Scheme Prioritisation Strategy

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Contents

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1. Introduction

The manner in highway maintenance works is identified, selected, prioritised, and implemented are impacted upon by a diverse range of corporate, operational, financial, administrative, and risk-safety factors that should be considered, reflective of good asset maintenance management practices and a risk-based approach to service delivery by selecting affordable treatments that are mindful of their carbon footprint and sustainable maintenance solutions.

This highway maintenance – 'Scheme Prioritisation Strategy' outlines the over-arching approach that is taken in the consideration of how the highway maintenance works and preventative treatment processes are adopted and applied at a network level.

The key drivers for highways maintenance are taken from :

- **The Highways Act 1980**, reflective of a Highway Authority's duty to maintain the highways in a safe and service condition, i.e., fit for purpose.
- **The Highways Code of Practice 2016** which is primarily geared towards delivering highways services based on sound asset management principles and adopting a risk-based approach.
- **The UKRLG/HMEP Highway Infrastructure Asset Management Guidance (HIAMG)** to maximise returns from highways investment and deliver efficient and effective services.

Whilst this strategy is aimed at highway works undertaken for carriageways and footways, it may similarly be adapted and applied to other highways infrastructure assets for Structures (e.g., Bridges and Retaining Walls, etc), Street Lighting, Drainage and Signals. This is the case for cycle tracks and footpaths, the footway strategy is used for these.

The Highways Infrastructure Code of Practice provides the following recommendations for Scheme Prioritisation:

RECOMMENDATION 13 – WHOLE LIFE / DESIGNING FOR MAINTENANCE

'Authorities should take whole life costs into consideration when assessing options for maintenance, new and improved highway schemes. The future maintenance costs of such new infrastructure are therefore a prime consideration.'

RECOMMENDATION 29 – LIFE CYCLE PLANS

'Life cycle planning principles should be used to review the level of funding, support investment decisions and substantiate the need for appropriate and sustainable long-term investment. (HIAMG Recommendation 6)'

RECOMMENDATION 30 – CROSS ASSET PRIORITIES

'In developing priorities and programmes, consideration should be given to prioritising across asset groups as well as within them.'

RECOMMENDATION 31 – WORKS PROGRAMMING

'A prioritised forward works programme for a rolling period of three to five years should be developed and updated regularly. (HIAMG Recommendation 7)'

RECOMMENDATION 32 – CARBON

'The impact of highway infrastructure maintenance activities in terms of whole life carbon costs should be considered when determining appropriate interventions, materials, and treatments.'

It is against this background that a 'Works Prioritisation Strategy' is required and is underpinned by Life Cycle Planning modelling protocols.

2. Scope

This strategy demonstrates the approach to developing priority planned works maintenance programmes for the generation of an 'Annual Service Plan' for works implementation in the coming year, and for generating an indicative 'Forward Programme' of works for future years based on multi-criteria 'Value Management' decision making techniques, lifecycle planning and condition projection modelling.

The Strategy is governed by the following overarching components of highway infrastructure asset maintenance management that should be accounted for in determining the delivery of maintenance services: -

Corporate plan, vision, goals, and objectives is aimed at improving the quality of life for people living and working in the region and in supporting the learning, cultural, educational, caring and transportation needs of residents in Newham. This provides the foundation upon which all services are derived and delivered.

The adoption of a risk-based approach to highway infrastructure asset maintenance is recommended in the Highways COP which includes highway inspections, works priorities, and works programmes. This will enable the Highway Authority to set levels of service reflective of their environment and circumstances and it will inform on corporate direction for determining the maintenance priority needs of the highways network.

The inclusion of Maintenance Hierarchy, Resilient Network, Critical Infrastructure, Critical Assets are essential in determining the priority maintenance needs of the highway's assets at a network level. The consideration of these elements is reflective of the relative importance of different parts of the network, what they serve and how they provide a maintenance priority profile that supports a risk-based approach to service delivery.

The safety, serviceability, sustainability, availability and accessibility of the highways network is vital in providing a robust maintenance delivery package compliant with and reflective of the key drivers for highways maintenance management. The consideration and adoption of these core requirements will ensure that the maintenance options selected are timely, fit for purpose, long-lasting, appropriate, sustainable, affordable, and inclusive.

