



Conférence Européenne
des Directeurs des Routes
Conference of European
Directors of Roads

**CEDR TRANSNATIONAL ROAD RESEARCH
PROGRAMME
Call 2012**

**Noise:
Integrating strategic noise
management into the operation and
maintenance of national road
networks**

Cross-border funded Transnational Research Programme

funded by
Belgium/Flanders, Germany, Ireland, Norway, Sweden,
United Kingdom

Description of Research Needs (DoRN)

May 2012



road **ERA** net





Table of contents

1	General introduction	1
2	Introduction to Call 2012.....	1
3	Aim of the Call.....	2
4	Reasons for the Transnational Research Programme	4
5	Research objectives	5
6	Overview of current and previous activities.....	14
7	Additional information.....	14
	Appendix A: Existing projects and resources.....	16

Authors of the DoRN:

Vincent O'MALLEY	National Roads Authority (NRA), Ireland (Leader)
Marguerite TROCMÉ	Department of the Environment, Transport, Energy and Communications (DETEC), Switzerland
Wiebe ALBERTS	Rijkswaterstaat Centre for Transport and Navigation, Netherlands
Ingunn MILFORD	Norwegian Public Roads Administration, Norway
Oliver RIPKE	BASt (Federal Highway Research Institute), Germany
Kjell STRÖMMER	Swedish Transport Administration, Sweden
Pamela LOWERY	Highways Agency, England, UK



1 General introduction

This Call for Proposals is launched by the Conference of European Directors of Roads (CEDR). CEDR is an organisation which brings together road directors of 27 European countries. The aim of CEDR is to contribute to the development of road engineering as part of an integrated transport system under the social, economical and environmental aspects of sustainability and to promote co-operation between the National Road Administrations. The website www.cedr.fr contains a full description of its structure and activities.

CEDR recognises the importance of research in the development of sustainable transport and has established a Technical Group (TG) to monitor European research activities and to advise the CEDR Board on issues relating to research. TG Research responsibilities include dissemination of research results as well as initiating research programmes that support CEDR members in current and future situations.

This Transnational Research Programme follows on from previous programmes organised under the ERA-NET ROAD brand. "ERA-NET ROAD – Coordination and implementation of Road Research in Europe" was a Coordination and Support Action funded by the 7th Framework Programme of the European Commission which concluded in December 2011. The goal of ERA-NET ROAD (ENR) was to develop a platform for international cooperation and collaboration in research areas of common interest. This included the production of an "ENR-toolkit" for carrying out transnational research and trials of the various procedures developed through a series of projects and programmes funded directly by European Road Administrations. Full details of the research projects commissioned through this process can also be viewed at the ENR website www.eranetroad.org.

The Governing Board of CEDR (CEDR GB) recognised in June 2010 that ERA-NET ROAD was delivering significant value for money as it structured the way CEDR members identify commonalities, reduce duplication of research and plan for transnational calls if needed. CEDR gave a mandate to its Technical Group Research (TG Research) to identify opportunities for further transnational road research programmes on the basis of the excellent start and of the experience gained during the ERA-NET ROAD project. CEDR also requested that:

- TGR only proposes suitable research topics and identifies good research proposals;
- TGR presents research proposals, when appropriate, to CEDR GB for decision; CEDR GB shall decide what programmes are taken forward;
- All call procedures shall be open and transparent and all EU members shall be invited to participate, with no advantages given to preferred suppliers or groups of suppliers;
- The costs of developing and managing the transnational calls shall be supported only by those CEDR members taking part in the programme.

2 Introduction to Call 2012

This Transnational Research Programme was developed initially within the framework of ENR and was then taken forward by TG Research to fulfil the common interests of the National Road Administration (NRA) members of CEDR.

The participating NRAs in this Call are Belgium/Flanders, Germany, Ireland, Norway, Sweden and United Kingdom. As in previous collaborative research programmes, the

participating members will establish a Programme Executive Board (PEB) made up of experts in the topics to be covered. The Common Obligation Programme Model from the “ENR-toolkit” has been adopted, with some modifications to take account of the role of TG Research in the process. The research budget will be jointly provided by the NRAs who provide participants to the PEB as listed above. PEB members will designate one of them to act as chair.

TG research has, on behalf of CEDR, appointed a Programme Manager (ProgM) to take over the administration of this Call for Proposals. For this programme, the ProgM will be the National Roads Authority, Ireland. Responsibilities of the ProgM include preparation of the Call for Proposals, financial management of the programme and setting up and managing the contracts with the research providers. These responsibilities will be conducted by the ProgM in its country under its law and regulations under the direction of TG Research. The terms under which the ProgM and PEB will operate will be set out in a Collaboration Agreement, signed by senior representatives of each participating NRA.

