

STRUCTURES LIFECYCLE PLAN 2010/11
PLANA CEARCALL-BEATHA STRUCTARAN
2010/11

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This document is an appendix of the Road Asset Management Plan 2010/11.

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Contents

Clàr-innse

Introduction	6
Ro-ràdh	6
1.0 Current Status	6
Inbhe Làithreach	6
1.1 Current Issues	6
Cùisean Làithreach.....	6
1.2 Current Asset Management Strategies.....	6
Ro-innleachdan Stiùiridh So-mhaoin Làithreach.....	6
2.0 The Asset	8
An t-So-mhaoin	8
2.1 Inventory.....	8
Clàr-cunntais	8
2.2 Asset Register	9
Clàr So-mhaoin.....	9
2.3 Asset Growth	10
Fàs So-mhaoin	10
3.0 Service Expectations	11
Dùilean Seirbheis	11
3.1 Customer Perceptions	11
Tuigse Luchd-cleachdaidh.....	11
3.2 Council Goals and Objectives.....	12
Amasan is Mion-amasan Comhairle	12
3.3 Use	12
Cleachdadh	12
3.4 Safety Considerations.....	12
Beachdachaidhean Sàbhailteachd	12
3.5 Public Utilities Activity	13
Gnìomh Ghoireasan Poblach	13
3.6 Third Party Claims	13
Tagraidhean Treas Pàrtaidh	13
3.7 Environmental Considerations	14
Beachdachaidhean Àrainneachd	14
3.8 Network Availability Considerations.....	14
Beachdachaidhean Comas Lìonraidh.....	14
3.9 Amenity Value Considerations.....	15
Beachdachaidhean Luach Goireis	15
4.0 Management Practices	16

Cleachdaidhean Stiùiridh.....	16
4.1 Policies	16
Poileasaidhean	16
4.2 Inspection Regime.....	16
Rèim Sgrùdaidh	16
4.3 Condition Assessment	17
Measadh Staid.....	17
4.4 Load Assessment	17
Measadh Luchd	17
4.5 Construction/Asset Acquisition	18
Togail/Buannachd So-mhaoin	18
4.6 Routine Maintenance.....	19
Cumail Suas Cunbhalach	19
4.7 Operational/Cyclic Maintenance	19
Cumail Suas Obrachail/Cearcallach	19
4.8 Planned Maintenance: Renewals	19
Cumail Suas Dealbhte: Ùrachaidhean.....	19
4.9 Disposal.....	19
Cur An Dàrna Taobh	19
5.0 Investment.....	21
Airgead an Seilbh	21
5.1 Historical Investment	21
Airgead an Seilbh gu h-Eachdraidheil.....	21
5.2 Output from Investment	21
Toradh bho Airgead an Seilbh	21
5.3 Forecasting Financial Needs	21
Ro-innse Feuman Ionmhasail.....	21
5.4 Valuation.....	22
Luachadh.....	22
6.0 Forward Works Programme	23
Prògram Obraichean Adhartach	23
6.1 Existing Programmes.....	23
Prògraman Làithreach	23
6.2 Programme Coordination.....	23
Co-òrdanachadh Prògram	23
6.3 Option Appraisal	23
Measadh Roghainnean.....	23
7.0 Risk.....	25
Cunnart.....	25
7.1 Risk Register	25
Clàr Cunnairt	25

8.0	Works Delivery and Procurement	26
	Libhrigeadh is Solar Obraichean	26
9.0	Performance Measurement	27
	Tomhas Coileanaidh	27
9.1	Performance Measurement	27
	Tomhas Coileanaidh.....	27
9.2	Performance Indicators: National	27
	Comharran Coileanaidh: Nàiseanta.....	27
9.3	Performance Indicators: Local.....	28
	Comharran Coileanaidh: Ionadail	28
9.4	Performance Reporting.....	28
	Aithris air Coileanadh.....	28
10.0	Future Strategies	29
	Ro-innleachdan Ama Ri Teachd	29
11.0	Service Improvement Actions	30
	Gnìomhan Leasachadh Seirbheis	30

