BEDFORD BOROUGH COUNCIL

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Resilient Network

A transformation strategy to data-led decision-making in maintaining Bedford's Highway network

CONTENTS

Page

1 Document Purpose

Bedford Borough Council will prioritise the management and maintenance of this network to minimise the impact that severe weather and other disruptive events could have on economic activity and maintain access to key services.

The application of a hierarchal approach to network activity and specific classifications such as the Resilient Network is essential for network management purposes. It helps to improve our understanding of our network and make better informed decisions about planning and coordinating works on the network and prioritise investments.

This plan has been developed to support local and national policies on tackling disruption to the network as well as how we will continue to take account of network classifications and hierarchies, helping to make informed network management decisions.

This document sets out what a Resilient Network is, why we need to establish one for Bedford Borough, how the Resilient Network has been developed, and ways it will be embedded into operational practice.

1.1 Background

Following consecutive severe winters in 2008/2009 and 2009/2010 with many Local Authorities running low on salt, The Quarmby Review (2010) published by the Department for Transport, highlighted problems with 'just in time' approach to local authority salt deliveries during times of large spikes in demand. Local Authorities were recommended to build salt barns to keep salt dry allowing for year- round deliveries. Local Authorities were also tasked with identifying a minimum salting route to ease demand during future scenarios of short salt supply.

In 2014, the Department for Transport expanded on the Quarmby review recommendations and produced a document called 'Transport Resilience Review: A review of the resilience of the transport network during extreme weather events.' It included a recommendation that "Local Highway Authorities identify a 'Resilient Network' to which they will give priority, to maintain economic activity and access to key services during extreme weather". This was further supported by the Well-Managed Highway Infrastructure (WMHI) Code of Practice (2016), which outlined that resilience is defined by the Cabinet Office as: 'the ability of the community, services, area or infrastructure to detect, prevent, and, if necessary to withstand, handle and recover from disruptive challenges.' There are four key components to resilience and Highway Authorities are likely to draw on a number of combinations to reduce risk of failure, especially on

their Resilient Networks:

- Resistance – preventing damage
- Reliability – operation during a range of conditions
- Redundancy – availability of contingencies or spare capacity i.e. a suitable diversion routes
- Recovery – enabling a fast response and recovery

2 Development of the Resilient Network

The starting point for defining a Resilient Network is to maintain continuity and economic connectivity. This involves incorporating the proposed Major Road Network which is defined as our principal classified A Roads that carry over 20,000 vehicle per day, the volume of which is over 5% HGV traffic. Following on from this, critical infrastructure needed to be defined and included.

2.1 Resilient Network

The WMHI Code of Practice (2016) recommends including critical infrastructure such as:

- Connectivity between major communities
- Links to the Strategic Network
- Connectivity across Authorities boundaries where appropriate
- Links to transport interchanges
- Access to emergency facilities including Fire and Rescue, Police, Ambulance Services and Hospitals
- Principle Public Transport routes, access to Rail and Bus Stations, and to Bus garages and other depots
- Other locally important facilities.

Using the recommendations above, Bedford borough identified facilitating access to key services including:

- Emergency Services
- Council Depots
- Recycle & Household Waste Sites
- Urgent Care Centres
- Train & Bus Stations
- Connectivity with neighbouring Highway Authorities
- Connectivity with National Highways and their Strategic roads.

3 How can we use the Network

The Resilient Network is a tool where priority activities can be set, this includes:

- Priority and frequency of carriageway inspection
- Identifying roads requiring priority winter gritting
- Prioritising funding to mitigate the onset of deterioration of the asset
- Prioritising work programmes to reduce the risk of failure of the asset
- Prioritising reactive maintenance in the case of extreme weather
- Assisting at emergency planning events including recovering from an emergency event

The Resilient Network will receive priority when responding to extreme weather events and incorporate resilience in limiting the effects of these events. Listed below are the common weather events that our network experiences

- Freezing Temperatures

Frost, ice, and snow are the most frequent severe weather events observed for most authorities. We have an extensive winter service network comprising of 8 routes covering the Borough. This network is separated into Priority

1 and Priority 2 precautionary salting routes. Both routes are usually carried out at the same time and have an average of 48 runs per winter. All sections of the Resilient Network will be a Priority 1 route. (See https://www.bedford.gov.uk/parking-roads-and-travel/winter-roads/keeping-winter-roads-safe).