Carbon Emissions: As industry guidance and direction is further developed and disseminated for carbon emissions relating to road surface and other maintenance treatments for asset management purposes to produce average C02e figures for all surface treatments and insitu-recycling, along with traditional asphalts, the Highway Authority will take account of this criteria in the planning of their future maintenance programmes. By adopting this approach we can ensure they are implementing whole carbon life cycle planning considerations which is cost efficient, minimises their carbon generation and demonstrates carbon savings against alternative much more carbon heavy treatments.

Social inclusion is an important part of accessibility for all users of the highway, and it is of particular interest in respect of certain user groups and minority groups that require considerations. Such equity and diversity considerations will relate to the following vehicular and pedestrian user groups: - disabled/non-disabled, sensory and mobility restricted, aged, young, walkers, cyclists, equestrian. The safe accessibility to all aspects of daily life, whether it be work, education, health services, social activity, transport, etc, for all facets of society is a reasonable expectation, and the user needs and expectations should be reasonably accommodated when determining the scope, extent, and engineering design of the maintenance proposal.

Levels of service and performance targets should be set in order to reflect reasonable user needs, manage expectations and deliver service outcomes. Service levels are broad statements of stakeholder requirements that can be performance measured reflective of set targets. This is reflective of an 'Performance Management Strategy' which determines whether the Highway Authority is meeting its approach to effective asset management.

Quality condition and inventory data supported by a robust maintenance hierarchy model of the highways network provides the platform for everything derived through asset maintenance management and for the determination of priority maintenance needs and network coverage. Regular asset condition updates are required to reliably model network maintenance needs and to account for changes in condition status and priorities reflective of winter degradation effects, impairment, extreme environmental events e.g., flooding, excessive heat, extreme winds, frost heave, etc, and for the evaluation of treatment milestones and condition thresholds associated with lifecycle planning and condition projection modelling.

Current highway infrastructure asset inventory is necessary to support Newham's Highway asset management decision making and planning protocols, this provides the knowledge about the existence, quantity, and characteristics of the asset against which current condition is registered and modelled giving rise to priority maintenance needs, financial investment requirements and it supports asset valuation calculations.

3. Asset Scheme Prioritisation

Asset Scheme Prioritisation

The process of 'Asset Scheme Prioritisation' is an essential tool in determining which assets require maintenance and replacement and provide the most cost and performance effective solutions for the stakeholders.

The scheme prioritisation methodology provides a focus for determining and delivering the right scheme, at the right time, and in the right place.
It involves:

- Developing criteria that define the probability and the consequences of asset failure.
- Establishing risk tolerance levels
- Applying the resulting guidelines to rank and prioritise maintenance and replacement schemes from the forward plans developed because of lifecycle planning and condition projection.

Asset scheme prioritisation is an essential part of the up-front strategic planning required to ensure the generation and success of the 'Annual Service Plan'. It helps to rate assets with respect to the impact of their failure and their reliability on business objectives, such values which are essential in managing maintenance backlogs, level of service and performance gaps, as well as developing an infrastructure wide reliability.

It is recognised with the ongoing consequences of budget restraints that an accurate assessment of asset condition and deterioration is required to provide a consistent and rational method for allocating limited financial and engineering resources. This strategy considers how the Highway Authority will identify and prioritise its maintenance and replacement selections and how it will allocate and spend its monies in an auditable, effective, and prioritised manner.

Newham Council's variable annual funding allocations for highway infrastructure works is frequently not at an adequate level to properly support a fully funded maintenance programme based on a lifecycle planning approach to maintenance management, or to resolve the existing maintenance backlog derived from the analysis of data from asset condition surveys. Consequently, it is key that those limited funds available are spent to achieve the optimal effect of upholding the 'Duty of Care' under the Highway Act 1980, meeting the identified risk, maintaining service levels, and reducing asset deterioration. It ensures that schemes are prioritised using optimisation methodologies to maximise risk reduction and minimise whole life costs.

The methods used to optimise works programmes are developed from best practice methods found in 'Well Manged Highway Infrastructure – A Code of Practice 2016 - UKRLG', 'Highway Infrastructure Asset Management Guidance 2014 – HMEP / UKRLG' and through discussions within National Forums and with other Local Highway Authorities.

The 'Highway Infrastructure Asset Management Guidance' document uses Figure 1 below to describe the priority works programme development process.