Figures

Figearan

Figure 2.3.1: Blaiach Bridge	10
Figure 3.1.1: CRM Bridge Asset Data	11
Figure 3.8.1: Bridge Inspection: Road Over Rail	15
Figure 4.5.1: Braenock Bridge.....	18
Figure 8.1: Quebec Bridge Flood Damage.....	26
Figure 8.2: Quebec Bridge Replacement Completed	26

Tables

Clàran

Table 2.1.1: The Highland Council Road Structures Inventory.....	8
Table 4.4.1: Bridge Load Assessment Status	18
Table 4.6.1: Reactive repair prioritisation categories.....	19
Table 5.1.1: Historical Investment	21
Table 9.2.1: Highland Council Structures Statutory Performance Indicator Returns 2004/05 to 2008/09	27
Table 11.1: Improvement Actions (Structures).....	32

Introduction

Ro-ràdh

The general background to lifecycle plans is described in Section 6 of the Road Asset Management Plan (RAMP). This lifecycle plan covers road structures owned and maintained by The Highland Council.

A significant number of structures on the road network are the responsibility of other owners, such as Transport Scotland, Network Rail, British Waterways and so on.

1.0 Current Status

Inbhe Làithreach

1.1 Current Issues

Cùisean Làithreach

It has been identified that there is a need to obtain better information regarding the retaining wall asset in regard to condition, ownership and maintenance responsibilities.

The Highland Council is currently behind in its bridge assessment programme, due to lack of resource. It is also behind in its bridge inspection programme for the same reason.

Historically, there has been a significant lack of funding for maintenance of the road structures asset. This has caused a serious backlog of required maintenance and repair work.

1.2 Current Asset Management Strategies

Ro-innleachdan Stiùiridh So-mhaoin Làithreach

The Highland Council has a number of existing asset management strategies in regard to its road structures. These are:

- use of an asset management database (SMS, by WDM[®] Limited) to hold structures inventory and inspection information and records;

- inspection and reporting in accordance with the Bridge Condition Indicator (BCI) regime developed by the County Surveyors Society;
- adoption of the practices laid down in the Code of Practice “Management of Highway Structures”^(RS1);
- load assessment of bridges that carry Council roads (both Council owned and privately owned);
- strengthening and replacement of weak or worn-out structures, through a Capital Programme;
- repair and maintenance of damaged and deteriorated structures;
- working to an interim inspection regime with longer intervals;
- working towards a full Road Asset Management Plan, through the ongoing SCOTS project.

2.0 The Asset

An t-So-mhaoin

2.1 Inventory

Clàr-cunntais

The Structures Asset within The Highland Council comprises:

Type of Structure	Construction Material (primary structural element)	Number of Structures
Special / Listed Bridges	Masonry	83
	Steel Composite (concrete or timber)	4
	Reinforced Concrete	8
	Prestressed Concrete	0
	Timber	1
Bridges carry Road over Road	Masonry	1
	Steel Composite (concrete or timber)	6
	Reinforced Concrete	8
	Prestressed Concrete	0
Bridges carry Road over Rail	Masonry	7
	Steel Composite (concrete or timber)	2
	Reinforced Concrete	3
	Prestressed Concrete	12
Bridges carry Road over Water	Masonry	502
	Steel Composite (concrete or timber)	458
	Reinforced Concrete	779
	Prestressed Concrete	163
	Timber	16
Footbridges	All	7
Retaining Walls	All	767
Total Road Structures		2827

Table 2.1.1: The Highland Council Road Structures Inventory

The figures have been derived from database records, updated by inspection surveys, and are considered to be of good reliability, with approximately 80% of the records of bridges and culverts thought to be accurate. Retaining structures data is less reliable, but is considered to be sufficiently detailed in terms of location and structural form. Knowledge of ownership is incomplete for retaining structures and an improvement action to investigate this has been identified. (IA S1)

2.2 Asset Register

Clàr So-mhaoin

The definitive record of the road structures asset is the asset management database which is currently the Structures Management System (SMS) provided by WDM[®] Limited. (IA S2/3)

The information held in SMS comprises:

- Structure – name, number, reference, type, owner, maintaining agent, asset carried, obstacle crossed, status, last inspection, next inspection.
- Location – grid reference.
- Description – narrative description of structure, heritage type, access difficulties.
- Construction – structural form, primary material, secondary material.
- Superstructure – construction, end widths, waterproofing, parapet, end expansions joints, length, span count, end skew, manufacturer, largest square span, c/way width, deck area, parapet height, date installed.
- Substructure – bearings, end support, end material, intermediate support, intermediate material.
- Inspection Schedule – date last inspected and date next inspection due.