Prolonged winter conditions can result in the need for additional supplies being required, leading to problems with procurement and increased cost. In addition, a prolonged winter requires staff to prioritise winter maintenance activities resulting in other duties identified as a lower priority being postponed. In terms of road condition, the freeze thaw cycle also causes significant damage to the road network (surface deterioration) which has a considerable impact on road user journeys and highway budgets.

- Prolonged High Temperatures and drought damage

Prolonged high temperatures can reduce soil moisture content and lower the ground water table resulting in a reduction of strength in supporting soil conditions. This can lead to increased occurrence of pavement deterioration, subsidence and surface failures such as significant road cracking and rutting.

Where a road has had several surface dressing treatments, the road surface can become binder rich. These sites can be prone to melting during prolong severely hot summer weather. Because bitumen is black in colour, it absorbs the sun's rays quicker allowing heat to radiate through the road surface causing more of it to melt.

To mitigate this effect, one solution is to spread granite dust onto the surface. The granite dust is light grey in colour, which reflects the sun's heat away from the road keeping the surface cool. In addition to this, the melted bitumen allows the aggregate dust to adhere to the road surface, and any melting binder will soak up the dust and solidify.

- Prolonged Rainfall

Prolonged rainfall over a sustained period can lead to both surface water and river flooding, and potentially a rise in groundwater levels as soil reaches its saturation level. Such instances will reduce the capacity of the surrounding land and drainage systems to accept surface water and excess water progressively produces large puddles on the surface. Intense rainfall can lead to localised surface water flooding and 'flash' river flooding. These can be highly localised and can last from a few minutes to several hours. Events such as these can quickly exceed drainage capacity causing severe flooding.

- Strong Winds

Strong winds can cause extensive damage from fallen trees. In addition to this the unpredictability of wind damage

makes it difficult to put measures in place. During periods of heavy winds temporary road closures on bridges or raised highways may be put in place, in the event of trees falling across a carriageway, road closures across the network are likely to be imposed

4 Critical Infrastructure

This section outlines what critical infrastructure is on Bedford Borough Councils Resilient Network.

4.1 Emergency Services

Table below shows which Emergency Services are on our Resilient Network.

Police

On Resilient Network	Not on Resilient Network
Headquarters, Woburn Road, Kempston	Shorts Building, Beauvais Square, Short-stown
	North rural Police post High Street, Riseley
Bedfordshire Police Station, Halsey Road	
Bedfordshire Police hub, Bus station, Bedford	

Ambulance

On Resilient Network	Not on Resilient Network
Ambulance Station, Bedford Road, Kempston	

Fire

On Resilient Network	Not on Resilient Network
Bedford Fire Station, Barkers Lane, Bedford	Harrold Fire Station, Odell Road
	Bedfordshire & Luton Fire and Rescue, South-fields Road, Kempston

4.2 Highway Depots

On Resilient Network	Close to Resilient Network
London Road Depot	Brunel Road Depot

4.3 Recycling & Household Waste

On Resilient Network	Close to Resilient Network
Barkers Lane Recycling Centre	
Elstow Waste Transfer	

4.4 Hospitals

On Resilient Network	Close to Resilient Network
Bedford Hospital South Wing, Ampthill Road	
Bedford Charter House, Kimbolton Road	

4.5 Train Station

On Resilient Network	Not on Resilient Network
Train Station, Ashburnham Road	St Johns, Melbourne Street

4.6 Bus Station

The WMHI Code of Practice (2016) identifies that the Resilient Network should be designed to 'maintain economic activity' with bus interchanges.

