

TRANSPORT AND WORKS ACT 1992

**TRANSPORT AND WORKS (INQUIRIES
PROCEDURE) RULES 2004**

**THE NETWORK RAIL
(CAMBRIDGE LEVEL CROSSING
REDUCTION)
ORDER**

APPENDICES

TO PROOF OF EVIDENCE OF JOHN PREST

Document Reference:	NR31/2
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Level 2

Management of lineside vegetation

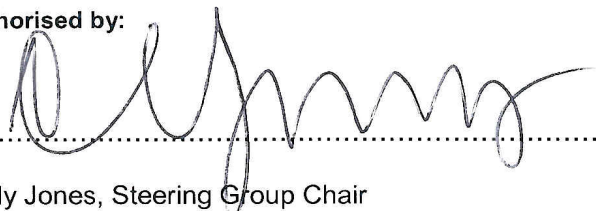
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User information

This Network Rail standard contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – No deviations, could stop the railway

- **Red requirements shall** always be complied with and achieved.
- Red requirements shall be presented in a red box **with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of red requirements lies with the Professional Head/Standard Owner.
- Red requirements are monitored for compliance.
- Corrective actions shall be enforced if deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Amber requirements – Controlled deviations, approved risk analysis and mitigation

- **Amber requirements shall** be complied with unless deviation has been approved in advance.
- Amber requirements shall be presented with an amber sidebar **and with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of these requirements lies with the Professional Head/Standard Owner, or their nominated Delegated Authority.
- Amber requirements are monitored for compliance.
- Deviations **may** be permitted. Deviations are approved by the Standard Owner or through existing Delegated Authority arrangements.
- Corrective actions shall be enforced if **non-approved** deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Green – Guidance

- Guidance is based on good practice. Guidance represents supporting information to help achieve **Red** and **Amber** requirements.
- Guidance shall be presented with a dotted green sidebar **and with the word “should” (usually in notes) or as a direct instruction**.
- Guidance is **not mandatory** and is not monitored for compliance.
- Alternative solutions may be used. Alternative solutions do not need to be formally approved.
- Decisions made by a competent person to use alternative solutions should be backed up by appropriate evidence or documentation.

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Issue record

Issue	Date	Comments
1	December 2006	New document. Replaces all draft versions of NR/SP/TRK/05200 and RT/CE/S/075 in circulation.
2	August 2008	Updated to reflect Phase 2A reorganisation. References to 009054 and 090180 deleted, activities superseded by SMPs
3	September 2009	Updated to incorporate derogations to requirements and raise awareness of TEFs made since issue 1, to reduce over specification and to incorporate other changes deemed of benefit to the Company as "quick wins".
4	June 2012	Completely revised document with new / revised clauses and figures marked with a vertical line

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 31 March 2013.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference documentation

NR/L1/TRK/05200	Vegetation
NR/L2/ELP/29987	Working on or about 25 kV A.C. Electrified Lines
NR/L2/SIG/19608	Level Crossing Infrastructure (Inspection & Maintenance)
NR/L2/SIG/10157	Signal Sighting
NR/L2/TRK/5100	Management of fencing and other boundary measures
NR/L3/MTC/PL0215	Communicating with the Public
NR/L3/TRK/003/TEF3069	Pesticide application record form
NR/L3/TRK/003/TEF3076	Leaf fall Risk Assessment
NR/L3/TRK/003/TEF3077	Tree Hazard: Risk Evaluation and Treatment System (THREATS and THREATS-NR)
NR/L3/TRK/003/TEF3078	Record of decision to alter vegetation inspection method
NR/L3/TRK/003/TEF3079	Lineside vegetation inspection
NR/L3/TRK/003/TEF3211	Fallen Tree Incident Form
NR/L3/TRK/003/TEF3245	Tree risk evaluation & control by non-arboriculturist railway personnel (THREATS-NRP)
NR/L3/TRK/003/TEF3244	Third party tree notification letters
BS 3998: 2010	Tree work. Recommendations
BS 5837: 2005	Trees in relation to construction – Recommendations
BS EN 50122: 1998	Railway applications. Fixed installations
	Recommended Planting – Species guidance

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1 Purpose

This Standard mandates that lineside vegetation will undergo inspection, maintenance and management regimes derived from risk assessments based upon railway and vegetation characteristics.

Compliance to this Standard will mitigate the risk of vegetation negatively impacting upon railway operations and lineside neighbours.

2 Scope

This Standard applies to the whole of the Network Rail controlled infrastructure.

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3 Definitions

AFAG

Arboriculture and Forestry Advisory Group

Arisings

Vegetative material resulting from management and maintenance operations

AWRs

Authorised Walking Routes

Ballasted area

Area between the outside edges of the cess ballast shoulders

BASIS

An independent organisation set up to advise the UK Government and to specify and assess standards in the pesticide industry relating to storage, transport and competency

Cess

For the purposes of this document; the ground from the outer edge of the ballasted area to 3 metres from the running rail

Cess Strip

For the purposes of this document; the ground area 3 to 5 metres from the running rail

% clear of vegetation

An area of lineside to be x% clear of vegetation, measured over a length of 220 yards

Clearance

Initial management of vegetation in order to achieve a structure of vegetation that reduces the risk posed by that vegetation to as low as reasonably practicable and prepares it for a follow-up regime of cyclical / annual maintenance

Closed line

A line that is legally closed but where land is still in ownership of Network Rail

Coppice regrowth

The production of shoots from a cut stump of most broadleaved trees

Cutting slope angle

Slope angle measured from horizontal

dbh

Diameter [of a tree trunk] at breast height, measured at 1.3 metres above ground level – when trees on slopes are measured, this shall be done from the ‘up-slope’ side of the tree

Disused line

A line that is not in use but is still legally available to train and freight operating companies

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Follow-up regime

Operations to keep the vegetation in a state that reduces risk posed

Hazardous tree

A tree which has been inspected by a competent person and which poses a risk to either the railway or a third party

High risk leaf fall species

Sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), sweet chestnut (*Castanea sativa*), horse chestnut (*Aesculus hippocastanum*), poplar (*Populus* species – except aspen, *P. tremula*) and lime (*Tilia* species)

HSE

Health and Safety Executive

Injurious and invasive weeds

Plants listed in (1) The Weeds Act 1959 and (2) The Wildlife and Countryside Act 1981 (as amended) – common ragwort⁽¹⁾ (*Senecio jacobaea*), Japanese knotweed⁽²⁾ (*Fallopia japonica*), giant hogweed⁽²⁾ (*Heracleum mantegazzianum*), Himalayan balsam⁽²⁾ (*Impatiens glandulifera*) and rhododendron⁽²⁾ (*Rhododendron ponticum*)

Plants not specifically listed in legislation – horsetail (*Equisetum arvense*)

IC

Incident Controller

Inspection

Routine or reactive activity

Lineside assets

Infrastructure assets including but not limited to the following: cess paths, walking routes, troughing/cable routes, access steps, location cabinets/rooms, lineside buildings, signalling gantries, OLE stanchions.

Live parts of the OLE

Except for the mast or structures, all parts in Figure 1 must be treated as live

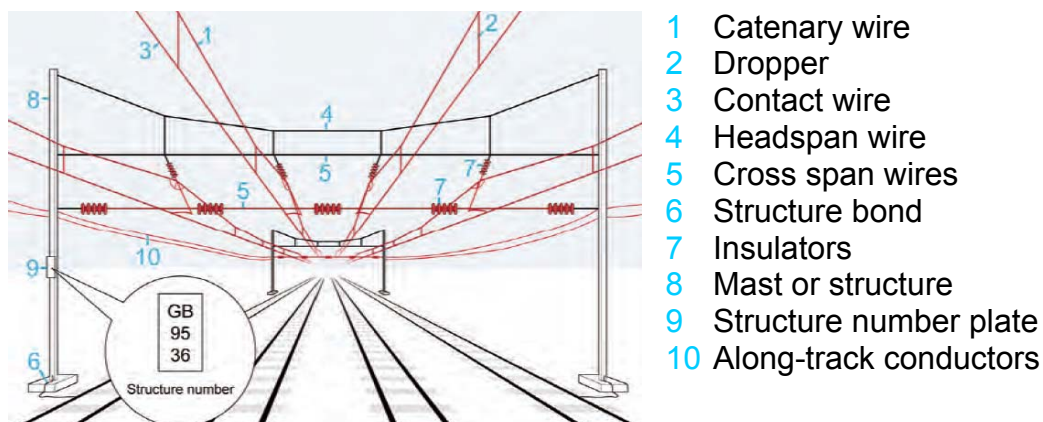


Figure 1 – Typical OLE construction

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Manual operations

The use of non-powered hand tools for the management of vegetation

Mechanical operations

The use of plant and machinery for the management of vegetation

PSR board

Permanent Speed Restriction board

Rail target

Potentially hazardous tree that is capable of reaching railway property

Rock cutting

Steep sided excavation through rock, chalk or interbedded rock and soil

Selective felling

Individual trees are identified and removed whilst retaining healthy trees and desirable species

Specialist

Persons undertaking surveys shall have a Level 3 competency as defined by the Arboricultural Association using the National Qualifications Framework (NQF)

Stump diameter

Measured at ground level and, for a coppice stool, shall include the diameter of the full extent of the stool

Survey

Periodic activity undertaken by specialist technical expert

Track category

Highest track category over the length of the record to be used for assessment purposes

Tree surgery

Activities including, but not limited to, crown lifting, crown reduction, crown thinning, pollarding and removal of dead wood

Windthrow

Uprooting or breakage of trees caused by strong winds

Woody vegetation

Trees and shrubs – brambles are included for the area up to 3 metres from the running rail and for 1 metre around lineside assets

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4 Inspection, survey and risk assessment

4.1 Inspection

4.1.1 Routine inspection

Visual routine inspection shall take place at least every 3 years for every one-eighth of a mile for each side, with each side recorded separately. This inspection shall take place on foot, during daylight hours between 01 May and 31 October.

4.1.1.1 Routine inspection alternative method proposal

When this is not possible record the alternative methods for inspection using NR/L3/TRK/003/TEF3078.

4.1.1.2 Routine inspection details

Collect and record the details below using NR/L3/TRK/003/TEF3079.

- a. date of inspection
- b. name of inspector
- c. location
- d. ELR
- e. mileage
- f. track ID (plus up/down for single lines)
- g. obstructed refuges, positions of safety, AWRs
- h. reduced clearances (for trains)
- i. locations where inspections of infrastructure are impeded
- j. impaired sighting
- k. hazardous trees (Clause 4.3.1)
- l. presence of certain weeds
- m. compliance to Clauses 5.2, 5.3 and 5.4

4.1.2 'Cab-ride' inspection

Cab-ride, or similar, inspection shall take place at least annually to identify any of the details listed in Clause 4.1.1.2 g. – m., recording approximate locations using five mile line diagrams. Details for each side shall be recorded on separate inspections.

4.1.2.1 Actions arising

Where new or changed hazards are recorded, a supplementary routine inspection shall take place as soon as is reasonably practicable in accordance with the risk to the safe operation of the railway.

4.1.3 Additional inspection

Additional inspection shall take place, following reports from Network Rail staff or contractors and train drivers or through the National Helpline and Community Relations/Corporate Affairs, as soon as is reasonably practicable in accordance with the reported risk to the safe operation of the railway.

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4.1.4 Photographs

Photographs to aid subsequent identification of locations, features or defects observed during inspection may be taken.

4.2 Survey

A survey shall be undertaken every five years and shall include:

- a. date of survey
- b. name of inspector
- c. location
- d. ELR
- e. mileage
- f. track ID (plus up/down for single lines)
- g. leaf fall data [using NR/L3/TRK/003/TEF3076]
- h. track circuit and adhesion issues
- i. woody species identification
- j. large trees (greater than 750mm dbh) [recorded using NR/L3/TRK/003/TEF3077]
- k. hazardous trees (greater than 150mm dbh) [recorded using NR/L3/TRK/003/TEF3077]
- l. third party tree of concern when observed during visual assessment shall be;

- photographed
- assigned a location tag (ELR, mileage, side of line, GPS reference) and have as many identification and defect details as possible recorded using NR/L3/TRK/003/TEF3077
- subjected to necessary risk mitigation to protect the railway

- m. digital photographs of any significant features to enable identification of the location during subsequent activities

4.3 Risk assessment

4.3.1 Hazardous tree risk assessment

Any potentially hazardous tree identified during inspection or survey shall follow Process A in Figure 2 and following risk assessment, be assigned a Threat Category as detailed in Table 1.

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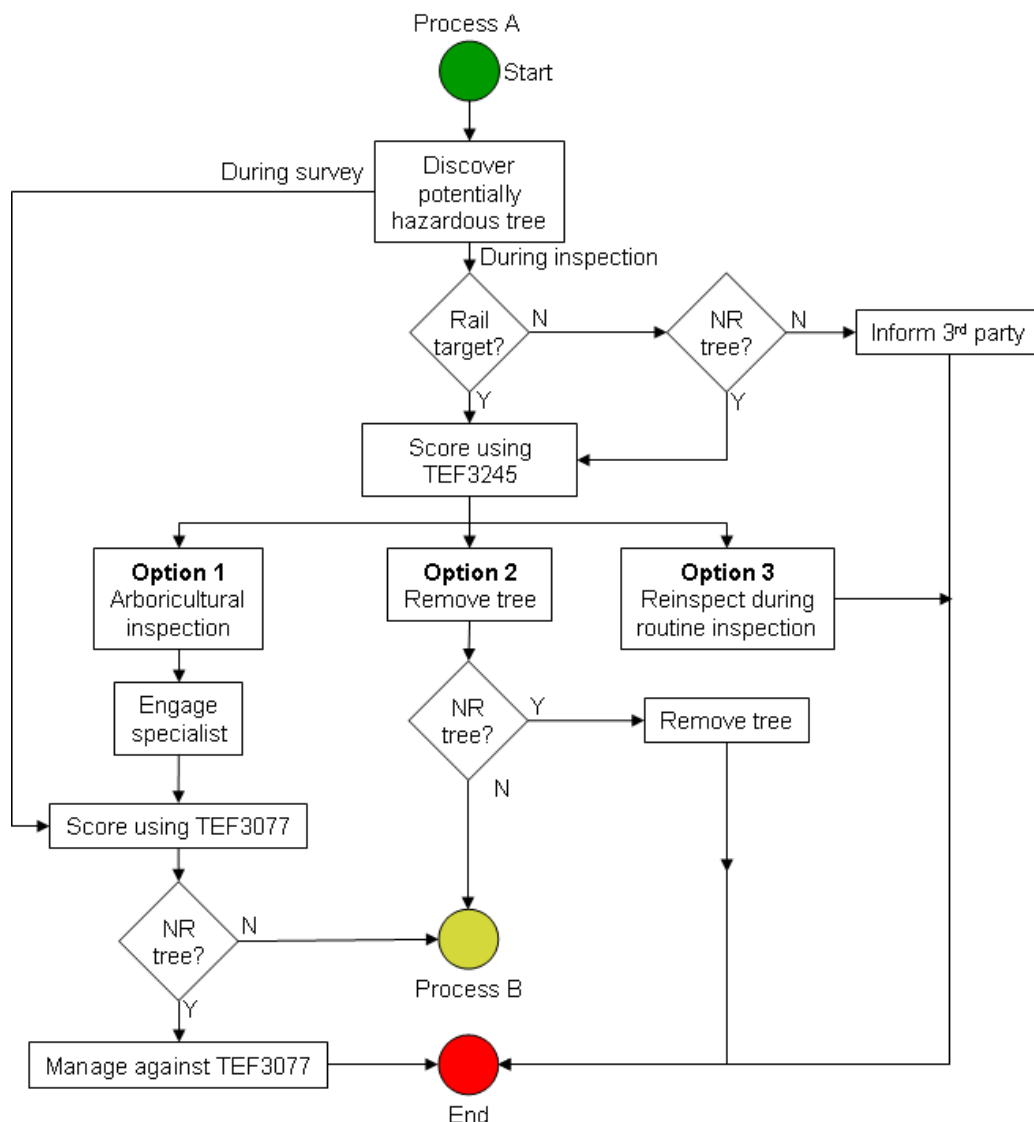


Figure 2 – Hazardous tree mitigation [Process A]

Threat Category	Risk Control: precautions & reinspection
7 - Extreme	Protect traffic (possibly by railway closure); emergency call-out of contractors
6 - Serious	Implement appropriate protection (inc. linespeed reduction) & remediate within 7 days
5 - Significant	Decide if protection appropriate (inc. linespeed reduction); remediate within 4 weeks
4 - Moderate	Remediate within 13 weeks; reinspect after severe weather events prior to remediation
3 - Slight	Remediation OR reinspection within 52 weeks (or after severe weather events beforehand)
2 - Minimal	Reinspect within 3 years, schedule work as required
1 - Insignificant	Reinspect within 5 years, schedule work as required

Table 1 – Threat Categories assigned to potentially hazardous trees

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4.3.1.1 Inspection protocol

Trees reported as potentially hazardous during inspection shall be assessed using the protocol defined in NR/L3/TRK/003/TEF3245.

4.3.1.2 Specialist protocol

Any trees requiring specialist investigation or those identified during survey shall be assessed using the protocol defined in NR/L3/TRK/003/TEF3077.

4.3.1.3 Trees not on Network Rail controlled infrastructure

Any tree not on Network Rail controlled infrastructure that is identified as potentially hazardous to railway operations and personnel shall be noted, photographed and Process B (Figure 3) followed.

Process B is described in detail in Appendix A. Letters described in Process B shall use the templates 3PTL and 3PTLii found in NR/L3/TRK/003/TEF3244.

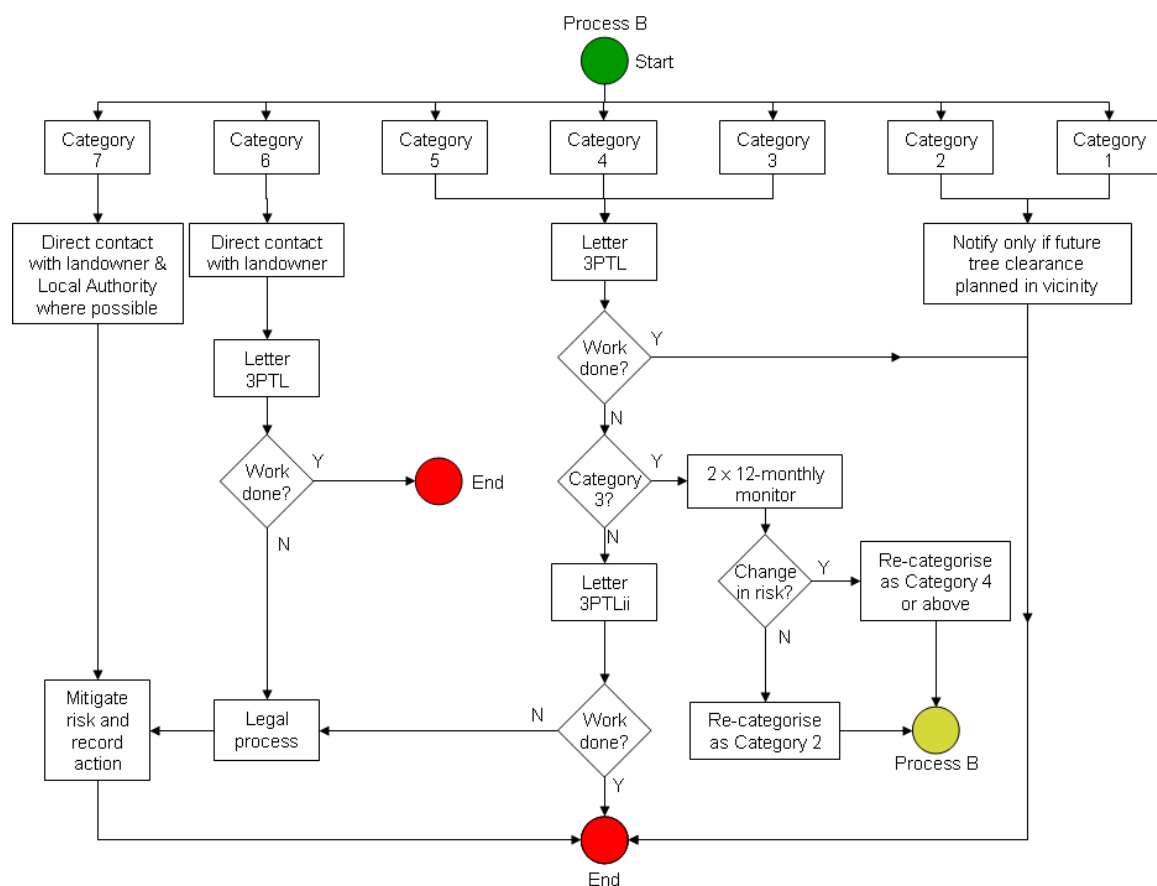


Figure 3 – Third party hazardous tree notification process [Process B]

4.3.2 Leaf fall risk assessment

The level of risk for leaf fall during autumn shall be determined using NR/L3/TRK/003/TEF3076.

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4.4 Post-incident data collection

Incidents involving tree or branch failure shall be investigated and recorded using NR/L3/TRK/003/TEF3211. Criteria for application of the form are either;

- a. Where the circumference of fallen woody material at sleeper end is greater than 450mm (which approximates to a diameter of 150mm), or
- b. Where the circumference of fallen woody material at boundary line is greater than 450mm (which approximates to a diameter of 150mm)

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5 Generic vegetation clearance requirements (by location)

5.1 Activity risk assessment and briefing

All activities shall be undertaken adopting methods in line with HSE and/or AFAG codes of practice. Prior to undertaking clearance and follow-up activities a risk assessment of the site and associated work shall be completed. Before any such works are undertaken all workers involved shall receive a full, site-specific task briefing.

5.2 Ballasted area

The ballasted area shall be maintained clear of all woody vegetation and 95% clear of other vegetation.

The area vertically above this shall also be maintained clear of all vegetation encroaching from other areas as shown in Figure 4.

5.3 Cess

The cess shall be maintained clear of all woody vegetation.

The area vertically above this shall also be maintained clear of all vegetation as shown in Figure 4.

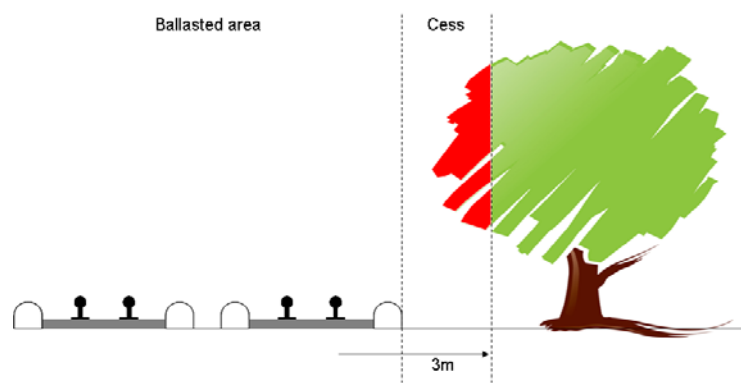


Figure 4 – Schematic representation of the vegetation structure when linespeed <60mph; red, prohibited; green, allowed.

5.4 Cess Strip

5.4.1 Less than 60mph

Where maximum linespeed is less than 60mph, vegetation clearance and follow up of the cess strip shall be managed according to Clause 5.5.

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5.4.2 60mph and above

Where maximum linespeed is 60mph and above, the ground area of the cess strip, up to 5m from the running rail, shall be maintained clear of all woody vegetation.

The area vertically above this shall also be maintained clear of all vegetation as shown in Figure 5.

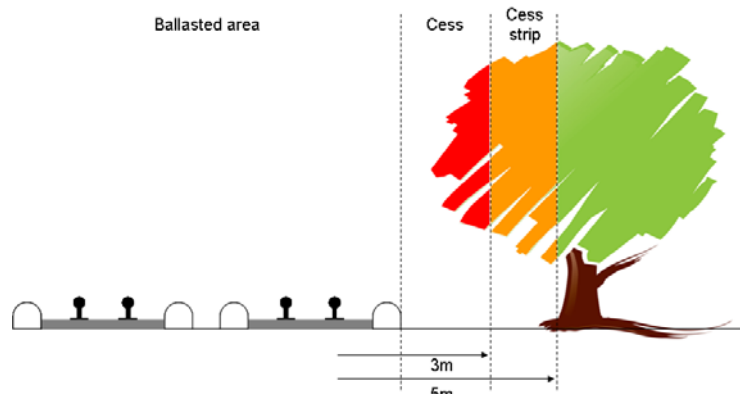


Figure 5 – Schematic representation of the vegetation structure when linespeed ≥ 60 mph; red, prohibited; amber, action where required; green, allowed.

- Where the Network Rail boundary falls within this area, regard shall be had to Clause 5.5 and potential public relations issues resulting from removal of vegetation.

5.5 Cess strip to boundary

5.5.1 Windthrow

Operations shall be planned such that the risk of windthrow is not increased following felling.

5.5.2 Leaf fall

Where the leaf fall risk category score is assessed as 4 or 5, operations shall be planned to reduce that score, to 3 or less, by altering the following components of the vegetation structure;

- tree density
- main species
- tree size
- distance from rail

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5.5.3 Hazardous trees

Where hazardous trees are identified by risk assessment in NR/L3/TRK/003/TEF3245 and NR/L3/TRK/003/TEF3077 the recommendations of the risk assessment shall be implemented within the timescales given in those documents.

5.5.4 Around AC overhead line equipment

Vegetation shall be maintained 3.5 metres clear of live parts of the OLE and the infinite vertical space above them as shown in Figure 6. Any operations in the vicinity of OLE shall be carried out in accordance with NR/L2/ELP/29987.

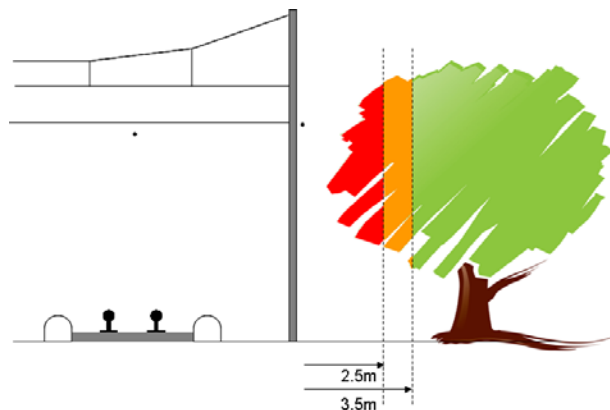


Figure 6 – Schematic representation of the vegetation structure in the vicinity of OLE: red, prohibited within 2.5m of live OLE ¹; amber, action where required; green, allowed.

Where this distance is not achievable due to limits of Network Rail property, vegetation shall be maintained in a vertical line in line with the Network Rail boundary.

¹ In accordance with BS EN 50122, Clause 5.2.6

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5.5.5 On cuttings and embankments

Vegetation on all slopes shall be maintained such that its removal does not compromise the stability of the slope (see Figure 7). The Route Asset Manager (Civils – Geotechnics) (RAM(CG)) shall be consulted to provide information such as, but not limited to;

- Current stability condition of the slope
- Locations of embankments vulnerable to desiccation
- Remedial action necessary to mitigate “at risk” stumps

Distance for the extent of vegetation management on cuttings and embankments are horizontal measurements from the running rail.

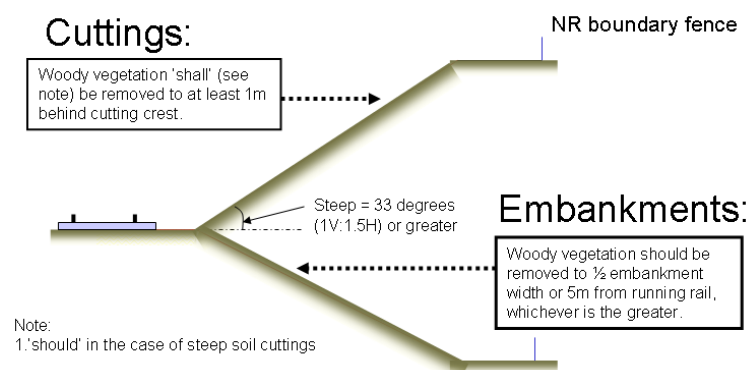


Figure 7 – Schematic representation of the vegetation structure on cuttings and embankments

5.5.5.1 Rock cuttings

All woody vegetation shall be removed to a distance of at least 1 metre beyond the top of the cutting.

5.5.5.2 Steep soil cuttings

On soil cuttings greater than 33° (1 in 1.5), all woody vegetation with a dbh greater than 150mm should be removed to a distance of at least 1 metre beyond the top of the cutting.

5.5.5.3 All embankments

All woody vegetation with a dbh greater than 150mm should be removed to one half of the horizontal distance from the outside edge of the running rail to the toe of the embankment; that distance should be a minimum of 5 metres.

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5.5.5.4 Tree stump requirements

Stumps assessed and categorised as “at risk” using Process C (Figure 8) shall have a suitable remedial action assigned by the RAM(CG).

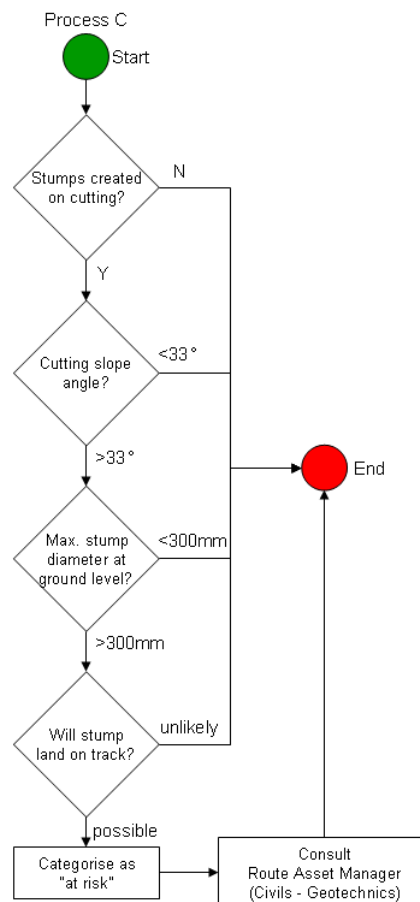


Figure 8 – Stump assessment process

5.5.6 Sighting distances

Vegetation shall be managed, and maintained clear at all times, in order to achieve the sighting requirements;

- Authorised crossings – Appendix C of NR/L2/SIG/19608 Level Crossing Infrastructure Inspection & Maintenance
- Signals – Clauses 9 and 10 of NR/L2/SIG/10157 Signal Sighting

5.5.7 On or near lineside assets

The ground area for a distance of 1 metre around lineside assets should be maintained clear of all vegetation to enable access, inspection or fire protection.

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5.5.8 Stations, depots and sidings

All woody vegetation in these areas shall be managed and where these areas are adjacent to the operational railway the vegetation structure shall be maintained as defined in this document.

5.5.9 Disused and Closed lines

The woody vegetation in the vicinity of these lines shall be managed such that the risk to railway operations and third parties is mitigated as far as reasonably practicable.

5.5.10 Boundary vegetation

Vegetation shall be managed, and maintained in accordance with NR/L2/TRK/5100.

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6 Site-specific management requirements

6.1 Legislation

Vegetation operations and activities shall be planned and undertaken in such a way as to avoid contravening any relevant legislation.

6.2 Stump killing requirements

Other than where specifically detailed within scope of works, all stumps shall be killed to prevent coppice regrowth.

6.3 Pesticide application

Pesticide selection and dosage rates shall be specified by a person with the appropriate, valid, BASIS certificate. Specifications shall be site-specific. Any pesticide application on the Network Rail controlled infrastructure shall be recorded using NR/L3/TRK/003/TEF3069.

6.4 Flailing or mulching of woody vegetation

Where mechanical flails or mulchers are used to clear or maintain vegetation, all broken branches / woody stumps over 50mm diameter and above ground level, shall be tidied by saw in line with BS 3998: 2010.

6.5 Invasive and hazardous weeds

Invasive and hazardous weeds shall be managed (including entry in Ellipse) according to the risk posed to the safe operational railway and, in certain circumstances, to lineside neighbours in order to comply with relevant legislation.

6.6 Planting or seeding

Where it is identified that planting or seeding is required (on a site-specific basis) for, for example, mitigation of visual impact or biofuel, species to be used shall be chosen from the Recommended Planting – Species Guidance list available on the Network Rail Portal. Other species not included in this list shall not be used without the permission of Network Rail's Senior Technology Engineer [Lineside].

6.7 Disposal of timber and arisings

Arisings shall be a minimum of 3 metres from any running rail and shall not be left in a location that could affect the safe performance of the railway or affect lineside neighbours. This includes preventing access to positions of safety, preventing inspections, movement by weather action into, for example, watercourses, drains or ditches and risks associated with route crime.

Consideration should be made to see if the arisings have any monetary value and/or removing arisings from the work site and guidance can be obtained from Network Rail's Senior Technology Engineer [Lineside].

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7 Stakeholder communication

7.1 Communication of vegetation work up to 5m from the track

Works included in Clauses 5.2, 5.3 and 5.4 above shall be managed in accordance with Clause 5.5.2 of NR/L3/MTC/PL0215 Communicating with the Public.

7.2 Communication of vegetation work beyond the cess strip

Works included in Clauses 5.5 above shall be managed in accordance with Clause 5.5.4 of NR/L3/MTC/PL0215 Communicating with the Public.

7.3 Emergency and late-notice work

Emergency and late notice work shall be managed in accordance with with Clause 5.5.3 of NR/L3/MTC/PL0215 Communicating with the Public.

7.4 Complaints procedure

Complaints made to staff when on site shall be directed to the Network Rail National Helpline on 08457 11 41 41.

■ Staff includes anyone employed directly or indirectly by Network Rail.

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8 Database

An Ellipse database of lineside vegetation shall be kept using records collected as part of inspections, results of risk assessments and relevant information obtained as part of communication procedures. The database shall be updated following any activity that results in a change in record.

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Appendix

Process B – Third Party Hazardous Tree Notification Process

For audit purposes, all decisions are to be documented throughout the process.

Threat Category 7 – Extreme; action required immediately

1. Surveyor to contact IC
2. IC to arrange to protect train movements, surveyor to remain on Network Rail Land adjacent to the tree(s) until tree crew arrive – acting as watchman and to brief attending tree crew on tree(s) and defects and to make sure that only essential works are carried out and nothing further.
3. During normal working hours IC to contact SM[OT] to co-ordinate risk mitigation and to make sure that only essential works are carried out and nothing further.
- 3a. Outside normal working hours IC to arrange emergency call out of appropriately qualified NR chainsaw operators or appropriately qualified NR approved contractors. SM[OT] to be notified as soon as possible.
4. SM[OT] to inform TME / MPC
5. **(Not Scotland)** During normal working hours MPC to make all reasonable attempts to inform Local Authority (LA) of the necessity to remove the tree(s) using the Local Government Miscellaneous Provisions Act 1976, to seek their consent.
- 5a. **(Not Scotland)** Outside normal working hours IC to make all reasonable attempts to inform Local Authority (LA) of the necessity to remove the tree(s) using the Local Government Miscellaneous Provisions Act 1976, to seek their consent.
6. When practicable NR representative to make all reasonable attempts to contact the owner / occupier to explain the necessity to remove the tree(s) and seek their consent.
7. MPC / NR representative to advise tree felling team that consent has been granted to remove the tree.
8. **(Not Scotland)** If owner / occupier are unobtainable but LA consent obtained safety works should proceed.
9. If no consents received but the tree is accessible, IC to be contacted by site representative to obtain authority to proceed.
10. If access is being physically denied, IC to determine who coordinates contact with BTP (for on-site support) and NR Legal Services as this may necessitate an injunction.
11. On confirmation of authority to precede tree(s) to be made safe, with cut parts of tree left tidy and secure on 3rd party land and all works made good. IC updated by site representative.
12. IC to update SM[OT], TME, Legal Services (Litigation) and MPC once tree is made safe.
13. MPC to notify NR Claims Department of works undertaken for possible cost recovery or claims for damage.