It is essential that SMS be kept updated with all additions, removals, renewals, inspections and works undertaken. (IA S4)

SMS is capable of producing works orders and recording works carried out. This functionality is not currently being used, but is expected to be operational in 2010. (IA S5)

Road structure drawings are held in the form of microfiche cards, with card details being stored in the CARMEN database.

2.3 Asset Growth

Fàs So-mhaoin

Over the course of time, the quantum of the road structures asset may be expected to change. Although some structures may be deleted as a result of stopping up, or by replacement of retaining walls with embankments, it is expected that the asset will grow as a result of new housing or industrial developments.



Figure 2.3.1: Blaich Bridge

3.0 Service Expectations

Dùilean Seirbheis

3.1 Customer Perceptions

Tuigse Luchd-cleachdaidh

Although The Highland Council undertakes performance surveys on all of its services, it does not specifically gather customer perceptions on road structures. (IA S6)

At present the reporting facilities available within the SMS database are not being fully utilised. (IA S5)

The current Customer Relationship Management (CRM) system was introduced in 2006. Data relating to the bridge asset is shown in Figure 3.1.1 below. It can be seen that a relatively small number of enquiries in the CRM system are received for the structures asset.

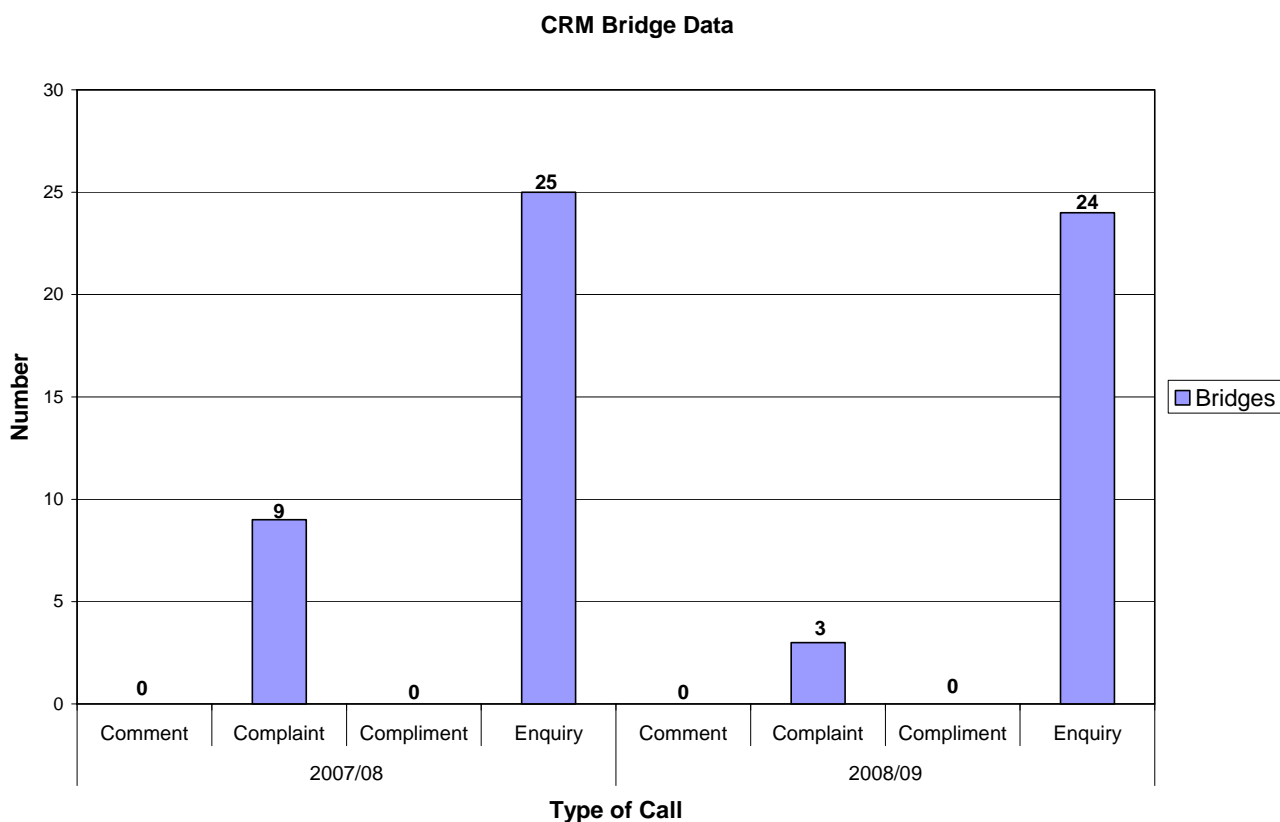


Figure 3.1.1: CRM Bridge Asset Data

3.2 Council Goals and Objectives

Amasan is Mion-amasan Comhairle

The Highland Council has identified a number of goals and objectives. These are identified in The Corporate Plan; The Programme for The Highland Council 2009 - 2011, Strengthening the Highlands which is available on the [Council website](#)^(RS2).

The Highland Council Local Transport Strategy (LTS) details the Council's vision for the transport network of which the road assets form a major part. At the time of writing this version of the RAMP, the Local Transport Strategy for Highland was under consultation.

3.3 Use

Cleachdadh

The Council's TEC Service keeps records of traffic volumes from a number of permanent and temporary counter sites. An improvement action to identify and collate data for a sample of sites across the Highland area has been included to allow traffic growth to be monitored. (IA S7)

The majority of heavy vehicle (HGV) traffic is expected to occur on the principal roads; however there are a number of unclassified routes where significant volumes of HGV vehicles are present and this may require further investigation and the adoption of a revised maintenance treatment regime. Identification of those sites with an HGV percentage greater than 20% has been included as an improvement action. (IA S8)

