Highways Agency Environmental Performance: Above the waterline…

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Abstract

The Highways Agency, an executive agency of the UK's Department for Transport, is responsible for operating, maintaining and improving the strategic road network in England. Performance indicators have been developed that measure the Highways Agency's delivery of the UK Government's objectives for transport.

The Highways Agency has advice and procedures for environmental survey, assessment and reporting informing and influencing road scheme design through the entire project planning process from conception to implementation. Regulators, interested parties and society have the opportunity to contribute to impact assessment and influence the project appraisal findings. To date, beyond informing design and investment decisions on individual projects, little use has been made of the growing database of project appraisal information. Furthermore, despite environmental indicators having a strong correlation with the delivery of desirable outcomes, the business has focussed on output measures delivering targeted positive interventions. This paper outlines a proposal for better data analysis and the development of outcome environmental performance measurement within the Agency illustrating the extent to which appraised proposals coming forward are addressing the delivery of environmental sub-criteria. When viewed over a number of years, this will illustrate the business' environmental performance trend.

The primary objectives of the proposals are to derive an approach embracing the whole canvas of the Highways Agency's works on the network: environmentally targeted investments; overall performance of road improvements; and, long-term prudent custody of the highway. To report predicted environmental impacts of all improvement schemes, there are inordinate ways in which appraisal data could be analysed and viewed. Careful selection of graphics can be used to convey quite complex messages to interested stakeholders. This paper, by drawing on the appraisal of Agency's major improvement programme and local network schemes, illustrates the concept of performance against a "waterline" and explores future business monitoring applications.

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INTRODUCTION

This paper outlines a proposal for the further development of environmental performance measurement within the Highways Agency. The main objective of the proposal is to derive an approach that can embrace the whole canvas of the Highways Agency's works on the network. Particular focus is on the ability to adopt the environmental consequences of the Agency's entire improvement programme.

The Highways Agency is an executive agency of the Department for Transport (DfT) and is responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State for Transport. The Agency has a major role in delivering the Government's ten-year plan for transport.

The Highways Agency's road network statistics
(Source (unless otherwise stated): Transport Statistics 2003)

Length	8,255km/5,130 miles[1]
Types	Trunk roads, including motorways
Percentage of total road length in Great Britain	2%
Road traffic carried (as % of all Kilometres travelled in Great Britain)	31%
Total length of journeys undertaken annually	151 billion vehicle kilometres/ 94 billion vehicle miles

[1] Source: as at 31 March 2003 (2002-03 Highways Agency Annual Report and Accounts)

England's motorway and trunk road network is the country's greatest single transport asset, valued at £65 billion. The strategic road network has been divided into 'core' and 'non-core' roads and comprises approximately 2% of UK's roads – about 8,255 km (5,130 miles) out of a total of 300,000km (186,000 miles) - but carries nearly a third of all traffic and two thirds of all freight. The purpose of the core network is to provide reliable and safe long-distance journeys, linking the main centres of population as well as improving accessibility to the peripheral regions, major ports, airports and rail terminals. The remaining non-core network is being transferred to local highway authorities ('detrunked'). These routes service local and regional needs and are more appropriately managed by local authorities.

The Highways Agency's annual budget is £1.7 billion, and that is spent on construction, safety improvements and making the best use of our roads - with important new initiatives like the traffic officer service. The Agency's road network provides a vital service to commerce and industry and has a huge impact on the lives of individuals and communities. It comprises various types of roads ranging from motorways carrying 200,000 vehicles per day to single carriageway trunk roads carrying fewer than 10,000 vehicles per day.

The Agency recognises the need to maintain a balance between a responsibility to develop and operate the strategic road network effectively and responsibilities to the needs of neighbouring communities and the wider environment. The Agency does this by integrating environmental considerations into all its network improvement work. Where aspects of environmental performance have been identified for improvement, it has instituted specific programmes such as that to reduce traffic noise through quieter road surfaces. The strategic road network also plays a role in the support of wider environmental polices, for example in support of the UK's biodiversity and air quality strategies. The Agency has implemented its environmental strategy, which promotes

the use of low noise surfacing, recycled materials in road construction and environmentally friendly lighting. In 2003, the Biodiversity Action Plan was implemented, which delivers improvements for habitat and species throughout the network.