Threat Category 6 – Serious; action required within 7 days

1. Surveyor to contact IC
2. IC to advise TME for appropriate safety of the line actions to be taken
3. IC to advise MPC and SM[OT]
4. MPC to make all reasonable attempts to contact owner/occupier, initially by phone followed by template letter as necessary, (3PL No.1) with Hazardous Tree Report attached. MPC to arrange for template letter to be sent by hand or registered post.

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5. If landowner accepts responsibility and agrees to undertake risk mitigation works within target date specified in Hazardous Tree Report, MPC to monitor to closure and update SM[OT] and IC.
6. If landowner requests NR assistance as per guidance in the template letter, MPC to arrange call out of appropriately qualified NR staff or appropriately qualified NR approved contractors (may only require assistance with traffic protection).
7. **(Not Scotland)** If landowner declines responsibility or owner / occupier is not contactable MPC to contact LA requesting risk mitigation using the Local Government Miscellaneous Provisions Act 1976 , seek their consent.
- 7a. If LA consent not given, or in Scotland, MPC and SM[OT] to provide survey data and any other relevant information to NR Legal Services (Litigation) to enable a Court Injunction to be applied for.
8. MPC / SM[OT] to update IC, TME and Legal Services (Litigation) once tree is made safe.
9. MPC to notify NR Claims Department of works undertaken for possible cost recovery or claims for damage.

Threat Category 5 – Significant: action required within 4 weeks

1. SM[OT] / Responsible Manager to notify MPC of Category 5 tree
2. MPC to attempt to identify owner / occupier via desktop study (websites: site investigation, Google/Bing Maps, Royal Mail, BT, Yell.com*, GI Portal and Community Relations.)
3. If GI Portal highlights land ownership to be NR non Operational Land (i.e. Property, TOC/FOC, RIG) MPC to forward Hazardous Tree Report to appropriate department, cc to Lineside Engineer for appropriate onwards action by relevant department.
4. If landownership still unclear MPC to forward GI Portal Map to Commercial Property. Commercial Property to carry out land registry search and feedback to MPC.
5. If owner / occupier are identified MPC to send template letter (3PL No.1) with Hazardous Tree Report attached, by registered post.
6. If no response received within 7 days from date of posting template 1 letter, MPC to send template letter 2 (3PL No.2) with Hazardous Tree Report attached (registered next day delivery) stipulating response within 7 days from date of letter.
7. If owner / occupier accepts responsibility and agrees to undertake risk mitigation works within target date specified in Hazardous Tree Report, MPC to monitor to closure and update SM[OT]
8. If owner / occupier requests NR assistance as per guidance in the template letter, MPC to arrange call out of appropriately qualified NR staff or appropriately qualified NR approved contractors (may only require assistance with traffic protection).
9. **(Not Scotland)** If owner / occupier declines responsibility or owner / occupier are not contactable MPC to contact LA requesting risk mitigation using the Local Government Miscellaneous Provisions Act 1976 , seek their consent.
10. If LA consent not given, or in Scotland, MPC and SM[OT] to provide survey data and any other relevant information to NR Legal Services (Litigation) to consider a Court Injunction.
11. MPC / SM[OT] to update IC, TME and Legal Services (Litigation) once tree is made safe.
12. MPC to notify NR Claims Department of works undertaken for possible cost recovery or claims for damage.

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Threat Category 4 – Moderate; action required within 13 weeks

1. SM[OT] / Responsible Manager to notify MPC of Category 4 tree
2. MPC to attempt to identify landowner via desktop study (websites: site investigation, Google/Bing Maps, Royal Mail, BT, Yell.com), GI Portal and Community Relations.
3. If GI Portal highlights land ownership to be NR non Operational Land (i.e. Property, TOC/FOC, RIG) MPC to forward Hazardous Tree Report to appropriate department, cc to Lineside Engineer for appropriate onwards action by relevant department.
4. If landownership still unclear MPC to forward GI Portal Map to Commercial Property. Commercial Property to carry out land registry search and feedback to MPC.
5. If owner / occupier are identified MPC to send template letter (3PL No.1) with Hazardous Tree Report attached by registered post.
6. If no response received within 14 days from date of posting template 1 letter, MPC to send template letter 2 (3PL No.2) with Hazardous Tree Report attached (registered next day delivery or by hand) stipulating response within 21 days from date of letter.
7. If owner/ occupier accepts responsibility and agrees to undertake risk mitigation works within target date specified in Hazardous Tree Report, MPC to monitor to closure and update SM[OT]
8. If owner / occupier or LA request NR assistance as per guidance in the template letter, MPC to forward request to SM[OT] to arrange for appropriately qualified NR staff or appropriately qualified NR approved contractors. (may only require assistance with traffic protection).
9. **(Not Scotland)** If owner / occupier declines responsibility or owner / occupier are not contactable MPC to contact LA requesting risk mitigation using the Local Government Miscellaneous Provisions Act 1976, seek their consent.
10. If LA consent not given, or in Scotland, MPC and SM[OT] to provide survey data and any other relevant information to NR Legal Services (Litigation) to advise on appropriate action.
11. MPC / SM[OT] to update IC, TME and Legal Services (Litigation) once tree is made safe.
12. MPC to notify NR Claims Department of works undertaken for possible cost recovery or claims for damage.

Threat Category 3 – Slight; re-inspect annually, schedule work within 2 years.

1. MPC to send template letter (3PL No.1) with Hazardous Tree Report attached to landowner within 1 calendar month (registered next day delivery or by hand).
2. If third party fails to confirm works complete or fails to respond, MPC to notify Section Manager Off Track and arrange re-inspection within 12 months from initial inspection date.
3. Following the 1st 12 monthly re-inspection if there is no visible deterioration re inspect within a further 12 months.
4. Following the 2nd 12 monthly re-inspection if there is no visible deterioration consider re categorising as Category 2.
5. If at any point the tree condition deteriorates to Category 4 or worse, escalate as per above process.

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Threat Category 2 – Minimal; re-inspect within 3 years, schedule works as required

1. Re inspect within 3 years, there is only a need to contact 3rd party if planned vegetation works are taking place within the vicinity and there is the ability to include mitigation works as required.
2. If works are planned, MPC to contact landowner to seek permission to incorporate tree works and notify SM[OT] of any permissions gained or refused.

Threat Category 1 – Insignificant; re-inspect within 5 years, schedule works as required

1. Re inspect within 5 years, there is only a need to contact 3rd party if planned vegetation works are taking place within the vicinity and there is the ability to include mitigation works as required.

If works are planned MPC to contact landowner to seek permission to incorporate tree works and notify SM[OT] of any permissions gained or refused.

Standards Briefing Note

Ref: NR/L2/TRK/5201		Issue: 4					
Title: Management of lineside vegetation							
Publication Date: 02/06/2012		Compliance Date: 31/03/2013					
Standard Owner: Professional Head [Track]							
Non-Compliance rep (NRNC): Professional Head [Track]							
Further information contact: Neil Strong		Tel: 07876 578848					
Purpose: This Standard mandates that lineside vegetation will undergo inspection, maintenance and management regimes derived from risk assessments based upon railway and vegetation characteristics. Compliance to this Standard will mitigate the risk of vegetation negatively impacting upon railway operations and lineside neighbours.		Scope: This Standard applies to the whole of the Network Rail controlled infrastructure.					
What's New/ What's Changed and Why: Changes and clarification of existing clauses to enable compliance to be achieved Introduction of formal third party hazardous tree notification process in response to incidents and RAIB recommendations Changes to inspection procedure and protocol to enable more targeted inspection of the vegetation asset Simplification of requirements for vegetation management beyond 5m from rails							
Affected documents: <table><tr><td>Reference</td><td>Impact</td></tr><tr><td>NR/L2/TRK/5201 ISSUE 3</td><td>Superseded</td></tr></table>				Reference	Impact	NR/L2/TRK/5201 ISSUE 3	Superseded
Reference	Impact						
NR/L2/TRK/5201 ISSUE 3	Superseded						
Briefing requirements: Where Technical briefing (T) is required, the specific Post title is indicated. These posts have specific responsibilities within this standard and receive briefing as part of the Implementation Programme. For Awareness briefing (A) the Post title is not mandatory. Please see http://ccms2.hiav.networkrail.co.uk/webtop/drl/objectId/09013b5b804504da for guidance.							
Briefing (A-Awareness/ T-Technical)	Post	Team	Function				
T	Section Managers [Off Track]	Delivery Unit	Network Operations				
T	Maintenance Protection Co-ordinators	Delivery Unit	Network Operations				
T	Lineside Inspectors	Delivery Unit	Network Operations				
A	Track Maintenance Engineers	Delivery Unit	Network Operations				
A	Incident Controllers	Route	Network Operations				
A	Community Relations Managers		Government & Corporate Affairs				
A	National Helpline operatives		Government & Corporate Affairs				
A	Legal Advisors		Legal Services				
A	Directors – Route Asset Management	Route	Asset Management				

*NOTE: Contractors are responsible for arranging and undertaking their own Technical and Awareness Briefings in accordance with their own processes and procedure

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RISK ASSESSING LEVEL CROSSINGS

1 PURPOSE

1.1 This document provides a process for risk assessing level crossing assets.

This document contributes to the control of the following high level risks:

- Level Crossings: vehicle, person or animal on the line at risk of collision; and
- Level crossing – non-collision (with train) incident.

Level Crossing risk assessments form part of a multi-disciplinary process that demonstrates that level crossings remain safe, reliable and legally compliant.

2 SCOPE

2.1 This process describes a method of risk assessing operational level crossings on Network Rail's managed infrastructure. It includes:

- a) the core level crossing risk assessment process;
- b) frequency of risk assessments;
- c) use of the All Level Crossing Risk Model (ALCRM) as the risk model;
- d) monitoring and response to level crossing incidents and accidents; and
- e) level crossing risk records.

It does not apply to authorised walking routes that cross the railway unless they are classified as a staff crossing with white lights. It does not apply to road rail access points or track access points.

A flowchart of the process is shown in Appendix A. A RACI chart is shown in Appendix B.

3 GENERAL

3.1 Operational level crossings on Network Rail managed infrastructure shall be risk assessed as required by [NR/L2/OPS/100 – Provision, Risk Assessment and Review of Level Crossings](#).

Risk assessment of level crossings shall include:

- an ALCRM assessment of risk incorporating site visit, census and data collection;
- demonstration of collaborative working with stakeholders;
- optioneering; and
- production of a Narrative Risk Assessment (NRA).

Level crossings shall be risk assessed at the required frequencies, see Section 5.

At hybrid level crossings where separate public and private rights exist, a separate risk assessment shall be conducted for each element of the asset.

Note 1: All elements of a level crossing risk assessment should normally be undertaken by the same person.

Note 2: An example of a hybrid level crossing is one where a public footpath and private vehicle gates each provide separate means of access across the railway.

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4 COMPETENCE

4.1 Level crossing risk assessments shall be undertaken by risk assessors who:

- have completed the level crossing risk assessment training; and
- have demonstrated the capabilities necessary to undertake level crossing risk assessments; or
- are under mentorship by someone who is competent to undertake level crossing risk assessments.

Note: The level crossing competence framework is shown in Appendix C.

5 RISK ASSESSMENT FREQUENCY

5.1 Calculated Frequency

The frequency of level crossing risk assessments shall be based on the calculated risk for each crossing. The calculated frequency is the minimum frequency at which crossings shall be risk assessed.

Note 1: The minimum risk assessment frequencies are calculated by ALCRM using the live risk scores. Risk assessment frequencies may be increased, see Section 5.2.

Crossings are placed into one of four categories. The categories, their associated risk assessment frequency and categorisation criteria are shown in Table 1.

The risk assessment frequency for hybrid level crossings shall be determined by the highest risk score.

Category	Criteria	Assessment Frequency (Years)
Red	<ul style="list-style-type: none">Individual risk is ACollective risk is 1Collective risk is 2Collision frequency (pedestrian + vehicle) is > 0.01	1.25
Yellow	<ul style="list-style-type: none">Individual risk is BIndividual risk is CCollective risk is 3Collision frequency (pedestrian + vehicle) is > 0.001Sighting time is less than warning time by > 4 seconds <p>Note: This does not take mitigations such as whistle boards and telephones into account</p>	2.25
Double Yellow	Risk score is not M13 and no red or yellow criteria apply	3.25
Green	Risk score is M13	Not assessed

Table 1 – Risk assessment frequency and risk categorisation criteria

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Note 2: Level crossing MSTs in Ellipse should align to ALCRM frequencies and be reviewed as part of an annual check of risk assessment frequencies.

5.2 Calculated Risk Assessment Frequency Review

The risk assessor shall review the risk assessment frequencies calculated by ALCRM. The frequency may be increased where structured expert judgement or limitations in ALCRM's ability to model crossing specific risks are present. The risk assessor shall record their decision when the frequency is increased.

5.3 Additional Risk Assessment triggers

A level crossing risk assessment shall be carried out:

- a) at the evaluation stage for new crossings, proposed renewals, or alterations to the type of protection;
- b) after commissioning of the renewal or safety enhancement of a level crossing;
- c) within four weeks of a formal expression of concerns from internal or external stakeholders, e.g. TOCs (Train Operating Companies), ORR (The Office of Rail Regulation), highways authority, authorised user;
- d) before significant timetable changes (as a minimum, optioneering of the impact of timetable change), see [NR/L2/OCS/031 – Rail Assessment and Briefing of Timetable Change](#);
- e) before alterations to permissible line speeds, see [NR/L2/SIG/30021 – Alterations to Authorised Line Speeds](#);
- f) within four weeks of an incident of misuse, near miss or accident which triggers the requirement for a risk assessment, see Table 2;
- g) before Network Rail responds to planning proposal consultations that indicate a substantial change in traffic volumes, patterns or speeds (as a minimum, optioneering of the impact of traffic volume);
- h) following a report of a significant change in the environment which has an impact on a level crossing;
- i) within four weeks of receiving information of substantial increase in road traffic volume;
- j) before infrastructure changes that affect a level crossing, e.g. new lines / sidings, line closures or the reopening of mothballed lines.

Note 1: Risk assessments are also undertaken to support decision making for enhancements projects or stand-alone renewals.

Note 2: Apply structured expert judgement when deciding if changes are significant or substantial.

Note 3: In the case of very lightly used crossings a small increase in the number of road vehicles will have a greater impact on risk.

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6 RISK ASSESSMENT PROCESS – COLLATE INFORMATION

6.1 Initial Contact with Authorised Users of User Worked Crossings (UWC)

Risk assessors shall use the Customer Relationship Management (CRM) system to correspond with authorised users. Authorised users of user worked crossings shall be sent the templated authorised user initial letter which includes the authorised user questionnaire. Letters shall be sent between two and three months before the date of the next scheduled risk assessment.

Note: Contact with authorised users of user worked crossings is important to support our understanding of risk. It enables us to work jointly with authorised users to improve level crossing safety.

Letters shall be sent with a pre-paid envelope for authorised users to respond.

Authorised users might provide an email address as their preferred means of contact. In these circumstances, authorised user letters should be sent as email attachments.

6.2 Follow Up Contact with Authorised Users of User Worked Crossings

Where contact telephone numbers are available, risk assessors shall telephone authorised users to confirm their attendance at the site visit.

6.3 Prepare for Site Visit

Risk assessors shall prepare for the site visit. As a minimum this shall include:

- a) completing the office based element of the risk assessment;
- b) a review of previous census data;
- c) deciding which type of census will be undertaken. Factors to take into account include time of day, duration and need for a second census due to seasonal variations;
- d) obtaining crossing usage information held by the controlling signal box e.g. records of requests to use the crossing entered in the occurrence book for user worked crossings, drivers of long or slow moving vehicles, herding animals; and
- e) using appropriate 'smart' sources of information, e.g. local sources of information on crossing usage held in site logs by businesses or reports from residents, Google maps, local authority websites, SMIS (Safety Management Information System).

Note: See Level Crossing Guidance documents LCG 01 and LCG 02 which are available on the Level Crossings Hub.

6.4 Stakeholder Involvement

Risk assessors shall decide if stakeholder representation is needed during the site visit. Arrange to meet stakeholders on site when their attendance is needed.

6.5 Carry Out Site Visit

Risk assessors shall use a mobile device when undertaking the risk assessment site visit.

Risk assessors shall use the mobile device to record site visit inputs to risk assessments. The mobile device shall only be used in a position of safety.

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Note: The mobile device presents risk assessors with the relevant questions for the crossing being risk assessed. It provides risk assessors with the available fields and options to record the inputs to the risk assessment.

If the mobile device fails, risk assessors can undertake risk assessment site visits using data collection forms.

6.6

Confirm Usage – No Users Observed

At crossings where a quick census is undertaken, no users are observed and there is no visual or other supporting evidence of crossing use:

EITHER:

- a) where possible carry out appropriate local investigations to substantiate usage, e.g. contact the authorised user, speak to nearby residents, check the internet for local walking groups etc; and
- b) information supports the crossing is not being used;
- c) where possible, establish and record if non-usage is temporary or permanent;
- d) record no use as an estimated census in ALCRM and add supporting commentary.

Note 1: Where permanent non-use has been established, closure should be pursued.

Note 2: If agreement can be reached with the authorised user, lock crossing out of use until such time as it is needed again.

OR:

- e) if local investigations are not possible;
- f) record no use as an estimated census in ALCRM and add supporting commentary;
- g) deploy census equipment for a minimum of one month to verify if the crossing is being used. If this confirms that;

EITHER

- 1. the crossing is being used, update the risk assessment with the revised census information and continue to risk assess at the required frequency;

OR

- 2. the crossing is not being used, the risk assessment remains valid. Confirm its M13 status in ALCRM and continue to monitor for use during asset inspection visits.

If monitoring during asset inspection visits identifies that the crossing is being used, conduct a new risk assessment within four weeks.

If informed that a crossing with M13 status is being used, a new risk assessment shall be conducted within four weeks.

Note 3: Interim measures might be needed before the new risk assessment is conducted.

A flowchart of the action to take is shown in Figure 1.

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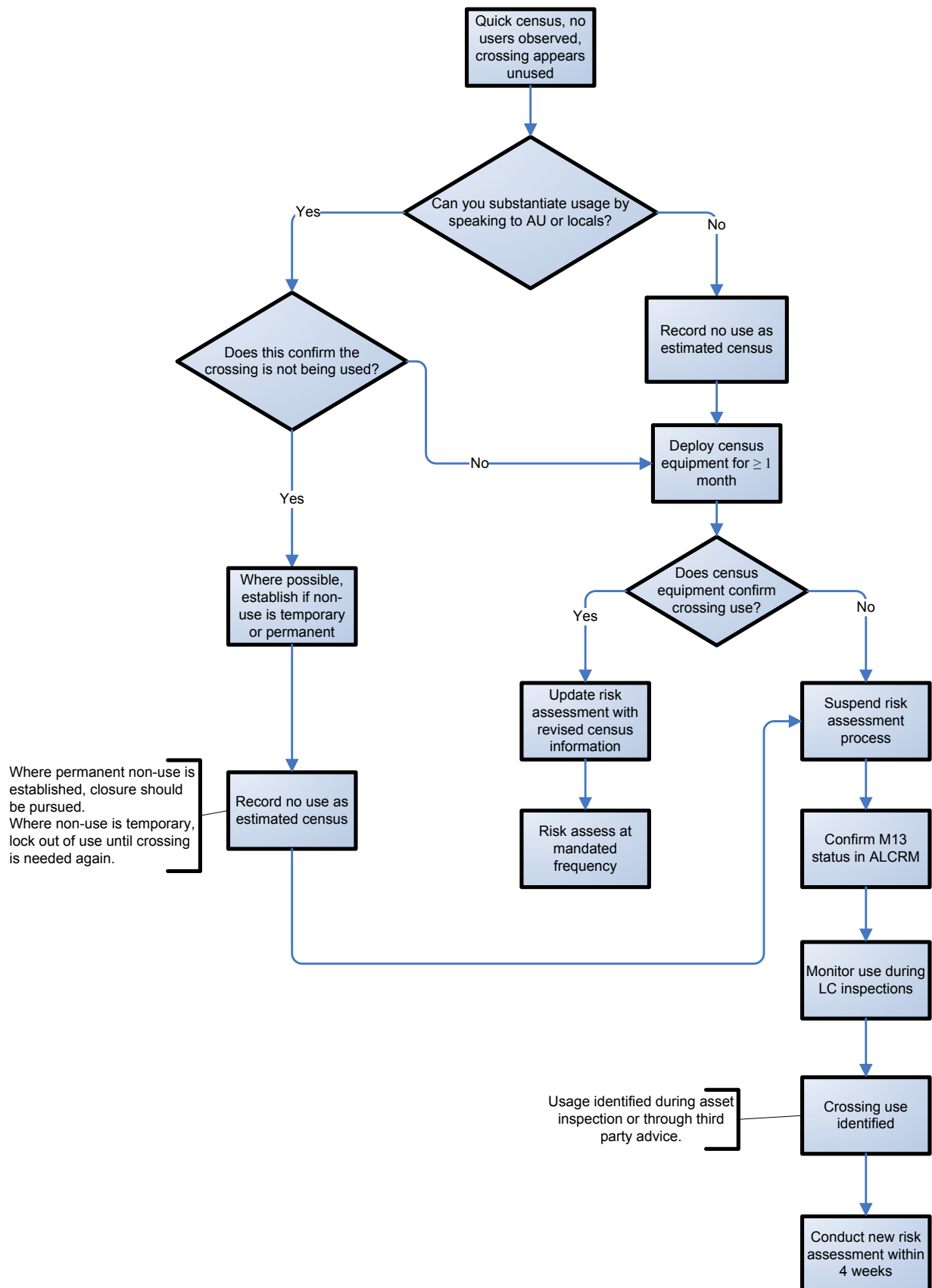


Figure 1 – Substantiating use of M13 status

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6.7 Post Site Visit Follow Up

After completing the site visit, follow up checks might be needed. These can include:

- a) checking the accuracy of data collected; or
- b) speaking to an outside party, e.g. a local business; or
- c) conducting an additional site visit.

6.8 Submit Data into ALCRM

Risk assessors shall commit the data collected for the risk assessment into ALCRM from the mobile device.

Note: To avoid loss of data, always commit the data collected where full Wi-Fi is available.

Where risk assessment data is not recorded on the mobile device, e.g. device failure or paper copy used, risk assessors shall manually enter the data into ALCRM.

6.9 Check for Existing Safety Benefits

Check the mitigations tab of the previous risk assessment in ALCRM to determine if any safety benefits have been applied, e.g. spoken alarm or red light safety equipment. Apply the safety benefits to the new risk assessment if still applicable.

6.10 Carry Out ALCRM Sign Off Checks

A sign off check shall be undertaken for each risk assessment. This shall be conducted by a person who meets the requirements of Section 4.

The person undertaking the check should focus on key inputs and sense check all data for errors and anomalies. Any issues identified shall be discussed with the relevant risk assessor. Agreement shall be reached on any corrective action to be taken prior to sign off.

6.11 Sign Off ALCRM Risk Assessment

Risk assessments shall be signed off in ALCRM:

- a) within six weeks of the site visit; and
- b) a person who meets the requirements of Section 4.

6.12 Changes to Risk Assessment Frequency

ALCRM provides a warning of change in risk assessment frequency. If the risk assessment frequency has changed, the risk assessor shall arrange for the relevant MST (Maintenance Schedule Task) in Ellipse to be updated.

Note 1: Information on changes in risk assessment frequency is held on the Analyse Results page. The change in frequency management report (available on the Level Crossings Hub) can be run periodically to identify changes in risk assessment frequency.

Note 2: MSTs are updated by the Systems Support Manager. If the ALCRM score has changed to M13, the MST should be turned off.

RISK ASSESSING LEVEL CROSSINGS

7 RISK ASSESSMENT PROCESS – IDENTIFY RISK CONTROLS OPTIONEERING

7.1 Optioneering Short and Long Term Solutions

Optioneering is the opportunity to investigate potential safety improvements at a level crossing or its environment. Options that are modelled in ALCRM and selected for progression should be practicable.

Optioneering shall be undertaken on all risk assessments. Optioneering shall be undertaken within 12 weeks of the site visit. Options to be progressed shall be identified and set to 'recommended' status within this timescale.

Potential risk controls shall be identified taking account of:

- a) the ALCRM outputs;
- b) key risk drivers;
- c) structured expert judgement; and
- d) other sources e.g. advice from other experts or key stakeholders.

Risk controls shall include short and long term solutions as appropriate.

New Level Crossing Orders place requirements on Network Rail and local authorities to agree long term strategies for public road level crossings. Discussions and agreements shall be referenced in the NRA, see Section 7.10, and recorded in the level crossing file, see Section 10.1.

Note 1: Risk assessors can create a first version of the NRA to assist with identifying risk controls during optioneering.

Note 2: The Level Crossing Risk Management Toolkit (LXRMTK)

<http://www.lxrmtk.com> and the Level Crossing Risk Management Catalogue are good sources of risk control and human factors information.

Note 3: See 7.9.2 for action to be taken when risk is deemed to be adequately managed by existing controls and no further mitigations are reasonably practicable.

Note 4: It is good practice to agree long term strategies for all public road level crossings and footpath crossings with local authorities. All long term strategies should be developed in consultation with the Route Asset Manager.

7.2 Optioneering Interim Risk Controls:

Interim risk controls might be needed in addition to short and long term solutions. As a minimum, interim risk controls shall be evaluated and progressed in the following circumstances:

- a) deficient sighting; or
- b) where a significant risk would exist pending delivery of short or long term solution(s).

Note: See guidance on Managing Interim Risk at Level Crossings. Interim risk controls should be modelled as short term options in ALCRM.

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7.3 Copy Previous Options

Relevant options from the previous risk assessment shall be copied onto the new live risk assessment.

Note 1: Relevant options can include those that:

- a) control risk and have not previously been recommended or approved;
- b) have been previously recommended and are awaiting financial authority to progress to approved stage; or
- c) are approved options awaiting delivery.

Note 2: Previous options being copied should be checked and where needed amended for consistency with the new risk assessment, e.g. census numbers, sighting distances, train service data.

7.4 Analyse Results

Modelled options shall be analysed to determine which:

- a) give the greatest safety benefit as measured in Fatalities and Weighted Injuries (FWI);
- b) are effective at controlling and / or reducing risk conditions present at the crossing, e.g. address key risk drivers, known incidents of misuse or potential consequences of an incident or environmental risks; and
- c) are achievable and practicable.

7.5 Carry Out Cost Benefit Analysis (CBA)

CBA shall be carried out on options that meet the requirements of Section 7.4. The CBA shall be completed using the Network Rail CBA tool.

The CBA will give a benefit to cost ratio. CBA shall be used to support the decision when selecting options that will be progressed.

The following can be used to support decision making:

- a) benefit to cost ratio is ≥ 1 : positive safety and business benefit established;
- b) benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established; and
- c) benefit to cost ratio is between 0.0 and 0.49: weak safety and business benefit established.

CBA might not be needed in all cases, e.g. low cost solutions or remedies for enforcement action. CBA gives an indication of overall business benefit. It should be used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA does not always adequately reflect the safety benefit that can be achieved by implementing an option.

Note: Where a business to cost ratio is < 1 , supporting documentation will be needed to progress an option.

7.6 Final Option Selection

Decide which option(s) will be progressed for implementation.

Note 1: This could include discussing with and obtaining the support of the wider Route team.

Note 2: More than one option can be progressed. Option(s) can include interim, short and long term risk controls.

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7.7 Recommend Option(s)

All option(s) that are:

- a) being progressed; or
- b) are to be progressed in the future;

shall be set to 'recommended' status in ALCRM.

Note: The ALCRM User Guide gives guidance on recommending options. Optioneering guidance is being developed.

7.8 Seek Option Approval

Obtain approval for the selected option as appropriate.

Seek financial authority for the selected option(s) where needed.

Note: This includes obtaining the support of an Investment Panel where appropriate. A sponsor might be appointed.

For technical solutions, establish the high level feasibility of selected option(s).

7.9 Option(s) Approved

7.9.1 Options to be progressed

When a feasible option has obtained approval, including financial authority where needed, it shall be set to 'approved' status in ALCRM.

Review the progress of recommended option(s) that have not gained financial authority or where feasibility has not been established within six months. Establish if the option remains viable.

Risk assessors shall revisit option selection, see Sections 7.1 and 7.2 if options are not approved or are not viable.

7.9.2 No options to be progressed

Risk assessors shall 'recommend', 'approve' and 'implement' a 'no further SFAIRP mitigation identified' option. Where:

- a) risk is deemed to be adequately managed by existing risk controls, e.g. at a CCTV level crossing; and
- b) no further safety benefits are reasonably practicable.

Note: SFAIRP – so far as is reasonably practicable.

7.10 Complete a Narrative Risk Assessment (NRA)

The risk assessor shall complete a NRA for the level crossing being risk assessed.

As a minimum a NRA shall contain:

- a) information automatically extracted from ALCRM;
- b) enhanced qualitative narrative to greater articulate the risks present and support decision making;
- c) conclusions relating to the management of risk in the interim, short and long term; and
- d) evidence of risk control option(s) identified, those being progressed and those identified for future progression.

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The NRA shall be completed within 12 weeks of the site visit.

Note 1: The process for creating and guidance for completing NRAs are available on the Level Crossings Hub.

Note 2: The NRA is a risk assessment report for the level crossing. It should be written in report format.

Note 3: Review the joint long term strategy for all public road crossings when completing the conclusions.

7.11 Notify Authorised Users of Risk Assessment Outcome

When the risk assessment is complete, the risk assessor shall send authorised users of user worked crossings the templated authorised user follow up letter and appropriate safe crossing usage information.

If the authorised user has provided alternative contact details, e.g. an email address, and confirmed they prefer to be contacted using these details, the letter shall be sent using the alternative contact details.

Note: Authorised user letter templates are contained in CRM.

8 RISK ASSESSMENT PROCESS – IMPLEMENT RISK CONTROLS

8.1 Stakeholder Management

Risk assessors shall:

- a) Maintain contact with stakeholders to keep them updated on the progress of approved options;
- b) Inform stakeholders that work is due to take place before it commences.

8.2 Track Option Implementation:

Risk assessors shall progress and track option(s) until they are implemented. Liaise with the sponsor and / or delivery agent as needed.

Work closely with teams implementing the works.

Recommended option(s) that have not been progressed within 12 months of the risk assessment date shall be reported six monthly. The report shall be run by the Route Level Crossing Manager (RLCM) / Operations Risk Advisor (ORA).

Note 1: The suite of ALCRM management reports includes an optioneering report.

Note 2: Risk assessors should review the recommended options report to advise if options are still viable.

8.3 Implement Delivered Option

Risk assessors shall establish that an option has been implemented and the expected safety benefits are achieved. Evidence of implementation can include:

- a) site visit;
- b) photographs; and
- c) documentary evidence, e.g. changes to ground plans, Level Crossing Orders etc.

When this has been established the option status shall be set to 'implemented' in ALCRM.

Update ALCRM to reflect temporary or permanent closure of a level crossing.

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Follow the requirements of Section 6.12 to determine if the risk assessment frequency has changed.

Note 1: This will generate a new live risk assessment. The risk assessment date will remain as the date of the site visit on which the implemented option is based.

Note 2: Guidance on closing and archiving crossings in ALCRM is given in AUG/CA, which is available on the Level Crossings Hub.

Note 3: Implementing a risk control option can result in a change to the risk assessment frequency and reduce the FWI.

8.4 Carry Over Ongoing Options

Where more than one option is being progressed, carry over any other ongoing recommended or approved options to the new live risk assessment, see Section 7.3.

8.5 Notify Stakeholders

Notify internal and external stakeholders of implemented options.

8.6 Decide if a New Risk Assessment is Needed

Factors to take into account include:

- a) the time elapsed between the date of site visit and delivery of implemented option; and
- b) the requirements of Section 5.3.

Restart the process if a new risk assessment is needed.

9 LEVEL CROSSING INCIDENTS AND ACCIDENTS

9.1 Identifying Incidents and Accidents

Risk assessors shall review daily Route Control logs and SMIS downloads to identify incidents and accidents affecting level crossings for which they are responsible.

This includes incidents of misuse, near misses and accidents.

9.2 Follow Up to Incidents and Accidents

Risk assessors shall implement the actions described in Table 2.

When undertaking trigger risk assessments of user worked crossings, risk assessors shall document the method of contact and attempts to contact authorised users in the relevant level crossing file.

Where possible, involve other stakeholders in the review of risk assessments, findings and recommended actions arising from incidents and accidents. Stakeholders include Highway Authorities, Environment Agency, the BTP (British Transport Police), Emergency Services and Road Rail Partnership Groups, etc.

Note 1: Risk assessors should keep a record of incidents and accidents on the level crossings for which they are responsible to help identify when the triggers given in Table 2 are reached.

Note 2: Risk assessors should identify potential factors that might cause or increase misuse and the controls to address the risks. Risk assessors should maintain regular contact with Community Safety Managers so they are aware of route crime incidents at level crossings.

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9.3 Report Reconciliation

Risk assessors shall reconcile data recorded in the Route Control log and SMIS for each period within one week of receipt of the report. Risk assessors shall inform the Safety Reporting Specialist (SRS) of any discrepancies. Risk assessors shall reach agreement with the SRS on any discrepancies identified and how they will be recorded in SMIS.

Note: Risk assessors might receive other reports or information about incidents and accidents from local sources that can clarify the location or circumstances of incidents.

10 LEVEL CROSSING RISK RECORDS

10.1 Level crossing files shall be maintained in accordance with [NR/L3/OCS/041/5-20 – Level Crossing Administration](#). Records shall include:

- a) copies of all correspondence sent to the authorised users of UWCs;
- b) copies of completed NRAs;
- c) correspondence related to the consideration of and decisions about proposed risk controls;
- d) correspondence relating to actual or potential closures;
- e) long term strategy agreements and proposals;
- f) actions taken as a result monitoring and response to incidents and accidents;
- g) general correspondence relating to the risk management of level crossings.