It is anticipated that the existing traffic levels will remain steady or will slightly increase, for the foreseeable future.

3.4 Safety Considerations

Beachdachaidhean Sàbhailteachd

Safety of road structures is a major aspect of their management and maintenance. Load assessments and regular inspections of the structures can highlight problems that require rectification or imposition of safety measures,

such as the implementation and enforcement of weight or lane restrictions. Structural assessments undertaken on the Authority's bridges result in the application of appropriate safety measures where required.

Accident statistics for the structures asset are recorded with all other road accidents and are not identified separately.

Although records do exist of third party claims associated with roads, those associated with structures are not specifically recorded (see [section 3.6](#)). The records that do exist are not used to assess specific problem areas that may be improved using good asset management. ([IA S9](#))

3.5 Public Utilities Activity

Gnìomh Ghoireasan Poblach

Public Utilities activity can have a major impact on the maintenance and management of the structures asset. Where new services are required or refurbishment of existing services is undertaken, this can have a major impact on the availability of the structure and the road it carries. In addition, when maintenance work on the structure is undertaken this can require disturbance and even diversion of the services carried by the structure, with a very large additional cost implication for the scheme.

The Council is encouraging statutory undertakers to put services within a structure rather than attaching them to the external walls and soffits.

However, where utility apparatus runs through a structure it can be a cause of water ingress; in order to alleviate this problem the Council now requires that drainage chambers be constructed wherever a service enters a structure. ([IA S10](#))

3.6 Third Party Claims

Tagraidhean Treas Pàrtaidh

Claims against the Council, by third parties, are not currently identified as being associated with any particular road structure.

Recovery of costs from third parties (resulting from damage to Council structures) is not recorded centrally. (IA S9)

3.7 Environmental Considerations

Beachdachaidhean Àrainneachd

The Highland Council is aware of a number of its structures that are within or adjacent to sites of particular environmental classification (eg. SAC, SSSI etc). Numerous structures are Listed, or lie in the environs of other Listed properties.