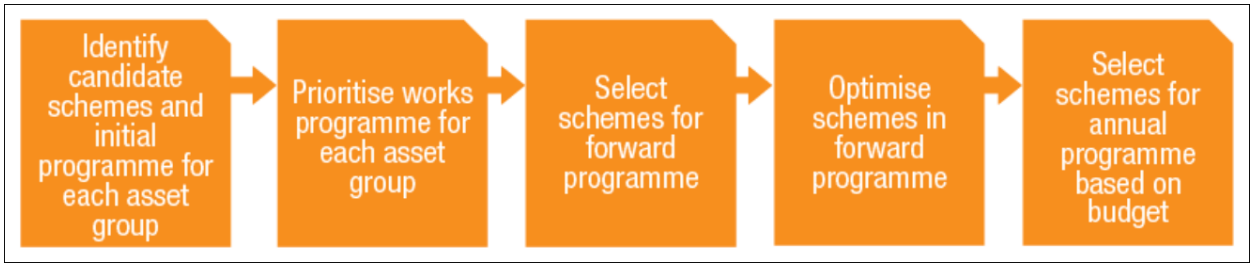

Figure 1 – Highway Infrastructure Asset Management Guidance 2014 – HMEP / UKRLG 'Developing a Programme of Works'

Value Management

With limited budgets, the process of 'Value Management' (VM) is an essential part of the scheme optimisation and prioritisation process for developing the 'Forward Works Programme' and extracting from this the Highway's asset management 'Annual Service Plan'.

To achieve this position, multi-criteria 'Value Management' decision making techniques are used to fine-tune and balance prioritisation criteria and weighting sets based on the principles above which consider the unique attributes and requirements of each asset. The scores and weightings used are reviewed annually to consider changing requirements and priorities for the Council and the changing condition of the highway's asset reflective of ongoing and progressive deterioration.

The following multi-criteria components of scheme prioritisation and value management are considered.

- **Highway Maintenance Asset Condition Status** – The analysis of condition data available for each asset is required to identify a condition driven list of schemes in need of maintenance and improvement.

- **Network Hierarchy** - greater priority is given to roads and key assets on roads such as critical infrastructure that have the greatest usage or need, reflective of the highway network maintenance hierarchy as denoted in the Highways Code of Practice, this is balanced against the need to maintain all the assets across the network.

- **Risk** – the adoption of a risk-based approach aligned to the Highways Code of Practice will ensure higher priority will be given to schemes that pose the greatest risk to public safety.
- **Life Cycle-Value for Money** – a whole life cycle cost approach will be used to determine the cost benefit aspects of priority scheme selection to promote the right treatments at the right time are selected in order to produce cost effective solutions and programmes of work.
- **Network Management** – The Highway Authority will ensure works are programmed to minimise disruption to users and maximise benefits to the community by combining schemes for different assets together.
    - including corridor works and combining different jobs in an area.
    - analysis of cost benefits of night/weekend working against the actual disruption ability to complete the work in a shorter time and to a higher standard.
- **Socio-Economic & Environmental** – consideration of the benefits and impact of the works on local and regional businesses, vulnerable communities, hospitals, schools, and public transport, etc are considered through the Value Management model. The consideration of sustainability, environmental impacts and carbon footprint are also essential components of determining scheme prioritisation and treatment selection.

Each component is modelled and scored in the Value Management (VM) prioritisation process to provide an overall VM score for each scheme to reflect the priority needs of the asset.

Appendix 1 shows the Carriageway VM Specification.

Forward Programme

The end-product of 'Asset Scheme Prioritisation' is the creation of the 'Forward Programme' and the extraction of the 'Annual Service Plan'.

The 'Forward Programme' is an indicative 5 to 6-year plan of projects and schemes designed to maintain and improve the asset condition and performance.

The scope of the 'Forward Programme' of works may be applied to each asset group which is proposed to be undertaken over the subsequent three to five years. This has the benefit of bringing into the process:

- the maintenance and treatment milestones generated through the process of lifecycle planning in order to consider bringing forward ancillary schemes located in the proximity of the main scheme to support economies of scale and promote engineering and financial efficiencies.
- a knowledge and appreciation of maintenance needs and associated funding requirements over the coming years.
- a consideration of the risks associated with future maintenance needs and the consequences of not delivering the scheme.
- the management of Elected Member and stakeholder expectations
- an appreciation of the engineering design and construction resources required to support the programme over the coming years.
- the ability to coordinate planned works programmes and operations with external organisations, e.g., statutory utility organisations, Network Rail, Transport for London, etc, to avoid engineering conflicts, minimise disruption and promote reliable service delivery protocols.