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Table 2 – Responding to Incidents and Accidents

Crossing Type	Definition of Misuse	Trigger	Action Required	Definition of Near Miss	Trigger	Action Required	Definition of Accident	Trigger	Action Required
ABCL, AHB, AOCL(+B), AOCL, AOCR	Crossing of the line during the warning sequence by vehicles or pedestrians Irregular use of the crossing by a long, low or slow moving vehicle	3 times in a period of 12 months	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months	Crossing of the line during the warning sequence by vehicles or pedestrians necessitating emergency braking to be initiated by the train driver or too late for avoiding action to be taken	After each reported occurrence	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months	Train has struck a vehicle or pedestrian or a vehicle has struck a train	After each reported occurrence (except pedestrian suicides)	Undertake additional risk assessment
MCB type, MG	Crossing of the line during the warning sequence by vehicles or pedestrians Barrier Strikes before the crossing clear button is pressed	3 times in a period of 12 months	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months	Barrier Strikes after the crossing clear button is pressed	After each reported occurrence	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months	Train has struck a vehicle or pedestrian or a vehicle has struck a train	After each reported occurrence (except pedestrian suicides)	Undertake additional risk assessment

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Crossing Type	Definition of Misuse	Trigger	Action Required	Definition of Near Miss	Trigger	Action Required	Definition of Accident	Trigger	Action Required
Open	Crossing of the line during the approach of a train (within the minimum required sighting distance)	3 times in a period of 12 months	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months	Crossing of the line during the approach of a train by vehicles or pedestrians necessitating emergency braking to be initiated by the train driver or too late for avoiding action to be taken	After each reported occurrence	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months	Train has struck a vehicle or pedestrian or a vehicle has struck a train	After each reported occurrence (except pedestrian suicides)	Undertake additional risk assessment
UWC type	Crossing of the line during the approach of a train (within the minimum required sighting distance) Non use of telephone when provided (except incidents of the user failing to call back after use) Crossing when the MSLs are red Gates left open	3 times in a period of 12 months	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months Make contact with authorised user to invite them to attend the risk assessment	Crossing of the line during the approach of a train by vehicles or pedestrians necessitating emergency braking to be initiated by the train driver or too late for avoiding action to be taken	After each reported occurrence	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months Make contact with authorised user to invite them to attend the risk assessment	Train has struck a vehicle or pedestrian or a vehicle has struck a train	After each reported occurrence (except pedestrian suicides)	Undertake additional risk assessment If appropriate, make contact with authorised user to invite them to attend the risk assessment

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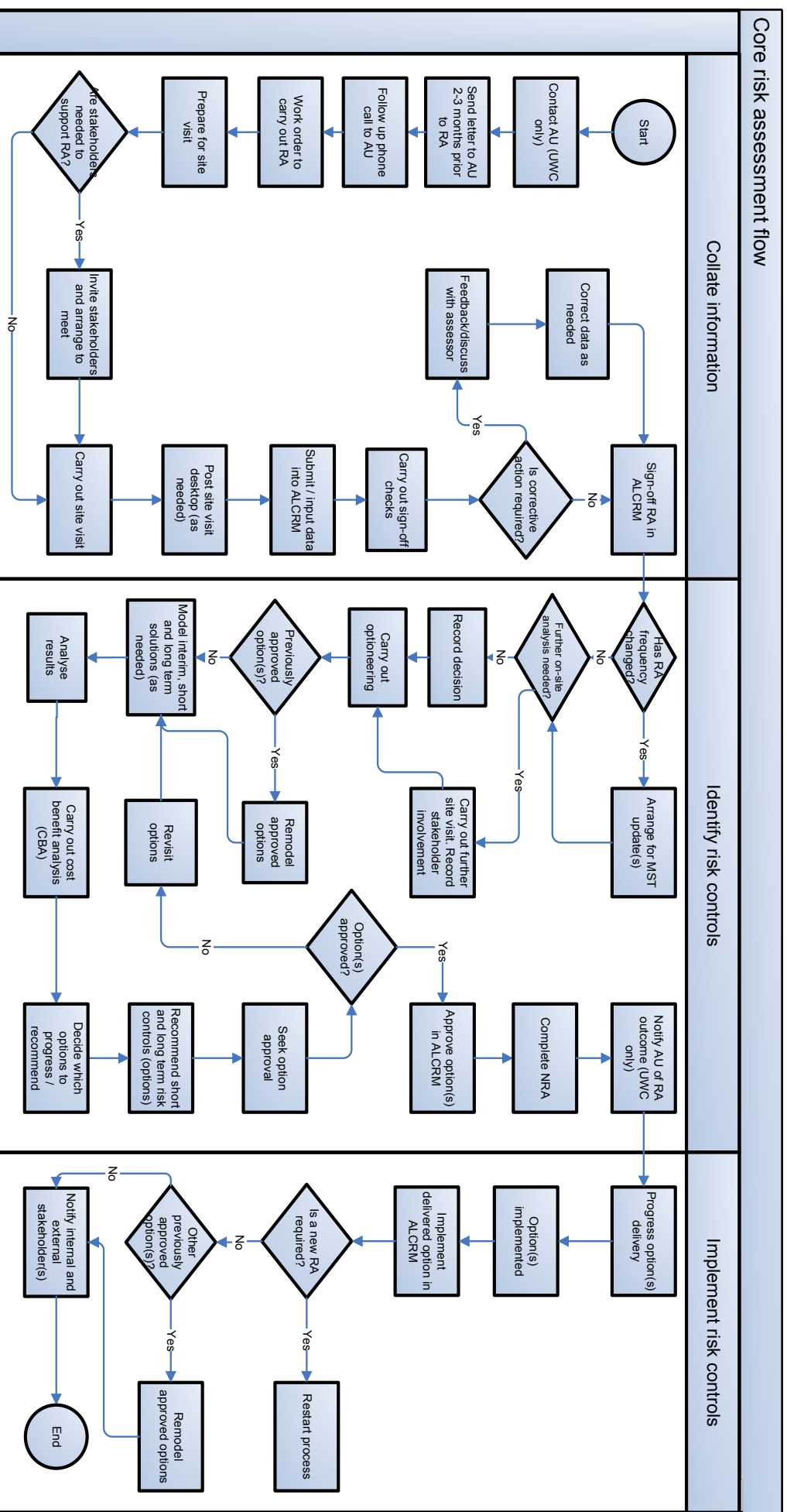
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Crossing Type	Definition of Misuse	Trigger	Action Required	Definition of Near Miss	Trigger	Action Required	Definition of Accident	Trigger	Action Required
BW, FP, Station pedestrian crossings	<p>Crossing of the line during the approach of a train (within the minimum required sighting distance)</p> <p>Crossing when the MSLs are red</p> <p>Crossing when the White Light Indicator is extinguished</p>	3 times in a period of 12 months	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months	<p>In any of the following circumstances:</p> <ul style="list-style-type: none"> crossing of the line during the approach of a train crossing when the MSLs are red crossing when the White Light Indicator is extinguished necessitating emergency braking to be initiated by the train driver or too late for avoiding action to be taken 	After each reported occurrence	Undertake additional risk assessment unless within 6 months of last routine risk assessment or a risk assessment has already been undertaken in accordance with this table within the last 12 months	Train has struck a pedestrian or horse	After each reported occurrence (except pedestrian suicides)	Undertake additional risk assessment

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Appendix A

RISK ASSESSMENT FLOWCHART



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Appendix B

RESPONSIBILITIES

<p>R – Responsible is the person or people who are responsible for performing a certain task or action.</p> <p>A – An Accountable person is one who has overall accountability to make sure that a task or action is completed.</p> <p>C – Consulted people have an input into the task or action, this can be providing information, reviewing documents or attending workshops etc.</p> <p>I – Informed people are those who receive the output of a task or process.</p>		Level Crossing Manager	Route Level Crossing Manager / Operations Risk Advisor	Authorised User	External stakeholders	Internal Stakeholders	Sponsor
3	General	R	A C				
5	Scheduled risk assessment	R	A C				
6	Collate information	R	A C	C	C	C	
7	Identify risk controls	R	A C	I	C	C	C
8	Implement risk controls	R	A C	I	I	C	C
9	Level crossing incidents and accidents	R	A C	C	C	C	
10	Level crossing risk records	R	A				

APPENDIX C

LEVEL CROSSING COMPETENCE FRAMEWORK

C.1 **PURPOSE**

C.1.1 This procedure details the competency assessment process for those required to maintain competency to carry out the role of Level Crossing Manager (LCM).

Note: The level crossing competency standard Authority to Work together with relevant AiTL give Level Crossing Managers their authority to undertake their role.

C.1.2 An LCM can be classed as a Level Crossing Manager or a person competent to carry out the role. LCMs are employed specifically to undertake the risk management of level crossings and do so as part of their core duties. Other persons competent to carry out the role are those staff within the function that will only undertake risk management of level crossings in emergency or during contingent situations. They need to maintain competency to do so.

C.1.3 All activities or tasks that an LCM undertakes have been risk assessed and graded as low, medium or high risk.

C.1.4 Activities or tasks that have been graded as low risk carry an assumed competency unless evidence is available to indicate non-compliance or poor performance.

C.1.5 Medium and high risk activities or tasks are assessed through direct observation, the submission of supporting evidence and by simulation and knowledge tests.

C.1.6 All risk levels are supported by:

- a) observation of the LCM;
- b) professional discussion as part of the bands 1 to 4 performance management process;
- c) naturally occurring performance indicators; and
- d) simulation and knowledge tests.

C.1.7 An additional assessment of the non-technical skills of capabilities and behaviours demonstrated by an LCM supports Line Managers' decisions on competence.

C.2 **GUIDANCE AND CLARIFICATION**

C.2.1 Line Managers and other staff who need further clarification on the contents of this document should contact the Level Crossing Risk Manager, National Level Crossing Team.

Note: See Managing Level Crossing Risk Management Competence Guidance LCG 07 which is available on the Level Crossings Hub.

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- C.2.2 The assessment and development day will comprise of:
- a) an observation of the LCM conducting a planned level crossing data collection;
 - b) input into ALCRM;
 - c) considered and recommended options;
 - d) review of the LCM's performance and supporting evidence of their risk management of their core crossing types.
- C.2.3 There will be simulation and knowledge testing for medium and high risk activities that are not a normal part of the LCM's activity, or where there is insufficient naturally occurring evidence.
- C.2.4 Line Managers regularly and actively assess the competence and performance of LCMs by direct observation of level crossing risk management activities. These observations take place during visits to each LCM on their area. These visits, known as Observation visits are detailed in C.9.
- C.2.5 Line Managers agree action plans with LCMs where any gaps exist regarding an individual's competence. Where considerable knowledge gaps and lack of understanding are identified, Line Managers decide whether to remove an individual's Authority to Work (AtW) certification until competence has been reviewed, re-assessed and regained.

C.3 DEFINITIONS

LCM	Any individual permanently required to undertake risk management of level crossings.
Person competent to carry out the role	Anyone who is not permanently employed to undertake risk management of level crossings but may be required to under contingent arrangements.
Competence	The ability to perform activities to the standards expected in employment. It is a combination of practical and thinking skills, experience and knowledge, soft skills and behaviours. It includes the willingness of an individual to consistently perform a task to the standard required.
Line Manager	The manager who is directly responsible for LCMs who are required to maintain competency to undertake risk management of level crossings.
Line Manager – qualification	To carryout the requirements of this procedure Line Managers (or any nominated deputy) need to be a qualified assessor as set out in C.16.
Non-technical skills	Non-technical skills are core behavioural capabilities of those responsible for the management of level crossing risk.

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C.4 COMPETENCE FRAMEWORK OVERVIEW

C.4.1 Each LCM shall be subject to a one yearly competency cycle.

C.4.2 Each cycle shall be sub divided into two cycles of 26 week duration.

Note: Each level crossing risk management activity and task that an LCM is required to undertake have been risk assessed and graded as low, medium or high risk.

C.4.4 Low risk activities shall be given an assumed competency unless evidence is available to suggest non-compliance or poor performance.

C.4.5 Medium and high risk activities or tasks shall be assessed through one to one discussion, direct observation and the submission of supporting evidence and by simulation and knowledge tests.

C.4.6 LCMs shall attend an assessment and development day with Line Managers once each 26 week cycle. They shall undertake those observations, knowledge tests and simulations detailed in the competency cycle. LCMs shall provide self-generated evidence of their level crossing risk management activity in support of their competence.

Note: More frequent assessment and development days can be undertaken if needed.

C.4.7 In support of the knowledge testing and simulation, Line Managers shall:

- a) undertake observation visits,
- b) monitor safety critical voice communications; and
- c) undertake non-technical skills assessments with LCMs.

C.4.8 AtW certificates for this competence shall be issued to LCMs at the commencement of each one year cycle.

C.5 COMPETENCE CYCLE

C.5.1 All tasks and activities that LCMs are required to maintain competency in have been defined and grouped into units and elements. These units and elements have been graded as high or medium risk.

C.5.2 Within each 26 week cycle, the competency cycle dictates which high and medium risk elements will be tested and assessed.

Note: The competency cycle is published on the competence management system.

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C.6 SIMULATION

C.6.1 Line Managers shall undertake simulations at each assessment and development day. The topics to be tested are scheduled in the competency cycle.

Note 1: All simulation scenarios are based on the medium and high risk elements within the competency cycle. The majority of simulations are generic and are applicable to all LCMs with some exceptions.

Note 2: Line Managers are issued with an assessor pack for each simulation. It includes all materials needed to conduct the simulation and to record the actions and output from the LCM. This includes competence decisions and responses to 'what if' questions. 'What if' questions are provided to enhance the generic simulations to provide location based specifics that could not be replicated within the scenarios.

C.6.2 Where a simulation is not provided that adequately matches a particular circumstance, utilise locally produced scenarios. These scenarios shall match the requirements of each simulation topic.

C.6.3 Line Managers upload the output from the simulations and the resulting competence decisions to the competence management system.

C.6.4 Line Managers shall indicate which 'what if' questions are used. They shall record LCM's responses to the questions.

C.6.5 Line Managers shall use their judgement and technical knowledge to determine if the LCM is competent in the activities and tasks being assessed. In making this determination Line Managers might need to carry out coaching.

Note: The simulation supported by 'what if' questions allow Line Managers to assess LCMs' overall understanding and ability to apply their knowledge.

C.6.6 Line Managers are required to make a decision on an individual's competence status. An individual can be assigned as:

- a) not yet competent with a Development Action Plan (DAP) and suitable mitigations in place;
- b) competent with a DAP plan in place; or
- c) competent and confident.

Note: To be assigned competent and confident an individual should demonstrate the technical knowledge and have clear self belief in their level of understanding and its application.

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C.7 **ASSESSMENT AND DEVELOPMENT DAY**

- C.7.1 LCMs and their Line Managers shall undertake an Assessment and Development Day during each 26 week cycle.
- C.7.2 LCMs shall provide evidence of level crossing risk management activity to support their development day. LCMs shall undertake knowledge tests as required and simulations allowing Line Managers to:
- a) identify an individual's strengths;
 - b) identify any areas for development;
 - c) provide coaching; and
 - d) address any minor knowledge deficiencies highlighted during area visits.
- C.7.3 The observational element of assessment and development days shall consist of Line Managers observing LCMs:
- a) conducting a planned level crossing site visit; and
 - b) assessing the LCM's knowledge and understanding of the risks associated with the level crossing.
- C.7.4 Following the observational element, LCMs shall discuss the following topics with their Line Managers:
- a) options they would consider and recommend including their reasoning;
 - b) LCM's self-generated evidence of their risk management of their core crossing types; and
 - c) non-technical skills capability assessment record.
- C.7.5 When Line Managers cannot reach a decision on an LCM's competence based on observation and submitted evidence, the LCM shall undertake the competence cycle determined knowledge tests and simulation. Knowledge tests of high risk activities shall be followed by simulations of the same activity. See C.14.3 for action to be taken if competency cannot be established.

C.8 **PERSON COMPETENT TO CARRY OUT THE ROLE**

- C.8.1 Persons competent to carry out the role shall undergo the process set out in this procedure.
- C.8.2 Persons competent to carry out the role shall have a test menu set up by their Line Manager. It shall include a dated plan for the assessments to take place within the one year cycle. A minimum of one assessment day shall be completed within each one year competency cycle.

Note 1: The test plan should be set up with the support of the relevant RLCM / ORA.

Note 2: At least one assessment session should take place within the first six month period of this new procedure commencing.

- C.8.3 It is recognised that Line Managers of some persons competent to carry out the role might not have the required competence to conduct assessments. It is permitted for any person competent to carry out the role to be assessed by a manager who meets the requirements of C.16.

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C.9 VISITS TO LEVEL CROSSING MANAGERS

C.9.1 Line Managers shall visit each LCM they are responsible for a minimum of once in every alternate period.

Note: This allows the Line Manager the chance to observe and discuss the LCM carrying out level crossing risk management activity in their normal working environment. This can include level crossing asset inspections.

C.9.2 Each visit should be of a duration that allows:

- a) Line Managers the opportunity to observe and discuss with the LCM any issues they may have; and,
- b) LCMs the opportunity to present any evidence they wish to be considered in support of their competence.

Note: Line Managers should allow sufficient time so that the individual's performance can be considered and assessed as being to an acceptable level.

C.9.3 Line Managers should give consideration to undertaking visits to LCMs when LCM workload is at the maximum level.

Note: Visits at these times might be of more value than visits to the LCM when workload is at a minimum.

C.9.4 During each visit Line Managers shall as well as observing and discussing the individual's performance, check outputs from any activity outside normal business as usual issues.

C.9.5 Where Line Managers become aware that the LCM is not performing at an acceptable level, they shall discuss the performance issues with the individual. A DAP shall be opened immediately.

Note: This should include making the individual aware which areas of performance are not at the required standard.

C.10 MONITORING OF VOICE COMMUNICATIONS

C.10.1 Within the one year competency cycle, Line Managers shall monitor and rate a sufficient number of naturally occurring safety critical communications associated with the high risk activities to deem an LCM competent.

C.10.2 Line Managers shall decide how many naturally occurring safety critical communications they will monitor for each LCM.

C.10.3 Where, due to the nature of the voice recorder coverage on the area, naturally occurring safety critical communications recordings are not available for high risk activities. Line Managers shall use the output from the Simulations as evidence of voice communications, provided the Line Manager has the agreement of their Line Manager.

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C.10.4 The outcome of assessments shall be managed as shown in Table C.1.

Rating	Outcome	Immediate Action	Follow up Action
A and B	Competent	None.	None.
C	Competent with minor development	Agree a DAP plan with the LCM.	<ul style="list-style-type: none"> Monitor further until LCM can consistently deliver voice communications graded B or above. Agree frequency of monitoring with LCM
D	Not yet competent	<ul style="list-style-type: none"> Discuss outcome with LCM within one week of development need being identified. Make clear which elements of safety critical communications need to be improved Agree a DAP with the LCM. 	<ul style="list-style-type: none"> Assess a sufficient number of further communications in the following month to determine if there has been an improvement or whether further action is necessary. Monitoring further until LCM can consistently deliver voice communications graded B or above.
E	Not yet competent	<ul style="list-style-type: none"> Discuss outcome with LCM immediately on identifying development need. Make clear which elements of safety critical communications need to be improved Decide if the LCM's authority to work is to be suspended. Agree a DAP with the LCM. 	

Table C.1 – Assessment outcome and actions

C.10.5 The safety critical communications monitoring record form, F3-08A is provided on the competence management system. It shall be completed for each naturally occurring High Risk voice communication and for simulation output voice communications.

C.10.6 In determining if an LCM is competent in Safety Critical Communication Line Managers shall use the process and guidance set out in [NR/L3/OCS/041/3-08 – Voice Recording Checks – Messages Concerning Safety](#).

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C.11 NON-TECHNICAL SKILLS CAPABILITY ASSESSMENT

- C.11.1 Non-technical skills shall be observed at different times and from different sources. The assessment shall be made and during:
- site visits;
 - optioneering;
 - Narrative Risk Assessments etc.
- C.11.2 At a minimum frequency of once every six months, Line Managers shall complete a Level Crossing Manager non-technical skills capability assessment for each LCM they manage. Any issues arising from this assessment shall be documented in a DAP.
- C.11.3 Line Managers shall decide if [NR/L3/OCS/041/2-07 – Operator Additional Monitoring and Support](#) is required by the individual.

C.12 NEW LCMs

- C.12.1 Where new LCMs are appointed, Line Managers shall open a DAP. Use the plan to document the gap between current knowledge and understanding and the knowledge and understanding the individual needs to obtain as part of the process for gaining an authority to work for their area.

C.13 RETURNING TO WORK FROM A PERIOD OF ABSENCE FROM LEVEL CROSSING RISK MANAGEMENT DUTIES

- C.13.1 At the end of any period of absence, and before LCMs return to level crossing risk management duties, Line Managers shall arrange to complete the actions shown in Table C.2.

Length of Absence	Criteria	Action
1 to 6 months	No assessment and development days missed	Decide if following are required; location refresher training and Rule Book / Instruction changes briefing. Decide if the knowledge test and / or simulations will be used to assist the LCM in returning to level crossing risk management duties. Agree a DAP with the LCM for this purpose.
1 to 6 months	Assessment and development day missed	Decide if following are required; location refresher training and Rule Book / Instruction changes briefing. The missed assessment and development day shall take place within 1 month of the individual returning to work. Agree a DAP with the LCM for this purpose.

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Length of Absence	Criteria	Action
Over 6 months	One or more assessment and development day(s) missed	Arrange for the AtW to be suspended. A period of location refresher training shall be undertaken before a new AtW can be issued Rule Book / Instruction changes briefing shall be given. Outstanding observations, knowledge tests and simulations shall be completed. Agree a DAP with the LCM.

Table C.2 – Return to work following periods of absence

Note: In some cases it may be appropriate for the individual LCM to attend all or part of Initial Level Crossing Manager training course.

C.14 ADDRESSING DEVELOPMENT NEEDS

C.14.1 Line Manager supported development

Line Managers shall create DAPs when development needs are identified.

Note: During the Assessment and Development day the Line Manager has an opportunity to coach the LCM. Using the simulation, explaining the activity in a different way or relating the task to the LCM's normal working location may bring clarity to the individual's understanding.

C.14.2 An LCM can fall below standard on simulation results and Line Managers may still return a 'competent' decision. Line Managers shall provide evidence to support these decisions including simulation reports and other supporting evidence. This evidence shall be recorded in the individual's competence record.

C.14.3 If following coaching and open discussions, Line Managers cannot deem the individual competent, Line Managers shall put actions into place to mitigate any risks with the individual's lack of knowledge. This can include the suspension of an individual's AtW until re-training and a successful re-assessment has taken place. The details of action taken shall be recorded in a DAP.

C.14.4 Self-Development

Self-development is aimed at LCMs wishing to develop themselves e.g. by moving to a different location, or broadening their knowledge of core crossing types and associated issues. Appropriate development needs to be judged on a case by case basis. All development actions shall be recorded by Line Managers in the individual's competence record.

Note: Types of development might include opening up further simulations beyond the location specific menu, time on other areas, cab rides, job shadowing, etc.

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C.15 **INDIVIDUAL COMPETENCE RECORD**

C.15.1 Line Managers shall update individual's competence record in Academy.

Note: The individual's competence record is contained within Academy which is the Network Operations Competence Management System (CMS). The Operations Competency Manager assigns access rights to the CMS.

C.15.2 At the beginning of a new competence cycle, a new individual competence record shall be started. The previous completed record shall be closed. Records shall be retained in accordance with Network Rail's records retention requirements.

C.15.3 When LCMs move location within the cycle, the existing Line Manager shall transfer the individual's competence record to the new Line Manager. The new Line Manager shall update the record as appropriate.

C.16 **LINE MANAGER / ASSESSOR COMPETENCE**

C.16.1 Line Managers / assessors competence shall meet the requirements of Table 2.

C.16.2 Line Managers shall maintain occupational and vocational competence in accordance with Table 2.

C.16.3 The Line Managers' Manager shall check that Line Manager / assessor competence is maintained in accordance with Table C.3.

C.17 **VERIFICATION**

C.17.1 Verification shall be carried out in accordance with Table C.3.

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RISK ASSESSING LEVEL CROSSINGS

	Occupational	Vocational	New assessors/verifiers	Existing assessors/verifiers without qualifications	Verification
Line Manager/ assessor	Line Managers shall: a) have undertaken the activity in relation to their location; or b) have performed the activity in the past and currently supervise or train people in the activity; or c) be regarded as technical experts because they directly manage the quality of the activity to be assessed; or d) demonstrate knowledge and understanding in the subject matter to make them a credible assessor.	Line Managers shall hold: a) D32/D33; or b) A1; or c) L20; or d) Network Rail Operations Assessor Qualification	New Line Managers shall successfully complete the Network Rail Operations Assessor training programme and pass the associated knowledge and understanding test.	The Lead Verifier for the scheme involved shall provide guidance on what combination of the above process shall apply to existing assessors without qualifications. <i>NOTE: This should account for the length of time an individual has been assessing and the quality of their assessing.</i>	Shall be observed conducting an assessment and development day at a minimum of once a year. <i>NOTE: This will normally be by their Line Manager.</i>
Verifier	Verifiers shall have: a) undertaken the activity in the preceding five years, or; b) performed the activity in the past and are currently supervising or training people in the activity; or c) be regarded as technical experts because they currently directly manage the quality of the activity to be assessed or they can demonstrate sufficient technical expertise to make them a credible assessor, or; d) written agreement from the Lead Verifier for the scheme in question that they have appropriate occupational competence.	Verifiers shall hold: a) D34; or b) V1; or c) Network Rail Operations Verifier Qualification; or d) other qualification deemed appropriate by the Lead Verifier for the scheme involved.	New Verifiers shall successfully complete the Network Rail Operations Verifier training programme and pass the associated knowledge and understanding test. They shall also be subject to additional monitoring by the Lead Verifier for a period of three months. At the end of this period the Lead Verifier shall deem them competent or shall initiate further development and further monitoring.	The Lead Verifier for the scheme involved shall provide guidance on what combination of the above process shall apply to existing Verifiers without qualifications. <i>NOTE: This should account for the length of time an individual has been verifying and the quality of their verification.</i>	The Network Operations Competence Manager assumes the role of Lead Verifier. Verifiers shall observe the Line Manager / assessor conducting an assessment and development day at a minimum of once a year. The person carrying out this observation will normally be Line Managers' Manager and shall meet the criteria of a verifier set out in this table.

Table C.3 – Line Manager / Assessor Competence and Verification

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CENSUS GOOD PRACTICE

KNOW YOUR CROSSING, ITS USERS AND ITS ENVIRONMENT

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1 Purpose

This document provides guidance in the undertaking of census data collection as part of the risk assessment of level crossing safety.

2 Scope

It is intended for Level Crossing Managers and any other competent person responsible for the safe management and risk assessment of level crossings. It may also be used by other Network Rail personnel undertaking census data collection in support of level crossing risk assessments.

It should be applied to all risk assessments of level crossings and used to support decision making regarding the best means to obtain accurate census data, so far as is reasonably practicable.

3 The importance of accurate census

Census is one of the underpinning elements of a level crossing risk assessment. It is one of the most important influences on the level of risk. Therefore it is vital that a robust census is undertaken to achieve a meaningful and accurate risk assessment.

In general, the window of opportunity for an accident at a level crossing increases with a high level of crossing usage and a high number of train movements. Therefore, the number of level crossing users and the equivalent train moment, or trains per day, is a key influence of risk.

Census is also a key input of the All Level Crossing Risk Model [ALCRM] and forms a critical component in the calculated levels of risk. Underestimating or overestimating census can have a varying effect on the modelled output, which could influence decisions taken by the assessor or the business to manage safety. For example, crossings with a high individual risk and a low collective risk can be sensitive to changes in census data. In this circumstance, ALCRM might evaluate a crossing with weak census data to represent a slightly lower risk than that of the true risk profile. This could result in a lack of intelligence about the level of risk at an asset, leading to inaccuracies in strategic planning to manage safety.

In addition to the volume of use, it is also vital to understand the user demographic; i.e. the types of users who make up the census number, so as to identify hazards which may be prevalent to one or more user segments and to better target risk mitigation in these areas. Accurate census will therefore help us to better identify, and encapsulate within risk assessments, the types and vulnerabilities of users of our assets.



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4 Census types, selection criteria and enhancing census accuracy

4.1 General

In general it may be considered that the greater the duration of census data collection activity, the greater the opportunity to improve the accuracy of the census.

This is an especially pertinent point in relation to determining pedestrian usage and in the undertaking of all census at footpath, bridleway and private user worked crossings.

In some cases due to seasonal fluctuations or peaks and troughs in use, it might be necessary to undertake more than one census data collection activity so as to broaden understanding regarding daily/annual usage. ALCRM can accommodate two censuses for this purpose.

In addition to physical on-site data collection techniques, an array of smart-sources of intelligence should also be used to support understanding; see 8. In determining robust knowledge of crossing usage, it might be necessary to use multiple combinations of on-site activities and other research based intelligence to accrue the complete picture.

4.2 Types of census and the preferred approach

Non-estimated census

The quick census is the least favoured of the non-estimate types due to its limited capacity to accurately reflect usage levels or identify all segments of users. A quick census can be susceptible to the time and date of the visit, omitting or overly including, peaks, troughs, seasonal activity and omitting weekend, evening and variances in use. It has, however, been independently endorsed as a broadly capable method for counting vehicles at public road crossings.

Where-ever possible, nine day census or greater (extended census) should be the census of choice for assessors. It offers strength in accuracy and endorses the company's approach to continuous improvement by enhancing the accuracy of risk assessments and improving level crossing safety.

Estimated census

Estimated census should ideally be a last resort unless using forecast figures to determine the impact of a proposed housing development for example.

If it is to be used as the primary source, every effort should be made to determine usage levels using actual census data collection activity and prior to adopting it as the chosen census gathering technique. As with all census gathering activity, but especially so when using estimated structured judgement, all available intelligent sources should be used to aid decision making; see 5.7 and 8.

Table 1 details the types of census which can be used within the risk assessment process. It also highlights some of the benefits and dis-benefits associated with each census type.

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Type	When to use	When not to use	Strengths and weaknesses	Census owner
Nine day or extended duration	In all cases where a census is required. Applicable to all asset types and all assessments from steady-state to project work where it is a prerequisite: e.g. re-signalling schemes and level crossing (LC) renewals. Serves to enhance understanding of LC usage and user behaviour, e.g. identifying night time usage, confirming vulnerable or irregular users, identifying peaks and troughs etc.		<p>Strengths: High level of accuracy leading to improved modelling of risk in ALCRM and informed decision making for the assessor and the business.</p> <p>Weaknesses: Internal resources needed to deploy equipment and analyse footage. Availability of mobile or fixed camera technology within the Route.</p> <p>Cost to employ external supplier to undertake census. Availability of external supplier to meet business timescales/deadlines.</p> <p>TIP: <i>Camera equipment should be directed away from train movements to prevent spurious activations and to improve analysis time and resource.</i></p>	Level Crossing Manager or External Supplier
24 hours	To support understanding of LC usage and where time-constraints prevent use of nine day or extended duration census. <i>NOTE: At lesser used crossings a longer census will be more appropriate to identify consistent usage and afford greater accuracy.</i>	Not appropriate for understanding weekend, consistent night time usage or where there are known or suspected peaks and troughs in usage which are likely to extend beyond 24 hours.	<p>Strengths: A better level of accuracy than a quick census and might otherwise improve the accuracy of the risk assessment. Could be undertaken as a physical count by Network Rail staff in the absence of technology, for expediency or to facilitate engagement with users.</p> <p>Weaknesses: Does not provide the same level of accuracy as a nine day census. Resource implications for Network Rail staff to deploy technology or undertake a physical count. Cost and availability of external supplier to meet business timescales/deadlines.</p>	Level Crossing Manager, Operations Staff or External Supplier



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Type	When to use	When not to use	Strengths and weaknesses	Census owner
Quick 30 to 60 minutes. Mon to Fri between 9:30 - 16:30	Weakest of all non-estimated census types. Primarily best suited for vehicle count at public roads.	Not appropriate where pedestrian usage is inconsistent throughout the day or unlikely to be witnessed during the census, but is known or suspected, or where vehicle use at private crossings is subject to variation. Where an assessor is seeking to identify weekend use, night time usage or where there are known or suspected peaks and troughs in usage, including seasonal variations.	Strengths: Speed of data collection and assessor can observe and interact with users of the crossing. Weaknesses: Less accurate than a nine day, extended census or a 24 hour census. Only provides a snapshot of use observed during the site visit. Provides poor understanding of crossing user demographic.	Level Crossing Manager
Estimate at passive crossings including 24 hour usage	No crossing usage witnessed		Strengths: Reasonable expectation of accuracy. Weaknesses: Reliability of data provided by user. Behavioural patterns not observed.	Level Crossing Manager
	Authorised user data available where: a). Authorised user provides written daily usage information; or b). Interview conducted with authorised user(s).	Not advisable if an authorised user is known or suspected to provide inaccurate information, e.g. over estimates usage due to fear of asset closure.	Strengths: Data potentially more accurate than relying on visual appearance of crossing. Weaknesses: Individual's opinion might not reflect accurate usage. User demographic might be misinformed.	
	Interview conducted with crossing user. Based on appearance of crossing.	Not advisable if it is established or suspected that the user is unfamiliar with the crossing. Not advisable when trying to establish sleeping dog status, or where suspected or known high usage exists. Census needs to be supported with further evidence and is better suited to a nine day count.	Strengths: Allows use of structured expert judgement. Weaknesses: Relies on structured expert judgement being accurate. Unsupported by factual information. Behavioural patterns not observed.	

Type	When to use	When not to use	Strengths and weaknesses	Census owner
Estimate at protected crossings	For modelling the effect of changes in predicted traffic flows, e.g. impact of new developments on LC usage.	Not advisable where real time data is available.	<p>Strengths: Allows forecast changes to be modelled in ALCRM enabling the impact to safety to be understood. This intelligence enables, for example, informed decision making in regard to planning application approvals or objections.</p> <p>Weaknesses: Relies on projected data to be accurate, as far as is reasonably practicable.</p>	Level Crossing Manager

Table 1 Types of census

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4.3 Selecting an appropriate census type

Although a nine day or extended census offers the greater opportunity for accuracy and is therefore the preferred choice, as detailed in 4.2, there are many factors that might ultimately influence the type of census chosen by an assessor.

Decisions that influence census selection might include matters such as the availability of source material; such as mobile camera technology, the readiness of resources required to undertake the census or deploy equipment, the confidence in existing intelligence or the financial outlay if using third party suppliers or procuring technology. In addition there are other considerations which can vary between assets and which will influence the requirement. For example:

- Reason for census – e.g. the census is required to support a risk assessment at which intelligence is already rich and relatively current, to verify and quantify vulnerable usage or to support a re-signalling or renewal project.
- Peaks and troughs – where usage can vary significantly during the hours of the day and days of the week, a nine day census or longer is more likely to provide a much better picture of crossing use than a quick 30-60 minute census.
- Seasonal variations – where usage varies significantly at different times of the year, e.g. due to holiday periods, leisure attractions or agricultural use, a second census is advised as this will provide better quality data relating to annual usage.
- Weekend peaks – where high weekend usage is suspected e.g. crossing is on a route to a tourist attraction or is used as a leisure walkway, a nine day census or longer will offer a much better picture of crossing use than a quick mid-week or 24 hour census.
- Logistics, practicalities and costs – e.g. an extended census might be needed for a duration of between nine days to several months to substantiate usage or the crossing might be in a remote location.



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To illustrate this further, the table below offers examples of how factors may shape decision making. The content of Table 2 is not exhaustive.

Factor	Requirement	Census suitability
Uncertainty over night-time quiet period usage	Need to establish the level of use during the hours when whistle board protection is removed.	Quick census is unsuitable for this purpose as it will not offer a consistent picture or pattern. A nine day census or extended census is needed. Deployment of mobile camera technology or third party supplier required.
School in close proximity to level crossing	Need to better understand behavioural patterns and the volume of crossing usage by vulnerable users. <i>NOTE: Whilst it is essential to understand the effect the school has on crossing usage, it is also important that a quick census does not focus solely on school arrival and departure times or during a lull in activity during the day.</i>	A nine day census or extended census offers to the best opportunity to identify trending patterns of use. Deployment of mobile camera technology or third party supplier required. A 24 hour census is better suited for this purpose than a quick census, but is not as robust as a nine day or extended census.
24 hour operational business resides in close proximity to level crossing	Need to understand the impact that shift change or deliveries might have on level crossing safety, e.g. night time quiet period, darkness risk and peaks in usage.	Quick census is unsuitable for this purpose as it will not offer a consistent picture or pattern. A nine day census or extended census offers to the best opportunity to identify trending patterns of use. Deployment of mobile camera technology or third party supplier required. <i>NOTE: Speaking to local businesses for information on working hours can enhance understanding of business impact on level crossing safety.</i>

Table 2 Additional census selection factors

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5 Good practice regarding census data collection activity

5.1 General

This section contains good practice guidance for assessors when undertaking quick or 24 hour census in-house, in addition it details items to consider when actively recruiting an external supplier to undertake a 24 hour, nine day or extended census.

Section 5 also features guidance on vulnerable users.

5.2 Quick and 24 hour ‘manual count’ census undertaken by Network Rail staff

If a nine day or extended census cannot be undertaken, it is important that assessors are confident that either a 24 hour or quick census is appropriate to reflect reasoned accuracy for the asset being assessed. Census selection is discussed in 4.

Preparation	<p>Quick & 24 hour census</p> <ul style="list-style-type: none"> ✓ Always review previous censuses to re-familiarise yourself with the user demographic recorded and take cognisance of observations relating to vulnerable users, irregular users, peaks, troughs and seasonal fluctuation. ✓ Also use this information to determine the appropriateness of using a 24 hour or quick census.
	<p>Quick census</p> <ul style="list-style-type: none"> ✓ Previous census might also offer intelligence to inform decision making when deciding on the best time of day or day of the week to undertake census data collection activity. ✓ Make sure that you source equipment, tools and other items in a timely manner. Such items might include: downloading of electronic forms, iPad (charged), paper collection forms (contingency), pens, compass, range finder, measuring wheel, camera (charged/memory card with capacity) and appropriate clothing aside of corporate PPE; e.g. taking forecast weather conditions into account, the crossing location and the need for personal comfort. ✓ Prepare and obtain necessary SSOWPs to assure your site safety during the visit. <p>24 hour census</p> <ul style="list-style-type: none"> ✓ Agreement with relevant operations staff will be needed if a 24 hour ‘manual count’ census is considered appropriate. Consideration will need to be given to staff welfare; the ability for this method to provide a robust count and take cognisance of resource implications, so as to justify why this approach is better suited than deploying technology or employing outside parties. ✓ If a 24 hour ‘manual count’ census is considered appropriate, a template for this purpose should be provided to staff undertaking the task.