In addition, works on bridges may be affected by the presence of bats, otters or other creatures, requiring surveys and, in some cases, a licence to work. Restrictions on types of work, materials used and timings of work, may be applicable.

The Scottish Environmental Protection Agency (SEPA) is responsible for maintaining and improving the environment and regulating environmental emissions. It has a duty to discharge its functions to protect and enhance the environment and to promote conservation and recreation.

The Water Environment (Controlled Activities) (Scotland) Regulations 2005^(RS3) apply to any works on Structures that are over or adjacent to a watercourse and imposes a requirement upon the Council to notify SEPA of all works on such structures, based on a number of criteria, and for a licence to be granted where appropriate.

3.8 Network Availability Considerations

Beachdachaidhean Comas Lìonraidh

There are a number of streets designated as traffic sensitive within the Highland area. However, those which have structures present have not been formally identified. (IA S11)

There are many structures on Council roads that are the sole access to communities or businesses, which have specific closure requirements. These will be identified as data management progresses. (IA S3)

Additionally, works over railways or navigable waterways are subject to restrictions imposed by the rail or waterway authority.



Figure 3.8.1: Bridge Inspection: Road Over Rail

3.9 Amenity Value Considerations

Beachdachaidhean Luach Goireis

The Council does not currently have a formal policy in regard to construction or material standards for differing amenity areas. Some works require planning permission, and there is recognition that all works should be in keeping with the local area and in particular, that works on heritage or Listed structures may require formal consent and consultation with Historic Scotland or Scottish Natural Heritage.

Consider development of a suitable Policy. (IA S12)

4.0 Management Practices

Cleachdaidhean Stiùiridh

4.1 Policies

Poileasaidhean

In common with other authorities, The Highland Council has “policies” that are not, in fact, documented Council policies; rather they are custom and practice that has been taken to be Council policy.

There are a number of areas where policies relating to the management of the structures asset need to be developed. These will be identified and undertaken as necessary throughout the development of the RAMP. (IA S13)

Suggested areas for development are:-

- Identifying the standard to which stock can be maintained for the available budget allocation.
- Maintaining and enhancing, where appropriate, the existing road network to allow adequate transportation of road freight.
- Use of sustainable construction methods and materials.
- Development of asset management techniques to facilitate a long term strategic approach to the maintenance and renewal of structures.

Once complete the policy documents will be available on the Council's website.

4.2 Inspection Regime

Rèim Sgrùdaidh

Bridge inspections are carried out in accordance with the guidance and recommendations of the Code of Practice “Management of Highway Structures”^(RS1) (the ACoP). Current inspection intervals are greater than those recommended in the ACoP. (IA S14)

In some cases, where specific monitoring of condition may be important, inspection intervals may be reduced.

The results of these inspections are recorded and held in SMS. These records are used to determine the reactive work requirements.

4.3 Condition Assessment

Measadh Staid

Inspection findings produce Bridge Condition Indicator (BCI) values, as recommended within the ACoP. ([IA S14](#))

Taken in total for the whole structures stock, average (BSClav) and critical (BSClcrit) values are obtained which may be used, over time, to gauge improvement or deterioration in the road structures stock condition.

4.4 Load Assessment

Measadh Luchd

Load assessment of bridge structures is undertaken to establish safe working vehicular loading.

Ad hoc load assessments may be required where exceptional use, or the movement of abnormal indivisible loads (AIL) are proposed.

Also, for bridges not designed to modern Standards, a programme of load assessment has been ongoing since 1989, to determine whether bridges achieve “Construction and Use” capacity (currently 40/44 Tonnes). Where bridges fail to achieve this assessed capacity, they are considered for strengthening/replacement or monitoring, or may have a restriction placed on their use.

[Table 4.4.1](#) below, shows the current assessment status of the bridge stock.