Challenging but achievable performance measures are agreed with Ministers each year. Performance is reported to Parliament in an annual report, which can be found on our website, www.highways.gov.uk. These annual measures complement the longer-term strategic role of supporting the Government's ten-year plan for transport, in providing a safe, un-congested network, and provide milestones in measuring our progress in its delivery. Key performance measures, comprising the indicators and targets set by Ministers

HISTORY

Measurement of the Highways Agency's environmental performance using dedicated indicators was first introduced in 1999 for the 2000-01 business plan. The indicator was built from the contribution to targets across four environmental topics.

Indicator:
The % achievement of the average annual target based on the environmental programme.

The target for 2000/01 is:
To achieve an average annual target of 85% across the four environment programme sub-indicators.

This indicator provides a broad measure of the Agency's environmental activities. During 2000/01, the indicator will cover:

- *Noise, where we aim to treat at least 10 sites from the list published in Hansard on 11 November 1999, and to spend the full £5m budget on cost effective schemes*
- *Air quality, where we aim to respond to 95% of consultations on local air quality plans in accordance with local authority review and assessment programme timescales*
- *Biodiversity, where we aim to have 10% by length of the network under active bio-diversity management by 31 March 2001*
- *Landscape, where we aim to have 25% by length of the network under active landscape management by 31 March 2001.*

Highways Agency 2000-01 Business Plan

It is worth noting that the nature of the measurements with in each target varies with the topic. The noise indicator concerns delivery of priority actions at identified locations on the network. The local air quality measure is quite different, focussing on the Agency's contribution to supporting the local authorities in England with their formulation and review of local air quality plans. The biodiversity and landscape

components, while different to the previous topics, are consistent with each other. Namely, they are both concerned with the 'active management' of the network in an informed and positive manner.

The development of this indicator took place within a wider cross government focus on performance management and great debate about how this should be achieved. The indicators were also considered against the background of the `Quality of Life Counts' publication, which provided the performance indicators to track progress in delivery of the UK Sustainable Development Strategy `a better quality of life'.

An ambition was declared to expand this set of indicators to reflect the themes within the Highways Agency's environmental strategic plan `Towards a Balance with Nature'. This would have given coverage in the additional areas of waste, water management, heritage and procurement. For the following year the indicator remained the same but with a more demanding targets.

Indicator:
The % achievement of the average annual target based on the environmental programme.

Target:
To achieve an average annual target of 90% across the four environment programme sub indicators.

These are:

- *Noise*
- *Air quality*
- *Biodiversity*
- *Landscape*

Highways Agency 2001-02 Business Plan

These indicators were used for the business years 2000-01 and 2001-02. Even from the brief extracts above, it can be seen that in only the second year the outward explanation of the components building the target are missing. While these were specified within the Agency, the disappointing outturn at the end of the year was a delivery of the target, but in a manner that the Agency was, "unable to validate the achievement of this target" (Highways Agency Annual Report and Accounts 2001-02).

Indicator:
% of the average annual target based on the environmental programme.

Target:
Achieve an average of 95% across the four environmental sub-indicators:

- *Noise: The Agency will treat at least a further three sites from the list published in Hansard on 11 November 1999.*
- *Air quality: The Agency will respond to 95% of consultations on local air quality plans in accordance with local authority review and assessment programme timescales.*
- *Biodiversity: The Agency will have 60% by length of the network under active biodiversity management by 31 March 2003.*

- *Landscape: The Agency will have 85% by length of the network under active landscape management by 31 March 2003.*

Highways Agency 2002-03 Business Plan

Positively, the indicator had remained consistent for three business years with increasing targets set in each year. This establishes and maintains a business focus. During this period however, a number of issues were raised both internally and in technical press. These revolved around clarity and transparency, which could be summarised as: -

i. Lack of guidance on precise meaning of component performance indicators;
ii. Concern regarding the concept of a `built indicator' particularly the unseen sums involved in determining the overall percentage;
iii. Variable appeal, acceptance and adoption both across the Agency and with its environmental partners; and,
iv. Concern that indicators were not outcome based.