Applications are invited from suitable qualified consortia in response to this Call for Proposals. Consortia must consist of at least two legal entities from different EU countries. Individuals and organisations involved in the formulation of the Call specification are prohibited from any involvement in proposals. Applications should focus on the sharing of national research, knowledge and experience at all levels as an important prerequisite for achieving the goals of CEDR and its members. This will accelerate the development of faster and durable methods and techniques for road maintenance and management. It is particularly important that the results can be easily implemented through various demonstration projects in order to contextualise **the benefits of the transnational collaboration**. The applications will be evaluated by the PEB in relation to:

- Extent to which the proposal meets the requirement of the DoRN
- Technical quality of proposal
- Track record of consortium members
- Management of project
- Value for money.

Details of these evaluation criteria and how they will be interpreted and applied by the PEB are presented in the Guide for Applicants (GfA) which accompanies this Call for Proposals.

3 Aim of the Call

This research programme aims to **integrate strategic noise management into the operation and maintenance of national road networks in a holistic manner**. Current approaches to addressing noise issues on national road networks are fragmented and unduly limit the potential to harness the valuable results of today’s state-of-the-art noise assessment studies, thus impacting the **sustainable development of major road networks across Europe**. This research programme is intended to result in the development of a **holistic approach to the management of environmental noise** issues by developing a range of technical and economical solutions to minimise vehicular noise emissions by examining four broad sub-themes i) Noise assessment and management strategies ii) Noise mitigation measures integrated with national roads, iii) Future visions for the management of noise on national road networks, iv) Strengthening/developing holistic pavement management systems.

Road traffic is now recognised as one of the main contributors to **human noise annoyance** in Europe. Approaches used to mitigate such noise on existing and new roads are and will continue to be a significant challenge to most National Road Administrations (NRAs) across Europe. The European Commission recently estimated that more than 40 million people living in European cities of more than 250,000 inhabitants are exposed to daily road traffic noise levels of greater than 50 dB L_{den} . This level of exposure has severe health and economic effects. The World Health Organisation recently estimated that at least 1 million healthy life years are lost each year due to traffic-related noise in the western European countries, including EU Member States. Furthermore, the social costs of noise from road and rail across the EU have recently been estimated at €40 billion a year, about 0.4% of total EU GDP including health care costs.

Examples of elements that contribute to the economic damage include a reduction in residential property prices, lost labour days due to illness associated with noise and reduced options for long term sustainable land use planning. While the problems from road traffic noise exposure continue to grow, it is evident that a unified and consistent approach is needed for the management and control of the problem.

European NRAs do not only play a significant role in facilitating better transport mobility across Europe, but they are also taking responsibility for maintaining environmental quality standards, particularly noise standards, in close proximity to their networks. The publication of the European Noise Directive (END) in 2002 has brought noise issues centre stage for most European NRAs. The aim of this Directive is to define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. The requirement to produce strategic noise maps and action plans has introduced additional budgetary constraints for most NRAs in a time when resources for maintaining national road networks are limited. In addition, the requirement to make noise maps available to the public has not only enhanced public awareness of noise issues themselves but obliges the appropriate administrations to take action to mitigate the impact of noise where noise levels are deemed unacceptable. The identification and implementation of such actions is a particular area of concern for most NRAs. Currently, there appears to be a myriad of approaches adopted for the development of action plans across member states where some member state NRAs place a strong emphasis on broad policy measures while others focus on identifying various technical measures to resolve noise issues at a local level.

Today, many NRAs in Europe are facing insufficient funding for the operation and maintenance of their national road networks. Demands for more innovative, long term and environmentally conscious solutions to address noise issues have been increasing and it is anticipated that these demands will accelerate due to increased noise annoyance complaints from the general public as traffic volumes continue to grow. Moreover, stakeholders today require greater accountability for all road transportation issues from road administrations.