Whilst the forward programmed schemes identified in years two to five may have a good to fair level of confidence of delivery, it should be minded that there could be reason to fine-tune the proposed works programme to account for inordinate asset condition degradation, for example subsequent to severe or extended winter weather effects or emergency impact events such as flooding and wind damage to highways assets. This effect becomes more prominent as the years increase and confidence in the reliability of the forward programme diminishes.

Further extension of the forward programme for up to ten years and maybe longer, may be derived through the processes of lifecycle planning and condition projection, and this will assist in affirming the long-term maintenance funding needs of highways investment planning and the operational planning needs of the service. However, such a programme extension should be considered only as 'indicative' and it is likely that the schemes generated over this period will likely be annually

reassessed and could be reprioritised reflective of updated condition assessment survey data relevant at that time.

Annual Service Plan

The 'Annual Service Plan' is a priority ranked schedule of projects that is generated from Year 1 of the Forward Plan and it details the actions that will be undertaken in any one year to maintain and improve the asset condition and performance and consequently improve the safety, availability, serviceability, accessibility, and sustainability of the highway infrastructure network within annual budget and affordability limits.

The 'Annual Service Plan' translates the objectives of the Council's Corporate Plan into detailed supporting strategies for service delivery and it takes account of and is consistent with the service budget allocations for asset maintenance as adopted by the Cabinet.

4. Summary

With the limitations of annual funding and engineering resource constraints along with site availability restrictions, the need for an effective scheme prioritisation model is essential to meet the corporate business needs, aims, goals and objectives of Newham Council at the strategic level and the more specific detailed delivery aspects of the service at the tactical and operational levels of service reflective of considerations of risk and benefits.

To ensure the successful implementation of this strategy the rationale behind the strategic development of the 'Annual Service Plan' and the indicative 'Forward Programme' will be communicated to Corporate Management Team and Cabinet, to secure their understanding and buy-in of the process and to enable them to defend any future stakeholder challenge in terms of priority scheme delivery.

The effective implementation of the 'Scheme Prioritisation Strategy' will provide a sound approach to the provision of an 'Annual Service Plan' and an indicative 'Forward Programme' in providing the maximum cost benefit to the highway infrastructure network. In essence this will support good asset management protocols for the determination of priority maintenance works reflective of a risk-based approach to maintenance management within annual funding provisions and affordability, and it will align with the requirements of the Highway Infrastructure Asset Management Plan and Strategy. This approach will also aid the defence in court to works undertaken across the Borough through an open and transparent process for prioritising maintenance schemes.

Appendices

Appendix 1 – Carriageway Scheme Prioritisation

The budget allocation for carriageways is based upon the lifecycle planning ratio for the maintenance hierarchy being considered. The following paragraphs illustrate how the carriageway schemes are prioritised across the infrastructure network.

A carriageway scheme is highlighted by the network survey carried out in line with the Asset Condition & Service Inspection document. These schemes, whilst have been derived from a survey of condition, do not deliver prioritisation, hence the Highway's Asset Management Team will follow this process.

Actual Carriageway Condition

Carriageway deterioration is measured by the following defect and are categorised by standard UKPMS defect definition, over each maintenance length the percentage of each defect within the length is calculated:

Carriageway Condition

- Major Cracking (VMCJ) – This is the percentage of the scheme area affected by cracking >2mm in width.

- Minor Cracking (VMCN) – This is the percentage of the scheme area affected by cracking <2mm in width.

- Major Fretting (VMFJ) – This is the percentage of the scheme area affected by major fretting, Loss of material other than surface applied chippings from the surface course or potholing to the degree that the original surface course is no longer discernible OR loss of material from the surface matrix to a depth greater than 20mm. Major Cracking – This is the percentage of the scheme area affected by cracking >2mm in width

- Minor Fretting (VMFN) – This is the percentage of the scheme area affected by Minor Fretting "Loss of material other than surface applied chippings from the surface course where the original surface course remains discernible OR loss of material for the surface matrix to a depth less than 20mm.

