low risk of causing harm, and are considered to be defects that impact long term serviceability and sustainability of the highway asset. These defects will be addressed in a planned manner as resources permit.

Response time is defined as the time taken to deliver a make safe or permanent repair from the time the defect is assessed on site by an inspector.

County Route carriageways or footways		Local Route carriageways or footways		Non-carriageway or non-footway assets	
Priority response	Response Time	Priority response	Response Time	Priority response	Response Time
<b>S1</b> (score 16)	2 hours*	<b>S1</b> (score 16)	2 hours*	<b>S1</b> (score 16)	2 hours*
<b>S2</b> (scores 8-12)	2 working days*	<b>S2</b> (scores 8-12)	5 working days*	<b>S2</b> (scores 8-12)	If an S2 defect is in the carriageway the response time will be inherited from the carriageway hierarchy S2. If the S2 defect is in the footway the response time will be inherited from the footway hierarchy S2.
<b>S3</b> (scores 4-6)	Defect to be considered for repair as part of a planned maintenance programme	<b>S3</b> (scores 4-6)	Defect to be considered for repair as part of a planned maintenance programme	<b>S3</b> (scores 4-6)	Defect to be considered for repair as part of a planned maintenance programme
<b>S4</b> (scores 1-3)	Presumption not to undertake repair within a stated time period	<b>S4</b> (scores 1-3)	Presumption not to undertake repair within a stated time period	<b>S4</b> (scores 1-3)	Presumption not to undertake repair within a stated time period

<sup>\*</sup>Where a S1 defect may require follow up treatment to affect a permanent repair, this will be undertaken as Priority 3 (S3) defect.

# 1.6.1. Guidance and monitoring

This type of assessment by its nature is subjective and therefore every Inspector attends regular training sessions. In addition there is an audit regime in place to check the quality and consistency of defect identification and recording.

The Highway Inspection manual contains information about how inspectors undertake this function.

#### 1.6.2. Exceptions

There will be occasions where the inspector will be faced with exceptional situations or when having completed the defect assessment the Inspector feels a higher priority is warranted. In such situations the inspector may use their discretion to increase the priority of a defect.

In these cases the inspector will record this increase on the notes relevant to the defect summarising their reasoning. Supporting evidence in the form of extra photographs, etc., may be linked or attached within the asset management system.

# 1.6.3. Recording of inspections and defects

All routine safety inspections are to be electronically recorded with the following information.

- Date and time of inspection
- Identity of the lead inspector
- Weather conditions and highway surface state
- Type of inspection
- Identity of secondary inspector (if applicable)
- Notes of any issues or concerns noted by the inspector.
- General photographs of the road or highway that was inspected.

Defects will be recorded with the following information.

- Date and time that the defect was recorded
- Identity of the inspector
- Description of the defect (including any measurements)
- Location of the defect
- The assessment scores and Risk factor score
- The defect priority
- Linked photographs

# 1.6.4. Performance Management

In order to assess and manage the delivery the following measures and indicators will be recorded and assessed:

- 1. Monitoring and reporting each year the level of missed inspections, split by cause
- 2. Monitoring and reporting each month the level of defects being recorded, split by priority

The reports shall be maintained and presented as Safety Inspection Performance Measures.

# 1.6.5. Key roles and Competencies

There is a dedicated team whose main function is undertaking Highway Safety Inspections and reactive Inspections in accordance with this Strategy. All members of the team will be assessed against the 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** 

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