In addition, the local air quality description was now time expired, local authorities by now had completed their review and assessment procedures. The Highways Agency too had now published its Biodiversity Action Plan that set clear priority targets for certain species and habitats associated with the trunk road network in England. During 2002 also, the focus of this debate became the issue of performance measurement expressed as outcomes. With this objective in mind, a revised set of performance measures was derived as set out below.

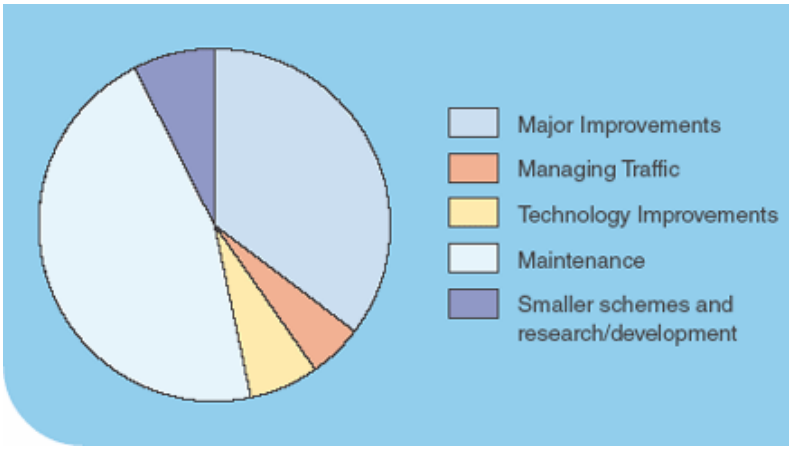
Indicator and target:
Average achievement, at least 95%, across the following five sub-indicators:

- *Improve air quality of at least 4 sites in Air Quality Management Areas*
- *Achieve at least 12% of Biodiversity Action Plan, extending across 15 targets*
- *Introduce no less than 8 planting schemes to enhance the landscape*
- *Treat at least 300 lane kms of concrete road surface with lower noise surfacing*
- *Treat at least 2 pollution risk water outfall sites.*

Highways Agency 2003-04 Business Plan

In 2003-04 business plan, there were some significant changes to the components within the environmental performance indicator even if the general appearance was similar to the previous years. Gone are administrative and management measures (although the active network management is being tacked within the business) and here is a clear focus on positive outputs. These focus on interventions on the network targeted at particular environmental problems or opportunities for improvement. These too have a strong correlation with the delivery of desirable outcomes. Focussing on benefits within local air quality management areas delivers benefits for populations at the highest risk from local air quality incidents. Similarly, the biodiversity and, new, water target focus on independently established priorities.

It is now recognised that this pursuit of outcome measures has led to a very partial focus on the breadth of the Highways Agency's activities measuring only easily visible outputs. Predominantly these outputs are delivered by technology and smaller schemes. This represents only a small part of the Highways Agency's overall activity as described on the graphic below.



Highways Agency 2004-05 Business Plan

The strengths of the current system are its clarity of purpose, ease of measurement and the delivery of very specific interventions on the network targeted at particular environmental problems/opportunities. The indicators and updated targets will be used to measure our 2004-05 performance. These focus on interventions on the network targeted at particular environmental problems or opportunities for improvement.

POSSIBLE FUTURE DEVELOPMENT

For the future, it is possible that the Highways Agency should move to a performance measurement that reflects a far greater part of the Agency's work and will continue to develop these measures in the coming year. Drawing on the established procedures for appraisal, the Agency will be analysing the extent to which all its network improvement projects will deliver the Government's environmental objectives for transport investment.