- Surface Deterioration (VMSD) – This is the percentage of the scheme area affected by Surface Deterioration, which includes an excess of bituminous binder on the surface course, and/or loss of Surface Dressing, and or polishing / smooth surface.

- Structural Deterioration (VMST) – This is the percentage of the scheme area affected by Structural Deterioration, which includes rutting >15mm and/or Settlement >30mm and/or Wheel track cracking.

Site Location and Risk

The location of the infrastructure is important as it affects how important the asset is to be repaired. A good example of this is the highway tree and defining priority e.g.

- A failing tree adjacent to a school or A failing tree adjacent to a high-speed road

An auditable process will justify the Authority's position with regards to maintenance.

The following attributes are used to help prioritise the carriageway asset.

- **Engineers Inspection and Score**: This is the Engineers assessment of the condition of the carriageway using their experience and expertise, together with local knowledge. This is perhaps the most important factor when assessing carriageway condition and factors such as condition score, ride quality, drainage, maintenance hierarchy are taken into this validation process. Included in this assessment process is 'Engineering Priority' – This factor allows the Highway Authority engineers and inspectors to apply local knowledge factors that otherwise would not be captured.
  This is assessed on a scale of 1-10 and scored 0-30.

  Scoring

Description	Score
Good (0 to 5)	0
Fair (5 to 6)	5
Poor (6 to 8)	10
Very Poor (9 to 10)	30

- **Outside School or Public building –** This is an indication of use. Areas of social gathering are important to the community and should be prioritised over other sites. Includes transport hubs.

  Scoring

Description	Score
Yes	5
No	0

- **Reactive Maintenance Patching –** This is an indication of the road failing to meet the minimum service standard. Repairing these roads first should mitigate any future claims and reduce reactive maintenance spend. Feedback from reactive maintenance team will be taken into consideration and their ability or inability to undertake localised repairs at an affordable cost and assess if this is efficient for them to undertake rather than to include in a planned programme.

  Scoring

Description	Score
A large number of localised repairs or job tickets raised for this particular location or road and reactive maintenance hotpots which will benefit from being in a planned programme.	5

- **Rate of Deterioration –** This is an indication of how quickly the road will deteriorate. Roads which deteriorate quickly are a higher risk for possible claims if potholes occur therefore should be prioritised over those roads which deteriorate slowly.

  Scoring

Description	Score
Negligible	0
Low	1
Medium	2
High	3

- **Scheme Requiring Immediate Intervention –** A treatment recommendation that if not actioned within short time frame would result in the treatment recommendation changing.

  Scoring

Description	Score
Yes	10
No	0

- **Road Hierarchy –** The hierarchy structure already consists of many factors that should be considered for prioritisation. The hierarchy places significance to the section in terms of maintenance need and priority and therefore must be considered for overall scheme prioritisation.

  Scoring

Description	Score
Cat1, Cat2, Cat3 or Cat4	5
All other cway maintenance hierarchies	0

- **Resilient Network –** The resilient network by its nature must be afforded a certain priority.

  Scoring

Description	Score
Yes	5
No	0

- **Public Enquiries/Complaints** – An indication of the public's concern or impression relating to a section.

  Scoring

Description	Score
0 to 3	5
4 to 10	10
>10	20

- **Associated Funding –** An indication of whether additional funding is available to a particular section.

  Scoring

Description	Score
None	0
Section 106	5
Section 278	5

- **Planned Works** – Following consultation with our stakeholders we will determine if any works are planned within the next two years. This option reduced any scoring given from the survey such that the scheme is deferred into the future .

  Scoring

Description	Score
None	0
Yes	-200

Carriageway Prioritisation Calculation

The final prioritised score is based upon the answers provided in above. Each of the items above are scored by local Engineers and consultants with experience across the uk. This chapter discusses the scoring and how the final prioritised score is obtained.

Carriageway Condition Score

The final condition score calculation is based upon the following formula: The maximum score for condition is 150.