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On site behaviour	<p>Site safety and staff welfare is the first priority</p> <ul style="list-style-type: none"> ✓ Take the census from a position of safety where the crossing is fully visible. ✓ Do not obstruct user access or distract users during the traverse/within the confines of the crossing. ✓ Park road vehicles appropriately, e.g. do not obstruct signage, crossing equipment or impair safe use of the crossing. ✓ Do not stand where you might obstruct crossing signage or equipment. ✓ If engaging with users to determine a broader understanding of the risk profile: <ul style="list-style-type: none"> – be approachable, professional and prepared to listen; – be cognisant of the environment and the positions of safety; and – only engage in conversation when it is safe and appropriate to do so
	<p>Data collection</p> <ul style="list-style-type: none"> ✓ Note the start time, date and duration of the activity. ✓ Take cognisance of the type of crossing you are at and the level of concentration that is needed to conduct an accurate census, e.g. are you at a public highway crossing with high traffic moment or are you at a rural passive crossing that is lightly used? ✓ Observe usage: <ul style="list-style-type: none"> – is it in keeping with the calculated traverse time? – are users operating the crossing safely? – are there a high number of vulnerable and irregular users and how does this translate into applying the 50% safeguard? ✓ It is always useful to engage with users to obtain census information. It might lead to intelligence on risks and hazards that you might be unsighted to. It is often good practice to ask them about user demographics, if they have observed deliberate misuse or safety events and if they have any issues of concern with the asset, e.g. slippery surface, confusion with instructions on safe crossing protocol etc. ✓ Be aware of extreme weather conditions; this might influence the level of use witnessed during the census gathering activity. This can be particularly relevant at footpath or bridleway crossings. For example, very bad weather (gale-force winds, sleet, snow and very cold conditions) might lead to a reduction in the number of crossing users seen and conversely very good weather (heatwave) might result in slightly more users being out-and-about. Whilst both extremes are valid user moment experiences, in terms of quick census they could distort accuracy levels if significant. It is important therefore to consider if the weather conditions might have distorted the accuracy of the census. If appropriate, evaluate the need to revisit the crossing at another time.

Table 3 Quick and 24 hour 'manual count' census data gathering



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5.3 Identifying vulnerable users

5.3.1 Vulnerable user definition

Vulnerable level crossing users can be defined as people who, when compared with typical users:

- are likely to take an extended time to traverse due to disability or distraction; and/or
- might be at greater risk of harm due to their perception of risk.

5.3.2 Defining vulnerability

There are a number of factors that can result in people being at greater risk when using level crossings. These can include but are not limited to:

- Limitations in mobility (take into account not only the ability to walk, but also the ability to turn their bodies or heads and look for oncoming trains)
- Visual or hearing impairment
- Cognitive ability, e.g. making safety related decisions (very young and elderly people are more likely to make poor decisions on the distance and speed of large moving objects such as trains)
- Being encumbered, e.g. crossing with bags, pushchairs, cycles or dogs (consider if dogs are on or off a lead (including the use of extendable versions), and if owners are in charge of more than one dog; it becomes increasingly harder to control multiple animals)
- Inability to comprehend English, i.e. to read signage and / or speak to Signallers

5.3.3 Types of vulnerable users

Vulnerable users can include, but are not limited to:

- People with physical and/or mental disabilities or other impairments; incl. those using mobility scooters
- Young children; unaccompanied or in groups
- Elderly people
- Dog walkers
- Cyclists, e.g. where known not to dismount and considered 'at risk'
- People carrying heavy bags or large objects, with pushchairs etc.
- Non-English language speakers, e.g. migrant workers

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5.3.4 Identifying vulnerable users by location

The likelihood of a level crossing being used by vulnerable users can be influenced by its proximity to:

- Sheltered housing or care homes; residential and nursing
- Schools
- Stations
- Residential thoroughfares
- Busy high streets
- Parks, play areas, known walking areas
- Fixed local attractions, e.g. beaches, caravan sites

5.3.5 Means of identifying vulnerable users

Crossings that might have vulnerable users can be identified by:

- Observation; census
- Research into the crossing environment using intelligent sources of information
- Interviewing users in nearby businesses, residential dwellings etc.
- Near miss or other reporting of precursor events

Other influencing factors can include:

- Location and/or crossing type, e.g. field to field crossings with stiles are less likely to have a high proportion of vulnerable users than a gated footpath crossing in an urban area
- Condition of the asset which might influence user traverse speed further, e.g. skewed crossing, stepped approaches etc.

5.3.6 Higher than average

5.3.6.1 What is higher than average?

NOTE: The below illustrative example does not offer a ratio of application, nor does it take precedence over structured expert judgement where for example, an assessor considers it an essential requirement to protect a minority user group or single person.

If there is ambiguity or uncertainty then, additional research and/or extended census might be necessary to inform decision making.

Deciding on whether higher than average vulnerable usage is prevalent should always be based on structured expert judgement and assessor's acquired knowledge. Decisions should be supported by all available evidence gathered as part of the risk assessment; taking cognisance of physical on-site observation and

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intelligent sources of information. As an illustrative means only, it might be appropriate to consider, if for every five users:

- only one in five is made by a vulnerable user, the 50% safeguard might not typically be applied
- two in five is made by a vulnerable user, it is especially important that a risk based decision is made
- three to five are made by vulnerable users, the 50% safeguard would always be applied

The table below can be used to help decide which groups are considered vulnerable; however, it remains the LCMs final decision to add the 50% safeguard

	Vulnerabilities	When users are not normally considered vulnerable
Physical or mental disability	Users with known or suspected disabilities should always be considered as vulnerable; records should support this	N/A
Children	Easily distracted	Observed to be using the crossing correctly and safely as an individual user
	Subject to peer group pressures	Observed to be using the crossing correctly and safely as part of a group of users
	Low cognitive ability to interpret risk	Older children who may not be considered to be vulnerable users
	Observed to be unaware of or ignoring safe crossing protocols	Observed using the crossing correctly and safely whilst dismounted from a bicycle, scooter or similar
	Very young children most susceptible to all of the above vulnerabilities	
	Unaccompanied	
	Mounted or pushing a bicycle, scooter or similar	



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	Vulnerabilities	When users are not normally considered vulnerable
Elderly <i>Judgement is needed as not all elderly people are slow or less able to use a crossing safely. The elderly are often in less of a hurry and can equally take greater time and care when crossing.</i>	Observed using walking aids or other obvious signs of mobility impairment	Observed to be using the crossing correctly and safely as an individual user
	Encumbered with shopping trolleys or large heavy bags	Observed to be using the crossing correctly and safely as part of a group of users
	Slower cognitive ability and/or reaction times	Observed to be compensating for sensory loss by checking carefully and moving as quickly as possible
	Using a mobility scooter; risks associated with negotiating decked surface (including width considerations) or getting stuck on the flange-way at skewed crossings	Persons who display physical fitness such as ramblers and leisure walkers
	Mounted or pushing a bicycle	
	Have become complacent and overly familiar with the train timetable and safe crossing protocol	
Dog walkers	Distracted due to: <ul style="list-style-type: none"> dogs off leads multiple dogs on leads dogs on extendable leads 	Observed to be using the crossing correctly and safely whilst keeping dogs on leads and under control
	Users who put themselves in danger to recover dogs off leads who are lineside	
	Type of access, stile/gate, and relative position of safety which may import risk to users who are unduly focusing on their dogs rather than making a safe crossing	
Cyclists	Failing to dismount and cycling across the crossing	Individuals observed dismounted and using the crossing correctly and safely
	Groups observed riding over the crossing together	Observed negotiating the crossing from a position of safety when manoeuvring their bicycle through the access and egress points
	Families on outings with small, young children on bicycles	
	Cyclists with trailers	
	Cycling event routes which attract and encourage crossing use by mounted riders	
	Type of access, stile/gate, and relative position of safety which may import risk to users who are unduly focusing on their bicycles	



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5.4 Pedestrian usage at public highway crossings

If undertaking a quick census at public highway crossings, in the absence of the availability of a nine day or extended traffic census, it is good practice to sense-check pedestrian count. Whilst vehicular traffic flow remains 'broadly' consistent, pedestrian moment can be much more volatile and subject to environmental influences. These same environmental factors will also dictate the 'typical' volume of pedestrian use of level crossings; generating peaks and troughs which could be missed by a quick census. For example, if an asset is located in close proximity to residential dwellings and/or community links such as shops or schools, the chances are that the pedestrian footfall is notable; i.e. you would expect to see pedestrian users. If a 30 minute quick census was undertaken mid-morning and resulted in very nominal numbers observed or no pedestrian users witnessed, this might not represent 'typical' pedestrian moment, but could be a rare lull in use. In addition, where users are witnessed, this might not represent the complete user demographic; schoolchildren, students etc. If uncertainty exists, a nine day or extended census might be needed. Utilisation of other intelligent sources, see 7, would be advisable and might also serve to substantiate concerns.

5.5 Nine day, extended or 24 hour census undertaken by external suppliers

There are companies that can be appointed to undertake 24 hour, nine day or extended census gathering activities. Research might be necessary to identify local companies with the capability to do this type of work or if appropriate and economical, national organisations might also be available for this purpose.

Funding for census data collection activity undertaken by external suppliers will need to be considered. Sources of funding for such work might incorporate use of the Route Safety Fund or additionally project funding, for example if census relates to a renewal or enhancement activity, might be available for this purpose.

It might also be necessary to undertake a formal tender process if the cost of work necessitates this. If in doubt, please confirm business protocol requirements.

Instructions to companies undertaking census data collection activities should include requirements for:

- a) when the census is to be undertaken and its duration;
- b) data to be recorded, e.g. types of users (vulnerability of users: persons encumbered, disabled, unaccompanied children, elderly, dog walkers, headphone wearing, texting etc...), vehicle types (HGV, tractors, buses, cars, vans etc...), and the date/time they are observed;
- c) how the data is to be presented, e.g. hourly, daily, mean average per user type and/or hazardous event (e.g. children, elderly, texting, using mobile phone, hood up); and
- d) when the data is required by

GRD007 Level Crossing Census Requirements contains further details on this.

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5.6 Modelling of nine day or extended census activity

It is recommended that daily usage is recorded by respective user groups so as to enable an average to be taken per group for the census duration. In this way, the 24 hour entry in ALCRM represents the average daily moment per user group as opposed to overestimating or underestimating usage patterns by taking the highest or lowest daily figure witnessed during the census data collection activity.

5.7 Estimated census

As discussed in 4.1, estimated census is likely to be the least accurate of all census types and is the non-preferred approach. In all cases, actual census activity should be undertaken whenever practicable.

Where estimate census is used, it should only be applied to very lightly used crossings, such as field to field crossings in rural areas or private vehicular crossings with evidence of limited usage e.g. rusty padlock, overgrown approaches.

To estimate the usage of the crossing:

- use information supplied by the authorised user(s) if applicable/available;
- If applicable, interview the landowner or neighbouring landowners and ask how often the crossing is used, by whom and if applicable, by what type of vehicles. Ask whether or not there are particular periods which might generate use or greater use e.g. harvesting, holidays etc;
- speak to owners of nearby dwellings or facilities that might use or witness use of the crossing;
- look for evidence of use such as tracks or trodden paths, litter or other signs, analyse the extent of vegetation growth around the access points, take account of rust on padlocks (where fitted); and
- utilise intelligent sources of information to help in the application of structured judgement; see 7.

6 Influencing factors affecting crossing usage

There are many factors that can influence usage patterns over level crossings. These factors might impact census flow daily, weekly, monthly or even annually.

It is important that such intense changes are evaluated when undertaking census gathering activity so as to avoid over or under inflating calculated risk. Where such usage patterns are identified, steps should be taken to provide a balanced census count. This might involve re-commissioning census or an extended census to better reflect accuracy and/or involve adding a second census in addition to the first so as to afford a more accurate representation of user moment.

Intelligent sources of information in addition to on-site observations can help assessors identify influencing factors; see 7.

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The table below details a selection of factors that might influence user moment. The content is non-exhaustive.

Influencing factor	Asset Type		
	Public road	Footpath or bridleway	User worked crossing
Road network: full or partial closures, minor road works, diversionary routes in utilisation, road traffic accidents, road layout alterations under construction	✓		
Asset located near to attractions: funfairs, leisure retreats, historical or tourist matters of interest, beaches, race courses, motor racing circuits, theatres, concert halls, proximity to 'night-life' – e.g. clubs, bars, restaurants etc...	✓	✓	
Proximity of schools, hospitals, health clinics, community centres, shops etc...	✓	✓	
Proximity of businesses, types of businesses and hours of operation	✓	✓	
Type of private asset: field to field access for tending to crops or cattle, residential access, entrance to private facility or business use			✓
Harvest: types of crops, seasonal variance, hours of crop management			✓

Table 4 Influencing factors affecting user moment

NOTE: For further information on census at private vehicle crossings, please also see guidance document LCG12 – Intensive use at UWCs.

7 Using in-house technology to collect census information

In-house technology is widely used by assessors to help gather census intelligence. Available technologies adopted include use of mobile cameras, gate counters, pressure pads and SmartCam fixed equipment.

Camera equipment offers the best intelligence gathering capability as it can be used not only to count users, but to identify user demographics, including the presence of vulnerable users, and capture the behavioural attitude of users of level crossings. Naturally cameras are suited to 24 hour, nine day and extended censuses.

Gate counters and pressure pads, although suited to similar census conditions, have weaknesses which limit their successful deployment and effectiveness. The primary shortcomings with these census solutions is their inability to differentiate between user groups, provide capability for assessors to interrogate behaviour and the uncertainty of activation; e.g. a counter could be triggered by wind moving a gate or an animal standing on a pressure pad.

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7.1 Use of fixed or mobile camera solutions

7.1.1 General and pre-planning activity

Deploying camera technology for nine days or more or using fixed equipment (where available) offers the greatest opportunity for accurate census.

It is important to pre-plan this activity well in advance so as to maximise the accuracy of the census gathering opportunity. You should take account of the date of the planned risk assessment and the duration of the census needed to provide a robust census, so that sufficient time is allocated to deploy camera technology. This applies where a single census is proposed to portray annual usage or where a second census is needed to support a more balanced annual picture.

When using camera equipment for the purpose of census gathering data collection, there are other important things to consider and procedures to follow. These are discussed below.

7.1.2 Knowing the law and complying with our legal obligations

Network Rail is subject to various acts of legislation and codes of practice. In particular, information security and data protection acts apply to the use of camera technology where it is used for the purpose of gathering census information at level crossings.

It is important that these instructions are adhered to so as to prevent legal or reputational risks to the company or individuals within the company. This includes regulatory or other operational threats and financial penalties which might ensue.

7.1.2.1 Notifying the general public/private land owners

Before camera equipment is switched on and during its operational use, it is essential that a conspicuous notice is provided on each side of the crossing informing users of its operational status and purpose.

The wording of notices shall be:

“A CCTV recording system is operated at this level crossing for the purposes of safety and the prevention of crime. The organisation responsible for the management of the system is Network Rail, which can be contacted on 03457 114141”.

These legal notices demonstrate that Network Rail is complying with the requirements of the Data Protection Act 1998. Specifically we must demonstrate that we are conforming to the following principles:

- Personal data shall be processed fairly and lawfully – *Organisations must be transparent about how they intend to use the data and give individuals appropriate privacy notices when collecting their personal data.*
- Personal data shall be obtained only for one or more specified and lawful purposes – *Organisations must be clear from the outset about why they are collecting personal data and what they intend to do with it.*



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7.1.2.2 Data security

Data security is an important aspect of our company compliance with legislation and codes of practice. It is important that camera equipment is secured against vandalism or theft, and where equipment is mobile, that all practical steps are taken to reduce the temptation or likelihood of such acts.

The essential requirements that must be undertaken when deploying any camera technology are:

- Placing the camera equipment in a security box which is securely located and padlocked; and/or
- Encrypting the SD card prior to use.

In addition, locating equipment which will reduce attention, conspicuity or the likelihood of tampering is strongly advised.

7.1.2.3 Data retention/storage

Census data cannot be held indefinitely without good reason. A reason for retention of footage or an image might be necessary because it highlights a risk or bad practice that can be used to promote awareness and educate others. Before images are shared, whether externally or internally, it is essential that they are redacted so as to preserve a user's identity. Retention shall be by exception and a record should exist of any pictures held including where they are located.

In normal operation, data must be deleted once the census has been completed and intelligence analysed.

When making decisions about retention, consider the implications of the following principle of the Data Protection Act 1998:

- Personal data processed for any purpose or purposes shall not be kept longer than is necessary for that purpose or those purposes – *Organisations need to:*
 - Review the length of time personal data is kept for;
 - Consider the purpose or purposes the information is held in deciding whether (and for how long) to retain it;
 - Securely delete information that is no longer needed for this purpose or these purposes; and
 - Update, archive or securely delete information if it goes out of date.

7.1.2.4 Subject access requests (SARs)

So as to comply with SARs, a log of camera deployment, a record of data deletion and the location of any retained images or footage (as above 6.1.2.3) must be kept.

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7.1.3 Positioning of mobile solutions

NOTE: When deploying camera solutions always remember that your personal safety is essential – make sure you have arranged a safe system of work before you begin.

It is important to position camera equipment so that it can record the very best footage and afford the very finest intelligence. In deciding on the location of equipment there are many things that need to be taken into consideration. These include, but are not limited to:

- The quality and capability of the technology; e.g. will the image quality be sufficiently robust to depict the user demographic and age profile if positioned remote from the asset.
- Optimal positioning so as to facilitate the identity of the user demographic, identify vulnerable, encumbered or obviously impaired users, whilst contextualising the user and the asset and helping to identify behaviours, hazards and risks.
- The likelihood that equipment may suffer from theft or vandalism.
- The possibility that the environment may trigger spurious activations where motion detection is in use due to vegetation, wildlife or passing trains.
- Battery life and data capacity; the greater the number of users/motion activated triggers, the greater the impact on battery drain and memory card capacity.
- The need to understand greater second train coming frequency.

There are a number of good practice indicators which have been identified within the Level Crossing Manager community in regard to camera deployment. Excerpts of these are shown below:

- When mounting census equipment within the railway boundary, ensure that it does not interfere with the safe operation of trains, crossing equipment or positioned so as to result in user distraction.
- Try to avoid installing equipment on the direct route a user will travel to minimise the likelihood that the camera might be subject to theft or tampering.
- Take cognisance of the trespass history of the crossing in determining the positioning or appropriateness of deploying camera technology.
- It is advisable to mount camera equipment at a height of between 2ft and 6ft from the ground to reduce the likelihood of spurious activations from vegetation or animals.
- Where camera equipment is located in close proximity to trees or other shrubbery, make sure that branches will not foul the field of vision during bouts of wind or rain.

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- Be aware of positioning equipment in such a way that activity from roads or paths parallel to the railway might cause spurious activations and result in unanticipated battery drain and/or quickly fill capacity of memory cards.

7.2 Use of gate counters and pressure pads

Due to the limited capabilities of gate counters and pressure pads in comparison with camera technology, as discussed in 6, the value added ability of this equipment is to support census intelligence by validating user numbers. For example, the use of quick census combined with multiple intelligent sources might, in isolated cases, provide enough information on which to make a judgement regarding user demographic, vulnerable usage and user behaviour. Gate counter or pressure pad technologies, could therefore help assessors to determine usage numbers over a sustained period of time and in doing so validate the quantitative output of the quick census.

In addition and where equipment can record date and time of activations, gate counters or pressure pads might be used to provide intelligence relating to peaks and troughs and night-time quiet period usage for example.

In summary and as illustrative examples, these technologies can be used for confirming:

- a) sleeping dog status;
- b) night-time quiet period use or usage during darkness;
- c) peaks and troughs: daily or weekly;
- d) provide a numerical count to check the accuracy of a quick census or validate other intelligent sources of information; and
- e) to gather generic data, i.e. not user type intelligence, in support of level crossing closures.

8 Identifying crossing use through intelligent sources of information

8.1 General

As discussed in 4.1, it is important in addition to on-site census activity, to make full use of all available intelligent sources when determining usage of level crossings.

The fatality at Frampton level crossing on 11th May 2014, involving unknown unauthorised use of the bridleway element of the crossing by trail bike riders, highlights the type of activity that takes place across our network. It is acknowledged even with extended census and the use of intelligent sources, that this type of event might still go undetected, but the broader the research and active data collection, the greater the opportunity to identify such practices.

It is therefore advocated that the combined use of census which is nine day or greater, with the proactive use of intelligent sources (internet searches, researching social media and local club sites), in addition to seeking visual cues when on-site



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(tyre tread patterns or other clues); better the opportunity for identifying the risk of unsafe or unauthorised activity than a quick, 24 hour or nine day census in isolation.

This is especially important so as to identify usage or patterns of use that might not be apparent even where nine day or extended census is undertaken. For example, organised groups promoting monthly or annual events which impact on the use of a level crossing could be missed from census activity alone, even where extended census is applied.

Utilisation of intelligent sources might also serve to identify vulnerable users or unauthorised use of level crossings. In this regard it can help assessors to identify organised groups so as to engage with them proactively and/or target risk mitigation appropriately.

8.2 Use of intelligent sources

Intelligent or smart-sources of information can take many forms. The information sources detailed below are not exhaustive, but they are a good source from which to build a portfolio of research material. Their sequence is also not representative of any hierarchical order of importance.

8.2.1 The internet

The world-wide web offers an abundance of opportunities to identify information to support census gathering intelligence. This rich smart-source may hold the key to significantly increasing assessor knowledge about the use of a level crossing and/or its users.

Detailed internet searches may yield information about the immediate environment, identify the promotion of rights of access or events and highlight use of level crossings by organisations or societies. When using the internet, consider:

- Local authority websites – might contain information on redevelopment proposals, road diversions, public attractions such as funfairs or other risk influencing intelligence.
- Rights of way maps and other mapping services – will highlight risk influencing factors within the immediate environment such as schools, businesses, public attractions, road layouts and afford understanding of how an asset serves the local community; e.g. provides a thoroughfare link, commuter route etc. The Definitive Map will help to identify if the route over a level crossing is publically promoted.
- Social media sites – intelligence relating to the use of level crossing might be available from social media channels such as: Facebook, YouTube, Twitter and Instagram. Individuals and organisations often promote activities via these network channels. Intelligence might include *posts* on forthcoming organised events within the locality, video footage or images of actual crossing use (including unauthorised or risk taking activity) and/or highlight

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trends in use or frequencies of use including use by an unknown user demographic.

- Dedicated websites or chatroom forums – National groups such as the Ramblers or more localised groups such as off-road trail bike, 4x4 vehicle communities or regional scout groups often share or discuss experiences, social activity and promote events on their dedicated websites. A search for such communities and groups within the area of a level crossing may yield unknown intelligence about level crossing activity.

8.2.2 Highways authority traffic surveys

It is prudent to discuss with local authorities their programme of traffic surveys; both planned works and available footage or census data from completed activities. It might be possible to utilise this intelligence within risk assessments wholly or partially with agreement. Direct liaison with local authority contacts or through Road Rail Partnership Groups is advised.

8.2.3 Discuss the level crossing with the local experts

It might be that the best intelligence is accrued from the local community or those who interface with the asset directly. Often information may come to light through engaging with persons or groups that would otherwise reside unknown from census activity alone. Such intelligence might be obtained through discussion with people or groups such as:

- Local authority rights of way officers or community leads
- Council or Highways Agency officials
- Level crossing users
- Authorised users of private level crossings
- Local residents or businesses, schools or colleges
- Local user groups or clubs
- Signalling staff (Signallers or Crossing Keepers)
- Off-track, S&T, patrolling or other operational staff; e.g. MOMs
- Train operating companies (Drivers, Guards, station staff)
- British Transport Police

8.2.4 Operational records of crossing use

For private vehicle crossings equipped with telephones or automatic half barrier crossings (AHBs), record keeping in the form of occurrence books should exist to supplement intelligence for vehicle movements; albeit only for large or slow movements in the case of AHBs. In addition, in cases where the crossing provides

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access to business premises, there might be separate registers or site visitor logs which could support intelligence regarding vehicle use.

Accuracy of records is unlikely to be such that numbers or intelligence can be considered to be 100% assured, but if information is combined with additional research, it might contribute toward a broader understanding of actual crossing usage.

8.2.5 Tagging

At very lightly used or perceived dormant crossings, tagging a gate can be a useful way to determine if the asset is actually used, by whom and at what frequency. There is no guarantee that a user will make contact if they break the tag to cross, but its presence might:

- a) Promote contact, resulting in useful intelligence that would not otherwise be forthcoming; or
- b) If removed to cross, but no contact is made, it will be apparent to the assessor during the next risk assessment or asset inspection; an obvious sign that the crossing has been used and that greater intelligence is needed.

If tagging a gate, the user instruction should be stored in a waterproof container with the tag in a conspicuous place. As a minimum its contents should include:

- Level crossing details; name, type, UID (ELR, miles, chains)
- Date tag was placed at the crossing and the reason for the tag
- Telephone number and/or email address of contact point (typically this might be a Control Centre to ensure a 24 hour response)

9 Intelligence driven response to census

9.1 General

The undertaking of active census in conjunction with the use of intelligent sources of information will often confirm 'known' or suspected patterns of use, substantiate risks or hazards and endorse the user demographic; including the presence of vulnerable users. In other cases it may highlight unknown threats, unauthorised use or unsafe practices which require immediate interim actions, in addition to long-term plans, to control.

As a prerequisite of risk management protocol, it is important that intelligence is acted upon to mitigate threats or hazards and manage safety. In no hierarchical order, actions or parallel actions might include:

- Redeploy camera equipment (if appropriate) to better identify usage, patterns of use, user groups or collate additional evidence to support intelligence.
- Work collaboratively with operations staff (OM, LOM, and MOM), BTP, train operators and other stakeholder partners. If regular patterns of use are identified and as appropriate, arrange for evening or weekend visits to the

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crossing, so as to talk directly with users to re-educate them regarding unauthorised use and unsafe acts. A BTP presence might also serve to enforce key messages. Operations staff working on a shift basis, such as MOMs, may be best placed to support this approach, unless by agreement, a Level Crossing Manager volunteers to work 'out-of-hours'.

- Revisit the internet and make specific use of targeted user group searches; specifically this should include using social media and local community or club websites to identify groups or clubs that observed users may belong to.
- Make direct contact with relevant local organisations, such as trail bike, 4x4, equestrian or walking societies, so as to promote safe crossing protocols, highlighting the risks and hazards associated with level crossings and unauthorised use. Work collaboratively to address safety concerns.
- Make contact with any county or national organisations if it is possible that the group or organisation is broader than the immediacy of the parish. Contact the central level crossing team if there are national implications and transferrable risks. It is important and advantageous to engage with and promote safety within larger institutions.
- Work collaboratively with local authorities, highways agencies and rights of way officers to:
 - determine if public and private status is accurately represented in documentation such as the Definitive Map;
 - identify whether restrictions and prohibitions by vehicles or other groups is suitably recorded and visible in public documentation; and
 - understand what additional actions can be taken by local authority colleagues to support Network Rail in managing asset safety.
- Take practicable steps to improve safety through delivery of physical improvements and provision of mitigation:
 - Re-evaluate closure opportunities, diversionary access and downgrades in status (where applicable).
 - Evaluate the requirements to provide risk reducing mitigation such as MSL, POGO for example.
 - Signage: review optimal positioning and order of signs, clarity of instructions; are there too many leading to signage cluttering and ambiguity or confused information, is there unnecessary signage or duplication, if appropriate and safe to do so without resulting in distraction or dilution of safety critical information – is there scope to provide an additional safety information or trespass sign etc...
 - Take steps to improve the crossing layout and undertake general infrastructure improvements: channelling, user segregation, improving traverse, sighting etc...



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10 Census protocol

10.1 General

Every effort should be made to undertake a new census when undertaking a new risk assessment. In this way data is kept current with latest intelligence and:

- recorded census is reflective of the most current position, taking account of environmental or other external influences and the user demographic;
- calculated risk is representative of the current threat; and
- it facilitates analysis of the trending risk profile of the asset.

Where a quick census is used, see 4.2, this should be undertaken at the time of the site visit. In exceptional circumstances, it might be necessary to undertake the census on a different day, for example, if weather conditions adversely affect the accuracy of census data on the planned day of collection. If the census needs to be taken on another day, it should be undertaken as close to the date of the original site visit as possible.

Where a 24 hour, nine day or extended census is used, pre-planning activity should facilitate a structured timeline to deploy census gathering equipment or arrange external support, so as to tie-in with the date of the risk assessment site visit.

Where additional census is needed, this should be undertaken during the most appropriate parameter; taking account of intelligence, the reason for the second census and all other pertinent factors.

10.2 Applying new census data to an existing risk assessment

10.2.1 Acceptable use

Sometimes, more recent census data than that used in the current risk assessment becomes available or a need for new census data is identified. For example:

- a Network Rail project might commission a nine day census as part of an asset renewal or re-signalling scheme;
- a developer might submit a current nine day census for comparison against projected usage;
- an authorised user might provide unsolicited census data;
- an additional census might have been undertaken to capture seasonal variations in use;
- a Highways Authority might undertake a traffic survey and share it directly with the Level Crossing Manager or through Road Rail Partnership Groups; or
- a third party report might be received which generates a requirement for a more recent census, for example, usage is identified during the night-time quiet period at a whistle board protected crossing.

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The new census information can be applied to the existing risk assessment provided there is confidence that all other cumulative data remains fit for purpose. If there is any doubt or ambiguity over this or if an extended period has lapsed since this data was accrued, a complete new risk assessment might be necessary.

If there is a significant change in the ALCRM score as a result of using new census data:

- a) evaluate the need to undertake a new risk assessment;
- b) re-evaluate the need for new or additional risk control measures or the need to expedite planned mitigations or implement interim controls; and
- c) review the impact of the change on the risk assessment frequency.

10.2.2 How to record this in ALCRM

When it has been established that it is appropriate to use new census data in an existing risk assessment (in place of existing data), this should be recorded in ALCRM as follows:

- a) Create a new option below the current (LIVE) risk assessment and in the census tab enter the new census date;
- b) Enter the name or source of the census taker/provider, duration and type for the census being used and the census data itself;
- c) Add any pertinent information about the new census within the notes section and explain why the decision to use it has been made; and
- d) Set the option to recommend, approved and implemented so that it becomes the LIVE risk assessment.

10.3 Using old census data in new risk assessments

10.3.1 Acceptable use

In exceptional circumstances it might be appropriate to use census data that pre-dates the risk assessment being undertaken. This is only appropriate where the census is believed to give greater accuracy than that completed during the site visit. Examples are shown in table 4.

Wherever possible, the old census data should be compared to the census completed during the site visit. This is important to establish if the old census continues to provide accurate data on crossing usage.

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Old census	New census	Validation	Comments
Nine day or extended census or 24 hour census	Quick census	Compare the daily usage from the new quick census with the daily usage from the previous nine day, extended or 24 hour census.	<p>If the data is broadly comparable, use the nine day, extended or 24 hour census.</p> <p>If there is significant variation, decide which census offers the greater accuracy using structured judgement and accounting for intelligent sources of information.</p> <p>If needed, undertake a new nine day, extended or 24 hour census.</p>
Estimate provided by an authorised user	Quick or estimate census	<p>Compare the daily usage from the new quick or estimate census with the data provided previously by the authorised user.</p> <p><i>NOTE: A quick census might over or under estimate usage. The AU estimate might identify different patterns of use not identified by a quick or visual estimate.</i></p>	<p>If the data is broadly comparable, use the estimate provided by the authorised user.</p> <p>If there is significant variation, decide which census offers the greater accuracy using structured judgement and accounting for intelligent sources of information.</p>
Quick census, users witnessed	Quick census, no users witnessed and estimate made	Apply structured expert judgement to decide if either census is appropriate or if a new census is needed.	<p>Use the old census data if it is believed to more closely reflect usage than the estimate made, making use of structured judgement and accounting for intelligent sources of information within decision making.</p> <p>If not satisfied that either census reflects crossing usage accurately, a new nine day or extended census should be undertaken.</p>

Table 5 Examples of using old census data



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10.3.2 How to record this in ALCRM

When it has been established that it is appropriate to use old census data in a new risk assessment, this should be recorded in ALCRM. The date of the old census should be recorded appropriately and any pertinent information about the old census, including the decisions taken to use it and any comparison or validation with new census data, should be documented within the notes section.

10.4 Comparing new census with historic census

10.4.1 General

It is good practice to compare new census information with historic census so as to:

- a) identify when significant changes have taken place such as:
 - changes in user numbers;
 - changes in user demographic, e.g. increase in vulnerable and/or irregular users
 - changes in vehicle use or type, e.g. increase in or introduction of HGVs; and
- b) take account of historic census activity so as to utilise all intelligence and remain consistent in the identification of vulnerable and irregular users or types of vehicles and patterns of use, SFAIRP;
- c) consistently apply an appropriate traverse time applicable to the user demographic or vehicle moment;
- d) apply the correct minimum sighting requirements appropriate to the user demographic or vehicle moment; and
- e) reduce the likelihood of errors within census counts so as to increase the accuracy of modelled risk and the application of structured judgement within risk assessment.

A comparison of data between new and historic censuses can help to identify trends, highlight any potentially significant changes in risk or signpost errors in census data. It is good practice to make this comparison using more than the last census taken so as to comprehensively take account of all available information.

Changes to look for should include:

- significant movement in usage figures;
- alterations in use by vulnerable and irregular users; taking account of any broader demographic change; and
- peaks and troughs and seasonal variation.

Such transitions in use or by users can significantly impact on the risk controls in place, or those proposed. It might also serve to provide assessors with a true holistic understanding of the assets history and an insight into future risks.



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10.4.2 Analysis and actions

Where significant changes are identified, it might be necessary to undertake further detailed analysis to validate new intelligence. This will enable assessors to determine the full impact on risk.

Examples of changes that might trigger further investigation include:

- a) the new census does not identify vulnerable users when they have been identified previously;
- b) previous census(es) indicate night-time quiet period use and the new census does not;
- c) previous census(es) include vehicle types which import risk, e.g. tractors and trailers or HGVs, the new census does not;
- d) there are significant changes in user numbers (vehicle and pedestrian);
- e) previously identified irregular use is not recorded in the new census, e.g. irregular usage previously recorded due to: leisure attractions, seasonal variation (beach access, fruit farms) etc.

Where conflicting information between assessments exists, it is important to utilise intelligent sources of information, in addition to further census activity or site-visits, to determine the accurate position.

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1. Core Crossing Details

Crossing Type	FPS	
Crossing Name	West River Bridge (Ely)	
Alternative Name	N/A	
Name of nearest station or junction	Up Line	Waterbeach
	Down Line	Ely Dock Jn
Is the crossing located at or near a station within (tick the one most applicable)	At Station	
	Within Sight	
	Not Within Sight	X
OS Grid Reference	TL 538 746	
ELR	BGK	
Miles	67m	
Chains	22ch	
Signalbox Controlling Line	Cambridge	
Road Name	N/A	
How many rail lines does the crossing traverse	2	

What is the approximate bearing of the path from North (0 to 360 degrees)	160
What is the approximate bearing of the railway from North to the up line in the up direction (0 to 360 degrees)	210

Consider whether sun glare can be an issue at this crossing at any time of the year

Is the horizon looking along the line (Tick the one most applicable)	Low horizon – the sun could be behind approaching train	X
	The horizon is high – hilly or mountainous terrain low sun blocked or horizon not an issue	

Is the crossing a sleeping dog crossing e.g. a crossing where the right to cross the line exists but are not exercised and there is very little or no trace of the crossing on site and it is not possible to use the crossing.	Yes	No
		X


If the crossing is identified as being a sleeping dog crossing (tick which one applies)

There is no trace of a crossing at or in the vicinity of the mileage shown for the crossing. The boundary fences are complete on both sides of the lines and there is no evidence the crossing is used.	The fence lines are complete on both sides of the line but there is evidence that the crossing is used. No warning signs or other safeguards are provided.	The fence line is broken but there is no stile or gate provision and there is no evidence of persons crossing the line
N/A		

If yes answered to either sleeping dog provide supporting information.