This call, entitled the **integration of strategic noise management into the operation and maintenance of national road networks**, will primarily focus on the following issues:

- Developing and optimising strategies for assessing and managing noise issues on existing national road networks across Europe. Particular regard will be paid to how emerging **strategic noise mapping datasets** and corresponding **action plans** can be integrated into the **maintenance and upgrade of existing roads** and the **future planning of new national road schemes**.
- Promoting innovative and new approaches for the integration of noise mitigation

measures into new and existing roads. Here the emphasis will be on how various noise **mitigation measures perform at mitigating noise over time**. The development of such **noise deterioration models** will also take cognisance of the **maintenance procedures** normally applied to such mitigation measures under consideration. In addition, this may also require the development of some form of **cost/benefit analyses or whole life cost analysis** for assessing the suitability of the measures in the first place. It is anticipated that the development of such deterioration models will allow for a more reliable prediction of future design year noise levels when planning new roads or upgrading existing roads.

- Identifying and developing future visions for noise management on national road networks. This will entail the consideration of how the **ever-increasing numbers of electric/hybrid vehicles as well as the changes in noise limits for vehicles and tyres** can impact on the noise climate in urban and rural areas. In addition, consideration will be given to how some current roadside features such as crash barriers/noise barriers could be redesigned to serve multi-functional purposes. The concept of **multi-functional noise barriers** as well as the development of **'smart' mitigation measures** e.g. **dense vegetation and trees, sonic crystals, quiet and green areas, intelligent speed reduction systems** etc, for the treatment of noise and congestion on existing roads will be explored. The phenomena of **psycho-acoustics** should also form part of these considerations.
- Strengthen/modify an existing **pavement management system** at project level to incorporate the parameter of **noise**.

4 Reasons for the Transnational Research Programme

The main reason for this Transnational Research Programme is to accelerate the process of developing new approaches for integrating **holistic cost-effective noise management** solutions into the planning, construction and operation of national road networks across Europe. Joint efforts are necessary in order to run effective research on identified common issues. The aim is to catch up and meet the current acoustic needs of road networks across Europe and plan for future upgrades in a more environmentally conscious manner.

The research to be commissioned by this Call is already underpinned by many years of research effort into many facets of road traffic noise from the perspective of monitoring, mitigation and associated health impacts. This involved a significant number of nationally focused studies as well as a number of CEDR supported transnational noise studies and reviews. In discussions undertaken at a European level, it is widely recognised that while research effort has gone into some of the themes under consideration in this proposal, there is a desire for a more holistic approach to the integration of noise issues into the operation and maintenance of national road networks. **This programme is not intended to duplicate research that is already completed or underway**. However, what is initially required is a comprehensive review of already completed research studies at both national and European levels and then to devise a programme of holistic research needs that compliments existing research and fills existing gaps which limit effective management of noise issues on national road networks. The value of any proposed research programme can be augmented by any proposal calling for the introduction of **pilot demonstration projects** to show how the findings of the research can be implemented across member states. In addition, the potential for the development of new or improving existing standards, methods and technologies aimed at achieving the objectives of this research call should be explored.

Conclusions and recommendations arising from this research should be presented in a format that allows implementation in all EU Member States without significant alteration or

investment. This should take account of the prevailing conditions of different road administrations, their responsibilities, differences in road classes from country to country, their own national standards, maintenance strategies, etc. These should not be an obstacle to the implementation of research findings from this programme. Proposals should also outline any strengths, weaknesses and opportunities. Findings should be treated so that Member States can determine with a reasonable degree of certainty on how they can be integrated into their respective national road programmes and plan accordingly.

While the main focus of the programme is on improving how noise issues are integrated into the operation and maintenance of road networks in a more holistic manner over the long term, research proposals should include an examination of specific issues such as maintaining noise levels where they are already deemed acceptable and the future impact of electric/hybrid vehicles, low noise tyres, etc, on the ambient noise climate in close proximity to national road networks.

5 Research objectives

The overall aim of the Transnational Research Programme “**Noise: integrating strategic noise management into the operation and maintenance of national road networks**” is to enhance how various noise issues associated with national road networks can be addressed in a holistic way to reduce annoyance from road traffic noise.

The programme is based on the following **four objectives** which are described below together with anticipated outputs. The objectives were developed with the concepts of:

- A. Optimising current noise assessment and management strategies.**
- B. Integrating noise mitigation measures with national roads and how they perform over time.**
- C. Developing future visions for the management of noise on national road networks.**
- D. Strengthening/developing a holistic approach to pavement management systems.**

These objectives were developed by specialists from a number of road administrations during discussions held at a workshop in London at the end of November 2011. At this workshop, it was recognised that the traditional approach without trans-European co-operation often resulted in duplication of research and did not fully exploit the experiences and developments that have taken place in individual countries. This research programme seeks to redress the problem by integrating these issues into a holistic framework.