∑ (%age of area affected VMST*1.2) + (%age of area affected VMFJ*1.2) + (%age of area affected VMCJ*1.0) + (%age of area affected VMCN*0.8) + (%age of area affected VMFN*0.6) + (%age of area affected VMSD*0.4)

Carriageway Site Location and Risk

The final condition score calculation is based upon the following formula:

Source	Type	Factor	Weighting	Max Score	Contribution
Site Questions	Service User	Ride Quality	1	10	10
	Condition	Amount of Patching	2	10	20
	Condition	Rate of Deterioration	2	10	20
	Condition	Immediate intervention	5	5	25
Network Data	Risk	Maintenance Hierarchy	4	5	20
	Risk	Resilient Network	2	5	10
	Service User	Public Complaints	1	20	20
	Condition	Job Tickets	1	10	10
	Consultative	Inspector Priority	2	20	20
Total Contribution to overall score					155

Final Carriageway Scheme Score Calculation

The final prioritised score is calculated using the following formula. Max available score is 248

Final Prioritised Score$_{(cway)}$ = ∑ ((Final Condition Score) + (final site location and safety score))

Appendix 2 – Footway Scheme Prioritisation

The budget allocation for footways is based upon the lifecycle planning ratio for the maintenance hierarchy being considered. The following paragraphs illustrate how the footway schemes are prioritised across the infrastructure network.

A footway scheme is highlighted by the network survey carried out in line with our Asset Condition & Service Inspection Policy document. These schemes, whilst have been derived from a survey of condition, do not deliver prioritisation, hence the Highway's Asset Management Team will follow this process.

Actual Footway Condition

Footway deterioration is measured by the following defect and are categorised by standard UKPMS defect definition, over each maintenance length the percentage of each defect within the length is calculated:

Footway Condition

- **Major Cracking (VMCJ)** – This is the percentage of the scheme area affected by cracking >2mm in width.

- **Major Fretting (VMFJ) –** This is the percentage of the scheme area affected by major fretting, Loss of material other than surface applied chippings from the surface course or potholing to the degree that the original surface course is no longer discernible OR loss of material from the surface matrix to a depth greater than 20mm. Major Cracking – This is the percentage of the scheme area affected by cracking >2mm in width.

- **Surface Deterioration (VMSD)** – This is the percentage of the scheme area affected by Surface Deterioration, which includes an excess of bituminous binder on the surface course, and/or loss of Surface Dressing, and or polishing / smooth surface.

- **Structural Deterioration (VMST) –** This is the percentage of the scheme area affected by Structural Deterioration, which includes rutting >15mm and/or Settlement >30mm and/or Wheel track cracking.

Footway Site Location & Risk

The following attributes are used to help prioritise the footway asset.

- **Footway Hierarchy –** The hierarchy structure already consists of many factors that should be considered for prioritisation. The hierarchy places significance to the section in terms of maintenance need and priority and therefore must be considered for overall scheme prioritisation.

  Scoring

Description	Score
Cat 1, Cat 2 or Cat 3	5
All remaining maintenance hierarchies	0

- **Member/Public Enquiries/Complaints –** An indication of the public's concern or impression relating to a section.

  Scoring

Description	Score
0 to 3	5
4 to 10	10
>10	20

- **Public Amenities –** Sections associated with schools or public buildings.

  Scoring

Description	Score
Yes	5
No	0

- **Hazards –** Highlighted footway section has hazards in them that pose a risk to the road/footpath user.

  Scoring

Description	Score
0 to 5 Safety Inspection defects recorded in past year	5
>5 Safety Inspection defects recorded in past year	10
Tree Root Damage	10

Footway Prioritisation Calculation

The final prioritised score is based upon the answers provided in above. Each of the items above are scored by local Engineers and consultants with experience across the UK. This discusses the scoring and how the final prioritised score is obtained.

Footway Condition Score

The final condition score calculation is based upon the following formula: The maximum score for condition is 150.

∑ (%age of area affected VMST*1.2) + (%age of area affected VMFJ*1.2) + (%age of area affected VMCJ*1.0) + (%age of area affected VMSD*0.4)

Footway Site location and Risk

The final condition score calculation is based upon the following formula:

Source	Type	Factor	Weighting	Max Score	Contribution
Site Questions	Service User	Public Amenities	1	10	10
	Condition	Hazards	2	10	20
Network Data	Risk	Maintenance Hierarchy	4	5	20
	Service User	Public Complaints	1	20	20
Total Contribution to overall score					70

Final Carriageway Scheme Score Calculation

The final prioritised score is calculated using the following formula. Max available score is 110

Final Prioritised Score$_{(fway)}$ = ∑ ((Final Condition Score) + (final site location and safety score))