N/A

2. Assessment Collector Details

Completed by:	John Prest
Signature:	
Phone Number	07917 857890
E-Mail	John.Prest@networkrail.co.uk
Date of visit	14 th December 2015

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3. Photographs

The following Photographs of the level crossing should be taken at the time of site visit and census:

Photograph	Filename Protocol	Taken?
Up side crossing approach	elr_lxname_usca_date	✓
Up side looking across crossing	elr_lxname_usac_date	✓
Up side looking up direction	elr_Lxname_usud_date	✓
Up side looking down direction	elr_lxname_usdd_date	✓
Down side crossing approach	elr_lxname_dsca_date	✓
Down side looking across crossing	elr_lxname_dsac_date	✓
Down side looking up direction	elr_Lxname_dsud_date	✓
Down side looking down direction	elr_lxname_dsdd_date	✓
Signs/lights/crossing equipment on both Up and Down sides	Elr_lxname_slceX_date	✓

Notes on Photographs

V:\EA\Operations Risk Team\Ops Man & Stds\5-20 LX Admin\Compilation of LC Files\Active\West River Bridge (FPS) BGK 67m 22ch\2. Photographs\14.12.15

4. User Census

4.1 Application of the census

Type of Census undertaken (tick type of census undertaken):

Full 24 hour	✓	Quick census to be undertaken between 0930 and 1630 Monday to Friday (recommended time period 30 minutes. Maximum time period of quick census to be 60 minutes.)	
Estimated 24 hour			
Start Time		Start time	June 2015 – Acorn Camera 9 Day Survey
Finish Time		Duration (mins)	

Estimate Census (Should only be necessary for lightly used crossings where no or few users are seen during the visit) Basis for the estimate tick one:

Estimated Census Undertaken	Interview with crossing owner	
	Interview with crossing user	
	Appearance of crossing	X

Notes of Interview with crossing user if an estimate census

9 days census undertaken by Sky High –Count On Us in June 2013 but no users were found to have used the crossing in the nine days of the survey. Also June 2015 - 9 Day Acorn Survey revealed no usage.

How many hours per day are trains timetabled to run over the crossing	20
---	----

What proportion of the year does the census apply to (in percent)	100%
---	------

Notes of reasons why a single census does not apply to the whole year

N/A

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4.2 Census Environment

What is the footpath crossings environment? (tick which one applies)

Rural area with fields or other open land in the vicinity	Riding school, nature reserve, leisure attraction generating some use	Is there local signage promoting an attraction across the crossing e.g. national trust brown signage etc.	Town or village etc on one side of the line within approximately 500 metres of the railway in an otherwise rural area	Town or village etc on both sides of the line within approximately 500 metres of the railway in an otherwise rural area providing a cross community link	Work complex, business park, supermarket, hospital, school, caravan park or similar institution close by	Provides access to rail locked residential property	Any other category
	X						

Crossing provides access to? (Tick which one applies)	Field to field	Road to road	Access track to field	Access to farm/house from public road	Access to worksite or leisure facility
					X

4.3 Vulnerable Population

Is there a higher than usual number of vulnerable people using the crossing (e.g. children, elderly, disabled, vision impaired, deaf, those with learning difficulties, pushchair users, etc.) Tick applicable	Yes	
	No	X

If yes answered provide supporting information.

No evidence recorded – LCM has not seen this usage during inspections either

4.4 Irregular Users

Does the crossing have a high number of irregular users (e.g. ramblers, yachting visitors to marina, seasonal events etc)	Yes	X
	No	

If yes answered provide supporting information.

Crossing has public footpath signs on the stile posts – will be used by rambling community, there is a marina and pub/club for marina users nearby. Fishermen use this area also.

Holiday boats moor at the marina all year round

4.5 Night time/Dusk Usage

Does the crossing have a high number of users during night/dusk? If yes note type and issue in section on notes on sighting and decision point	Yes	
	No	X

Estimate the percentage of users who use the crossing between 2300 and 0700	1%
---	----

If yes answered provide supporting information.

No evidence of higher than usual night usage

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4.6 Results

Record number of users either by number within census period or if no users seen during the site visit undertake an estimated census and tick approximate box

Type of User	Count	Total	Six to nine daily	Three to five daily	Once or twice daily	Weekly	Few Times a year only	No evidence of use
Pedal/Motor Cyclists	No evidence of use Estimates based on potential usage all year round and averaged out using LCM local knowledge							X
Adult Pedestrians					X			
Child Pedestrians						X		
Horses								X

NOTE:

When undertaking the site visit check that all signage is provided, in the correct place and in good order. If any issues with the signage or state of the crossing are identified then report to maintenance and take action to make sure the crossing is safe to use

Notes on any issues with crossing signage or state

Signage in relatively good order. Rubber decking Up Side, Wood Decking down side with non slip surface. Crossing has trespass guards. Crossing has the visible appearance of being well maintained.

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5. Train and Strike in Time for MWL Crossings Only

For MWL crossings, if a train(s) arrives during the site visit record the train type and strike in time, and wherever possible the data collector should try to obtain strike in times for train movements in each direction. It is possible to identify up to three train types that cross over the crossing and provide the information below.

Maximum 3 types of trains e.g. Passenger Stopping/Non-Stop or freight	N/A		
Time taken (seconds) for train to arrive at crossing once MWL has gone to Red			
Record which Line the train was seen on.			

6. Crossing Sighting Distance and Traverse Time

NOTE: The decision point from the nearest running rail should be

- **For Footpath Crossings It should be no nearer than**
 - **6ft 6 inches (2m) from the nearest running rail for line speeds of 100 MPH or less,**
 - **10ft (3m) from the nearest running rail for line speeds greater than 100 MPH**
- **For Bridleway crossings it should be no nearer than**
 - **10ft (3m) from the nearest running rail**

If there are locations where the minimum distance is not met and no controls are in place record and take action to make sure the crossing is safe to use.

What is the sighting distance from the decision point in metres and minimum sighting time?

NOTE: SIGHTING DISTANCE IS TO BE CALCULATED USING PERMISSIBLE LINE SPEED

	Minimum Sighting Distance Required	Measured Sighting Distance (metres)	Sighting distance measured to what marker/reference point?	Is Deficient Sighting Distance Mitigated? YES/NO	Deficient Sighting Time Mitigations Notes
Upside looking towards up direction trains approaching	260m	1,050m	CA250R Signal	N/A	N/A
Upside looking towards down direction trains approaching	260m	1,500m+	Dimmocks Cote LC	N/A	N/A
Downside looking towards up direction trains approaching	260m	1,050m	CA250R Signal	N/A	N/A
Downside looking towards down direction trains approaching	260m	1,500m+	Dimmocks Cote LC	N/A	N/A

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What limits sighting for up and down directions (tick which one applies)

	Up Direction	Down Direction
Nothing vanishing point	X	
Track Curvature		X
Permanent structure (building/wall etc)		
Signage or crossing equipment		
Vegetation		
Bad weather on the day of visit		
Other		

How was the sighting distance measured (tick which ones apply)

	Up direction	Down Direction
Range finder	X	X
Using a known reference point (bridge etc)	X	X
Using a marker at a known distance		
Using a measuring wheel		

What distance is the decision point from the nearest running rail?

Up Line Decision Point Distance (m)	Down Line Decision Point Distance (m)
2.2m	2m

What did you record the decision point as being from?

Up side Decision Point	Down side Decision Point
Stop, Look and Listen Sign	Stop, Look and Listen Sign

What is the distance in metres from the decision point to 2 metres past the furthest rail?

Up side	Down side
9.2m	9m

Are there any obstructions that could make it difficult to observe trains (e.g. posts, scrap, redundant structures, equipment cabinets, signage etc?)
If yes note type and issue in section on notes on sighting and decision point

Yes	X
No	

Are there any other visibility issues at this crossing at certain times of the year (e.g. fog likely or foliage growth (**If yes note type and issue in section on notes on sighting and decision point**))

Yes	X
No	

Note on sighting and decision point

OHL Structures can affect visibility. Dust and Wind affect visibility and hearing. The bridge can also affect visibility for children as the metal railings both sides are at potentially a small child's height

Is there any action that can be taken to improve sighting?

Yes	
No	X

Note on how to improve sighting and decision point

Pro Active Vegetation management at the bridge has resolved this previous issue

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Are there whistle boards that apply to the crossing on the up line on the approach to the crossing and if yes the distance from crossing?

Yes		Distance (Metres)
No	X	

Are there whistle boards that apply to the crossing on the down line on the approach to the crossing and if yes the distance from crossing?

Yes		Distance (Metres)
No	X	

Note on whistle boards

None present

Please provide any further information that may be relevant or of use

Stiles at crossing are low to the step over and as such a quite high leg lift is required for use. This may discourage some potential users from using this crossing

7. Crossing Approach

Has there been or is there planned or apparent any development near the crossing which may lead to a change or increase in use such as a housing estate or change in farming practice?

Yes	
No	X

Notes on new developments

None evidenced

Are there any adjacent sources of light/noise (e.g. Road, Industrial Site, Airport) that could affect the crossings users ability to see or hear an approaching train? (if yes note type and issue in Notes on crossing Approach section)

Yes	
No	X

Where are the signs for the crossing located? (If not directly on the route a crossing user would use make note in Notes on crossing Approach section)

On the route a crossing user would take to cross the crossing directly	X	Not on the route a crossing user would take to cross the crossing directly	
--	---	--	--

Are the signs at the crossing positioned so as to be clearly visible for crossing users on a direct route over the crossing? (if no note type and issue in Notes on crossing Approach section)

Yes	X
No	

Are the signs for the crossing clearly visible during night/dusk? (If not visible at night make note in Notes on crossing Approach section)

Yes	X
No	

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Notes on Crossing Approach

No lighting at crossing. Up and Down sides have steep approaches. Wind here makes it very hard to hear approaching trains. Approaches get muddy and slippery when wet.

For footpath crossings are the approaches to the crossing within the boundary fence steep, slippery or pose a tripping hazard (tick which one applies)

Yes	X
No	

Provide any additional information on footpath crossing.

Steep slopes – slippery/icy in bad weather conditions

8. Risk of Crossing Use

Has there been any user abuse of the crossing in the last year?

Yes	
No	X

Provide any additional information, such as history of abuse, effect of any mitigation measures that have been installed

No incidents recorded in 13 Period SMIS Report. Trespass Guards in place
Small Scale Vandalism on Up signage

What is the type of crossing surface? (Tick which one applies)

Decking	X	Is the decking provided wide enough for all users?				Yes	X	No	
No Decking Ballast		Does it have a non slip surface?				Yes	X	No	
Record Type of crossing surface	Timber	Concrete	Rubber	Ballast	Other Describe				
	X		X		Up – Rubber, Down – Wood Deck with non slip surface				

What is the traverse time in seconds from decision point to 2 metres past the furthest rail for shown for the distance in Appendix A: (Note The crossing time should be increased by 50% if vulnerable users are identified to allow for users who are encumbered e.g. bicycles, wheelchairs etc)

Pedestrians/Horse & Riders	7.74	If you have increased the traverse time by 50% tick the box	
----------------------------	------	---	--

Notes on traverse time

Used Sighting Spreadsheet not table below

LEVEL CROSSING RISK ASSESSMENT – SITE VISITS & CENSUSES

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Appendix A – Crossing Times

	Length of crossing in metres	Pedestrian no deck	Pedestrian with deck
Minimum for 1 track	5	5	5
	6	6	5
	7	7	6
	8	8	7
Minimum for 2 tracks	9	9	8
	10	10	9
	11	11	10
Minimum for 3 tracks	12	12	11
	13	13	11
	14	14	12
Minimum for 4 tracks	15	15	13
	16	16	14
	17	17	15

The following crossing speeds shall be used to calculate crossing times:

User	Crossing Speed (metres per second)
Category B Pedestrians (without decks)	1.006
Category C Equestrians Cyclists Pedestrians (at crossings with decks)	1.189

NARRATIVE RISK ASSESSMENT – PASSIVE TEMPLATE FINAL v2.0

PASSIVE LEVEL CROSSING RISK ASSESSMENT

1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT

1.1 LEVEL CROSSING OVERVIEW

This is a risk assessment for West River Bridge level crossing.

Crossing details	
Name	West River Bridge
Type	FPS
Crossing status	Public Footpath
Overall crossing status	Open
Route name	Bethnal Green to Kings Lynn
Engineers Line Reference	BGK, 67m, 22ch
OS grid reference	TL 538 746
Number of lines crossed	2
Line speed (mph)	75
Electrification	OHL
Signal box	Cambridge

Risk assessment details	
Name of assessor	John Prest
Post	Level Crossing Manager - Ely
Date completed	17/12/2015
Next due date	17/03/2018
Email address	John.Prest@networkrail.co.uk
Phone number	07917 857890

ALCRM risk score	
Individual risk	C
Collective risk	6
FWI	0.00023908

1.2 INFORMATION SOURCES

The table below shows the stakeholder consultation that was undertaken as part of the risk assessment.

Consulted	Attended site
Local community	No

Stakeholder consultation and attendance notes:

Public Footpath so no AU's

The reference sources used during the risk assessment included:

- GI Portal, SMIS,
- Covert Census June 2015 and Count On Us Survey June 2013

1.3 ENVIRONMENT



Up side crossing approach

Down side crossing approach

The environment surrounding West River Bridge level crossing consists of a marina leisure attraction and a fishing river with public footpath walks generating some use.

It is a public footpath level crossing. There are no stations visible at the level crossing.

At West River Bridge level crossing the orientation of the road/path from the north is 160°; the orientation of the railway from the north to the up line in the up direction is 210°. Low horizon can result in sun glare; sun glare is a known issue.

There are no planned or apparent developments near the crossing which may lead to a change or increase in use or risk.

Site visit general observations:

The Up Approach is a steep, grassy slope leading to a footpath stile and Network Rail Access Gate. The Down Approach is a slight Up Hill gradient but not on a comparative scale to the Up side. There is a bridge (BGK/1557) that has in the LCM's opinion a viable alternative footpath route right next to the crossing and this is being explored by the LCM/Liabilities as a potential diversion of rights to lead to closure. The over bridge walkway would need upgrading to facilitate people walking under it for such a closure but could be done in the LCM's opinion relatively economically

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over West River Bridge level crossing consists of passenger and freight trains. There are 186 trains per day. The highest permissible line speed of trains is 75mph. Trains are timetabled to run for 20 hours per day.

Assessor's notes:

An increase in rail traffic by 2 trains per hour from 2017 onwards is anticipated

2.2 USER CENSUS DATA

An estimated census has been used. The census was estimated on 14/12/2015 by John Prest. The census applies to 100% of the year.

The census taken on the day is as follows:

Pedestrians	ONCE OR TWICE DAILY
Pedal cyclists	NO
Horses / riders	NO
Animals on the hoof	NO

Available information indicates that the crossing does not have a high proportion of vulnerable users.

Vulnerable user observations:

No evidence recorded. LCM has not seen this usage during inspections either. No evidence from Sky High Count On Us Survey of June 2013

Available information indicates that the crossing has a high number of irregular users.

Irregular user observations:

Crossing has public footpath signs on the stile posts and will be used by rambling community there is a marina and pub/club for marina users nearby. Fishermen use this area also.

Holiday boats moor at the marina all year round as do holiday boat users. No evidence of this use though from Sky High Count On Us Survey of June 2013

Information gathered indicates that West River Bridge level crossing does not have a high number of users during the night or at dusk.

Site visit night / dusk user observations:

No evidence of higher than usual night usage

Assessor's general census notes:

9 days census undertaken by Sky High –Count On Us in June 2013 but no users were found to have used the crossing in the nine days of the survey. Also June 2015 - 9 Day Acorn Survey revealed no usage

2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to be 0 road vehicles and 2 pedestrians and cyclists per day.

3. RISK OF USE

3.1 SIGHTING AND TRAVERSE

At West River Bridge level crossing, the decision point and traverse lengths are calculated as:

	Decision point (m)	Traverse length (m)	Measured from
Up side	2.2	9.2	Stop, Look, Listen Signs
Down side	2	9	Stop, Look, Listen Signs

Rubber decking is provided over the Up side of this level crossing and Wooden Decking with Non Slip Surfacing is provided on the Down side. The decking is considered to be wide enough for all users of the crossing.

The traverse times are calculated as:

	Traverse time (s)
Pedestrians	7.74

The current census has not identified a high proportion of vulnerable users. Therefore, the pedestrian traverse time has not been increased.

Assessor's traverse time notes:

Single type of decking may make for a smoother journey across this crossing

Sighting was measured by the following means:

- Using known references
- Using Range Finder

Sighting, measured in metres, at West River Bridge level crossing is recorded as:

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	260m	1,050m	CA250R Signal	Yes	N/A	N/A
Up side looking toward down direction train approach	260m	1,500m	Dimmocks Cote LC	Yes	N/A	N/A
Down side looking toward up direction train approach	260m	1,050m	CA250R Signal	Yes	N/A	N/A
Down side looking toward down direction train approach	260m	1,500m	Dimmocks Cote LC	Yes	N/A	N/A

Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	YES	NO
Track curvature	NO	YES
Permanent structure (building/wall etc)	NO	NO
Signage or crossing equipment	NO	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO
Other	NO	NO

There are known obstructions that could make it difficult for users to see approaching trains. There are known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

Actions to improve sighting have not been identified.

Assessor's improving sighting and decision point notes

Pro Active Vegetation management at the bridge has resolved this previous issue. The bridge can slightly impair visibility of a train

Assessor's general sighting and traverse notes:

OHL Structures can affect visibility. Dust and Wind affect visibility and hearing. The bridge can also affect visibility for children as the metal railings both sides are at potentially a small child's height.

3.2 EVALUATION OF MITIGATIONS

Crossing has wooden Trespass Guards

3.3 CROSSING APPROACHES

The signs at West River Bridge level crossing are located on the direct route a user would take over the level crossing. They are positioned so that they are clearly visible to users taking a direct route over the level crossing. The visibility of the signs is not reduced at night or at dusk. There is no lighting at this crossing

The approaches to the crossing within the boundary fence are considered to be steep, slippery or present a tripping hazard to users.

Assessor's notes:

Up side approach is steep and grassy – Down side approach less so

There are no adjacent sources of light or noise that could affect a users' ability to see or hear approaching trains.

Assessor's general crossing approach notes:

No lighting at crossing. Up and Down sides have steep approaches. Wind here makes it very hard to hear approaching trains. Approaches get muddy and slippery when wet

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

Trains are occasionally known to pass each other at this crossing.

Assessor's another train coming notes:

This is a risk that is likely to increase when the train service increases in the near future

3.5 INCIDENT HISTORY

A level crossing safety event has not been known to occur at West River Bridge level crossing in the last twelve months.

Assessor's incident history notes:

No misuse recorded in SMIS or other data sources. Some small scale vandalism is apparent on some signs at the crossing

4. ALCRM CALCULATED RISK

West River Bridge level crossing ALCRM results

Key risk drivers: ALCRM calculates that the following key risk drivers influence the risk at this crossing:

- Frequent trains
- User misuses
- Sun glare

Assessor's key risk drivers notes

The frequency of trains at this crossing coupled with potential usage from irregular users such as holidaymakers are a real concern at this crossing. It does seem however that rather than use the crossing most people already walk under the bridge as it is a natural instinct to avoid the unnecessary railway crossing

Safety risk				
Compared to other crossings the safety risk for this crossing is	Individual risk		Collective risk	
	C		6	
	Individual risk (fraction)	Individual risk (numeric)		
Car	0	0	0	
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	0	0	0	
Pedestrian	1 in 6144	0.000162757	0.000237625	
				Derailment contribution
Passengers			0	0
Staff			0.000001455	0
Total			0.00023908	0
Collision frequencies	Train / user	User equipment	Other	
Vehicle	0	0	0	
Pedestrian	0.000290994	0.000017536	0.000048034	
Collision risk	Train / user	User equipment	Other	
Vehicle	0	0	0	
Pedestrian	0.000236287	0.000000281	0.000001057	

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at West River Bridge crossing include:

Option	Term ¹	ALCRM risk score	ALCRM FWI	Safety Benefit	Cost	Benefit Cost Ratio	Status	Comments
Upgrade to MWL	Long Term	C6	0.000114	0.0001250000	£305,000	0.01	COMPLETE	If closure by diversion of rights cannot be facilitated then this would be the LCM's preferred solution at the crossing.
Closure By Bridge	Long Term	M13	0.0000	0.000239	£1,200,000	0.01	COMPLETE	Considered to be unlikely at this crossing due to its location – could be possibly facilitated with a feasibility meeting etc
Closure By Diversion Of Rights	Long Term	M13	0.0000	0.000239	£70,000	0.10	COMPLETE	Diversion of rights to footway under the existing bridge + funds to improve this walkway to an acceptable level to enable closure
Upgrade Down side to H/Fast Deck and define DP/Lights on crossing deck	Short Term	C6	0.000192	0.0000470000	£6,000	0.23	COMPLETE	Upgrade Decking from wood, remark D.P. add lights to decking. Would need similar upgrade to the Up side which has Holdfast deck already

NOTES

Network Rail always evaluates the need for short¹ and long term risk control solutions. An example of level crossing risk management might be; a short term risk control of a temporary speed restriction with the long term solution being closure of the level crossing and its replacement with a bridge.

¹ Includes interim

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA might not be needed in all cases, e.g. standard maintenance tasks or low cost solutions (less than £5k).

The following CBA criteria are used as a support to decision making:

- a. benefit to cost ratio is ≥ 1 : positive safety and business benefit established;
- b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and
- c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

5.2 CONCLUSIONS

Assessor's notes:

As Level Crossing Manager for this crossing I would recommend the following options in order of preference –

1. Pursue the closure of this crossing by Diversion to the existing footpath under Bridge BGK/1557 if possible. The existing footpath under the bridge requires significant cosmetic enhancement to be viable in my opinion although it is probably being used as it is right now. Closure by Bridge would also be acceptable but fails a CBA and would in my opinion be difficult to achieve given the crossings location – if money is available we should still however consider this. Diversion is definitely the easier of the two closure options.
2. If closure by diversion/bridge cannot be achieved pursue upgrade option as a medium term solution – upgrade to MWL/VAMOS – we know traffic is going to increase on this line and therefore need to action accordingly despite the obvious failure of a CBA analysis.
3. As a short term option if closure cannot be achieved we should upgrade the Wood Deck on the Down Side to a Rubber Holdfast/Strail with the DP clearly defined, blue lights, approaches remodelled etc. There would have to be some similar work to the Up side although this is a Holdfast Deck currently. Again this is a CBA fail but would take us to SFAIRP in my view in regard to what can be done to the crossing short of closure.
4. Undertake a further 9 day survey to confirm usage – LCM will action this with Covert Cameras.

ANNEX A – ADDITIONAL PHOTOGRAPHS



2m D.P – Down Side Down Direction View



2m D.P. – Down Side Up Direction View



2.2m D.P. Up Side Up Direction View



2.2m D.P. Up Side Down Direction View

ANNEX B – HAZARD IDENTIFICATION AND RISK CONTROLS

The table below is intended for use by risk assessors when identifying hazards and risk control solutions. It is not an exhaustive list or presented in a hierarchical order.

	Hazard	Control
Road vehicle and train collision risk	<p>Examples at the crossing include:</p> <ul style="list-style-type: none"> insufficient sighting and / or train warning for all vehicle types; known to be exacerbated by the driving position, e.g. tractor level crossing equipment and signage is not conspicuous or optimally positioned instructions for safe use might be misunderstood e.g. signage clutter detracts from key messages, conflicting information given high volume of unfamiliar users, e.g. irregular visitors, migrant workers known user complacency leading to high levels of indiscipline, e.g. failure to use telephone, gates left open type of vehicle unsuitable for crossing; <ul style="list-style-type: none"> large, low, slow making access or egress difficult and / or vehicle is too heavy for crossing surface risk of grounding and / or the severity of the gradient adversely affects ability to traverse poor decking panel alignment / position on skewed crossing where telephones are provided, users experience a long waiting time due to: <ul style="list-style-type: none"> long signal section (Signaller unaware of exact train location) high train frequency insufficient or excessive strike in times at MSL crossings high chance of a second train coming high line speed and / or high frequency of trains unsuitable crossing type for location, train service, line speed and vehicle types 	<p>Controls can include:</p> <ul style="list-style-type: none"> optimising the position of equipment and / or signs removing redundant and / conflicting signs engaging with signalling engineers to optimise strike in times upgrading of asset to a higher form of protection downgrading of crossing by removing vehicle access rights optimising sighting lines and / or providing enhanced user based warning system, e.g. MSL re-profiling of crossing surface engaging with stakeholders / authorised users to reinforce safe crossing protocol, legal responsibilities and promote collaborative working widening access gates and / or improving the crossing surface construction material realigning or installing additional decking panels to accommodate all vehicle types implementing train speed restriction or providing crossing attendant
Pedestrian and train collision risk	<p>Examples include:</p> <ul style="list-style-type: none"> insufficient sighting and / or train warning ineffective whistle boards; warning inaudible, insufficient warning 	<p>Controls can include:</p> <ul style="list-style-type: none"> optimising the position of equipment and / or signs removing redundant and / conflicting signs

	Hazard	Control
	<p>time provided, known high usage between 23:00 and 07:00</p> <ul style="list-style-type: none"> • high chance of a second train coming • high line speed and / or high frequency of trains • level crossing equipment and signage is not conspicuous or optimally positioned • location and position of level crossing gates mean that users have their backs to approaching trains when they access the level crossing, i.e. users are initially unsighted to trains approaching from their side of the crossing • instructions for safe use might be misunderstood e.g. signage clutter detracts from key messages, conflicting information given • surface condition or lack of decking contribute to slip trip risk • known high level of use during darkness • increased likelihood of user error, e.g. crossing is at station • free wicket gates might result in user error • high volume of unfamiliar users, e.g. irregular visitors / ramblers, equestrians • complacency leading to high levels of indiscipline, e.g. users are known to rely on knowledge of timetable • high level of use by vulnerable people • where telephones are provided i.e. bridleways, users experience a long waiting time due to: <ul style="list-style-type: none"> - long signal section (Signaller unaware of exact train location) - high train frequency • insufficient or excessive strike in times at MSL crossings • unsuitable crossing type for location, train service, line speed and user groups • high usage by cyclists • degree of skew over crossing increases traverse time and users' exposure to trains • crossing layout encourages users not to cross at the designed decision point; egress route unclear especially during darkness 	<ul style="list-style-type: none"> • upgrading of asset to a higher form of protection • optimising sighting lines, e.g. de-vegetation programme, repositioning of equipment or removal of redundant railway assets • implementing train speed restriction or providing crossing attendant • providing enhanced user based warning system, e.g. MSL • engaging with stakeholders / authorised users to reinforce safe crossing protocol, legal responsibilities and promote collaborative working • installing guide fencing and / or handrails to encourage users to look for approaching trains, read signage or cross at the designed decision point • re-design of crossing approach so that users arrive at the crossing as close to a 90° angle as possible • installing lighting sources • engaging with signalling engineers to optimise strike in times • providing decking or improving crossing surface, e.g. holdfast, strail, non-slip surface • providing cyclist dismount signs and / or chicanes • straightening of crossing deck

	Hazard	Control
	schools, local amenities or other attractions are known to contribute towards user error	
Pedestrian and road vehicle collision risk	<p>Examples include:</p> <ul style="list-style-type: none"> a single gate is provided for pedestrian and vehicle users where there is a high likelihood that both user groups will traverse at the same time the position of pedestrian gate forces / encourages pedestrian users to traverse diagonally across the roadway road / footpath inadequately separated; footpath not clearly defined condition of footpath surface increases the likelihood of users slipping / tripping into the path of vehicles 	<p>Controls can include:</p> <ul style="list-style-type: none"> providing separate pedestrian gates clearly defining the footpath; renew markings positioning pedestrian gates on the same side of the crossing improving footpath crossing surface so it is devoid of potholes, excessive flangeway gaps and is evenly laid improving crossing surface, e.g. holdfast, strail, non-slip surface
Personal injury	<p>Examples include:</p> <ul style="list-style-type: none"> skewed crossing with large flangeway gaps results in cyclist, mobility scooter, pushchair or wheelchair user being unseated condition of footpath surface increases the likelihood of users slipping / tripping degraded gate mechanism or level crossing equipment barrier mechanism unguarded / inadequately protected 	<p>Controls can include:</p> <ul style="list-style-type: none"> improving fence lines reducing flangeway gaps and straightening where possible providing decking or improving crossing surface, e.g. holdfast, strail, non-slip surface straighten / realign gate posts fully guarding barrier mechanisms

ANNEX C – ALCRM RISK SCORE EXPLANATION

ALCRM provides an estimate of both the individual and collective risks at a level crossing.

The individual and collective risk is expressed in Fatalities and Weighted Injuries (FWI). The following values help to explain this:

- **1** = 1 fatality per year or 10 major injuries or 200 minor RIDDOR events or 1000 minor non-RIDDOR events
- **0.1** = 20 minor RIDDOR events or 100 minor non-RIDDOR events
- **0.005** = 5 minor non-RIDDOR events

INDIVIDUAL RISK

This is the annualised probability of fatality to a 'regular user'. *NOTE: A regular user is taken as a person making a daily return trip over the crossing; assumed 500 traverses per year.*

Individual risk:

- Applies only to crossing users. It is not used for train staff and passengers
- Does not increase with the number of users.
- Is presented as a simplified ranking:
 - Allocates individual risk into rankings A to M (A is highest, L is lowest, and M is 'zero risk' e.g. temporary closed, dormant or crossings on mothballed lines)
 - Allows comparison of individual risk to average users across any crossings on the network

Individual Risk Ranking	Upper Value (Probability)	Lower Value (Probability)	Upper Value (FWI)	Lower Value (FW)
A	1 in 1	Greater than 1 in 1,000	1	0.001000000
B	1 in 1,000	1 in 5,000	0.001000000	0.000200000
C	1 in 5,000	1 in 25,000	0.000200000	0.000040000
D	1 in 25,000	1 in 125,000	0.000040000	0.000008000
E	1 in 125,000	1 in 250,000	0.000008000	0.000004000
F	1 in 250,000	1 in 500,000	0.000004000	0.000002000
G	1 in 500,000	1 in 1,000,000	0.000002000	0.000001000
H	1 in 1,000,000	1 in 2,000,000	0.000001000	0.000000500
I	1 in 2,000,000	1 in 4,000,000	0.000000500	0.000000250
J	1 in 4,000,000	1 in 10,000,000	0.000000250	0.000000100
K	1 in 10,000,000	1 in 20,000,000	0.000000100	0.000000050
L	Less than 1 in 20,000,000	Greater than 0	0.000000050	Greater than 0
M	0	0	0	0

COLLECTIVE RISK

This is the total risk for the crossing and includes the risk to users (pedestrian and vehicle), train staff and passengers.

Collective risk:

- Is presented as a simplified ranking:
 - Allocates collective risk into rankings 1 to 13
(1 is highest, 12 is lowest, and 13 is 'zero risk' e.g. temporary closed, dormant or crossings on mothballed lines)
 - Can easily compare collective risk between any two crossings on the network

Collective Risk Ranking	Upper Value (FWI)	Lower Value (FW)
1	Theoretically infinite	Greater than 5.00E-02
2	0.050000000	0.010000000
3	0.010000000	0.005000000
4	0.005000000	0.001000000
5	0.001000000	0.000500000
6	0.000500000	0.000100000
7	0.000100000	0.000050000
8	0.000050000	0.000010000
9	0.000010000	0.000005000
10	0.000005000	0.000001000
11	0.000001000	0.000000500
12	0.0000005	0
13	0.00E+00	0.00E+00

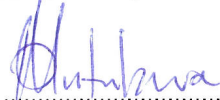
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Level 3

Maintaining Track Assets at Level Crossings

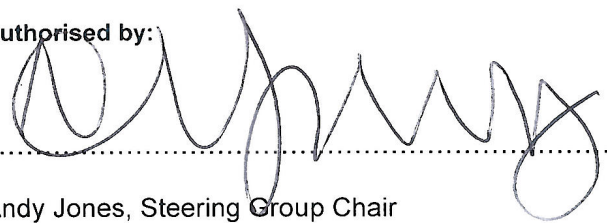
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User information

This Network Rail standard contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – *No deviations, could stop the railway*

- **Red requirements shall** always be complied with and achieved.
- Red requirements shall be presented in a red box **with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of red requirements lies with the Professional Head/Standard Owner.
- Red requirements are monitored for compliance.
- Corrective actions shall be enforced if deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Amber requirements – *Controlled deviations, approved risk analysis and mitigation*

- **Amber requirements shall** be complied with unless deviation has been approved in advance.
- Amber requirements shall be presented with an amber sidebar **and with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of these requirements lies with the Professional Head/Standard Owner, or their nominated Delegated Authority.
- Amber requirements are monitored for compliance.
- Deviations **may** be permitted. Deviations are approved by the Standard Owner or through existing Delegated Authority arrangements.
- Corrective actions shall be enforced if **non-approved** deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Green – *Guidance*

- Guidance is based on good practice. Guidance represents supporting information to help achieve **Red** and **Amber** requirements.
- Guidance shall be presented with a dotted green sidebar **and with the word “should” (usually in notes) or as a direct instruction**.
- Guidance is **not mandatory** and is not monitored for compliance.
- Alternative solutions may be used. Alternative solutions do not need to be formally approved.
- Decisions made by a competent person to use alternative solutions should be backed up by appropriate evidence or documentation.

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Issue record

Issue	Date	Comments
1	June 2012	New Standard

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 01 September 2012.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference documentation

NR/L2/TRK/001 – Inspection and Maintenance of Permanent Way

NR/L3/TRK/1011 – Management of Permanent Way

NR/L2/TRK/2102 – Design and Construction of Track

NR/L2/TRK/2049 – Track Design Handbook

NR/L2/TRK/4040 – Level Crossing Surface Systems

NR/L2/TRK/5100 – Management of Fencing and Other Boundary Measures

NR/L2/TRK/5201 – Management of Lineside Vegetation

NR/L2/SIG/19608 – Level Crossing Infrastructure: Inspection and Maintenance

NR/L2/SIG/30017 – Requirements for Level Crossings

NR/L2/SIG/30015 – Specification for Station, Footpath, Bridleway and User Worked Crossings

NR/L3/SIG/MG0081 – Inspection of Level Crossings Including Work Identification and Prioritisation

NR/L2/OPS/100 – Provision, Risk Assessment and Review of Level Crossings

NR/L3/MTC/PL0175 – Infrastructure Maintenance Planning Handbook

NR/L2/RVE/0007 – Specification for on and Off Tracking of Road Rail Vehicles

NR/SP/ELP/27021 – Electric Track Equipment Layout Design for D.C. Electrified Lines

NR/GN/ELP/27088 – Layout of Overhead Line Equipment

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1 Purpose

This standard specifies the requirements for managing the installation, inspection, maintenance of track assets at operational level crossing infrastructure. It demonstrates that level crossing systems are compliant with legislation, reliable and safe.

2 Scope

This Network Rail standard is applicable to level crossings of the following types, including those that are subject to temporary closure:

- Automatic Half Barrier Crossings
- Automatic Full Barrier Crossing with Obstacle Detection
- Automatic Half Barrier Crossings Locally Monitored
- Automatic Open Crossings Locally Monitored (including OCFLs)
- Automatic Open Crossings Remotely Monitored
- Miniature Stop/ Warning Lights
- Manually Controlled Barriers (including CCTV and OCB)
- Traincrew Operated Crossings
- Manned Gated Level Crossings
- Manually Controlled Barrier – Obstacle Detection
- Open Crossings
- Power Operated Gate Opening Crossings
- User Worked Crossings
- Footpath and Bridleway Crossings
- Station Barrow Crossings
- Station Foot Crossings
- Sleeping Dog Crossings
- Mothballed Crossings.