A number of funding partners have agreed that there is significant potential for improvement on the traditional approaches used to **mitigate road traffic noise** through **innovative planning and design, adoption of enhanced material technology and more targeted road maintenance**.

Applicants should ensure their project proposals are **clearly linked to one of the four objectives** listed above, although it is accepted that there is the potential for overlap between them. Proposals can target individual elements of a specific objective or they can address all the issues outlined in the objective. Proposals should emphasise the **trans-national benefits** of the project outcomes for the participating NRAs in the context of a more

holistic approach to integrating noise management into the operation and maintenance of national road networks.

A: Optimising current noise assessment and management strategies

To address health and economic concerns, the EU issued Directive 2002/49/EC to establish a framework for environmental noise planning. This Directive called for the development of strategic noise maps and action plans in five year cycles. The noise mapping and action planning initiatives have significant potential to assist in the maintenance and operation of the existing road network and future planning of new national road schemes.

There now exists a valuable and unparalleled database of noise mapping studies with associated noise action plans across Europe. All strategic noise maps were developed using standard procedures and all methodologies utilised should have been well documented. Furthermore, many Member States undertook supplementary studies to complement this mapping initiative. Such studies include noise map validation, dose-response studies, sound power measurements for various fleets, etc.

This theme should develop a methodology to take advantage of the significant body of work conducted in accordance with the Directive to enhance procedures adopted for the maintenance and operation of the existing road network as well as the planning of new national road schemes.

Research proposals may include:

- Integrating the results from national **strategic noise mapping and action planning** studies to further enhance the operation and maintenance of national roads. Such research may focus on the results of the END initiative.
- Often **noise monitoring** is performed to **validate results** contained in strategic noise maps, particularly, maps generated for areas which have **complex noise situations** e.g., where multiple noise sources exist or geographical areas with variable meteorology. In addition to validating noise maps, these measurements may also have the potential to assist in the development of new or improving current approaches adopted for **predicting noise levels in complex situations** as well as assessing the effectiveness of noise mitigation measures implemented as part of an action planning programme. Research into **novel, cost effective methods** for undertaking such measurements may be beneficial.
- Innovative and practical approaches for **day-to-day road maintenance and operations** may be developed to enhance the assessment and performance of noise mitigation measures.
- Best practice for **action planning** may be developed following a review of a number of existing action plans. The manner in which many aspects of the action plan including the **prioritisation of mitigation measures** and population exposure estimations are developed across different Member States could be examined and thus best practices may be determined.

Expected outputs would include:

- Suggest methodology to assimilate results from **strategic noise mapping and action planning studies** with maintenance schedules for national roads, resulting in a more coherent approach to **noise assessments** for **future noise mapping studies**. This may include appropriate supplements and guidelines.

- Development of novel **noise monitoring techniques**, for assessing ambient noise levels in complex situations and for assessing the effectiveness of noise mitigation measures implemented as part of an action planning programme.
- Development of a **prioritisation tool for action planning**. This may take the form of a single number rating system (or some other practicable measure) and should take cognisance of likely maintenance schedules for various noise mitigation measures. It would be desirable that some form of **cost/benefit analysis or whole life cost analysis** would accompany this tool. Suggestions of **best practice for action planning may be** presented including examples of 'good' practice with associated benefits in terms of **population exposed/economic repercussions** etc.

B: Integrating noise mitigation measures with national roads and how they perform over time

By **intrinsically merging noise mitigation measures** with national roads it may be possible to ensure noise mitigation measures are considered at each stage of road scheme development. When designing noise mitigation measures for new roads or for the upgrade of existing roads, it is very difficult to anticipate how such measures will perform in **mitigating noise over time**. All noise mitigation measures are subjected to some form of **structural degradation** due to ageing and therefore, it is inevitable that their ability to reduce noise will be compromised. Where specifications or standards exist for current noise barriers or pavements, performance measurements over time should form part of such product standardisations. Therefore, guidance is needed on how to work with such specifications in procurement and harmonisation is needed in order to create a level playing field for NRAs (addressing contractual issues) and road engineers/contractors. To date, very little is known about how much noise barriers or pavements are compromised due to **various weathering processes and traffic loads**. There is an absence of methodologies to predict time-dependence of noise deterioration of pavements or noise barriers.