Group of Bridges	Number
Bridges which have either passed their load assessment or have been strengthened/replaced or have been permanently restricted	532
Bridges subject to temporary weight restriction, in lieu of strengthening	8
Bridges which still require strengthening or replacement	255
Bridges which still require load assessment	641
Bridges not in the assessment programme	617
Total	2053

Table 4.4.1: Bridge Load Assessment Status

4.5 Construction/Asset Acquisition

Togail/Buannachd So-mhaoin

New assets are typically acquired through road adoption, or through improvement works completed by the Council, or from developers acting through road construction consents. Design and construction standards for new or altered structures are enforced through the Technical Approval process operated by the Structures Section of TECS. [\(IA S15\)](#)



Figure 4.5.1: Braenock Bridge

4.6 Routine Maintenance

Cumail Suas Cunbhalach

Routine reactive repairs that are identified during the bridge inspection process are prioritised using the engineering judgement of responsible officers. The prioritisation categories are shown in [Table 4.6.1](#).

Category	Description
Emergency	Works undertaken as soon as physically possible, structure may be restricted or closed until works are undertaken.
Urgent	Works undertaken as soon as practical, based on financial and resource availability.
High	Works programmed for completion within 24 months wherever possible, subject to financial constraints.
Medium	Structures monitored or works undertaken in conjunction with any works identified above.
Low	Note placed on file and subject to additional review during next scheduled inspection.

Table 4.6.1: Reactive repair prioritisation categories

4.7 Operational/Cyclic Maintenance

Cumail Suas Obrachail/Cearcallach

Cyclic maintenance on structures is usually undertaken as part of cyclic carriageway works. This would include clearing drainage channels and minor pothole repairs. There is no set timetable for cyclic maintenance.

4.8 Planned Maintenance: Renewals

Cumail Suas Dealbhte: Ùrachaidhean

The Council has identified a number of planned activities that are available for the cyclic maintenance and renewal of the structures asset. Activities and indicative costs, relating to industry recommended standards, will be produced as the lifecycle process develops. ([IA S16](#))

4.9 Disposal

Cur An Dàrna Taobh

The disposal of structure assets is relatively rare from the perspective of a Council disposing of all responsibility for the structure. However there have been a few occasions where the enforced redundancy of a length of

carriageway or footway due to the introduction of a new route, for example, has resulted in a “stopping up” order being invoked with the structure and its ongoing maintenance liabilities reverting to the responsibility of the adjacent land owners. In such circumstances it is the responsibility of the Council to ensure that the structure is of an adequate standard prior to its disposal.

Other instances may be where water courses have been diverted or dried up naturally and the structure is in-filled, often with the provision of a drainage pipe, such that the structure becomes part of the carriageway or footway.

At present the Council has no formal procedure for determining when a structure should be disposed of. [\(IA S17\)](#)

5.0 Investment

Airgead an Seilbh

5.1 Historical Investment

Airgead an Seilbh gu h-Eachdraidheil

The actual Capital historical investment from the Roads maintenance budget for the last 5 years is detailed below.

Cost Category	2004/05	2005/06	2006/07	2007/08	2008/09
Capital	£000s	£000s	£000s	£000s	£000s
Capital Structures - Bridges	264	625	2,070	613	931

Table 5.1.1: Historical Investment

Revenue and safety related expenditure relating to structures are not specifically separated from the overall road maintenance budget headings used.

Capital scheme budgets can be spread over a number of years depending on the size and nature of the project. Therefore, Capital expenditure for a specific year should not be directly related to the output for that year.

5.2 Output from Investment

Toradh bho Airgead an Seilbh

Detailed information relating to the output from investment is not currently available. ([IA S18](#))

5.3 Forecasting Financial Needs

Ro-innse Feuman Ionmhasail

The Highland Council does not have a formal process for establishing the ongoing, long term, budgetary requirements for the maintenance and management of the structures asset. ([IA S19](#))

As discussed in [section 4.8](#), the budget required to fund different levels of service will be produced as part of the lifecycle process. ([IA S16](#))

The exercise will identify the annual investment required in order to maintain the asset to the industry recommended standards. However, existing available funding may be limited and the Council will have to identify a maintenance regime that they believe will be sufficient to maintain the asset to an acceptable standard.