NOTE This document is NOT applicable to Inspection and Maintenance of Road Rail Access Points (RRAPs), and Track Access Points (TAPs) as they are not level crossings.

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3 Roles and responsibilities

RACI DETAILS	KEY CONTROL ACTIVITY	Resources										
		Infrastructure Maintenance Engineer	Track Maintenance Engineer	Section Manager (Off Track)	Off Track Inspector	Operations Risk Control Coordinator	Infrastructure Fault Control	Signaller	Maintenance Protection Coordinator	Section Planner	Infrastructure Maintenance Services Manager	Route Asset Manager (Track)
Process Task												
6.1	-	-	R	R	R	-	-	-	-	-	-	-
6.2	-	-	-	C	C	-	-	-	-	A,R	-	-
6.4.1	X	-	R	I	-	A,R	-	-	-	-	-	-
6.4.2	-	-	I	A,R	-	-	-	-	-	-	-	-
6.4.3	-	-	A,R	C	-	-	-	-	-	-	R	-
6.4.4	-	-	I	C	-	-	-	-	-	A,R	-	-
6.4.5	-	-	I	I	-	-	-	-	-	A,R	-	-
6.4.6	-	-	R	A	-	-	-	-	-	-	-	-
6.4.7	-	-	A,R	C	-	R	-	-	-	-	-	-
6.4.8	-	-	I	A,R	-	R	-	-	-	-	-	-
6.4.9	X	I	R	A,R	-	-	-	-	-	-	-	-
6.4.10	-	-	C	A,R	-	-	-	-	-	-	-	-
6.4.11	-	-	-	A,R	-	-	-	-	-	R	-	-
6.4.12	X	-	-	A,R	R	-	-	-	-	-	-	-
6.4.13	-	-	-	C	A,R	-	-	-	-	-	-	-
6.4.14	-	-	I	C	A,R	-	C	C	-	-	-	-
6.4.15	-	-	-	-	A,R	-	-	-	-	-	-	-
6.4.16	-	-	I	A	R	-	C	C	-	-	-	-
6.4.17	-	-	I	A	R	-	-	-	-	-	-	-
6.4.18	-	-	I	A	R	-	-	-	-	-	-	-
6.4.19	-	-	I	A,C	R	-	-	-	-	-	-	-
6.4.20	X	-	A,R	R	-	-	-	-	-	C	-	-
6.4.21	-	-	A,R	R	-	-	-	-	-	-	-	-
6.4.22	-	-	A,R	-	-	C	-	-	-	-	-	-
6.4.23	-	I	I	I	-	A,R	-	-	-	-	-	-
6.4.24	-	-	-	A,R	-	-	-	-	-	-	-	-
6.4.25	-	-	-	A,R	-	-	-	-	C	-	-	-
6.4.26	-	-	I	A,R	R	-	-	-	-	C	-	-
6.4.27	-	-	-	A,R	-	-	-	-	-	R	-	-
6.4.28	-	-	-	A,R	-	-	-	-	-	-	-	-
6.5	-	-	I	R	A,R	-	-	-	-	-	-	-
6.6.1	-	-	-	I	A,R	-	-	-	-	-	-	-
6.6.2	-	-	-	I	A,R	-	-	-	-	-	-	-
6.6.3	-	-	-	I	A,R	-	-	-	-	-	-	-
6.7	-	-	-	A,R	R	-	C	C	-	-	-	-
6.7.1	-	-	A,R	R	-	-	-	-	-	-	-	-
6.8	-	-	A,R	C	-	-	-	-	-	-	-	-
6.9	-	-	A,R	R	-	-	-	-	-	-	-	-
6.9.1	-	-	A,R	C	-	-	-	-	-	-	-	-
6.9.2	-	-	A,R	C	-	-	-	-	-	-	-	C
6.9.3	-	-	A,R	R	-	-	-	-	-	-	-	-
6.9.4	-	-	-	-	-	A,R	-	-	-	-	-	-

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6.9.6	-	-	C	C	-	-	-	-	-	R	-	-
6.9.7.1	-	-	-	A,R	R	-	-	-	-	-	-	-
6.9.7.2	-	-	R	C	-	-	-	-	-	-	-	-
6.9.8	-	-	A,R	R	-	C	-	-	-	-	-	I
6.9.8.1	-	-	A,R	C	-	R	-	-	-	-	-	-
6.9.8.2	-	-	A,R	C	-	R	-	-	-	-	-	-
end RACI												

Table 1 – RACI

4 Definitions

For the purpose of this standard, the following terms and definitions apply.

ABCL	Automatic Barrier Crossing, Locally Monitored
AFBC-OD with TPWS	Automatic Full Barrier Crossing with Obstacle Detection and Train Protection Warning System
AHBC	Automatic Half-Barrier Crossing
ALCRM	Operations All Level Crossing Risk Model
AOCL	Automatic Open Crossing, Locally Monitored
AOCR	Automatic Open Crossing, Remotely Monitored
BW	Bridleway Crossing
CCTV	Closed Circuit Television
DCI	Driver's Crossing Indicator
ELLIPSE	Maintenance Scheduling System (formerly MIMS)
FP	Footpath Crossing
HAE	Highway Authority Engineer, this includes Local authority engineer
IFC	Infrastructure Fault Control
IMDM	Infrastructure Maintenance Delivery Manager
IMSM	Infrastructure Maintenance Services Manager
IME	Infrastructure Maintenance Engineer
MCB	Manually Controlled Barriers
MCB-CCTV	Manually Controlled Barriers with Closed Circuit Television
MCB-OD	Manually Controlled Barriers with Obstacle Detection
MCB-R	Remote Manually Controlled Barriers in excess of 50M from the Control Point
MG	Manned Crossing with Gates
MOM	Mobile Operations Manager
MPC	Maintenance Protection Coordinator
MSTs	Maintenance Scheduled Tasks

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NR	Network Rail
OC	Open Crossing without road warning lights
OTI	Off Track Inspector
ORCC	Operations Risk Control Coordinator
RAM(T)	Route Asset Manager (Track)
RotR	Rules of the Route
SM	Section Manager
SM(OT)	Section Manager Off Track
SP	Section Planner
STME	Signal and Telecoms Maintenance Engineer
TME	Track Maintenance Engineer
UWC	User Worked Crossing
WAIF	Work Arising Inspection Form
Acceptable condition	An asset in acceptable condition is fit for purpose and is unlikely to become a defect prior to the next inspection.
Accommodation crossing	A field to field crossing essentially for use of a farmer.
Active (visible or audible) warning	A device which warns users of the imminent arrival of a train. Such devices can be either visible or audible and can be used in combination.
Actual daily road vehicle user	The number of road vehicles passing between 06.00 and 24.00 averaged over a 9-day period. The value recorded in ALCRM is acceptable if a full 9 day census is not available.
Approaches (to a crossing)	The road, bridleway or path leading up to a crossing. For the purposes of this document, the approaches, measured from the nearest running rail, extend for 30 m on heavily used vehicular crossings and 20 m on other crossings.
Authorised user	A person having the legal or contractual right to use a particular level crossing.
Automatic control system	A system which automatically activates the protective equipment at a level crossing on the approach of a train.
Automatic crossing	A level crossing where the protective equipment, for example, barriers and active warnings, is automatically activated by the approaching train. The term excludes a manually controlled crossing where automatic lowering and/or automatic raising of the barriers is provided.
Automatic lowering	The lowering of the barriers at a crossing initiated by a train.
Automatic raising	The raising of the barriers at a crossing initiated by the

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	passage of a train clear of the crossing
Basic test	A simple check with a basic test gauge to determine compliance to vertical profiles within this document.
Bridleway crossing	A level crossing for pedestrians, cyclists and horses.
Cattle-cum-trespass guard	A device provided adjacent to the level crossing surface designed to deter animals from straying, and pedestrians from trespassing, onto the railway.
Check	Visually inspect for alignment, obstructions, breakages, decay and obvious damage.
Competence	Endorsement by line manager of a person's authority to work on a specific asset.
Control point	The location from which one or more controlled crossings are operated.
Crossing	Used in level crossing documentation to mean 'level crossing', where the continued use of 'level crossing' becomes repetitive and laboured.
Crossing length	The distance along the road or path between the barriers, decision points and stop lines on either side of the railway.
Crossing speed	The permissible train speed applying between a speed restriction sign and a locally monitored level crossing.
Crossing surface	An installation providing a continuation of the road surface to enable it to be carried across the railway at the same elevation. This term includes all associated support and fixing systems.
Crossing width	The width of the road or path crossing the railway.
Decision point	The point at which a level crossing user makes a decision to cross or wait.
Footpath crossing	A public or private pedestrian level crossing.
Grounding	The effect of any part of the road vehicle coming into contact with the crossing surface.
Hog	A measure of the crossing surface vertical profile over specified wheel base lengths.
Inspect	Visual examination of level crossing to detect hidden failures and deterioration of the assets. Includes non-intrusive "first aid" repairs (e.g. cleaning signs).
Left-hand side (of the road)	The left-hand side of the road or carriageway as it would appear to a person approaching the crossing along that road or carriageway.
Level crossing	An intersection at the same elevation of a road, footpath or bridleway and one or more rail tracks.

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Level Crossing Ground Plan	Scaled and dimensioned drawing(s) showing the position of all equipment and associated features at a level crossing that should represent the details indicated in the Level Crossing Order. In case of omission / error / confusion, the Level Crossing Order is the overriding document.
Level Crossing Order	A legal document made by, or on behalf of, the Secretary of State for Transport under the Level Crossings Act 1983 which references the operation of the crossing. It also defines the position and size of certain component parts, including road markings and signage, and the responsibilities of Network Rail and the appropriate Highways Authority. For the purposes of this Specification, this includes Letters of Consent authorising level crossings. This may also include 'Direction Orders' which have been issued to mandate certain positions for level crossing gates.
Level survey	A detailed level survey using approved surveying techniques.
Maintenance	Technical activities defined in engineering standards to check that level crossings continue to operate safely and reliably.
Mothballed	This type of crossing is one that is on a line that is 'out of use' but not legally closed, (i.e. no network change applied for). Such an arrangement does not absolve Network Rail, from liability for maintaining level crossings, on all mothballed lines in particular those used by members of the public in a condition fit for purpose. Crossings on mothballed lines should be capable of being brought back into use with minimal change and shall meet all of their original legal requirements as if they were still open and should be inspected and tested as such. Gates, crossing fencing and surface systems will be required to be inspected at the frequency mandated for active crossings whereas other component parts such as signage, warning lights, telephones and lifting barriers shall only be inspected at a reduced frequency.
Off Track Inspector	Specialised inspectors, who check level crossings in accordance with this standard and undertake certain repairs. Shall be referred to as the 'Inspector' throughout this standard.
Near Side (N)	The left hand side of the carriageway when viewed in the direction of road traffic.
Non running lines	Lines without a through route e.g. sidings, freight yards and depots.
Occupational crossing	Where a private road crosses the railway for example leading to a house or farm.
Off Side (O)	The right hand side of the carriageway when viewed in the direction of road traffic.

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Open crossing	A level crossing that has no barriers, gates or road traffic light signals and which is protected only by road traffic signs.
Outside party	Any asset owner other than Network Rail.
Repairs	The Inspector may carry out minor vegetation clearance, timber/ballast deck repairs, and sign changing. NOT repairs to electrical devices such as warning lights, barrier machines, audible alarms etc.
SC Defect	An immediate rectification defect, which if not immediately repaired has the potential to cause a serious incident to road, rail or pedestrian users.
Skew crossings	Acute skew crossings - the crossing angle measured in an anticlockwise direction from the road to the running rail (when facing direction of normal road traffic) is less than a 90degrees. Obtuse skew crossings - the crossing angle measured in an anticlockwise direction from the road to the running rail is greater than 90degrees.
Sleeping Dog crossing	A crossing generally of the UWC, FP, or Bridleway type which is still legally open and the right to cross the railway still legally exists but where no evidence exists that this right to cross is being exercised, or there is little or no trace of the crossing infrastructure.
Temporarily closed	Any crossing that has been temporarily closed for crossing the railway because of extended engineering work, adjacent developments etc., but where we intend to re-open the crossing.
Traffic moment	The number of road vehicles using the crossing multiplied by the number of trains passing in a given period.
User	A person who uses a level crossing. For the purposes of this document the term includes the authorised user and invitees of the authorised user.
User Worked crossing	A level crossing, where the user operates the crossing gates or barriers themselves.
Vegetation growing period	When growth on bushes, trees, hedgerows, grasses, reeds etc is likely to begin to thicken and affect visibility if not controlled.
Y Side	Normally, the side of the crossing adjacent to the UP line.
Z Side	Normally, the side of the crossing adjacent to the DOWN line.

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5 General Statutory Requirements

5.1 Level Crossing Order

A Level Crossing Order is a legal document made by, or on behalf of, the Secretary of State for Transport under the Level Crossings Act 1983, as amended by the Level Crossings Regulations 1997 and The Road Safety Act 2006.

The Level Crossing Order specifies how the crossing is to be operated and the protective equipment, which includes barriers, traffic signs, signals and road marking, and the responsibilities of Network Rail and the appropriate Highways Authority.

Non-compliance with the requirements of the Level Crossing Order is a criminal offence.

The location of the public right of way, that is Footpaths and Bridleways, is held on a 'Definitive Map' owned by the local Highway Authority. A Title Deed is the legal document in use for User Worked Level Crossing (Non Public).

5.2 Ground Plan

A Level Crossing Ground Plan drawing shows the position of all equipment and associated features at a Level Crossing and complies with the requirements of the Level Crossing Order.

Level Crossing Ground Plans and Level Crossing Orders generally apply to crossings on roads where the public has access.

Where a Ground Plan does NOT exist for a crossing collate photographs, 360degrees – approaches and either side, at least four in total, or create a controlled sketch, which is then endorsed as correct for the installation by the ORCCs.

[Clause 6 NR/L2/SIG/19608 TABLE 2](#), Level Crossing Features and References, provides guidance on which features are to be included on the Ground Plan and/or Level Crossing Order.

In cases of omission or error the Level Crossing Order takes precedence over the Level Crossing Ground Plan.

5.3 Walkway Requirements

Make appropriate provision for pedestrians, taking account of the number and frequency of pedestrians and trains, at all public vehicular level crossings.

Where a footway is provided on either or both sides of the approach road, a footway or footways of adequate width shall continue over the crossing. There shall be space, taking into account the volume and nature of the users, for pedestrians to pass each other without the need to use part of the carriageway reserved for road vehicles. Allowance shall be made for the needs of those with pushchairs and in wheelchairs.

Any footway shall be made up to the level of the carriageway and maintained in an even condition. Provide longitudinal road markings along each edge of any footway, to delineate the required width and define the safe route for pedestrians walking over

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the crossing. Also provide a safe place for pedestrians to stand when crossings are closed to road traffic on any footways approaching an automatic or open crossing.

All walkways are to be compliant with [NR/L2/SIG/30015](#).

5.4 Vegetation

Sighting of trains from the decision point shall not be compromised by vegetation. When installing equipment, take note of any vegetation that could affect the safe operation of the crossing or compromise sighting in the future, remove or report any such vegetation.

Scratching, stinging or rash making plants are not allowed to grow within one metre either side of a stile or footpath gate. This area shall be surrounded with an appropriate method of fencing.

Where the hedges either side are overgrown from an adjoining land owner, consult the land owner prior to removal.

Vegetation is to comply with [NR/L2/TRK/5201](#).

5.5 Fencing

Position fencing at the crossing as per the level crossing ground plan or controlled sketches / photographic record.

Fencing shall be compliant with [NR/L2/TRK/5100](#).

5.6 Cattle-cum-trespass Guards

Provide cattle-cum-trespass guards where indicated on ground plans or controlled sketches / photographic record that have been endorsed as correct by the ORCC.

Cattle-cum-trespass guards shall:

- Be adjacent to the footway at the edge of and level with the surface of the decking system
- Extend the full length of the crossing between the boundary fences with a fence extended from the boundary down the full length of each guard
- Be a minimum of 2.6 metres step over distance from any edge of the crossing surface
- If constructed of wood be of triangular rails base and vertical sides 115mm, with a Maximum of 35mm clear spacing between each rail
- If installed in DC conductor rail areas are to be constructed of a non-conductive material and adhere to [NR/SP/ELP/27021](#).

5.7 Road Closures

For guidance on Network Rail procedure refer to 'New Roads and Street Works Act Procedure', available from the National Signalling and Level Crossings Programme Team.

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6 Inspection

6.1 Inspection – Holistic View

Inspect the general arrangement of the crossing and check it is still to basic design as well as compliant to the Ground Plan or controlled sketches. Check if anything is missing with respect to the Ground Plan and surface system design.

Consider the relationship between the road and railway and the effects the location will have on the surface system. Have a diagram or cross section of the crossing location.

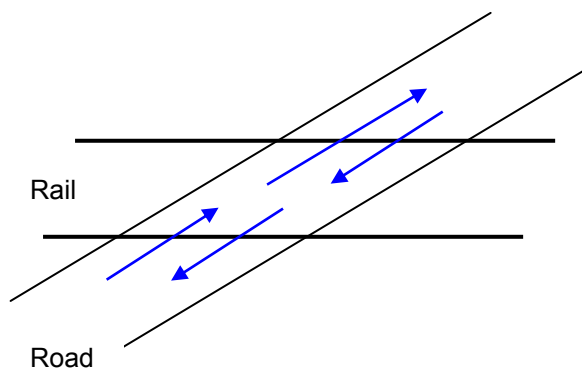


Figure 1 – Highly skewed crossing

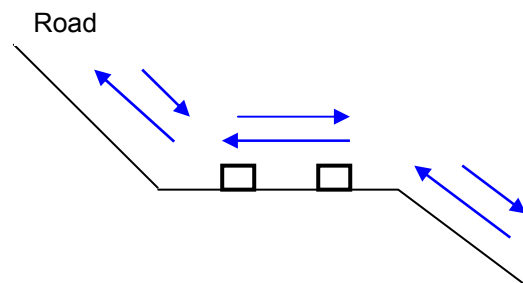


Figure 2 – Road/Rail Profile

Is the track providing a stable support?

Consider the effects of the road/railway profile:

- Highly skewed crossings experience increased dynamic loading, both vertical and lateral, which leads to panel fatigue and failure
- Look for signs of the crossing moving apart or shifting laterally
- Cumulative effects of panels affecting joint location on sleepers, panels likely to be staggered at skew crossings resulting in weakening of the system.
- Crossing on a tight radius, i.e. less than 400m - affects the profile of the level crossing as a result of the cant of the track.
- Topography/geology, e.g. hillside, valley, cutting, embankment, stable formation, water effects, effects on track stability
- Grounding (Nairn's) - risk of train striking road vehicle
- Look for signs of grounding on approaches and over crossing surface.

Consider change in use of the crossing:

- Increased traffic patterns or loading.

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Confirm the design of the crossing is correct:

- Performance history
- Surface system suitable for traffic type, volume and location.

Key issues are:

- The relationship between the road and railway, and the respective geometry
- Any effects due to the crossings location/environment
- Stability of the track system
- The surface systems ability to withstand the above given its design and condition.

6.2 Safe System of Work

Set up a safe system of work to comply with the Rule Book (GE/RT8000).

The safe system of work should extend to addressing the hazards associated with road traffic.

As a minimum this safe system of work should consider:

- Protection when working in the highway.
- The parking of any road vehicles, making sure that they are clear of the crossing; not parked in any lay by provided for large or slow vehicles; not parked in a position where it will obstruct the view of the Road Traffic Lights to oncoming users; not parked where it will constitute an offence i.e. in areas where there are double white lines in the centre of the carriageway.
- The method by which the highway is crossed. Where possible use pedestrian crossings (refer to the [Highway Code](#)).
- The method of walking along the highway; where possible, walk on the right hand side of a two-way highway facing oncoming traffic or use the safest alternative verge or footpath on a one-way highway.
- If part of a group, walk in single file.

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6.3 Inspection Interval

Description	Maximum Inspection Interval
Automatic Half Barrier Crossings	7 weeks
Automatic Half Barrier Crossings Locally Monitored	7 weeks
Automatic Full Barrier Crossings	7 weeks
Automatic Open Crossings Locally Monitored	7 weeks
Automatic Open Crossings Remotely Monitored	7 weeks
Miniature Stop/Warning Lights	7 weeks
Manually Controlled Barriers (inc CCTV and OCB)	3 months
Traincrew Operated Crossings	3 months
Manned Gated Level Crossings	3 months
Station, Barrow or foot crossings with White Lights	6 months
Open crossings	6 months
User Worked Crossings	6 months
Footpath and Bridleway Crossings	6 months
Station, Barrow or foot crossings without White Lights	6 months
Sleeping Dog Crossing	6 months
Crossings on Mothballed lines	In accordance with specific crossing type
Vertical Profiles on Level Crossings	Annually

Table 2 – Maximum Inspection Interval from [NR/L2/SIG/19608](#)

6.4 Inspection Process

NOTE Refer to Appendix A for Inspection Flowchart.

6.4.1 Create Inspection Register

The Operations Risk Control Coordinator, (ORCC), provides the Track Maintenance Engineer, (TME), with the list of level crossings to be entered into Ellipse. The frequency of inspection is determined by the ORCC to comply with [Table 2 Clause 6.3](#).

6.4.2 Produce Draft Inspection Plan

The Section Manager Off Track, (SM(OT)), produces the draft inspection plan using Ellipse data taking into account the required inspection intervals for inspection of level crossings.

6.4.3 Is Possession Access Required

The SM(OT), and the TME, shall determine the track access requirements for the inspection activities described within the plan, such that all tasks can be completed within their prescribed inspection frequencies.

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The Infrastructure Maintenance Services Manager (IMSM) team, arrange where appropriate, all access requirements that fall within the Rules of the Route (RotR), and process such requests to conclusion.

The IMSM provides details of which possessions include elements of inspection activity, informing the SM(OT) and TME of any access requirements that cannot be fulfilled.

6.4.4 Review Access Granted

The Section Planner, (SP), in consultation with the SM(OT) and TME, periodically reviews the progress of requests for access requirements as well as any outcomes of the RotR planning process.

The SP confirms to the SM(OT) and TME that the possessions granted match the requirements of the inspection plan.

6.4.5 Has Suitable Access been Granted?

The SP shall inform the SM(OT) and TME of any access requirements that cannot be fulfilled.

6.4.6 Can Inspection be Rescheduled?

The SM(OT), TME and SP, shall explore alternative access that can be used in order to carry out the required inspections within the allowed timescale tolerance of [NR/L2/SIG/19608 Clause 7.4.2](#), 7 days.

6.4.7 Need for Risk Mitigation Measures?

In the event of there being either no alternative access or inspection strategy, the SM(OT) and the TME, shall consider alternative inspection options and due dates in order to resolve the problem.

The TME and the ORCC will determine any risk mitigation measures necessary until the next schedule date shown in Ellipse.

6.4.8 Implement Risk Mitigation

The SM(OT) is responsible for the implementation of any risk mitigation agreed with the ORCC. Where these may require changes to Ellipse MSTs, the SM(OT) shall arrange that such changes are identified, communicated and realised.

6.4.9 Finalise Inspection Plan

The SM(OT) produces an inspection plan from Ellipse annually and submits it to the TME for endorsement.

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The TME reviews the proposed annual plan inspection intervals for agreement with those defined in [Table 2 Clause 6.3](#).

The TME is to review and action any instances where compliance cannot be met.

6.4.10 Resource Availability

The SM(OT):

- Arranges for sufficient resources to be available to deliver the inspection plan
- Checks that all staff are sufficiently trained and competent
- Provides adequate equipment and resources to enable the effective inspection and repair of the equipment.

The TME and SM(OT), at a period of no more than 12 months, shall review the resourcing requirements against the maintenance plan so that resources are utilised effectively and efficiently.

6.4.11 Update Ellipse

The SM(OT) shall, on a continual basis, pass sufficient information to the SP for Ellipse to be updated with all relevant information including planned start and planned end dates.

6.4.12 Inspect and Maintain

The SM(OT) shall confirm that the Off Track Inspector (OTI) undertakes the asset inspection and addresses any minor repair work to comply with the Ellipse Work Orders.

6.4.13 Defect(s) Identified?

The OTI, as part of the inspection process, shall identify any defects requiring repair and prioritise these to comply with this standard.

All defects to be recorded on the Level Crossing Inspection Record Form, TEF3243.

6.4.14 Is it an SC defect?

All SC (previously referred to as Priority 1) defects are a high risk to the safe operation of the level crossing and are to be immediately actioned. Where they cannot be rectified whilst on site, they shall be immediately reported to the Signaller and to Infrastructure Fault Control (IFC) for immediate action response. In addition, the OTI shall report the defect to their SM(OT).

For all other defects [Clause 6.4.17](#) applies.

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6.4.15 Can SC Defect be Repaired?

The OTI shall assess the SC defect for immediate repair and if able to shall undertake suitable repair work otherwise arrange for immediate rectification through IFC (Refer to [Clause 6.4.16](#)).

6.4.16 Instigate Immediate Action Response

If the nature of the repair is beyond the immediate capabilities of the OTI, then the OTI shall immediately, in consultation with the Signaller and IFC, instigate rapid response attendance to comply with the agreed process.

6.4.17 Can Defect(s) be repaired at time of inspection?

For defects other than SC, the OTI shall assess whether a repair within the context of availability of materials, plant and individual competence; can take place safely.

Defects which cannot be addressed as part of the inspection visit shall be recorded as per [Clause 6.4.19](#).

6.4.18 Undertake Repair

The OTI having assessed the nature of the identified defect(s), shall determine those that are repairable and where they are competent undertake such work.

6.4.19 Inspection Completed

The OTI shall complete the Level Crossing Inspection Record Form, TEF3243, the relevant level Crossing Inspection Checklists listed in Table 3 and any supporting Ellipse Works Order, returning these to the SM(OT).

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TEF no.	Inspection Checklist	Title
3241	LXi01	Road Arrangements
	LXi02	Road Signals
	LXi03	Booms or Barriers
	LXi04	Manned Gates
	LXi05	Telephone Systems
	LXi06	Road Signals & Signs, MSL/MWL
	LXi07	Road Signs, AHBC/ABCL
	LXi08	Road Signs, AOCL/AOCR
	LXi09	Road Signs, MCB/AFBC
	LXi10	Road Signs, Manned Gates
	LXi11	Road Signs, Open Crossings
	LXi12	Road Signs, UWC
	LXi13	Road Signs, Footpath and Bridleway
	LXi14	Road Signs, Station Barrow
	LXi15	Rail Signs, AHBC/MSL/MWL/AOCR
	LXi16	Rail Signs, Traincrew Operated
	LXi17	Rail Signs, AOCL/ABCL/OC
	LXi18	Whistleboards
	LXi19	AHBC/ABCL Operation
	LXi20	AOCL/AOCR Operation
	LXi21	MCB Operation
	LXi22	Manned Gates Operation
	LXi23	Gates/Barriers Operation
	LXi24	Train Man Operated Operation
	LXi25	Station Barrow Operation
	LXi26	Sleeping Dog
	LXi27	Crossings on Mothballed Lines
	LXi28	Surface Systems (Crossing Decks)
3242	LXi29	Level Crossing Vertical Profile Inspection Sheet

Table 3 – List of Level Crossing Inspection Checklists from [NR/L2/SIG/19608](#)

The details to be recorded:

- The date of the inspection, the location details and the inspector
- Repairs identified and immediately actioned
- Repairs identified and partially actioned
- Any repairs outstanding
- Any remarks.

6.4.20 Review Inspection Paperwork

The SM(OT) shall:

- Review all paperwork for completeness and for correct identification of work arising and file accordingly
- Review the defects for ownership, i.e. those for which Network Rail is responsible and those that are the responsibility of an outside party, refer to [Clause 6.4.25](#)
- Sign all work orders, Level Crossing Inspection report form

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- Escalate any queries to the TME
- Send all completed work orders to the SP for input into Ellipse.

6.4.21 Any Outstanding Defects?

The SM(OT), as part of the paperwork review, shall identify any outstanding defects which may require action. Where such action is identified [Clause 6.4.25](#) applies, otherwise go to [Clause 6.4.24](#).

6.4.22 Need for Feedback to ORCC?

The TME shall, as part of the paperwork review, identify factors that may require further consideration by the ORCC to comply with [NR/L2/SIG/19608](#).

6.4.23 ORCC Review

The ORCC shall review any feedback from the TME and consider any requirement for action.

If the outcome of this review requires a change of inspection interval or other mitigations then the ORCC shall inform the SM(OT), TME and IME.

6.4.24 Continue Cyclic Inspection

The cyclic inspection process shall continue regardless of whether there are defects requiring action identified.

6.4.25 Outside Party Responsibility?

Where defects are identified the SM(OT) shall determine the responsibility for the ownership of the repair.

For those deemed the responsibility of an outside party, the Maintenance Protection Coordinator (MPC), shall manage the rectification of the defect.

6.4.26 Prioritise Outstanding Defects

The OTI prioritises defects identified to comply with this standard. Produce supporting Ellipse Work Arising Inspection Forms (WAIF).

The SM(OT) shall:

- Check all defects are prioritised correctly
- Identify further access requirements necessary for their repair
- Provide this information to the SP for input to Ellipse
- Undertake a risk assessment prior to any outstanding defects being re-prioritised.

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6.4.27 Update Ellipse

Following receipt of the completed paperwork from the SM(OT) the SP shall:

- Update the task in Ellipse with details from the completed paperwork
- Re-plan any work not done as soon as practicable
- Add the WAIFs to the system as applicable
- File work sheets for inspection and audit purposes.

6.4.28 Repair Defect(s)

The SM(OT) is responsible for planning and delivering the defect repair to comply with [Table 13 Clause 6.7.1](#).

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6.5 Inspection - General

Inspection procedure with crossing installed:

Item	Check / Action
Surface system	Appropriate for the local environment
	Level with top of the railhead
	Free from defects, deficiencies and deterioration
	Fit for use (including edge beams and approaches)
	Signs of grounding
	Condition of road surface/crossing interface
	Road markings present and clear
	Skid resistance over level crossings equal to that of the road approaches
Flangeway	Clear of debris and water ponding
	Rubber panels for splitting in the flangeway
	Nominal width of 60mm. Where the flangeway is less than 60mm an entry and exit flare shall be provided.
	Minimum depth of 55mm with the exception of rubberised surface systems where a minimum depth of 50mm is permitted
Panels	Secure and stable
	Free from cracks and/or splits
	Tight against each other, i.e. no gaps
	Sitting level with each other with little variation in height, i.e. no steps
	Panel restraint is fitted, Polysafe and older STRAIL systems, and functioning. Especially key for configurations with high skew angles and/or tight radius.
	Watch road vehicles over the crossing to see if any panels rock or have excessive movement.
	All of the correct type
Trespass Guards	Fitted where required by Level Crossing Order and defect free
Drainage	Adequate
Chain deflectors	In position
End restraints	Correctly fitted where integral to proprietary system type
	Tightness

Table 4 – General surface system inspection with crossing installed

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Inspection procedure with crossing removed:

Item	Check / Action
Panels	For wear/splitting on underside
	Edges for cracking/splitting
	Have been correctly sitting on the sleepers.
	Correct panels have been used. (Note panels with continuous relief over the fastenings are not suitable for public road crossings).
Ballast	Level is correct for surface system type
Sleeper	Spacing is correct; 600mm for road crossings
Rail fastenings	Correctly installed
	Shall be checked for corrosion as specified in NR/L2/TRK/001/mod/09 . Adequate drainage is key to preventing excessive rail corrosion.
Rail	Shall be checked for corrosion as specified in NR/L2/TRK/001/mod/09 . Adequate drainage is key to preventing excessive rail corrosion.

Table 5 – General surface system inspection with crossing removed

All repairs shall be carried out using a method approved by the surface system manufacturer.

6.6 Inspection by Proprietary System Type

6.6.1 STRAIL

When inspecting a STRAIL system in addition to [Table 4 and Table 5 Clause 6.5](#), consider the following specific items:

Item	Check / Action
Panels	Tight against each other
	Correct type for application
End brackets (pre-1998 STRAIL systems ONLY)	Tight
End deflectors	In position

Table 6 – STRAIL Inspection – Panels in Place

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Item	Check / Action
Panels	Wear particularly the tongue and groove fixings and underside for splitting/wear Have been sitting on sleepers correctly
Movement stoppers	Present and correctly located on the centre sleeper
Sleepers	Correct spacing, road crossings - 600mm centres Not worn/ broken
Ballast	Level with the top of the sleepers
Filler blocks	Wear especially the older plastic type which may wear on the sleeper area

Table 7 – STRAIL Inspection – Panels Removed

6.6.2 Holdfast

When inspecting a Holdfast system in addition to [Table 4 and Table 5 Clause 6.5](#), consider the following specific items:

Item	Check/ Action
Panels	Correct type for application Four foot panels - in line and not staggered Ends sitting squarely and supported on the sleepers

Table 8 – Holdfast Inspection – Panels in Place

Item	Check/ Action
Panels	Underside for wear and splitting in flangeway Correct type - panels with continuous relief over the fastenings are not suitable for public road crossings Sitting on sleepers correctly
Sleepers	Spacing correct, i.e. 600mm centres
Winged turret plates	Located at the centre of the crossing with additional sets located as per the design of crossing
Turret plates	Correctly located on sleepers and between each panel
Ballast levels	Slightly lower than the top of the sleeper

Table 9 – Holdfast Inspection – Panels Removed

6.6.3 Polysafe

When inspecting a Polysafe system in addition to [Table 4 and Table 5 Clause 6.5](#), consider the following specific items:

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Item	Check/ Action
Panels	Tight against each other, up to 10mm gap tolerance is permissible, appropriate to crossing users
Securing Guards/ End restraints	Installed and secure
Panels	Surface cracks and break out
	Correct type for application
Wedges	In place

Table 10 – Polysafe Inspection – Panels in Place

Item	Check/ Action
Sleepers	600mm spacing for all panel types
Panels	Wear and condition
Rubber Wedges	Condition
Ballast levels	Level with the top of the sleepers

Table 11 – Polysafe Inspection – Panels Removed

6.7 Defect identification

6.7.1 Defect identification and reporting

The identification of defects at level crossings shall be achieved through a process of planned inspections using standardised inspection checklists, refer to Appendix B Table B1.

SC defects require immediate action as they are high risk to the safe operation of the level crossing, i.e. immediate danger or risk to pedestrians, road and/or rail traffic. Where they cannot be rectified whilst on site, they shall be immediately reported to the Signaller and to the Infrastructure Fault Control (IFC) for immediate action response. The OTI shall report the defect to their SM(OT) and remain on site till the rapid response team arrives.

SI defects are high risk to the safe operation of the level crossing, danger or risk to pedestrians, road and/or rail traffic. They shall be immediately reported to Infrastructure Fault Control (IFC) for rectification within 7days. The OTI shall report the defect to their SM(OT).

6.7.2 Defect Rectification Timescales

Defects shall be rectified in a timescale according to their assigned priority based on safety risk. Table 12 details the timescales to be applied.

SC and SI defects cannot be re-prioritised as they are high risk to the safe operation of the level crossing.

Defects with priorities of M1, M2, M3, M6, M12 and M24 may be re-prioritised by the TME after completing a risk assessment either via a site visit or site photographs.

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Minimum Action	Rectification Timescale
SC	Within 36 hours
SI	Within 7 days
M1	Within 4 weeks
M2	Within 7 weeks
M3	Within 13 weeks
M6	Within 26 weeks
M12	Within 52 weeks
M24	Within 104 weeks

Table 12 – Defect Rectification Timescales

6.8 Rail Corrosion

The Level Crossing surface system shall be removed at intervals set out in [NR/L2/TRK/001/mod09](#) to enable inspection of track for rail corrosion (foot, web and head).