The proposal therefore has three strands:

1. **Performance in the delivery of targeted interventions.** This largely reflects activities pursued through the Highways Agency's technology and smaller schemes programme of works.

2. **Programme wide analysis of expected delivery against the environmental appraisal sub-objectives.** Characterising the delivery of the Agency's overall road investment via the investment appraisal process

3. **Network wide analysis of the Agency's highway estate.** Characterising the changing state of the highways asset from an environmental perspective via the application of an environmental database.

Strand 1: Performance in the delivery of targeted interventions

This is essentially a continuation of the current indicator measures. Continuation of this approach recognises a desire to bring some stability to the performance measurement process through bringing some continuity to the definition of at least some indicators. Specific targets for the environmental components are set annually. Additional topics could be added over the current five e.g. heritage or greenhouse gases.

The proposal therefore retains the existing five part built indicator, noting that the in year targets will vary with the budget/programme possibilities. This would allow the business to develop efficient monitoring systems and facilitate the development of longer-term trend information.

Strand 2: Programme wide analysis of expected delivery against the environmental appraisal sub-objectives

Under the Highways Agency's project appraisal procedures, every improvement project with a cost exceeding £100K is subject to appraisal against a common framework of objectives from the Department for Transport's, 'New Approach to Appraisal' (NATA). Appraisal is the process of assessing the worth of a course of action. Transport appraisal is carried out to provide input to efficient policy development and resource allocation across government. To be effective, transport appraisal must deal consistently with competing proposals, be even-handed across modes and take account of a wide range of effects.

Throughout the NATA process, the Government's five objectives for transport are central:

- *Environmental* impact involves reducing the direct and indirect impacts of transport facilities on the environment of both users and non-users. There are 10 sub-objectives including noise, atmospheric pollution of differing kinds, impacts on countryside, wildlife, ancient monuments and historic buildings;
- *Safety* is concerned with reducing the loss of life, injuries and damage to property resulting from transport incidents and crime. The two sub-objectives are to reduce accidents and improve security;
- *Economy* is concerned with improving the economic efficiency of transport. The five sub-objectives are to improve economic efficiency for consumers and for business users and providers of transport, to improve reliability and the wider economic impacts, and to get good value for money in relation to impacts on public accounts;
- *Accessibility* is concerned with the ability with which people can reach different locations and facilities by different modes; and
- *Integration* aims to ensure that all decisions are taken in the context of the Government's integrated transport policy.

The appraisal framework in NATA is made up of four distinct parts:

- Appraisal Summary Table (achievement of Government objectives)
- Achievement of regional and local objectives
- Effectiveness of problem solving
- Supporting analyses

These four parts when considered together provide the decision-maker with the information needed to reach a considered judgement on the worth of a project. An important element of the NATA is the inclusion of the Appraisal Summary Table (AST). This is a one page tabular summary setting out simply and concisely the key consequences of different options for tackling a particular problem using the five objectives. Some of these objectives have been divided into a number of sub-objectives, reflecting the wide variety of impacts arising from transport projects.

The AST has space to record the impacts of the project under the following positive environment objective and sub-objectives:
Environment - to protect the built and natural environment

- to reduce noise,
- to improve local air quality
- to reduce greenhouse gases
- to protect and enhance the landscape
- to protect and enhance the townscape
- to protect the heritage of historic resources
- to support biodiversity
- to protect the water environment
- to encourage physical fitness
- to improve journey ambience

The main impacts in relation to each of the sub-objectives are summarised in text with any relevant quantified information. A summary assessment is then given to indicate whether the impact in each category is generally beneficial or adverse and how large it is. Where impacts can be quantified, the summary assessment is quantitative. Impacts that cannot be quantified are assessed on a (usually) seven-point textural (descriptive) scale.

To date beyond informing design and investment decisions on individual projects, little use has been made of this growing potential database of appraisal information. Under this strand, it is proposed that each year at a prescribed time(s) all this appraisal information is brought together to provide a characterisation of the Highways Agency's improvement programme at an aggregate level. Viewed over a number of years this will provide trend information as to the extent to which appraised proposals coming forward in the Agency's programmes are addressing the delivery of the environmental sub objectives.