Research proposals may include:

- The establishment of **performance over time e.g. deterioration models** of noise mitigation measures. The effectiveness of low noise road surfaces is dependent on regular maintenance and cleaning schedules while the performance of roadside noise barriers, particularly those constructed from timber, may significantly degrade over time. There is a need for further research into the manner in which current mitigation measures perform over time and how the life cycle of such measures may be extended or, at the very least, maintained to a level where they continue to deliver acceptable levels of noise reductions.
- Once a mitigation measure is in place it is important to ensure that it will **maintain an appropriate level of noise reduction**. This may require the scheduling of regular in-situ measurements to ensure a high level of performance. Changes to the environs of the road may significantly affect the mitigation performance and should be accounted for throughout the life cycle of the mitigation measure. A practical methodology to allow for such measurements and account for changes to the surrounding environment is required
- The development of some form of **cost/benefit analyses** is vital for assessing the appropriateness of a mitigation measure and for the integration of environmental considerations into policies. High levels of exposure to noise will have a significant impact on the economy. Estimates for the cost of noise vary from State to State and many have assigned a € per dB value. This research may develop an appropriate methodology to determine how such an estimate can be made, and develop a procedure to incorporate this in the assessment of mitigation measures.

Expected outputs would include:

- Identification of parameters that influence the **performance of mitigation measures** over time and how these may be assessed and controlled.

- Development of a methodology to **establish performance over time** of several common mitigation measures. Methodology should be accompanied with real data and analysis. A tool to predict performance over time would complement this.
- Evaluation and demonstration of **advanced technologies/materials** that can significantly improve or maintain mitigation measures over time.
- Development of an acceptable **cost/benefit analysis methodology** to assess feasibility and sustainability of mitigation measures.

C: Developing future visions for noise management on national road networks

The assessment and management of road traffic noise is an issue that has constantly been evolving. The proposed adoption of the CNOSSOS-EU Calculation Method (JRC 2011) represents a significant step forward for European NRAs. It is envisaged that the CNOSSOS-EU method for road traffic classifications will include an *open source* category that may be adopted to account for future changes to vehicle classes, beyond the scope of the current classification system. It is anticipated for example, that this open source category may be used to represent the ever growing number of **electric/hybrid vehicles** making up the vehicle fleet.

This open-ended theme explores future developments on the national road network. Innovation initiatives that may benefit national networks of the future are encouraged. A number of areas are initially identified below.

Research proposals may include the following topics:

- There has been some debate regarding the level of noise a new fleet of **electric/hybrid vehicles** will produce. Some authors have suggested that an electric fleet will reduce future road traffic noise levels while others have suggested adding artificial noise to account for safety considerations. This poses an interesting area for the future of Europe's national road network. In addition, the impact of low noise tyres and new vehicle technologies should be considered.
- Current action plans developed in accordance with EU Directive 2002/49/EC must include measures to protect **quiet/green areas**. The **development of criteria** to identify and classify **quiet/green areas in both urban and rural areas** is essential so that future planning needs can be facilitated without impacting such areas. The manner in which such areas may be protected or used to improve urban dwelling is in much need of research.
- Roadside features may be **re-designed** to serve more than one purpose and **multi-functional noise barriers** may represent a useful step forward. Some multi-functions may include crash barriers, solar panels to power street lights, traffic lights or warning signals.
- Once a road is operational the list of options available for mitigating noise is significantly reduced and invariably noise barriers are the obvious choice for many road engineers. This theme might include alternative '**smart**' **mitigation measures** and may include dense vegetation and trees as part of **innovative landscaping, sonic crystals, intelligent speed reduction systems, changes in traffic composition**, etc.
- The concept of **psycho-acoustics** may be included in the evaluation of some mitigation measures. This might include, for example, the introduction of a 'non-annoying' noise source to reduce the overall annoyance associated with road traffic noise without reducing the actual level of road noise. This 'masking' could be achieved at a local level by the introduction of water features, or trees, vegetation etc.

Expected outputs would include:

- Determine **sound power levels** of selected **electric/hybrid vehicles**, with view to input into future EU noise prediction methods.
- Assessment of the **impact of an electric/hybrid fleet, low noise tyres etc, on environmental noise levels** in both rural and urban environments. Safety initiatives may be taken into account and the merits and demerits of any proposals should be addressed. The impact of these initiatives should be quantified in order to present policy makers with appropriate information.
- Provide an appropriate methodology to **assess and protect quiet areas**. Advantages related to the **maintenance of quiet areas** may be identified.
- Development of concept designs for **multi-functional noise barriers**.
- Provide plans on how various '**smart**' **mitigation measures** could be implemented to mitigate noise on existing roads. Examples of **worked initiatives or demonstration pilot** studies including associated benefit and cost of implementation should also form part of the plan.
- Suggest methodologies or measures to account for **psycho-acoustic** based mitigation.
- Develop concepts for incentives to drive **public awareness** and **public participation** with novel or existing action planning measures.