Ultrasonic inspection of rail through level crossings shall be carried out as set out in [NR/L2/TRK/001/mod06](#). Consequence of corroded rail is increased derailment risk due to loss of material and therefore loss of anchoring. Action shall be taken on rail corrosion, particularly to the rail foot, to comply with [NR/L2/TRK/001/mod09](#).

The TME shall review and sign [NR/L3/TRK/003/TEF3043](#).

6.9 Road Profile

The profile over any vehicular crossing shall have no sudden changes of vertical curvature.

The profile over a level crossing shall not cause a vehicle, such as a low loader or a tractor and trailer, to become grounded and obstruct the railway.

The likelihood of grounding depends on the characteristics of the road surface and the crossing and any potentially low clearance vehicles that might use the crossing.

The safe profile is determined by considering the theoretical wheelbase and ground clearance of road vehicles which might use the crossing. The maximum permissible profile hog anywhere on the road surface over the longest foreseeable wheelbase length is 150mm. The maximum design hump for all new, renewed and substantially disturbed level crossing surface systems is 75mm.

NOTE Some Level Crossing Orders stipulate for the longest wheelbase of vehicles which may foreseeably use the crossing, any hump shall not exceed the 75mm design maximum by more than 40mm; i.e. maximum hump of 115mm. Maintain the profile at these level crossings to this level.

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The safe profile is defined by the vehicle category, which is in turn determined by the road and rail traffic density.

Crossing Type	Categorisation	Specified Wheelbase	For Distance From Rail	Maximum Permissible Hog	Comments
Cat 1	Crossings used by all types of vehicles including cars, vans, lorries or tractors or farm vehicles	11.5m	30m	150mm	Crossing Inspectors to use their local knowledge of the crossing usage to determine the categorisation, but where there is any doubt they shall default to Category 1. It is IMPORTANT that the category determined and measured is recorded on the form
Cat 2	Crossings used by 4 x 4 vehicles, Vans, Lorries or tractors or farm vehicles ONLY (not used by cars)	9.75m	20m	150mm	
Cat 3	Crossings ONLY used by Tractors or farm vehicles (not normal road vehicles)	8.5m	20m	150mm	

Table 13 – Vehicle Categorisation for Measuring Safe Vertical Profiles (Public and Private Roads)

NOTE Vehicles with a theoretical wheelbase of 15.3m are considered to be 'Abnormal Vehicles' and require permission from the Highways Authority Abnormal Loads Team before they can access the road network. It is therefore not necessary to check vehicular level crossings for clearance with the 15.3m theoretical wheelbase.

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Crossing Type	Categorisation	Specified Wheelbase	Distance From Rail	Maximum Permissible Hog	Comments
UWC Cat A	Crossings used by all types of vehicles including cars, vans, lorries or tractors or farm vehicles	8.5m	12m	150mm	<p>Crossing Inspectors to use their local knowledge of the crossing usage to determine the categorisation , but where there is any doubt they shall default to category A</p> <p>It is IMPORTANT that the category determined and measured is recorded on the form</p>
UWC Cat B	Crossings used by 4 x 4 vehicles, vans, lorries or tractors or farm vehicles ONLY (not used by cars)	6.5m	9m	150mm	
UWC Cat C	Crossings ONLY used by Tractors or farm vehicles (not normal road vehicles)	4m	6m	150mm	

Table 14 – Vehicle Categorisation for Measuring Safe Vertical Profiles (UWC)

6.9.1 Basic Test

The TME plans the basic tests required by [NR/L2/SIG/19608](#), which can be carried out separately or in conjunction with the normal inspection regime for level crossings.

6.9.2 Level and Gradient Surveys

The TME plans level surveys and gradient surveys that are required due to the results of basic tests. When determining the timescale for this work, the TME shall take into consideration the usage of the crossing and the degree of measured non-compliance from the basic test. The plan shall be agreed with the Route Asset Manager (Track), (RAM(T)).

6.9.3 Section Manager Off Track

The SM(OT) assists as necessary in the planning and implementation of the inspections, review the inspection outputs prioritise work arising, and delivery of subsequent works as appropriate.

6.9.4 Operation Risk Control Coordinator

The ORCC verifies the list of assets to be inspected and provide the level crossing category that applies to each crossing and the level crossings to be inspected.

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6.9.5 Tools and Equipment

6.9.5.1 Basic Inspection

- Non-conducting measuring rods and chord (as described in Appendix C)
- Measuring Tapes
- Approved optical inclinometer (Suunto PM-5/360 or similar)

6.9.5.2 Level Surveys and Gradient Surveys

Use approved level surveying equipment.

NOTE Vehicle borne survey systems can be used instead of Clause 6.9.5.1 and/ or Clause 6.9.5.2.

6.9.6 Planning

Using [Infrastructure Maintenance Planning Handbook](#), plan inspections using the Ellipse Standard Job 9534 - Basic Test. The inspections are covered by existing Task Risk Control Sheet [NR/L3/MTC/RCS0216/OT04](#) Inspect/ Maintain/ Repair Level Crossing. Detailed surveys are carried out by the Track Technical Team.

6.9.7 Method

6.9.7.1 Basic Inspection

- Inspect the crossing surface for evenness and absence of pot-holes. Examine the roadway surface condition for significant potholes or other similar surface defects that cause a potential risk of grounding.
- Using the basic test, as described in Appendix D, measure the actual hog against the maximum permissible hog of 150mm for the specified wheelbase for the crossing type as detailed in Table 15 below. If the maximum permissible hog is exceeded for the specified wheelbase for the crossing category, re-measure using the specified wheelbase for the next lower crossing category. Continue re-measuring until the maximum permissible hog is no longer exceeded and record the associated specified wheelbase, or that the level crossing fails all specified wheelbases.
-

Crossing Type and Category	Specified Wheelbase	Approach Slope Assessment Distance From Outer Rail	Maximum Permissible Hog
Cat 1	11.5m	30m	150mm
Cat 2	9.75m	20m	150mm
Cat 3	8.5m	20m	150mm
UWC Cat A	8.5m	12m	150mm
UWC Cat B	6.5m	9m	150mm
UWC Cat C	4m	6m	150mm

Table 15 – Vertical Profile Survey and Limits Data

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- iv. For UWC only - visually assess the approach slopes for:-
- hollows/concave changes of gradient, particularly at the crossing/approach interface
 - a steep gradient either side of the crossing (steeper than 1 in 8).

6.9.7.2 Level Survey and Gradient Survey

Where either of these surveys is required as a result of the basic inspection, they shall comply with Appendix D.

Crossing Profile	Surface Condition	Survey Result
< Maximum permissible hog	Pass	Pass
< Maximum permissible hog	Fail	Failed due to surface condition
> Maximum permissible hog	-	Fail
Approach slopes at UWCs have visible hollows/concave gradient changes or the gradient is steeper than 1 in 8	Fail	Gradient Survey Required

Table 16 – Level and Gradient Survey Results

6.9.8 Subsequent Actions

Prioritise crossings reported as “Failed due to surface condition” to comply with Table B1 Appendix B, so that action to correct the defects and/or to mitigate any risk may be taken.

Immediately report crossings reported as “Failed maximum permissible hog” to the responsible TME who will implement the following actions:

If serious risks are identified by the basic test, review existing on-site mitigation measures and arrange further actions to reduce the risk to road and rail traffic. Seek advice from the ORCC.

Mitigation includes but is not limited to:

- Emergency Speed Restriction for trains
- Temporary closure of the crossing with openings controlled by Mobile Operations Manager or other competent staff.
- Man the crossing.

Plan and carry out detailed level survey within 7 weeks using approved techniques to confirm the results of the basic test. Determine the extent of the corrective action required to remove or mitigate the risks of grounding. Details of the level survey fixed points are given in Appendix D.

Crossings reported as “Gradient survey required” shall have the approach gradients measured using approved survey equipment as detailed in Appendix D.

Crossings without any of the above issues reported as “Passed maximum permissible hog” require no further action other than reporting.

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The level crossings are to be inspected and details recorded on TEF3242 (LXi29) form. Completed forms are to be returned to the SM(OT) and reviewed by the TME.

6.9.8.1 Corrective Actions

Corrective action may include re-grading of the road or rail vertical profiles; mitigating actions include review and subsequent provision of mitigating systems on site.

Contact ORCC to agree risk mitigation measures to be put in place.

Mitigation includes, but is not limited to:

- Knowledge of how to contact Signaller (sign saying who to call)
- Risk of grounding signs (advice of grounding risk to user)
- Provision of direct phone to Signaller (ease of contact)
- Improve sighting distances (reducing effect of risk)
- Re-profiling of road surface which may include regrading of the track level.

The risk is increased ONE level if crossing has history of misuse.

6.9.8.2 Risk Levels

Crossings are allocated a risk level depending on existing mitigation on site:

Risk Level		Existing Mitigation	Sighting	Misuse
High	1	None	Inadequate	-
Medium	2	One level	-	-
Low	3	Two levels	-	No history

Table 17 – Failed Profile Risk Levels

The risk levels are determined by the TME and ORCC. Once a risk level has been assigned the following actions can be taken:

Risk Level		Mitigation
High	1	Install telephone and signage / Re-profile
Medium	2	Install telephone and/or signage
Low	3	No work required

Table 18 – Mitigation for failed crossings

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7 Installation and Maintenance

7.1 Introduction

A Level Crossing is a fixed point in the profile of the track and shall not change with engineering work; although a decking system is designed to take minor re-alignments of up to 10mm without having to be renewed.

7.2 Generic types of surface system for level crossings

7.2.1 Direct Loading Systems

These systems are dependant on sleeper spacing as they are supported by the sleeper. As the load is transferred from the crossing panel to the sleeper match the bottom of the panel to the top profile of the sleeper. Examples of this system include timber decks, Strail, Holdfast and older Omni systems (no longer manufactured).

7.2.2 Bridging Systems

The panels bridge the space between the supports, i.e. the rails or rail and kerb. Loads from road traffic are transferred from the panel to the rail and into the track system. Examples of this system include Polysafe and older Bomac Types (no longer manufactured).

7.2.3 Slab

This system consists of embedded rails where the load is spread throughout the pre-cast concrete units. The rails are moulded in situ. This design is considered to address most of the failure types associated with high loading. An example of this system is Harmelen.

7.2.4 Wooden Construction

This system is a direct loading system which distributes load directly onto sleepers and is constructed on site to suit track configuration. Construct to comply with REPW/450 - REPW/451.

Use wooden construction systems only where timber sleeper track exists, Track Categories 4 – 6. They are not suitable for public vehicular crossings. If any wooden systems exist in the highway they shall be renewed and replaced with a modern proprietary system.

7.2.5 Ballast Boxes

Do not use this crossing type in running lines, i.e. use in sidings and depots only.

Provide retaining boxes up to the rail head for all boxed ballast crossing surfaces. The boxes stop the surface degrading or sliding away underfoot, and maintain flange way clearance.

They shall be:

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- Easily removed and replaced for maintenance
- Secured against vertical and lateral movement
- Constructed in accordance to diagram RT/CED/600/11.

7.3 Proprietary System by Type

7.3.1 STRAIL

STRAIL is a direct loading rubber panel system which consists of end restraints and tie rods, locking the system together as a monolithic unit. Earlier STRAIL systems did not have tie rods, and are therefore not monolithic. End restraints are integral to the earlier system type.

In older panel designs, if there are difficulties in matching the sleeper and panel profiles approved rubber matting may be used as specified by the manufacturer.

For STRAIL systems in road level crossings space sleepers at 600mm centres and ballast to be just below or flush with the top of the sleepers.

STRAIL have produced compensation panels which vary in width up to 100mm from the standard panels. These may be used at high skew level crossings. When a panel joint is supported by less than 50mm of the sleeper, a reduced or enlarged compensation panel which brings the joint back to the sleeper centre should be installed to correct the panel seating.

Failure to install correctly can manifest as deflections of the rubber panels where they are insufficiently supported by sleepers.

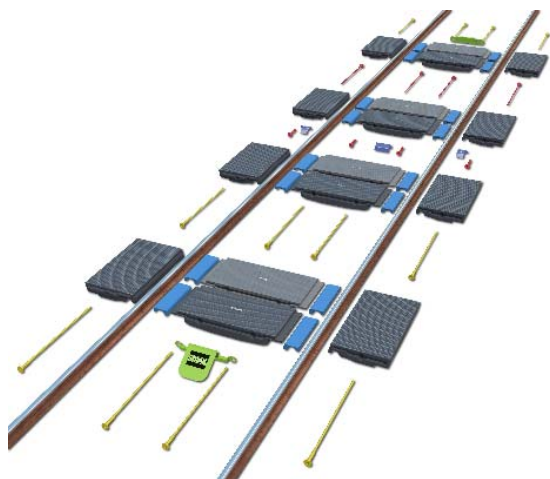


Figure 3 – STRAIL System
(Reproduced with permission from STRAIL/ Kraiburg Elastik GmbH)



Figure 4 – STRAIL System

7.3.2 Holdfast

Holdfast is a direct loading system based on the original Omni rubber panel design that is no longer manufactured.

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In older panels only, if there are difficulties in matching the sleeper profile to panel profile approved rubber matting may be used as specified by the manufacturer.

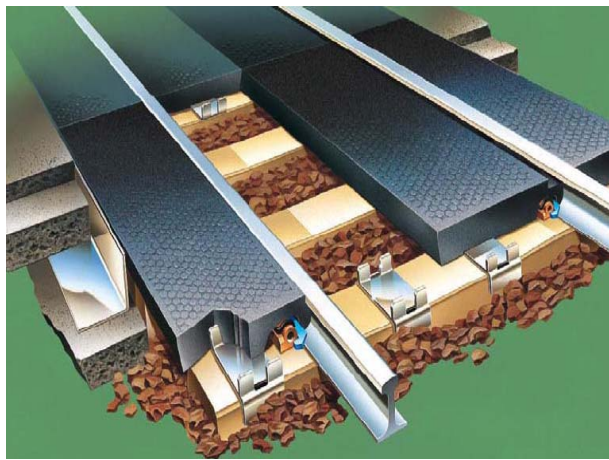
For Holdfast systems in road level crossings space sleepers at 600mm centres and ballast to be just below or flush with the top of the sleepers.

'Winged' turret plates are located at the centre of the crossing with additional sets located as per the design to fix the position and prevent lateral movement of the system. 'Plain' turret plates are located on the sleepers in between each panel to fix position of adjacent panels.

Failure to correctly install the turret plates will lead to increased risk of movement or displacement of the panels, which can be indicated by gaps in the system.



Figure 5 – Holdfast System



**Figure 6 – Holdfast System with panel removed
(Reproduced with permission from Holdfast Level Crossings Limited)**

7.3.3 Omni

Omni is a direct loading panel system that is no longer manufactured.

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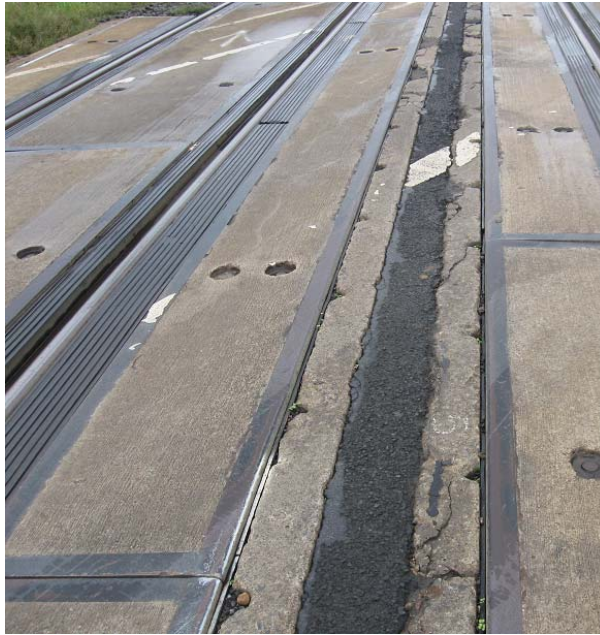


Figure 7 – Omni concrete panel system



Figure 8 – Omni rubber panel system

7.3.4 Polysafe

The Polysafe design is a bridging system based on the Tarmac Bomac concrete panel system which is no longer manufactured. The 'Bridging' design accommodates road profile on canted track.

Space sleepers in road level crossings at 600mm centres and ballast to be level with the top of sleepers.

Polysafe panels are held in place by friction between rubber wedges secured against panel nib and rail web. These wedges are both internal and external and are 600mm in length.

Track fastenings are visible with the crossing panels installed.



Figure 9 – Polysafe System



Figure 10 – Polysafe System

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7.3.5 Bomac

Bomac is a bridging system consisting of both framed and unframed concrete panels. The system is held in place by friction between rubber wedges, of length 200mm and 400mm, and the panels.

Polysafe concrete panels are compatible with Bomac panels, and can be mixed with these for maintenance. Support the panels with their respective rubber wedges.

Figure 11 below shows the correct installation of Bomac 113A wedge sets.



Figure 11 – Bomac 113A wedges installation

7.3.6 Harmelen

Harmelen is a slab track system consisting of embedded rails, the load spreads throughout the pre-cast concrete system.

Slab track crossings are only for use at crossings where Exceptional Operating Conditions (as defined in [NR/L2/TRK/4040](#)) have lead to repeated failure of other proprietary systems.

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Figure 12 – Harmelen system



Figure 13 – Harmelen system

7.4 Manufacturer Installation Guidance

Manufacturers are to provide copies of operating and maintenance manuals to users of the product as necessary.

7.4.1 STRAIL Installation Guide

<http://www.strail.de/index.php?id=915&L=1>



Figure 14 – STRAIL Manual Lifting Device



Figure 15 – STRAIL Manual Lifting Frame

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Figure 16 – Mechanical Lifting Device

STRAIL removal procedure:

- Remove the tie rods (or end brackets on older design).
- Remove internal panels by inserting two crowbars into the recesses on the bottom of the panel where it rests on the sleeper and levering up.
- As the panel is moved by rolling forward two persons grasp the leading edge and continue the rolling action freeing the panel.
- The external panels are removed with one person using a crowbar but two are needed to continue the rolling action.

7.4.2 Holdfast Installation Guide

<http://www.railcrossings.co.uk/downloads.php>



Figure 17 – Holdfast Lifting Pins



Figure 18 – Rosehill Lifting Pins

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The new Holdfast vertically split lifting pins have been developed to safely lift Holdfast panels.

Rosehill lifting pins have also been developed for lifting Holdfast crossing panels. The lifting pins are designed to lock in position to enable safe lifting.

Holdfast removal procedure:

- Use bars inserted into the two holes to lift the panels from their seated positions. If panels do not have holes work from the ends towards the centre.

7.4.3 Polysafe Installation Guide

http://www.polysafe.co.uk/cgi-bin/ps_page.pl?ref=5.3



Figure 19 – Polysafe Lifting Devices

Removal procedure:

- Unbolt and remove securing devices-leave clips in position.
- Remove top internal wedges using large screwdriver. Ease panel to one side using crowbars, use angle iron strip to protect panel.
- Remove internal panels using lifting device.
- Remove external panels by barring each panel sideways until sufficient room is obtained to insert lifting device, then lift and rotate the rear of the panel upwards and clear.

Removal procedure for single unit:

Inner panels

- Remove the top wedges up to and including the panel to be removed, lever panel sideways and install lifting devices.

Outer panels

- Raise the rear of the panel with two crowbars in the concrete kerb slots until it is possible to position the lifting device and raise the panel clear.

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NOTE Before re-installing make sure that the rail, all panel bearing surfaces and kerbs are brushed clean, the rubber wedges washed and any damaged components replaced.

7.5 General Maintenance

For the purposes of surface systems, maintenance generally refers to the replacement of individual panels and components as opposed to repair in situ.

For failure of major components, e.g. edge beams, road closures, possession access and machinery will be required to enable works.

For guidance on road closures for planned and emergency works, refer to “New Roads and Street Works Act Procedure” available from the National Signalling and Level Crossings Programme Team.

Mitigation in the form of Emergency Speed Restrictions (ESR); manning of the crossing to protect users and closure of the crossing to road vehicles and pedestrians, can be applied.

Level crossings are a fixed point in the profile of the track. The track shall not be lifted or recanted through level crossings when track tamping is undertaken.

7.5.1 Temporary Repairs

Temporary repair of surface systems may be required where timescales to obtain a road closure or possession is outside the defect rectification timescales.

The following temporary repairs can be considered for a panel system:

Item	Action
Gaps	Wedge gaps Fill with epoxy resins Fill with approved foam spray Use approved fillers
Surface damage	Epoxy resins
Restraints	Tighten
Four Foot Deflector/ Chain guards	Tighten

Potholes within the railway boundary can be temporarily repaired using tarmac.

NOTE Only use fillers, epoxies, etc with Product Acceptance.

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8 Renewals

8.1 General

Level crossing surface systems are designed to have a minimum service life of 15 years under normal operating conditions provided that the manufacturers' maintenance schedule has been followed.

[NR/L2/SIG/30015](#) details the preferred layouts for renewal of footpaths, bridleways and User Worked crossings. [NR/L2/SIG/30015](#) is applicable to new crossings or assets to be renewed during maintenance works.

For road crossings with high skew (acute angle between road and railway centre lines > 60°) /tight radius (radius of curvature of the railway < 400m) the proprietary system type shall be a full depth interlocking modular system.

When installing surface systems at crossings which are subjected to high loading a direct loading system shall be used.

Different proprietary system panels shall not be installed within the same level crossing.

The track shall not be lifted through level crossings when track renewal is undertaken, unless road profiling work is carried out at the same time. To meet the maximum design hump of 75mm; limit lifting or The new specification shall be achieved before the crossing is reopened to road and rail traffic.

8.2 Application of Proprietary Systems

Level crossing surface system supplier/ manufacturer's produce different panel systems for various crossing applications. Refer to [NR/L3/TRK/2049/Clause D.8.1: Level Crossing Surface Systems - 1](#) and [NR/L3/TRK/2049/Clause D.8.2: Level Crossing Surface Systems - 2](#).

8.3 Level Crossing Renewal/ Refurbishment Priority Assessment

TEF 3214 details a scoring system designed to assist with the prioritisation of renewals / refurbishment works. It covers both Maintenance Opex works e.g. replacement of Timber Decks at User Worked Crossings, and renewal / enhancement works.

Scoring prioritises crossing renewals / refurbishment works as a whole either by depot, route and/or nationally but does not specify set timescales.

The system consists of two sections – Usage and Condition. Each section has a sub total, which are multiplied together to give the overall score; this is then compared to scores from other crossings.

The crossing usage score is based upon:

- Crossing Type: Public Road / UWC / Bridleway / Footpath
- Road Classification - higher score for HGVs

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- Actual road speed across the crossing. This is estimated and is not necessarily the prescribed legal speed limit as some speeds over the crossings are actually higher or lower than the legal limits
- Track Category
- Whether there is a high skew angle.

The condition score is based upon:

- Percentage of damaged, worn or rocking panels
- Condition of the cill beams
- Condition of the tarmac / road approaches
- Wet beds or track drainage ineffective
- Uncoated rail present and/or potential for water run off for salt contamination.

8.4 Level Crossing Renewal/ Refurbishment

TEF 3215 provides a standardised template for Level Crossing renewal or refurbishment proposal and shall be followed.

The following information shall be specified:

- Proposal number
- Location, including - route, delivery unit, ELR, mileage, Track ID(s)
- Ellipse Equipment Number
- Sleeper Type
- Rail Type / fastenings
- Renewal or a refurbishment proposal.

The sleeper, rail type and fastening information, is crucial to allow the appropriate proprietary system to be scoped for the existing and/or proposed track components.

Detail the justification for the renewal/refurbishment, e.g. life expired components, ORR enforcement or track realignment; supporting evidence may also be included e.g. inspection reports, Network Operations All Level Crossing Risk Model (ALCRM). Include a detailed description of existing infrastructure with the preferred renewal / refurbishment system selected.

The TEF shall be signed by the TME, although it might be completed by their SM(OT). It is then submitted to the RAM(T) and a signed copy returned to the TME when approved or declined.

8.5 Road Re-profiling

Major track renewal which affects the interface between the road and the crossing will require associated road reprofiling to meet maximum design hog requirements of

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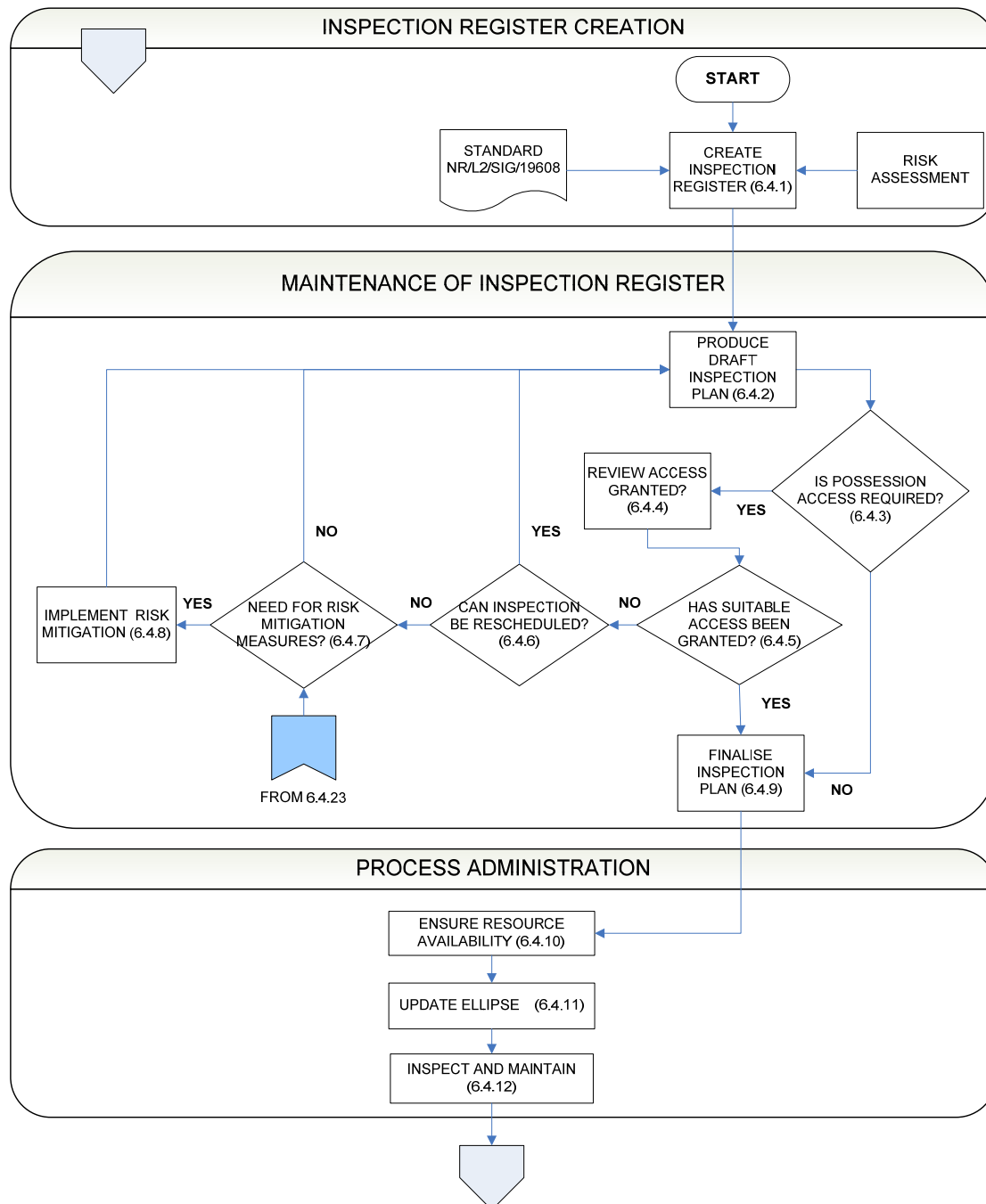
75mm. Additionally crossings which have failed maximum permissible hog will also require re-profiling.

The Local Authority will need to be consulted for reprofiling outside Network Rail boundaries.

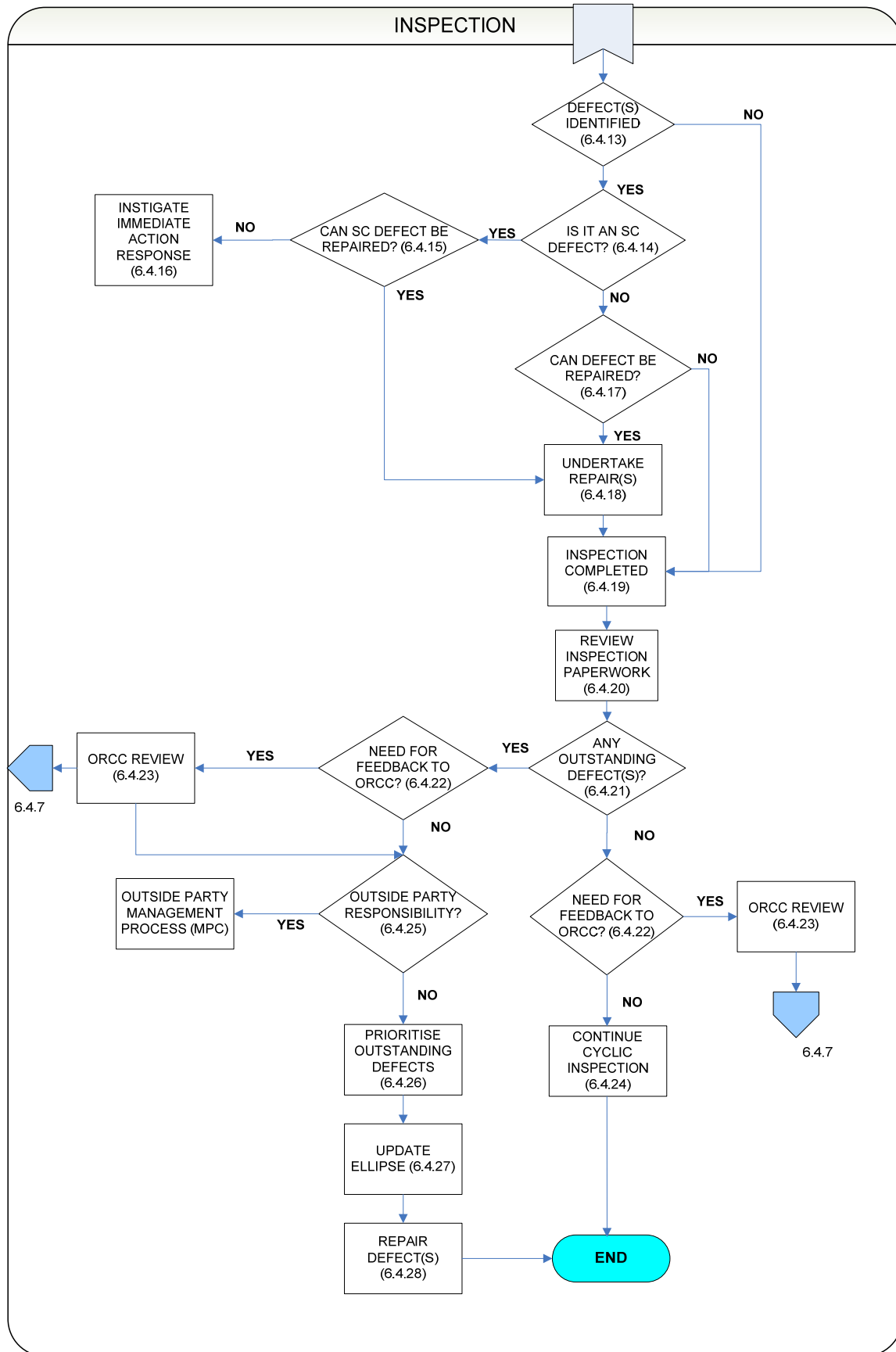
Refer to [NR/L3/TRK/2049/Clause D.8.3: Level Crossing Road Profiles - 1](#) and [NR/L3/TRK/2049/Clause D.8.4: Level Crossing Road Profiles - 2](#).