On Resilient Network	Close to Resilient Network
Bedford Bus station, Greyfriars	

4.7 The Council (Social Services)

Care for vulnerable people in our community needs to be maintained. The Resilient Network ensures access to Bedford Borough's Adult Social Care.

On Resilient Network	Close to Resilient Network
Borough Hall, Cauldwell Street	

5 Additions to our Resilient Network

NIL – In 2025

5.1 Neighbouring Authorities

Central Bedfordshire Council connectivity:
A6 Wilstead Bypass, Wilstead connection with A6 Wilstead Hill, Haynes
A600 High Road, Cotton End connection with A600 High Road, Haynes
A603 Sandy Road, Willington connection with A603 Bedford Road, Moggerhanger
B530 Ampthill Road, Kempston Hardwick connection with B530 Ampthill Road, Houghton Conquest
C5 High Street, Great Barford connection with C5 Barford Road, Blunham

Milton Keynes Council connectivity:
A422 Newport Pagnell Road, Stagsden connection with A422 Newport Road, Astwood
A428 Bridge Street, Turvey connection with A428 Bedford Road, Cold Brayfield
A6 Rushden Road, Souldrop connection with A6 Bedford Road, Rushden

Cambridge County Council connectivity:
B660 Kimbolton Road, Pertenhall connection with B660 Park Lane, Stonely

6 Summary of Resilient Network Changes

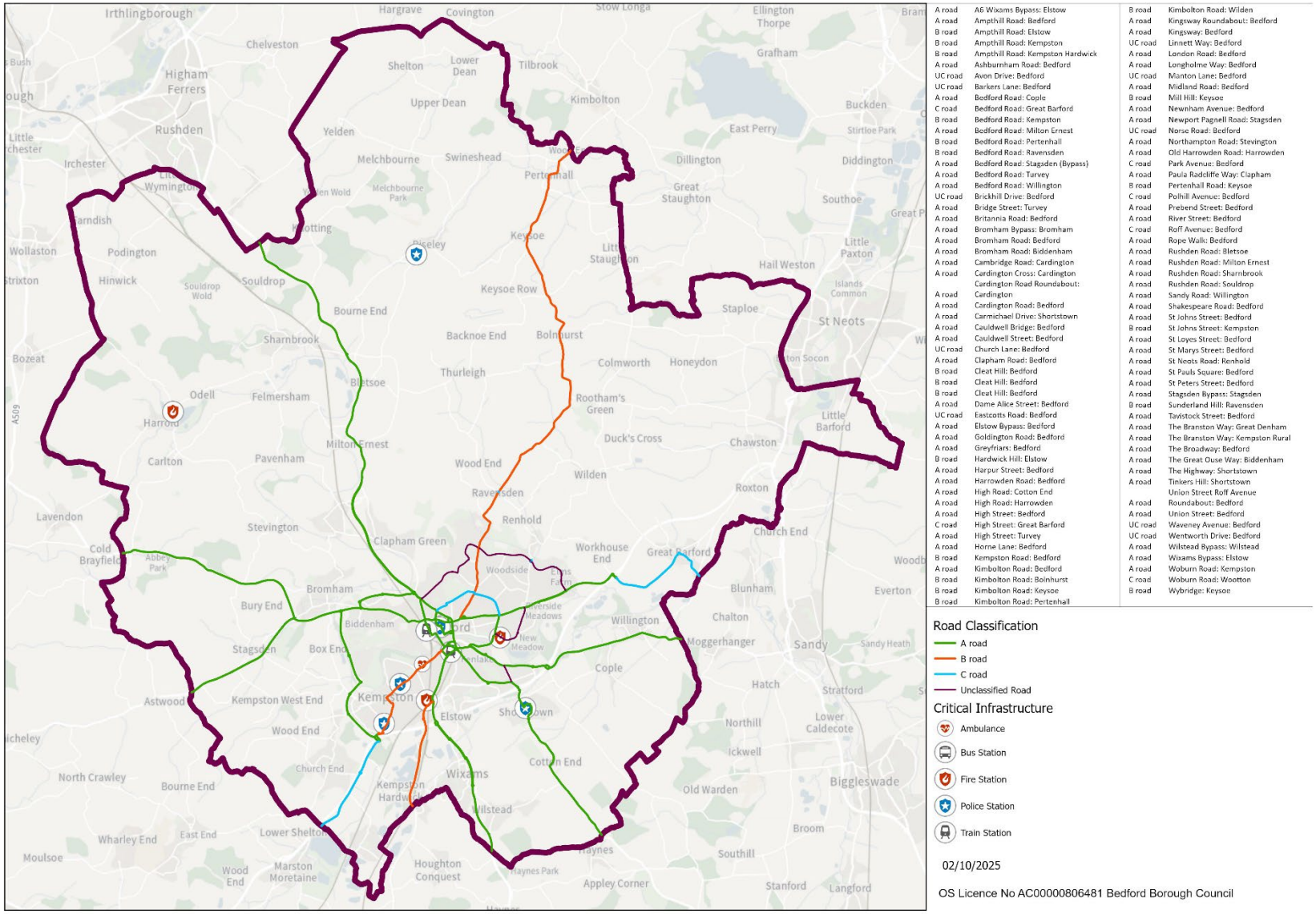
Resilient Network review and the additions and removals considered