D: Strengthening/developing a holistic approach to pavement management systems

Despite the economic downturn, there is a continual requirement for on-going maintenance works to road pavements in all member states. These works could entail either partial repair to a section of road or the total replacement of a wearing course by applying a new layer of surfacing. Current Pavement Management Systems (PMSs) provide decision support tools for the range of activities required for the provision and maintenance of road pavements. It is now viewed at European level that a PMS should ideally consider a holistic approach to pavement management where a wide range of parameters should form part of the considerations in determining whether and when pavements should be replaced or modified. Take for example the **parameter of noise**, in a 2008 CEDR noise survey, 90% of member states surveyed indicated that the parameter of noise is not considered in their respective PMSs. Invariably, the type of pavement and any future surfacing installed as part of ongoing maintenance can have a significant impact on the road/tyre noise levels. Therefore, the parameter of noise or noise abatement issues should in principle be integrated into road maintenance procedures.

In general, PMSs can be separated into two categories: those relating to pavement management at a network level and those relating to pavement management at project level. Pavement management at network level normally deals with the pavement network as a whole and is generally concerned with high-level decisions relating to network planning, policy and budgets. Project level pavement management deals with smaller constituent sections within the network and is generally concerned with decisions relating to pavement condition, maintenance, reconstruction and rehabilitation and unit costs. For example, at this level, detailed consideration is given to **alternative designs, construction methodologies, maintenance and rehabilitation activities** for specific projects. This may be accomplished by comparing benefit to cost ratios of several design alternatives and picking the design alternatives providing the desired benefits for the least total cost.

This research objective should focus on pavement management systems at project level. The objective here is to integrate the parameter of **noise** into a **pavement management system methodology** that will assist in life-cycle cost analysis of decision-making associated with changing pavements at a local or regional level.

Research proposals may include:

- **Modifying or identifying new approaches or models to pavement management systems at project level** which has the capacity to integrate the feature of noise.
- Consideration of **monitoring methodologies** that can be reliably used to integrate noise into pavement management systems.
- Integrating noise into **Life Cycle Costs and Analysis** by providing an approach to **monetising the benefits** arising from the consideration of noise in pavement management systems.
- Developing **concept for proper maintenance planning** which focuses on the selection of adequate maintenance works and the effective use of maintenance budgets based on available road condition data. This should ensure that the negative effects on those living in close proximity to the road, the road user and the general environment are also minimised.

Expected outputs would include:

- Strengthen or develop a **pavement management system** that integrates the parameter of noise which can be used with a high degree of confidence for the selection of road sections in need of maintenance based not only on cost and benefit analysis but also on the expectations of those exposed to noise living in close proximity to the road and the road user.

6 Overview of current and previous activities

A general overview of current and existing relevant research projects undertaken across Europe and other sources of information are outlined in Appendix A. These resources and subsequent reports will provide the starting point for proposals submitted in response to this Call and proposals will be evaluated on this basis. **Applicants must not duplicate existing results or ongoing projects.** Proposals should be based on the outcomes and state-of-the-art identified in these projects listed below. Failure to take account of available research conclusions will disqualify proposals from this call.

7 Additional information

The aim of this Transnational Research Programme is to provide applied research services for the benefit of National Road Administrations in Europe. The Call is open to legal entities established in Europe. Applications using the templates provided must be submitted by a coordinator of a consortium of at least two independent organisations from different countries. A maximum 75% of the workload can be assigned to one partner.

The duration of this programme is 36 months from November 2012 to October 2015. The target dates within this programme are:

Call opens:	1 May 2012
Call closes:	10 July 2012 (14:00 CET)
Evaluation:	19 Sept 2012
Selection:	5 October 2012
Project commencement:	5 November 2012

The duration for individual projects can be up to 24 months within the programme timescale.

The programme language is English: only proposals submitted exclusively in English are acceptable.

The target budget provided by the participating National Road Administrations for this programme is EUR 0.950 million.

Submissions in both hard copy and electronic format should be sent to:

National Road Authority, St Martin's House, Waterloo Road, Dublin 4, IRELAND
Tel: +353 1 665 8774
e-mail: adaly@nra.ie

Submissions received after the deadline will not be considered.