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Appendix A Inspection Flowchart



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Appendix B

Defect Minimum Actions (Table B.1)

Condition	Action Inspector/ Patroller	Action Section Manager (Off Track/ Track)	Initial Track Priority	Permanent Rectification Timescale
1.1 Trespass Guards on Public Road Vehicular Crossings (if required & shown on Legal Order / Ground Plan)				
One or more guards missing or one or more guards damaged and ineffective.	Notify Infrastructure Fault Control (IFC) and SM(OT). Temporary repair - lift adjacent guard(s) and re-fix at angle so effective measure in place. If temporary repair not possible consider closing crossing to pedestrian traffic at high risk locations.	Notify IFC. Notify SM(OT). Temporary repair - lift adjacent guard(s) and re-fix at angle so effective measure in place. If temporary repair not possible consider closing crossing to pedestrian traffic at high risk locations. Permanent repair - install missing / new guard within 24 weeks.	SC	M6
Any number of guards damaged but effective.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.		M6
Less than 2600mm but >1000mm 'step over' distance between adjacent sets of guards.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.		M6
Less than 1000mm 'step over' distance between adjacent sets of guards at manned crossing.	Notify IFC and SM(OT). Consider mitigation of placing watchman or closing crossing to pedestrian traffic. Temporary rectification - install additional length guards to achieve minimum 1000mm step over.	Notify IFC and ORCC/ORR. Consider mitigation of placing watchman or closing crossing to pedestrian traffic. Temporary rectification - install additional length guards to achieve minimum 1000mm step over. Permanent repair - install full length step over for guards within 24 weeks.	SC	M6
Guards installed incorrectly length <2.6m but >2.3m.	Record on inspection record sheet, raise WAIF with rectification timescale of 52 weeks.	Record on inspection record sheet. Permanent repair - install correct length as standard detail within 52 weeks.		M12
Guards installed incorrectly e.g. >35mm between timbers but effective.	Record on inspection record sheet, raise WAIF with rectification timescale of 52 weeks.	Record on inspection record sheet. Permanent repair - install correctly as standard detail within 52 weeks.		M12

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Less than 1000mm step over at unmanned or remote crossing / guards incorrectly installed but not effective / installed less than 2.3m in length.	Notify IFC and SM(OT). Consider mitigation of placing watchman or closing crossing to pedestrian traffic. Temporary rectification - install minimum 1000mm of guards to create effective measure.	Notify IFC and ORCC/ORR. Consider mitigation of placing watchman or closing crossing to pedestrian traffic. Temporary rectification - install minimum 1000mm of guards to create effective measure. Permanent rectification - install fully compliant trespass guards within 24 weeks.	SC	M6
1.2 Trespass Guards on Footpath Crossings (all types) and where part of a UWC (if required & shown on endorsed record plan)				
One or more guards missing or one or more guards damaged and ineffective.	Notify Infrastructure Fault Control (IFC) and SM(OT). Temporary repair - lift adjacent guard(s) and re-fix at angle so effective measure in place. If temporary repair not possible consider closing crossing to pedestrian traffic at high risk locations.	Notify IFC. Notify SM(OT). Temporary repair - lift adjacent guard(s) and re-fix at angle so effective measure in place. If temporary repair not possible consider closing crossing to pedestrian traffic at high risk locations. Permanent repair - install missing / new guard within 24 weeks.	SC	M6
Any number of guards damaged but effective.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.		M6
Less than 2600mm but >1000mm 'step over' distance between adjacent sets of guards.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.		M6
Less than 1000mm 'step over' distance between adjacent sets of guards.	Notify IFC and SM(OT). Consider mitigation of placing watchman or closing crossing to pedestrian traffic. Temporary rectification - install additional length guards to achieve minimum 1000mm step over.	Notify IFC and ORCC/ORR. Consider mitigation of placing watchman or closing crossing to pedestrian traffic. Temporary rectification - install additional length guards to achieve minimum 1000mm step over. Permanent repair - install full length step over for guards within 24 weeks.	SC	M6
Guards installed incorrectly length <2.6m but >2.3m.	Record on inspection record sheet, raise WAIF with rectification timescale of 52 weeks.	Record on inspection record sheet. Permanent repair - install correct length as standard detail within 52 weeks.		M12
Guards installed incorrectly (e.g. >35mm between timbers) but effective.	Record on inspection record sheet, raise WAIF with rectification timescale of 52 weeks.	Record on inspection record sheet. Permanent repair - install correctly as standard detail within 52 weeks.		M12
Less than 1000mm step over at unmanned or	Notify IFC and SM(OT). Consider mitigation of placing watchman or closing crossing to	Notify IFC and ORCC/ORR. Consider mitigation of placing watchman or closing crossing to	SC	M6

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remote crossing / guards incorrectly installed and not effective / installed less than 2.3m in length.	pedestrian traffic. Temporary rectification - install minimum 1000mm of guards to create effective measure. Permanent rectification - install fully compliant trespass guards within 24 weeks.		
1.3 Cattle cum Trespass Guards on UWC (if required & shown on endorsed record plan) (including for crossing of livestock)			
One guard missing or one guard damaged and ineffective.	Record on inspection record sheet, raise WAIF with permanent rectification timescale of 24 weeks. Temporary repair - lift adjacent guard and re-fix at angle so effective guard in place within 36 hours	SC	M6
Two or more guards missing or two or more guards damaged and ineffective.	Notify Infrastructure Fault Control (IFC), close crossing to passage of livestock. Notify ORCC/ORA. The ORCC/ORA shall consider continued or alternative mitigation of placing watchman or closing crossing to passage of livestock. Temporary repair if three or less guards missing, lift and re-fix at angle so effective barrier in place.	SC	M6
Any number of guards damaged but effective.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.		M6
Less than 2600mm but >1000mm 'step over' distance between adjacent sets of guards.	Record on inspection record sheet, raise WAIF with rectification timescale of 24 weeks.		M6
Less than 1000mm 'step over' distance between adjacent sets of guards.	Notify IFC, close crossing to passage of livestock. The ORCC/ORA shall consider continued or alternative mitigation e.g. placing watchman or closing crossing to passage of livestock. Temporary rectification - install additional length guards to achieve minimum 1000mm step over.	SC	M6
Guards installed incorrectly length <2.6m but >1000mm*.	Record on inspection record sheet, raise WAIF with rectification timescale of 52 weeks.		M12
Guards installed	Record on inspection record sheet, raise WAIF		M12

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incorrectly e.g. >35mm between timbers but effective.	with rectification timescale of 52 weeks.	repair - install correctly as standard detail within 52 weeks.		
Guards incorrectly installed and not effective to prevent animal incursion / installed less than 1000mm in length.	Notify IFC, close crossing to passage of livestock. Notify SM(OT). The ORCC/ORA shall consider continued or alternative mitigation e.g. placing watchman or closing crossing to passage of livestock. Temporary rectification - install additional length guards to achieve minimum 1000mm step over.	Notify IFC, close crossing to passage of livestock. Notify ORCC/ORA. The ORCC/ORA shall consider continued or alternative mitigation e.g. placing watchman or closing crossing to passage of livestock. Temporary rectification - install additional length guards to achieve minimum 1000mm step over. Permanent rectification - install fully compliant trespass guards within 24 weeks.	SC	M12
2.0 Surface Units - Bridging Systems (e.g. Bomac, Polysafe)				
Panel(s) rocking on public highway crossings (including broken nibs even if no panel movement).	Notify Signaller, Infrastructure Fault Control (IFC) and SM(OT). Consider closure of crossing to vehicular traffic. Immediate action - lift panel(s), investigate and rectify (normally failed nibs or missing rubbers). If immediate rectification not possible, place watchman and ORCC to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR with full time watchman etc).	Notify Signaller, IFC and ORCC/ORA. Consider closure of crossing to vehicular traffic. Immediate action - lift panel(s), investigate and rectify (normally failed nibs or missing rubbers). If immediate rectification not possible, place watchman and ORCC to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR with full time watchman etc).	SC	SC
Panel(s) rocking on UWC - all types (including broken nibs even if no panel movement).	Notify Signaller, IFC and SM(OT). Consider closure of crossing to vehicular traffic. Immediate action - lift panel(s), investigate and rectify (normally failed nibs or missing rubbers). If immediate rectification not possible, place watchman and ORCC/ORA to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR with full time watchman etc).	Notify Signaller, IFC, and ORCC/ORA. Consider closure of crossing to vehicular traffic. Immediate action - lift panel(s), investigate and rectify (normally failed nibs or missing rubbers). If immediate rectification not possible, place watchman and ORCC/ORA to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR with full time watchman etc).	SC	SC
Panel(s) rocking on pedestrian crossing - all types (including broken nibs even if no panel movement).	Notify IFC and SM(OT) . If trip hazard consider closing crossing to pedestrian traffic. Immediate action - lift panel(s), investigate and rectify (normally failed nibs or missing rubbers). If immediate rectification not possible, place watchman and ORCC/ORA to instruct on any	Notify IFC and ORCC/ORA. If trip hazard consider closing crossing to pedestrian traffic. Immediate action - lift panel(s), investigate and rectify (normally failed nibs or missing rubbers). If immediate rectification not possible, place watchman and ORCC/ORA to instruct on any	SC	SC

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	further mitigation (e.g. remove panel & close crossing to public, impose ESR with full time watchman etc).		
Not gapped correctly on public highway crossings.	If gap in area likely to be used by cyclists, notify IFC, Notify SM(OT), rectify within 36 hours. Temporary repair - install timber wedge rubber wedge, foam filler or similar OR consider taking line blockage and lever up panels to close gaps and install wedge at end restraint. Permanent repair, close up gaps and reset end restraints within 7 days.	SC	SI
Not gapped correctly on public highway crossings.	If gap in area not likely to be used by cyclists, rectify within 7 days. Temporary repair (not mandatory) - install timber wedge, rubber wedge, foam filler or similar OR consider taking line blockage and lever up panels to close gaps and install wedge at end restraint.	SI	SI
Not gapped correctly on UWC and Footpath Crossings - all types.	Record on inspection record sheet, raise WAIF with permanent rectification within 4 weeks. Temporary repair (not mandatory) - install timber wedge, rubber wedge, foam filler or similar OR consider taking line blockage and lever up panels to close gaps and install wedge at end restraint.	M1	M1
Missing rubbers - all crossing types.	Notify Signaller, IFC and SM(OT). Consider closing crossing to vehicular traffic. Immediate action - lift panel(s), investigate and rectify. If immediate rectification not possible, place watchman and ORCC to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR with full time watchman etc).	SC	SC
Displaced rubbers - all crossing types.	Record on inspection record sheet, raise WAIF re-inspect within 7 days if no worse rectify	SI	M1

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	within 4 weeks, if worse action as 'missing rubbers'.	4 weeks, if worse action as 'missing rubbers'.		
Surface condition - all types.	Note cracks, chips, holes, loose infill, small areas where surface has come out. Use inspector judgement as to location and scale of defect, the traffic, usage and any deterioration. If defect likely to cause panel failure within 36 hours or defect already a risk to users, notify Signaller, IFC and SM(OT). Consider closing crossing to vehicular traffic and / or pedestrian traffic (dependent on location of defect). Temporary repair to panel if possible - infill with tarmac, epoxy resin, grout etc; if no repair possible place watchman and ORCC to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR with full time watchman etc). For all other defects - record on inspection forms, take photograph, arrange re-inspection if considered appropriate to check for deterioration and record on WAIF with rectification timescale using best judgement. Range of timescales for rectification is 36hours to 52 weeks.	Note cracks, chips, holes, loose infill, small areas where surface has come out. Use inspector judgement as to location and scale of defect, the traffic, usage and any deterioration. If defect likely to cause panel failure within 36 hours or defect already a risk to users, notify Signaller, IFC and ORCC/ORA. Consider closing crossing to vehicular traffic and / or pedestrian traffic (dependent on location of defect). Temporary repair to panel if possible - infill with tarmac, epoxy resin, grout etc; if no repair possible place watchman and ORCC to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR with full time watchman etc). For all other defects - record on inspection forms, take photograph, arrange re-inspection if considered appropriate to check for deterioration and record on WAIF with rectification timescale using best judgement. Range of timescales for rectification is 36hours to 52 weeks.	SC	M12
Bomac / Polysafe panels mixed - incorrect rubbers.	Treat as displaced rubbers.	Treat as displaced rubbers.	SI	M1
Panels sitting proud of sill beams - where pedestrians cross, all crossing types.	Record on inspection record sheet, raise WAIF with permanent rectification within 52 weeks. Temporary repair - install tarmac or concrete ramp within 36hours.	Record on inspection record sheet, raise WAIF with permanent rectification within 52 weeks. Temporary repair - install tarmac or concrete ramp within 36hours.	SC	M12
Panels sitting proud of sill beams - other locations.	Record on inspection record sheet, raise WAIF with permanent rectification within 52 weeks.	Record on inspection record sheet, raise WAIF with permanent rectification within 52 weeks.	M12	M12
2.1 Surface Units - Load Bearing Systems 1 (e.g. Strail, Holdfast)				
Panel(s) rocking - all crossing types.	Load bearing systems should not rock. If they do, panel(s) either damaged or units not being properly supported by sills or sleepers. Notify Signaller and Infrastructure Fault Control (IFC), and SM(OT). Consider closing crossing to	Load bearing systems should not rock. If they do, panel(s) either damaged or units not being properly supported by sills or sleepers. Notify Signaller, IFC and ORCC/ORA. Consider closing crossing to vehicular traffic. Immediate action - lift	SC	SC

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	vehicular traffic. Immediate action - lift panel(s), investigate and rectify. If immediate rectification not possible, place watchman and ORCC to instruct on any further mitigation (e.g. close crossing to public, impose ESR, ESR with full time watchman etc).	panel(s), investigate and rectify. If immediate rectification not possible, place watchman and ORCC to instruct on any further mitigation (e.g. close crossing to public, impose ESR, ESR with full time watchman etc).		
Not gapped correctly - all crossing types.	Load bearing systems are joined together with either tie rods or turret plates. If gaps appear, likely that rod or turret plate broken or missing. Notify Signaller, IFC and ORCC/ORCA. Immediate temporary rectification such as install timber wedge rubber wedge, foam filler or similar and place steel pin / timber post or similar as temporary end restraint if none present. Permanent rectification within 4 weeks.	Load bearing systems are joined together with either tie rods or turret plates. If gaps appear, likely that rod or turret plate broken or missing. Notify Signaller, IFC and ORCC/ORCA. Immediate temporary rectification such as install timber wedge rubber wedge, foam filler or similar and place steel pin / timber post or similar as temporary end restraint if none present. Permanent rectification within 4 weeks.	SC	M1
Surface condition - all types.	Note cracks, tears, damage, holes. Use inspector judgement as to location and scale of defect, the traffic, usage and any deterioration. If defect likely to cause panel failure within 36 hours or defect already a risk to users, notify Signaller, IFC and SM(OT). Consider closing crossing to vehicular traffic and / or pedestrian traffic (dependent on location of defect). ORCC to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR, impose ESR with full time watchman etc) - rectification is to install new panel(s) or swap panel(s) or swap around such that defective panel is placed outside of trafficked area. For all other defects - record on inspection forms, take photograph, arrange re-inspection if considered appropriate to check for deterioration and record on WAIF with rectification timescale using best judgement. Range of timescales for rectification is 36hours to 52 weeks.	Note cracks, tears, damage, holes. Use inspector judgement as to location and scale of defect, the traffic, usage and any deterioration. If defect likely to cause panel failure within 36 hours or defect already a risk to users, notify Signaller, IFC and ORCC/ORCA. Consider closing crossing to vehicular traffic and / or pedestrian traffic (dependent on location of defect). ORCC to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR, impose ESR with full time watchman etc) - rectification is to install new panel(s) or swap around such that defective panel is placed outside of trafficked area. For all other defects - record on inspection forms, take photograph, arrange re-inspection if considered appropriate to check for deterioration and record on WAIF with rectification timescale using best judgement. Range of timescales for rectification is 36hours to 52 weeks.	SC	M12
Panels sitting proud of sill	Record on inspection record sheet, raise WAIF	Record on inspection record sheet, raise WAIF	SC	M12

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beams - where pedestrians cross, all crossing types.	with permanent rectification within 52 weeks. Temporary repair - install tarmac or concrete ramp within 36hours.		
Panels sitting proud of sill beams - other locations.	Record on inspection record sheet, raise WAIF with permanent rectification within 52 weeks.	M12	M12
Systems 2 (e.g. Omni)			
Panel(s) rocking - all crossing types.	Omni load bearing system should not rock. If it does, panel(s) either damaged or units not being properly supported by sills or sleepers. Notify Signaller, IFC and ORCC/ORA Consider closing crossing to vehicular traffic. Immediate action - lift panel(s), investigate and rectify. If immediate rectification not possible, place watchman and ORCC/ORA to instruct on any further mitigation (e.g. close crossing to public, impose ESR, ESR with full time watchman etc).	SC	SC
Not gapped correctly - all crossing types.	Omni load bearing systems are normally fixed down to a base plate. If gaps appear, likely that fixings have failed. Notify Signaller, IFC and ORCC/ORA. Immediate temporary rectification such as install timber wedge rubber or similar as temporary end restraint if none present. Omni system now obsolete so spares unlikely, permanent rectification will probably need to be full renewal. Notify RAM[T]. Minimum partial replacement of the affected cess, 4ft or 6ft panels with proprietary system within 24 weeks, full deck renewal within 2 years.	SC	M6 / M24
Surface condition - all types.	Note cracks, tears, damage, holes. Use inspector judgement as to location and scale of defect, the traffic, usage and any deterioration. If defect likely to cause panel failure within 36 hours or defect already a risk to users. Notify Signaller, Infrastructure Fault Control (IFC) and SM(OT). Consider closing crossing to vehicular	SC	M12

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	<p>traffic and / or pedestrian traffic (dependent on location of defect). ORCC to instruct on any further mitigation (e.g. remove crossing to public, impose ESR, impose ESR with full time watchman etc) - install new panel(s) or swap around such that defective panel is placed outside of trafficked area. For all other defects - record on inspection forms, take photograph, arrange re-inspection if considered appropriate to check for deterioration and record on WAIF with rectification timescale using best judgement. Range of timescales for rectification is 36hours to 52 weeks.</p>	<p>(dependent on location of defect). ORCC/ORCA to instruct on any further mitigation (e.g. remove panel & close crossing to public, impose ESR, impose ESR with full time watchman etc) - rectification is to install new panel(s) or swap around such that defective panel is placed outside of trafficked area. For all other defects - record on inspection forms, take photograph, arrange re-inspection if considered appropriate to check for deterioration and record on WAIF with rectification timescale using best judgement. Range of timescales for rectification is 36hours to 52 weeks. Consider renewal as system is obsolete.</p>	
Panels sitting proud of sill beams - where pedestrians cross, all crossing types.	Record on inspection record sheet, raise WAIF with permanent rectification within 52 weeks. Temporary repair - install tarmac or concrete ramp within 36hours.	SC	M12
Panels sitting proud of sill beams - other locations.	Record on inspection record sheet, raise WAIF with permanent rectification within 52 weeks.	M12	M12
2.3 Surface Units - Timbers (mainly UWC & Pedestrian)			
Timbers rocking / moving / damaged - all crossing types.	<p>Crossing may not be in use at time of inspection. If seen, inspectors judgement to be used depending on location, usage and condition. If defect likely to cause panel failure within 36 hours or defect already a risk to users, notify Infrastructure Fault Control, (IFC) and SM(OT). Consider closing crossing to vehicular traffic and / or pedestrian traffic (dependent on location of defect). ORCC to instruct on any further mitigation (e.g. remove timber & close crossing to public, impose ESR, impose ESR with full time watchman etc) - rectification is to install new timber(s). For all other defects - record on inspection forms, take photograph, arrange re-inspection if considered appropriate to check for deterioration and record on WAIF with rectification timescale using best</p>	SC	M12

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	record on WAIF with rectification timescale using best judgement. Range of timescales for rectification is 36hours to 52 weeks.	judgement. Range of timescales for rectification is 36hours to 52 weeks.		
Anti-slip surface damaged / worn / ineffective.	Record on inspection record sheet, raise WAIF, take photos, with permanent rectification within 4 weeks.	Record on inspection record sheet, raise WAIF, take photos, with permanent rectification within 4 weeks.	M1	M1
3.0 End Restraints (normally fitted only to Bomac & Polysafe systems but some Strail systems as secondary restraint)				
End restraint missing, loose or gapped.	If gaps in panels, treat as gapped panels and rectify at time of gapping defect - if missing, install temp steel pin or timber posts, if loose - tighten, if gapped - install wedge. Permanent rectification within 7 days.	If gaps in panels, treat as gapped panels and rectify at time of gapping defect. If missing, install temp steel pin or timber posts, if loose - tighten, if gapped - install wedge. Permanent rectification within 7 days.	SC	SI
End restraint missing, loose or gapped.	If no gaps in panels, record on inspection record sheet, raise WAIF & permanent rectification within 7 days.	If no gaps in panels, record on inspection record sheet, raise WAIF & permanent rectification within 7 days.	SI	SI
4.0 Four foot deflector plates / chain guards				
Loose - installed as combined end restraint.	Treat as end restraint.	Treat as end restraint.	as 3.0 above	as 3.0 above
Loose - stand alone deflector plate.	Immediate rectification required. Either remove or tighten. Record on inspection record sheet, raise WAIF with timescale for replacement within 52 weeks.	Immediate rectification required. Either remove or tighten. Record on inspection record sheet, raise WAIF. Replace within 52 weeks.	SC	M12
Missing or damaged.	Record on inspection record sheet, raise WAIF.	Record on inspection record sheet, raise WAIF. Replace within 52 weeks.	M12	M12
5.0 Road surface condition - including approaches				
Potholes > 150mm diameter AND > 40mm deep within Stop Line to Stop Line.	Immediate rectification required using 'bagged' tarmac or similar.	Immediate rectification required using 'bagged' tarmac or similar with permanent rectification within 24 weeks.	SC	M6
Potholes < 150mm diameter and < or > 40mm deep within Stop Line to Stop Line.	Record on inspection record sheet, raise WAIF.	Record on inspection record sheet, raise WAIF. Rectify within 26 weeks.	M6	M6
Potholes - all sizes - outside stop lines.	Record on inspection record sheet, inform MPC within 7 days for onward rectification by the responsible 3rd party in line with their	Record on inspection record sheet, inform MPC within 7 days for onward rectification by the responsible 3rd party in line with their timescales	SI	M6

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	timescales (most Local Authorities have a 'pothole' policy).	(most Local Authorities have a 'pot hole' policy).		
Surface wear.	Inspector's judgement depending on location, usage and condition. Record on inspection record sheet, take photos should further deterioration occur / not occur by next inspection. Raise WAIF with timescale for rectification to suit from 7 days to 52 weeks.	Inspector's judgement depending on location, usage and condition. Record on inspection record sheet, take photos should further deterioration occur / not occur by next inspection. Raise WAIF with timescale for rectification to suit from 7 days to 52 weeks.	SI	M12
5.1 Surface condition - including approaches - UWC and Footpaths				
Potholes > 150mm diameter AND > 40mm deep within decision points.	Immediate rectification required using 'bagged' tarmac or similar with permanent rectification within 24 weeks.	Immediate rectification required using 'bagged' tarmac or similar with permanent rectification within 24 weeks.	SC	M6
Potholes < 150mm diameter and < or > 40mm deep within decision points.	Record on inspection record sheet, raise WAIF. Rectify within 26 weeks.	Record on inspection record sheet, raise WAIF. Rectify within 26 weeks.	M6	M6
Potholes - all sizes outside decision points.	Inspector's judgement depending on type of crossing, location, usage and condition. Record on inspection record sheet, take photos to allow comparison should further deterioration occur / not occur by next inspection. Raise WAIF with timescale for rectification to suit from 7 days to 52 weeks.	Inspector's judgement depending on type of crossing, location, usage and condition. Record on inspection record sheet, take photos to allow comparison should further deterioration occur / not occur by next inspection. Raise WAIF with timescale for rectification to suit from 7 days to 52 weeks.	SI	M6
Surface wear.	Inspector's judgement depending on type of crossing, location, usage and condition. Record on inspection record sheet, take photos to allow comparison should further deterioration occur / not occur by next inspection. Raise WAIF with timescale for rectification to suit from 7 days to 52 weeks.	Inspector's judgement depending on type of crossing, location, usage and condition. Record on inspection record sheet, take photos to allow comparison should further deterioration occur / not occur by next inspection. Raise WAIF with timescale for rectification to suit from 7 days to 52 weeks.	SI	M12
6.0 Edge Beams / Sill Beams				
Rocking - all crossing types - where an immediate risk to rail, road or pedestrian users exists or likely to exist by	Notify Signaller, Infrastructure Fault Control (IFC) and SM(OT). Consider closing crossing to vehicular and/or pedestrian traffic. Immediate action - investigate and temporary rectification if possible (use of wedges / packers etc). If	Notify Signaller, IFC and ORCC/ORR. Consider closing crossing to vehicular and/or pedestrian traffic. Immediate action - investigate and temporary rectification if possible (use of wedges / packers etc) If immediate temporary (or	SC	M6

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time of next inspection.	immediate temporary (or permanent) rectification not possible, place watchman and ORCC/ORA to instruct on any further mitigation (e.g. block train traffic, close crossing to public, impose ESR, impose ESR with full time watchman etc). Permanent rectification within 26 weeks with enhanced 4 weekly inspection frequency.		permanent) rectification not possible, place watchman and ORCC/ORA to instruct on any further mitigation (e.g. block train traffic, close crossing to public, impose ESR, impose ESR with full time watchman etc). Permanent rectification within 26 weeks with enhanced 4 weekly inspection frequency.	
Damaged / Degrading (wear & tear).	Record on inspection record sheet, raise WAIF, take photos to allow comparison should further deterioration occur / not occur by time of next inspection. Timescales for rectification to be within 26 weeks although reprioritisation is allowed subject to confirmation of no deterioration.	M6	Record on inspection record sheet, raise WAIF, take photos to allow comparison should further deterioration occur / not occur by time of next inspection. Timescales for rectification to be within 26 weeks although reprioritisation is allowed subject to confirmation of no deterioration.	M6
More than 2 sill beams damaged in any row.	N/A		Consider refurbishment request to RAM[T].	
7.0 Fencing				
Incomplete or damaged such that access to railway is easily accessible.	Immediate temporary or permanent rectification required by inspector. If not possible, notify Infrastructure Fault Control (IFC) and Signaller to caution trains until temporary repair made. Notify SM(OT).	SC	Immediate temporary or permanent rectification required by inspector. If not possible, notify IFC and Signaller to caution trains until temporary repair made. Notify ORCC/ORA. Permanent rectification within 7 days unless adjacent land use allows extended timescale as Table 5 NR/L2/TRK/5100 .	SI
Incomplete or damaged such that access to railway is not easily accessible.	Notify SM(OT), immediate temporary (or permanent) repair required.	SC	Inspector to stay on site, notify SM(OT), immediate temporary (or permanent) repair required. Permanent rectification within 7 days unless adjacent land use allows extended timescale as Table 5 NR/L2/TRK/5100 .	SI
8.0 Gates, Stiles & the like				
Wicket gates not locked (if required) or gate catch missing / ineffective (at UWC).	Notify Signaller, Infrastructure Fault Control (IFC) and SM(OT). Consider closing crossing to pedestrian traffic. Temporary (or permanent) rectification immediately.	SC	Notify Signaller, IFC and ORCC/ORA. Consider closing crossing to pedestrian traffic. Temporary (or permanent) rectification immediately. Permanent rectification within 7 days.	SI
Wicket gates / stiles / gates - other defects that impact upon their	Record on inspection record sheet, raise WAIF with timescale for rectification to be within 26 weeks.	M6	Record on inspection record sheet, raise WAIF. Rectify within 26 weeks.	M6

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operation.				
9.0 Sighting distances - where required as primary mitigation at crossings (minimum sighting distance not achievable)				
Sighting not achievable due to encroachment by vegetation - all crossing types.	Notify Signaller, Infrastructure Fault Control (IFC) and SM(OT). Immediate rectification required. If not achievable, the ORCC/ORA shall instruct mitigation of imposing ESR to suit available sighting, placing watchman or closing crossing to pedestrian traffic.	SC	SC	SC
Sighting not achievable due to other obstruction either within or outside NR boundary.	Notify SM(OT). If immediate rectification not achievable, the ORCC/ORA shall instruct mitigation of imposing ESR to suit available sighting, placing watchman (max 24 hours), crossing closure to pedestrians or other. ORCC/ORA to advise on further mitigation within 24 hours to allow watchman to stand down e.g. if necessary, ESR to remain. Permanent rectification to be advised by ORCC/ORA within 8 weeks.	SC		M2
10.0 Road Markings and Studs				
Road markings or studs missing.	Record on inspection record sheet, raise WAIF with timescale for rectification to be within 8 weeks.	M2		M2
Road markings erased or indistinct.	Record on inspection record sheet, raise WAIF with timescale for rectification to be within 8 weeks.	M2		M2
11.0 Roadway or Pedestrian Walkways				
Incorrect width on highway crossing (dimensioned on Ground Plan).	Notify SM(OT), raise WAIF for rectification within 13 weeks.	M3		M3
Incorrect width on pedestrian crossing - all types.	Notify SM(OT), raise WAIF for rectification within 13 weeks.	M3		M3
NOTE All SC and SI defects should be reported to Infrastructure Fault Control for immediate attention and to the ORCC if the defect is a sighting deficiency. Defects discovered on road profiles including approaches, at vehicular crossings shall be assessed for priority of rectification by the TME.				

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Appendix C
Basic Test Equipment

C.1 Materials and Fabrication Method

The poles are fabricated using 40mm or greater diameter round hardwood of at least 1.4m in length having cup hooks screwed into them at 150mm from the flat end.

Measuring chords for each discrete wheelbase are fabricated from 6mm diameter non stretch rope. Allowance must be made for fitting to the cup hooks attached to the handles so that the correct wheelbase lengths are maintained.

Label or colour code each chord length so that the correct chord is used for each application.

C.2 Instructions:

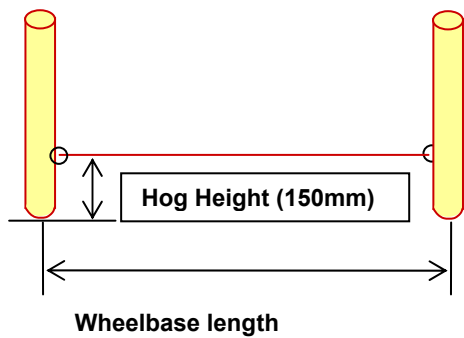


Figure C.1 – Pole and Chord Arrangement



STAGE 1



STAGE 2



STAGE 3

Figure C.2 – Pole and Chord

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- STAGE 1 - Using a ruler, score or mark notches at the required height (150mm) from the bottom of the wooden poles and screw in strong cup hooks at the marked points on each pole.
- STAGE 2 - Using yachting halyard, of differing colours for each specified wheelbase length, fabricate chords to lengths detailed in Table C1.
- STAGE 3 - Attach the required length of yachting halyard to the wooden poles, testing the strength and rigidity of the equipment.

Crossing Type and Category	Specified Wheelbase	Approach Slope Assessment Distance From Outer Rail	Maximum Permissible Hog
Cat 1	11.5m	30m	150mm
Cat 2	9.75m	20m	150mm
Cat 3	8.5m	20m	150mm
UWC Cat A	8.5m	12m	150mm
UWC Cat B	6.5m	9m	150mm
UWC Cat C	4m	6m	150mm

Table C.1 – Vertical Profile Survey and Limits Data

NOTE all material must be non-conducting.

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Appendix D

Basic Test Survey and Level Survey Methods

D.1 Basic Test

The basic test is to simply establish compliance with the absolute limits applicable to convex (hog) profiles. The test will be carried out using the equipment described in Appendix C.

D.2 Basic Test Methodology

- Set up the wheelbase chord length for crossing to be surveyed.
- Checking the chord is tight and the poles upright, walk across the crossing checking the hog using the basic test.
- Check the profile over the distance specified for the type and category of crossing.

Profiles should be checked along the centre line of road, and either 1.8m each side of the centre line, or 150mm from each carriageway edge if 1.8m is beyond the crossing surface. If vehicles follow another path across the crossing (if turning on to crossing from side road for example), also survey these paths.

If the chord clears or just touches the crossing surface at any point and is not deflected from straight line it shall be deemed as passed.

If the chord is deflected by the crossing surface, the profile must be scored as having exceeded the maximum permissible hog and actioned according to [Clause 6.9.8](#).

See Figure D1 below. Results to be recorded on LXi29

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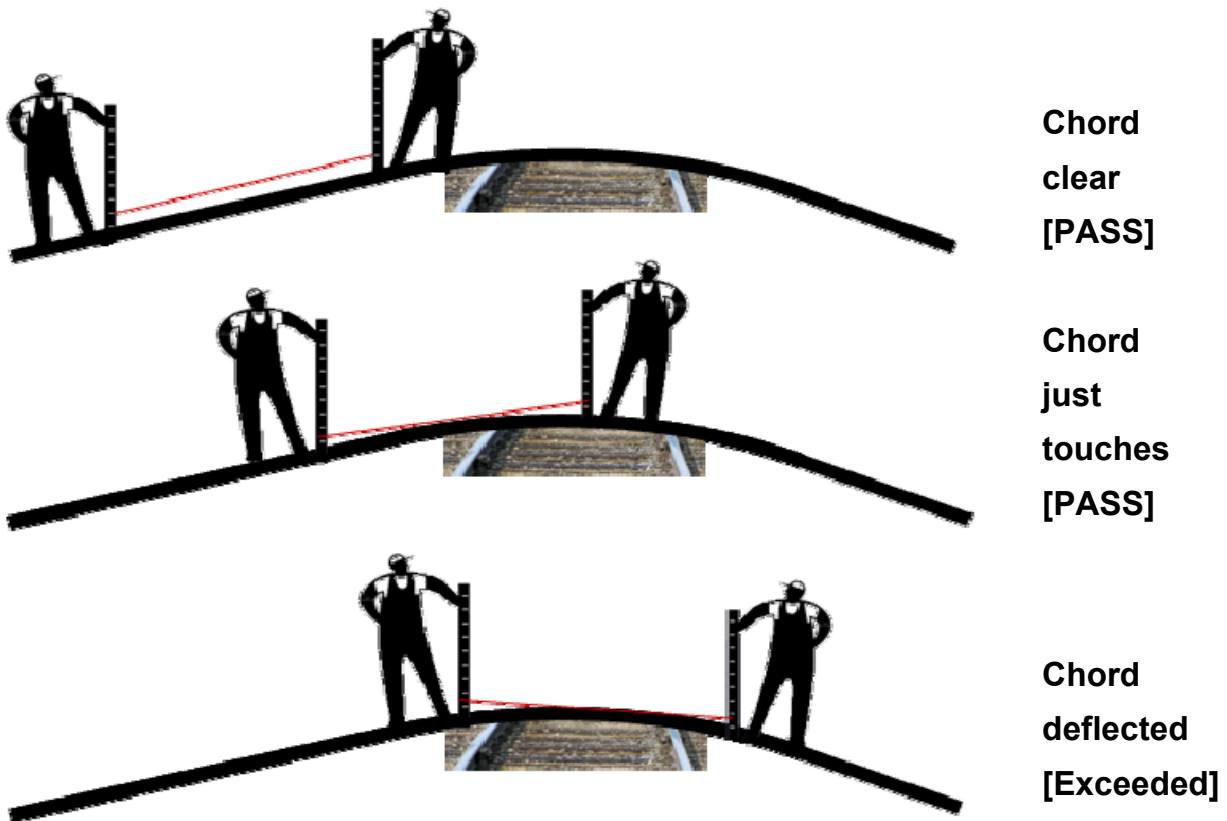


Figure D.1 – Basic Test Vertical Profile Survey

D.3 Level Survey and Gradient Survey

The level survey, using approved surveying equipment, should be detailed enough to accurately record the vertical profile, including local pot holes or sharp changes of gradient.

Levels should be taken to comply with Table D.1 below.

Area	Distance between Level Survey Points	Specific Points
20 – 50m from running rail	5m	
16 – 20m from running rail	2m	
0 – 16m from running rail	1m	
Level Crossing	Varies	Cill beams, All Panel Edges adjacent to rails, Rails, Four Foot Panel Centre Lines, Six/Ten Foot Centre Lines, and any other noticeable gradient changes

Table D.1 – Minimum Vertical Level Survey Points

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D.4 Vehicle Borne Survey

Using approved vehicle mounted survey system, levels taken continuously over the crossing and approaches.

Table D.1 details the minimum points to be extracted for processing with the 'Hump Calculator' or 'Excel' plot.

Standards Briefing Note

Ref: NR/L3/TRK/4041		Issue: 1					
Title: Maintaining Track Assets at Level Crossings							
Publication Date: 02/06/2012		Compliance Date: 01/09/2012					
Standard Owner: Professional Head (Track)							
Non-Compliance rep (NRNC): Professional Head (Track)							
Further information contact: Shingai Mutukwa		Tel: 08578372					
Purpose: This standard specifies the requirements for managing the installation, inspection, maintenance of track assets at operational level crossing infrastructure. It demonstrates that level crossing systems are compliant with legislation, reliable and safe.		Scope: This Network Rail standard is applicable to level crossings of the following types, including those that are subject to temporary closure. <i>NOTE This document is NOT applicable to Inspection and Maintenance of Road Rail Access Points (RRAPs), and Track Access Points (TAPs) as they are not level crossings.</i>					
What's New/ What's Changed and Why: Post title Level Crossing Inspector Maintainer (LCIM) amended to Off Track Inspector (OTI) Clause 5.7 Road Closures - guidance on Network Rail procedure, CCMS2 Document Number 62472748 . Clause 6.7 Defect Identification Clause 6.7.1 Defect Rectification Timescales Clause 6.9.5.2 Automated vehicle survey alternative to detailed and/or basic survey Clause 6.9.8.1 Corrective actions that can be implemented at crossings that fail vertical profile checks Clause 6.9.82 Process for assigning risk to crossings that fail vertical profile checks Appendix B - Defect Minimum Actions <i>Clause 7.64 and Appendix A of NR/L2/SIG/19608 are superseded.</i> <i>NR/BS/LI/236 has been Incorporated in Clause 6.9</i> NEW TEF numbers: TEF3241 Level Crossing Infrastructure: Inspection & Maintenance Checklists (LXi Checklists) TEF3242 Level Crossing Vertical Profile Inspection Sheet (LXi29) TEF3243 Level Crossing Inspection Record Form NEW Standard Track Drawings REPW/450 Timber Level Crossing REPW/451 Timber Pedestrian Level Crossing							
Affected documents: <table><tr><td>Reference</td><td>Impact</td></tr><tr><td>NR/BS/LI/236</td><td>Withdrawn</td></tr></table>				Reference	Impact	NR/BS/LI/236	Withdrawn
Reference	Impact						
NR/BS/LI/236	Withdrawn						
Briefing requirements: Where Technical briefing (T) is required, the specific Post title is indicated. These posts have specific responsibilities within this standard and receive briefing as part of the Implementation Programme. For Awareness briefing (A) the Post title is not mandatory. Please see http://ccms2.hiav.networkrail.co.uk/webtop/drl/objectId/09013b5b804504da for guidance.							
Briefing (A-Awareness/ T-Technical)	Post	Team	Function				
T	Off Track Inspector		Infrastructure Maintenance				
T	Section Manager (Off Track)		Infrastructure Maintenance				
T	Track Maintenance Engineer		Infrastructure Maintenance				
A	Infrastructure Maintenance Engineer		Infrastructure Maintenance				
A	Infrastructure Maintenance Delivery Manager		Infrastructure Maintenance				
A	Route Asset Manager (Track)		Infrastructure Maintenance				
A	Operations Risk Advisor		Network Operations				
T	Operations Risk Control Coordinator		Network Operations				
A	Fault Control		Network Operations				

*NOTE: Contractors are responsible for arranging and undertaking their own Technical and Awareness Briefings in accordance with their own processes and procedure