Addition Location	Addition distance (km)	Gritting Priority In-crease (P2 to P1) (km)
Nil	Nil	

7 Reviews

The Network shall be formally reviewed no less frequently than once every two years from the date of its formal ascent. However, interim reviews of the strategy, either wholly or in part may take place at more regular intervals if deemed necessary due to any other change in circumstance or significant occurrence that might warrant it. Reviews shall include Highways, Transport, Waste and Resilience teams.

Network


Irthlingborough
Hargrave
Covington
Stow Longa
Ellington
Thorpe
Chelveston
Shelton
Lower
Dean
Tilbrook
Grafham
Higham
Ferrers
Upper Dean
Kimbolton
Buckden
Rushden
Yelden
East Perry
Stirtloe Park
Melchbourne
Swineshead
Dillington
Diddington
Pertenhall
Great
Staughton
Southoe
Podington
Wollaston
Hinwick
Souldrop
Keysoe
Little
Staughton
Little
Paxton
Hail Weston
Keysoe Row
Bourne End
Staploe
St Neots
Sharnbrook
Backnoe End
Bolnhurst
Bozeat
Colmworth
Honeydon
Thurleigh
Odell
Felmersham
Harrold
Roothams
Green
Little
Barford
Duck's Cross
Chawston
Carlton
Pavenham
Wood End
Wilden
Roxton
Ravensden
Lavendon
Renhold
Stevington
Church End
Clapham Green
Workhouse
End
Great Barford
Bromham
Blunham
Everton
Bury End
Willington
Chalton
Biddenham
Moggerhanger
Sandy
Stagsden
Box End
Cople
Hatch
Stratford
Astwood
Kempston West End
Kempston
Elstow
Northill
Lower
Caldecote
Wood End
Ickwell
Church End
Cotton End
North Crawley
Wixams
Bourne End
Old Warden
Biggleswade
Wilstead
Broom
Wharley End
East End
Lower Shelton
Southill
Moulsoe
Houghton
Conquest
Haynes
Haynes Park
Appley Corner
Stanford
Langford
Marston
Moretaine
Wood
End
A road A6 Wixams Bypass: Elstow
A road Ampthill Road: Bedford
B road Ampthill Road: Elstow
B road Ampthill Road: Kempston
B road Ampthill Road: Kempston Hardwick
A road Ashburnham Road: Bedford
UC road Avon Drive: Bedford
UC road Barkers Lane: Bedford
A road Bedford Road: Cople
C road Bedford Road: Great Barford
B road Bedford Road: Kempston
A road Bedford Road: Milton Ernest
B road Bedford Road: Pertenhall
B road Bedford Road: Ravensden
A road Bedford Road: Stagsden (Bypass)
A road Bedford Road: Turvey
A road Bedford Road: Willington
UC road Brickhill Drive: Bedford
A road Bridge Street: Turvey
A road Britannia Road: Bedford
A road Bromham Bypass: Bromham
A road Bromham Road: Bedford
A road Bromham Road: Biddenham
A road Cambridge Road: Cardington
A road Cardington Cross: Cardington
Cardington Road Roundabout: Cardington
A road Cardington Road: Bedford
A road Carmichael Drive: Shortstown
A road Cauldwell Bridge: Bedford
A road Cauldwell Street: Bedford