Submissions should be clearly labelled with the reference “**CEDR Transnational Road Research Programme: Call 2012: NOISE**” and marked for the attention of Dr Albert Daly, Head of Research and Standards.

Please refer to the Guide for Applicants (GfA) for full details of how to submit proposals in response to this Call.

Appendix A: Existing projects and resources

Activities linked to the Environmental Noise Directive Research

<http://ec.europa.eu/environment/noise/research.htm>

Activities related to the assessment of Health effects due to noise

http://ec.europa.eu/environment/noise/health_effects.htm

European Project CALM II – Coordination of European Research for Advanced Transport Noise Mitigation. A coordination Action funded by the 6th Framework Programme. Blue Book 2006, ISBN: 978-3-200-00612-6

JRC 2011 CNOSSOS-EU - Common NOise ASSESSment MethOdS in EU

IMAGINE: Improved Methods for the Assessment of the Generic Impact of Noise in the Environment. Website: www.imagine-project.org

Summary: http://ec.europa.eu/research/fp6/ssp/imagine_en.htm

SILENCE Project: Towards the sound of SILENCE in European cities

Website: www.silence-ip.org/site

QCITY Project: Quiet City Transport Website: www.qcity.org

POLIS: Development of innovative technologies and policies in local transport

QUIESST: Quietening the Environment for a Sustainable Surface Transport Website: <http://www.quiesst.eu/>

CITYHUSH: Acoustically Green Road Vehicles and City Areas. Website: <http://www.cityhush.org/>

CEDR:

http://www.eranetroad.org/index.php?option=com_content&view=article&id=87&Itemid=93

EUROCITIES: supports its member cities in their efforts to bring about a better environment and work towards achieving sustainable development, by developing and sharing knowledge and expertise. Website: <http://www.eurocities.eu/main.php>

InterNoise 2010: A new and easy method for cost-benefit analysis of noise measures along highways and railways (paper 619 by Dolf de Gruijter)

CEDR Technical Group Road Noise

- i) Strategic Plan 2009-2013, October 2008
<http://www.cedr.eu>
Noise Management and abatement, CEDR 2010
Website:
http://www.cedr.fr/home/fileadmin/user_upload/Publications/2010/e%20Road%20noise.pdf

ERA-NET ROAD/ENR2

<http://www.eranetroad.org>

- i) Road users getting to grip with Climate Change ongoing project

ERTRAC – European Road Transport Research Advisory Council

<http://www.ertrac.org>

- i) Structured Research Recommendations 2007-2015.

FEHRL – Europe’s road research centres

<http://www.fehrl.org>

- i) The Strategic European Road Research Programme 2006-2011
- ii) Forever Open Road Programme

OECD – International Transport Forum

<http://www.internationaltransportforum.org>

- i) Speed Management, 2006
- ii) Long life pavements

National Programmes – Danish Road Directorate

<http://www.vd.dk>

- i) Acoustic ageing of asphalt pavements, Danish Road Institute, Report 171, 2009.

National Programmes – Norwegian Public Roads Administration

Nordic Programmes – NordFoU (www.nordfou.org)

1. Nord2000 Road Engineering method – implementation of the Nordic prediction model Nord2000 in road traffic noise computation (2005-2006)

2. Pavement Performance Models (2006-2010)
3. Road Surface texture for low noise and low rolling resistance (2009-2012)
4. NorSikt – Nordic system for intelligent classification of vehicles (2010-2012)
5. NordTyre - Tyre labelling and Nordic traffic noise (2011-2013)

National Programmes – Norwegian Public Roads Administration

<http://www.vegvesen.no/en/Professional>

1. Environmentally Friendly Pavements (2005-2008)
2. Sustainable Urban transport (2007 – 2011)
3. Development of Expertise within road maintenance (2007-2009)

National programmes – Highways Agency (UK)

- i) Risk approach to prioritising maintenance, 2010
- ii) Integrated whole life cost model for maintenance, 2009
- iii) Achieving best value through pavement maintenance monitoring, 2008
- iv) Integration of whole life costing of road features, 2008
- v) Better estimates of service lives of thin surfacing systems, 2006
- vi) Durability of concrete pavements surfaced with thin asphalt, 2006
- vii) Durable composite inlays for HGV lanes, 2006
- viii) Durability of quieter surfacing, 2004
- ix) Optimising the returns from long life roads, 2003
- x) Effect of highway drainage on pavement longevity, 2000
- xi) Acoustic durability of noise barriers over time, 2010
- xii) Performance of quieter surfaces over time, 2010