If this approach and the generated data are considered against the criticism of the recent environmental performance indicator, arguably the main points of disapproval are addressed.

i. Concerning the lack of guidance, the data source is established (from 1998) and well embedded into the project design and assessment process. The guidance on New Approach To Appraisal for highways projects has until recently been incorporated in the Guidance on the Methodology for Multi-Modal Studies (GOMMMS) and its supplements/annexes together with, 'Applying the Multi-Modal New Approach to Appraisal to Highway Schemes: The Bridging Document'. The recently introduced DfT WebTAG (Web Based Transport Analysis Guidance) now provides up to date guidance, including on the NATA.

ii. There is complete openness of the data and its presentation (assuming the adoption of the presentation methods outlined below) therefore the focus of

performance is on the outcomes rather than the tool constructing them.

iii. Addressing wider appeal and acceptance would remain a challenge for the Highways Agency not least owing to the nature of its business and the diversity of environmental stakeholders. However, the English statutory advisors to government (Countryside Agency, English Nature, English Heritage and the Environment Agency) were all co-authors of the NATA. As such, they have invested in its drafting, adequacy and positive objectives.
The assessment scores established by following an open and transparent procedure. The NATA is embedded in national and local transport analysis guidance so has very wide penetration and understanding with non-government organisations, environmental stakeholders and the public in general. For the Highways Agency's project managers and highway design consultants, they are constantly working with the appraisal process. The NATA is the framework for establishing overall value for money and headline source of data for investment decisions. Data for the performance measure is omnipresent.

iv. Finally, considering the quest for outcome based performance. The limitation of the appraisal assessment scores is their forecasting status. The *actual* outcome, effect on the environment would not be known until the project is constructed, operational and established. This of course would be a failing of any assessment and appraisal process, including environmental impact assessment. The aspiration is that this strand of the performance measure would nevertheless capture the outcome of all the Highways Agency's capital infrastructure investment capturing the forecast outcomes for a full half of the financial investment in the trunk road network.

Appraisal data could be analysed and viewed to study trends in potentially very many ways. Careful selection of graphics can be used to convey quite complex messages and is a technique in external corporate reporting including Government. The environmental data from the AST takes three forms:

- Qualitative (descriptions of significant issues on a given scheme)
- Quantative (numerical values of the impact)
- Assessment Score (as noted above, this has: a money value where possible; a quantified value where numbers exist; or, a textural descriptive score. The seven point assessment score scale: Large Adverse, Moderate Adverse, Slight Adverse, Neutral, Slight Beneficial, Moderate Beneficial and Large Beneficial).

The qualitative descriptions, while essential in the appraisal and decision making process, do not readily transfer themselves to performance process aimed at demonstrating a combined or cumulative outcome across many projects. The descriptions are very site and impact specific. They have not been considered further in the environmental performance measure.

Quantified assessments (noise, local air quality and greenhouse gases) more naturally lend themselves to simple summation. To more clearly illustrate the scale and bias of the figures, pie or histogram presentations are most applicable where the changes (quantified) can be clearly expressed. Trend comparisons can also be built in the longer term.

The interesting presentational opportunity exists from the textural scores. The attributes worthy of tracking as a measure of environmental performance should be capable of illustrating:

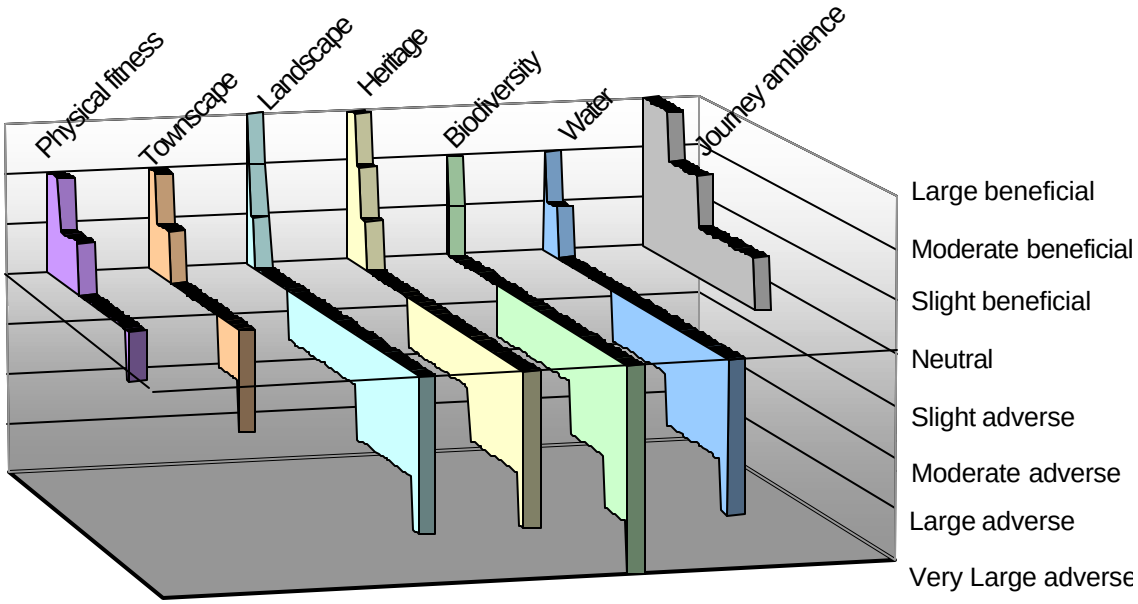
- the overall performance in terms of the distribution (quantity and significance) of environmental impact scores. Notably the balance benefiting the environment verses those with an adverse effect;

- the range of predicted impacts is of some interest to see the variability of the assessment scores from highway improve ments. Similarly, the average score gives the most succinct measure of environmental performance, together these factors present clear opportunities for analysing trend and target setting;

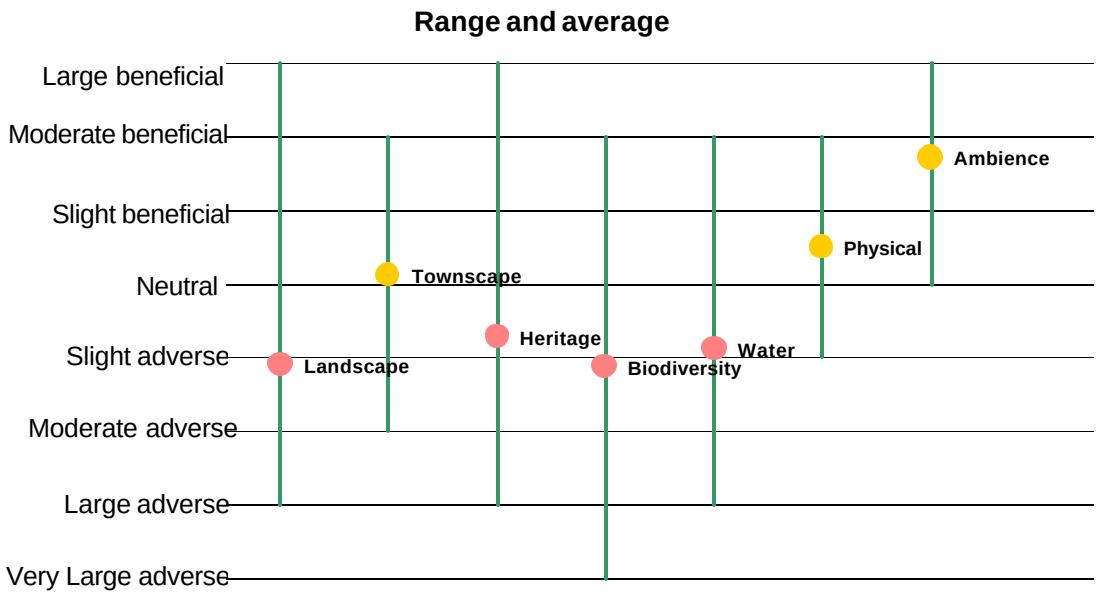
- trend over time is very valuable as a performance measure and has application to target setting.