UC road Church Lane: Bedford
A road Clapham Road: Bedford
B road Cleat Hill: Bedford
B road Cleat Hill: Bedford
B road Cleat Hill: Bedford
A road Dame Alice Street: Bedford
UC road Eastcotts Road: Bedford
A road Elstow Bypass: Bedford
A road Goldington Road: Bedford
A road Greyfriars: Bedford
B road Hardwick Hill: Elstow
A road Harpur Street: Bedford
A road Harrowden Road: Bedford
A road High Road: Cotton End
A road High Road: Harrowden
A road High Street: Bedford
C road High Street: Great Barford
A road High Street: Turvey
A road Horne Lane: Bedford
B road Kempston Road: Bedford
A road Kimbolton Road: Bedford
B road Kimbolton Road: Bolnhurst
B road Kimbolton Road: Keysoe
B road Kimbolton Road: Pertenhall
B road Kimbolton Road: Wilden
A road Kingsway Roundabout: Bedford
A road Kingsway: Bedford
UC road Linnett Way: Bedford
A road London Road: Bedford
A road Longholme Way: Bedford
UC road Manton Lane: Bedford
A road Midland Road: Bedford
B road Mill Hill: Keysoe
A road Newnham Avenue: Bedford
A road Newport Pagnell Road: Stagsden
UC road Norse Road: Bedford
A road Northampton Road: Stevington
A road Old Harrowden Road: Harrowden
C road Park Avenue: Bedford
A road Paula Radcliffe Way: Clapham
B road Pertenhall Road: Keysoe
C road Polhill Avenue: Bedford
A road Prebend Street: Bedford
A road River Street: Bedford
C road Roff Avenue: Bedford
A road Rope Walk: Bedford
A road Rushden Road: Bletsoe
A road Rushden Road: Milton Ernest
A road Rushden Road: Sharnbrook
A road Rushden Road: Souldrop
A road Sandy Road: Willington
A road Shakespeare Road: Bedford
A road St Johns Street: Bedford
B road St Johns Street: Kempston
A road St Loyes Street: Bedford
A road St Marys Street: Bedford
A road St Neots Road: Renhold
A road St Pauls Square: Bedford
A road St Peters Street: Bedford
A road Stagsden Bypass: Stagsden
B road Sunderland Hill: Ravensden
A road Tavistock Street: Bedford
A road The Branston Way: Great Denham
A road The Branston Way: Kempston Rural
A road The Broadway: Bedford
A road The Great Ouse Way: Biddenham
A road The Highway: Shortstown
A road Tinkers Hill: Shortstown
Union Street Roff Avenue Roundabout: Bedford
A road Union Street: Bedford
UC road Waveney Avenue: Bedford
UC road Wentworth Drive: Bedford
A road Wilstead Bypass: Wilstead
A road Wixams Bypass: Elstow
A road Woburn Road: Kempston
C road Woburn Road: Wootton
B road Wybridge: Keysoe
Road Classification
A road
B road
C road
Unclassified Road
Critical Infrastructure
Ambulance
Bus Station
Fire Station
Police Station
Train Station
02/10/2025
OS Licence No AC00000806481 Bedford Borough Council