National Programmes – Swiss Public Roads Administration

- i) **ASTRA 2000/411** - Lärmschirme an Strassen- Akustische Quellenhöhe bei der Berechnung der Hinderniswirkung
- ii) **ASTRA 2001/053** - Strassenlärm in grossen Abständen, Sound propagation at larger distances
- iii) **ASTRA 2005/006** - Realisierung von Pilotstrecken für die Entwicklung von lärmarmen Belägen im Niedergeschwindigkeitsbereich, Mitwirkung von Kantonen und Gemeinden.
- iv) **ASTRA 2008/012** - Lärmarme Beläge innerorts: Messungen 2008
- v) **ASTRA 2008/013_15 OBF** - Nächtliche Immissionsprognosen von Strassenlärm
- vi) **ASTRA 2008/014** - Forschungspagek: Lärmarme Beläge innerorts, Initialphase Mitwirkung bei der Initialisierung bis und mit Vergabe des Projektleitungsauftrages
- vii) **ASTRA 2007/003** - Akustisches Langzeitverhalten von Lärmschutzwänden
- viii) **ASTRA 2007/007** - Initialprojekt: Anreizprogramm Lärmarme Beläge innerorts
- ix) **SVI 2007/015** - Einfluss von Lärmschutzmassnahmen im Strassenverkehr auf die Standortattraktivität und Aufenthaltsattraktivität
- x) **VSS 2000/453** - Lärmschutz an Strassen

- xi) **VSS 2000/462** - Lärmverhalten verschiedener Belagsoberflächen
- xii) **VSS 2000/466** - Noise emissions of parking facilities, Lärmimmissionen von Parkieranlagen
- xiii) **VSS 2000/467** - Auswirkungen von Verkehrsberuhigungsmassnahmen auf die Lärmimmissionen- Impact of traffic calming measures on noise immissions
- xiv) **VSS 2000/202** - In-situ Messung der akustischen Leistungsfähigkeit von Schallschirmen
- xv) **VSS 2004/201_OBF** - Unterhalt von Lärmschirmen
- xvi) **VSS 2000/204** - Schallreflexionen an Kunstbauten im Strassenbereich
- xvii) **VSS 2007/502** - Stripping of Low Noise surface Courses during Laboratory Scaled Wheel Tracking - Stripping bei Lärmindernden Deckschichten unter Überrollbeanspruchung im Labormassstab
- xviii) **VSS 2007 1262** - Comparison of noise characteristics of wearing courses with Mastic Asphalt with designed surface - Lärmverhalten von Deckschichten im Vergleich zu Gussasphalt mit strukturierter Oberfläche
- xix) **VSS 2009/201** - Lärmimmissionen bei Knoten und Kreiseln
- xx) **VSS 2009, 1271** - Maintenance of noise reducing devices- Unterhalt von Lärmschirmen
- xxi) **VSS 2009/703** - Zusammenhang Textur und Griffigkeit von Fahrbahnen und Einflüsse auf die Lärmemission
- xxii) **VSS 1993/ 288** - In-situ-Messmethode zur Beurteilung von absorbierenden Lärmschutzbauten
- xxiii) **ASTRA 2004/006** - Lärmarme Beläge innerorts; Pilotstrecken für den Einbau lärmarmen Beläge im Niedergeschwindigkeitsbereich, Belagetechnischer Teil
- xxiv) **ASTRA 2004/007** - Lärmarme Beläge innerorts; Pilotstrecken für den Einbau lärmarmen Beläge im Niedergeschwindigkeitsbereich. Akustischer Teil
- xxv) **AGB 2008/008** - Lärmarme Oberflächen bei Gussasphalt-Deckschichten auf Brücken
- xxvi) **AGB 2002/023** - Lärmschutz bei Brücken

National programmes – German Road Administration

- i) Joint Research Programme "Leiser Straßenverkehr 2". Final report (in German). Oktober 2010. <http://edok01.tib.uni-hannover.de/edoks/e01fb10/640238327.pdf>
- ii) Final reports of research projects commissioned by the Federal Highway Research Institute downloadable in German:
http://bast.opus.hbz-nrw.de/schriftenreihen_ebene2.php?sr_id=7&la=de
http://bast.opus.hbz-nrw.de/schriftenreihen_ebene2.php?sr_id=9&la=de

National programmes – German Federal Environment Agency

- i) Final reports of research projects commissioned by the Federal Environment Agency downloadable mostly in German:
<http://www.umweltbundesamt.de/uba-info-medien-e/search-public-e.php>