5.4 Valuation

Luachadh

An exercise to calculate the value of the structures asset has been initiated. The Council's Structures Section has estimated a Gross Replacement Cost (GRC) value of £515,000,000 (£515 million) for its road structures. This is based on data in the asset management database and unit replacement costs calculated from historic rates. The valuation summary is contained in appendix E.

The valuation will be developed as data is collated. Further information will be included in future versions of the RAMP. ([IA S20](#))

6.0 Forward Works Programme

Prògram Obraichean Adhartach

6.1 Existing Programmes

Prògraman Làithreach

The Council's current Capital Programme was approved in 2006. At the time of writing this document, the Council was reviewing the Capital Programme with the objective of producing a 10 year programme. ([IA S21](#))

6.2 Programme Coordination

Co-òrdanachadh Prògraim

There is currently no formal process to co-ordinate works programmes within the Council. Co-ordination is undertaken on an ad hoc basis between elements of the Service.

An improvement action has been identified to investigate the creation of a co-ordinated programme of works which incorporates all of the individual asset groups. ([IA S22](#))

6.3 Option Appraisal

Measadh Roghainnean

The identification of the appropriate treatment required at an individual location is based at present on the engineering judgement of the responsible officer rather than on any set criteria.

A project prioritisation process has been developed which is used to assess the different project options available, within the allocated budget.

At a higher level the identification of budget allocation against the different works streams is mainly based upon the level of historic investment in that treatment type rather than by using a process to identify the best use of monies over a long period.

It is the intention of the authority to develop a process to consider how options are identified and appraised for this asset group including consideration of whether it is better value to invest in:

- different available maintenance treatment options,
- maintenance or asset improvement works,
- routine maintenance or planned renewals,
- asset options against “non asset options” e.g. demand management,
- preventative maintenance as opposed to corrective maintenance activities and
- renewal of asset components or full asset replacement.

(IA S23)

7.0 Risk

Cunnart

Risk management is a systematic approach to identifying and dealing with the risks that threaten our plans and projects and impact upon the continuation of service delivery.

The Council's Strategy for Risk Management considers "intelligent management of risk". That is to say, trying to understand the likelihood and impact of future events, be they favourable or unfavourable, in order to maximise future performance.

Risk management involves understanding the things that could help or hinder efforts to deliver objectives. Evaluation and management of risk may be summarised in the questions:

- What is the worst that could happen?
- What is the likelihood of it happening?
- What would be the impact if it did happen? and
- What can be done about it? (i.e. how can it be prevented from happening; or what can be put in place to manage it, if it should happen?)

To this end, The Highland Council has developed a risk management framework, the purpose of which is to define in a controlled way how risks and opportunities will be handled. The framework provides information on roles and responsibilities, and processes and procedures. It sets the context in which risks are identified, assessed, managed and reviewed.

7.1 Risk Register

Clàr Cunnairt

A risk register for the structures asset has yet to be developed. ([IA S24](#))

8.0 Works Delivery and Procurement

Lìbhrigeadh is Solar Obraichean

Small works are undertaken by Council labour or are placed with individual contractors, selected from an approved list based on; appropriate skilled personnel for the work being undertaken, resource availability, and an estimate of price based on a time and material evaluation.

For larger schemes works are tendered using the processes set down within The Highland Council Standing Orders.



Figure 8.1: Quebec Bridge Flood Damage



Figure 8.2: Quebec Bridge Replacement Completed

9.0 Performance Measurement

Tomhas Coileanaidh

9.1 Performance Measurement

Tomhas Coileanaidh

Statutory and local performance indicators are reported in the TEC Services Quarterly Performance Review.

The Highland Council is taking part in the development of relevant local performance indicators, through the SCOTS RAMP project.