Further careful consideration would have to be given to the form of presentation to ensure that it best reflected the data and was likely to be sensitive to the scale of prospective year on year change.

Waterline Graph



The 'waterline graph' illustrates programme wide project performance, with the waterline being a Neutral environmental effect. The beneficial appraisal scores (above Neutral) are grouped together as are the adverse (below Neutral).



The 'range and average' graph illustrates the programme wide distribution or project assessment scores. The highlights illustrate the average score across the programme. This most succinct statistic most naturally lends itself to trend analysis and target setting, such that similar graphs stacked over time could show betterment (or otherwise) in environmental performance.

Strand 3 Network wide analysis of the Agency's highway estate

An environmental database when populated will provide an opportunity track the evolving characteristics of the network making use of the function and element structure. The principle is that each existing or proposed environmental feature on or adjacent to the highway will have either one or more 'Functions', and an 'Element' which describes its physical attributes or designation in statutory terms.

The basis of recording and showing these features is that they have an interaction with the highway i.e. if there are features that do not have an environmental function, or form a constraint upon the design or operation of the road, they would not be recorded. All features (i.e. 'Elements') may have a multiple purpose and therefore can be ascribed more than one 'Function' e.g. a vertical barrier may be designed to achieve both Visual Screening and Noise Attenuation. Likewise, the standard of maintenance applied to a grassed area may enhance Visual Amenity, and also have a Heritage Function relating to the setting of an adjacent Listed building.

Careful consideration would need to be given to choosing a small number of function/elements to be tracked. The intention would be to select Functions/Elements that could be deemed characteristic of delivery against the sub-objectives. Trend analysis of this information could start to provide a basis of evidence that objectives were being delivered.

NEXT STEPS

Implementing a performance measurement regime as described would require some further technical work as well as a number of procedural steps to be taken to ensure that data was collected and quality assured. The Highways Agency has however committed itself to, " Drawing on our established procedures for appraisal, we will be analysing the extent to which all our network improvement projects will deliver the Government's environmental objectives for transport investment." (Highways Agency *2004-05 Business Plan*). This is a firm commitment to the forecast outcome methods discussed above. Developing this approach and achieving clarity and communication will be the issues for the year.

A future extension could be to establish a similar analysis but taking as input data the post scheme evaluation process, which is extant for major schemes and under development for smaller schemes and expected to be delivering data from 2004. Post-opening evaluation data formatted as the forecasting appraisal data would offer a number of parallel comparisons and performance opportunities addressing the attributes of the programme wide analysis of expected delivery against the environmental appraisal sub-objectives. Evaluation comparisons of overall outcomes (distribution) and the range of scores would be possible. Positive drivers for change could be constructed. The evaluation data would capture any changes that had taken place following completion of environmental impact assessment and reflect reduced or eliminated risk, site opportunities and completed mitigation. Comparing the distribution of after 'scores' with appraisal data has numerous feedback and enhancement prospects. Similar trends ove r time could also be developed.

There are a number of other initiatives running in the Highways Agency that touch on the issue of performance management particularly at the client/supplier level. These are being examined to consider what role they might play in providing performance data on supplier performance in the same or similar way to the Agency's measure. Opportunities may exist for capturing another view on environmental performance. The Highways Agency hosts two focused stakeholder committees, the National Environment Committee and the National Road Users' Committee. These include representatives from statutory and non-statutory environmental groups, industry and road users' representatives. Both committees are chaired by our chief executive. They meet twice a year to provide an opportunity to exchange ideas and discuss issues relating to the network to help identify areas for improvement. The National Environment Committee or the parallel Regional Environment Committees may present an opportunity for stakeholder review and performance measurement.

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