9.2 Performance Indicators: National

Comharran Coileanaidh: Nàiseanta

Those SPIs that are relevant to the structures asset are:

Performance Indicator	2004/05	2005/06	2006/07	2007/08	2008/09
Percentage of all bridges failing European Standard	32.63	32.42	31.41	30.82	31.31
Number of Council bridges with a weight or width restriction	6	8	4	5	7
Percentage of Council bridges with a weight or width restriction	0.83	1.10	0.55	0.66	0.89
Number of private bridges with a weight or width restriction	2	1	1	1	1
Percentage of private bridges with a weight or width restriction	5.41	2.5	2.5	2.5	2.5
Total number of bridges with a weight or width restriction	8	9	5	6	8
Percentage of all bridges with a weight or width restriction	1.06	1.18	0.65	0.75	0.97

Table 9.2.1: Highland Council Structures Statutory Performance Indicator Returns 2004/05 to 2008/09

9.3 Performance Indicators: Local

Comharran Coileanaidh: Ionadail

As stated in [section 9.1](#), local performance indicators and appropriate targets will be developed as part of the SCOTS project. ([IA S25](#))

9.4 Performance Reporting

Aithris air Coileanadh

TEC Services performance indicators are reported to Senior Management at the Quarterly Performance Review. SPIs are also reported annually to Audit Scotland. All Council performance indicators are published publicly.

10.0 Future Strategies

Ro-innleachdan Ama Ri Teachd

Documenting a lifecycle plan should enable the evolution of improved strategies for the management of the asset. Focusing on better long term outcomes may identify a need to invest in different treatments or in different parts of the asset. ([IA S26](#))

11.0 Service Improvement Actions

Gnìomhan Leasachadh Seirbheis

Number	Action	Proposed Implementation Date	Responsibility
IA S1	Investigate methods for obtaining ownership data in relation to retaining walls.	TBC	TBC
IA S2	Complete the population of the road structures database "SMS" with structures information.	TBC	TBC
IA S3	Develop an asset information and records strategy to determine the information required to be held, the information currently held, where and in what format, the missing information, the collection methods for the missing information and any proposed changes to the storage method.	TBC	TBC
IA S4	Develop & implement a formal data management procedure to ensure updating of the asset register and notification of changes to appropriate parties.	TBC	TBC
IA S5	Consider what features of SMS are currently underused and develop procedures for their development, as may be required.	TBC	TBC
IA S6	Develop a customer survey questionnaire appropriate to the structures asset.	TBC	TBC
IA S7	Identify and collect traffic data for a sample of sites across Highland.	TBC	TBC
IA S8	Identify sites with HGV presence >20%.	TBC	TBC
IA S9	Develop a method for collecting accident and third party claim data associated with the structures assets.	TBC	TBC

Number	Action	Proposed Implementation Date	Responsibility
IA S10	Monitor Public Utilities' compliance with Council requirements for installation of plant/ducts at road structures	TBC	TBC
IA S11	Identify the traffic sensitive streets which have structures present.	TBC	TBC
IA S12	Consider a formal policy in regard to construction or material standards for differing amenity areas.	TBC	TBC
IA S13	Complete the review and develop identified policies.	TBC	TBC
IA S14	Work towards intervals between inspections that match those recommended in the ACoP.	TBC	TBC
IA S15	Develop a procedure to assess the ongoing maintenance liability of new assets and ensure these figures are included within the design calculations or added to the service business plan.	TBC	TBC
IA S16	Develop indicative costs of planned maintenance activities.	TBC	TBC
IA S17	Develop a formal procedure for determining when the authority should dispose of a structure.	TBC	TBC
IA S18	Establish process to record outputs from investment.	TBC	TBC
IA S19	Develop a formalised process for establishing the ongoing, long term, budgetary requirements for the maintenance and management of the structures asset.	TBC	TBC
IA S20	Complete the valuation of the structures asset as part of the SCOTS asset management project.	TBC	TBC

Number	Action	Proposed Implementation Date	Responsibility
IA S21	Develop a long term programme of works required, and link to the financial need projections (IA S19).	TBC	TBC
IA S22	Investigate development of a formal process for creating a co-ordinated works programme made up of appropriate schemes from each of the individual asset groups.	TBC	TBC
IA S23	Develop a process to consider how maintenance options are identified and appraised for structures.	TBC	TBC
IA S24	Develop an asset specific risk register.	TBC	TBC
IA S25	Review the Local Performance Indicator requirements for structures and identify appropriate measures and targets.	TBC	TBC
IA S26	Identify future management strategies and update the LCP accordingly.	TBC	TBC

Table 11.1: Improvement Actions (Structures)