

Technical Assistance to RRC to Develop Road Research Capacity in Ethiopia

Scoping Report – AFCAP/EthRRC/01

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This project was funded by the Africa Community Access Programme (AFCAP) which promotes safe and sustainable access to markets, healthcare, education, employment and social and political networks for rural communities in Africa.

Launched in June 2008, this UK government (DFID) funded programme supports research and knowledge sharing between participating countries to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources.

The programme is active in Ethiopia, Kenya, Ghana, Malawi, Mozambique, Tanzania, Zambia, South Africa, Democratic Republic of Congo and South Sudan and is developing relationships with a number of other countries and regional organisations across Africa.

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Executive Summary

This report (AFCAP/EthRRC/01) provides a summary of the project scoping exercise for ongoing support of Ethiopia by AFCAP. The project was carried out through a short-term Technical Assistance to ERA through their Research and Development Directorate to identify and scope future projects that could be funded by AFCAP. In addition, support was identified for ongoing projects that were started in the first phase of AFCAP up to 31 July 2014 to take them to completion.

As part of the assignment, this report provides:

1. A review of the existing business plans and the strategy for the RRC produced by TRL UK Ltd as part of a project funded by the World bank to establish the Road Research Centre (RRC) between May 2011 and December 2012;
2. A review of the progress in establishing and developing the RRC to date against the business plans. This also includes some of the outcomes of a TRL technical assistance project to support the RRC between November 2013 and November 2014;
3. A list of agreed priority research projects and concepts based on the original business plans, and on preferences indicated at the Research Managers Meeting at TRL in September 2014
4. Project details, priorities, proposals and TORs as appropriate with potential funding options.
5. Linkages to the Logical Framework.

The breakdown of the proposed priority projects (both ongoing from AFCAP 1 and new projects) for further AFCAP funding either wholly; or jointly with ERA as part of capacity building and mentorship to the RRC; or as joint partnerships with ERA and other donor agencies; is highlighted in Sections 6 and 7 of the report. These projects were further discussed at a stakeholder meeting of 24 March 2015 and a separate document on the priority projects (AFCAP/EthRRC/02) has been developed to assist in the AFCAP PMU with the procurement of services to undertake the projects and provide ongoing technical assistance to the RRC.

The time estimates, proposed project budgets, and linkages to the logical framework summarised in Table 7 of this report. The actions shown in this report for the AFCAP PMU to implement the projects were discussed at the stakeholder meeting and updated in the separate project priority report. Project proposals where appropriate for development of Terms of Reference by the PMU; or draft Terms of Reference are now included in the Project Priority report AFCAP/EthRRC/02.

It should be noted that the RRC is in a state of constant change and development and that this scoping report is based on the circumstances at the end of November 2014. The final list of priority projects presented in AFCAP/EthRRC/02 is based on circumstances at the end of March 2015 following presentation of the scoping report to the stakeholder meeting of 24 March 2015.

In terms of the RRC Business Plan developed in 2012, the background information presented in this document related to the background to the business plan and the status of implementation to November 2014 will remain as reported here. However, as a final output to this project, it was requested that the 2012 business plan be reviewed and updated to a 2015 version to act as an updated working document for ongoing management of the RRC. The 2015 version of the business plan will also be updated based on any relevant comments from the final report of the TRL technical assistance that finished at the end of November 2014.

Table of Contents

1.	Introduction	1
2.	Project Objectives and Scope of Services	2
3.	RRC Background	2
3.1	RRC Business Plan Development (May 2011 to December 2012)	3
3.2	RSDP IV	4
3.2.1	Objectives of the RSDP IV	4
3.2.2	Targets of RSDP IV.....	4
3.2.3	Cost of implementation	4
3.2.4	Financing Plan	4
3.2.5	Policy and Strategy.....	5
3.3	Achievements to December 2012	6
4.	Outline of the RRC Business Plan	7
4.1	Key Strategic Issues	8
4.2	RRC Structure	10
4.2.1	Status as at November 2014.....	11
4.2.2	Staffing Levels at November 2014	13
4.3	Development of the Temporary and Permanent RRC at Kality	13
4.4	Priority Projects	14
4.4.1	Longer Term Projects.....	15
4.4.2	Status as at November 2014.....	15
4.5	Progress against the Business Plans	18
5.	RRC Capacity Building	19
5.1	TRL Technical Assistance	20
5.2	JICA Technical Assistance	20
5.3	Future Donor Support	20
5.3.1	EU support to the RRC	20
6.	Project identified for AFCAP Support	22
7.	Action plan for implementation and Linkage to the Logical Framework	24

Ethiopia Scoping report

List of Tables

Table 1: Summary of RSDP IV road targets	5
Table 2: RRC Staffing (November 2014)	13
Table 4: ERA/RRC Project Priorities as at November 2014	16
Table 5: Components and costs of EU support to the RRC	22
Table 6: Summary of Projects Proposed for AFCAP Funding	23

List of Figures

Figure 1: RRC organisational structure	12
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List of Appendices

Appendix 1: Plans and Actions from the 2012 Business Plan	34
Appendix 2: Constitution of the Research Steering Committee	46
Appendix 3: Project Schedules from the 2012 Business Plan	49
Appendix 4: Progress against Actions and Measure in the 2012 Business Plan	53

List of Terms and Acronyms

AFCAP	Africa Community Access Programme
AM	Asset Management team
APT	Accelerated Pavement Testing
ASCAP	Asia Community Access Programme
CMM	Construction and maintenance Management team
CSIR	Council for Scientific and Industrial Research
DFID	Department for International Development, UK
ERA	Ethiopian Roads Authority
EU	European Union
HD	Highway Design team
JICA	Japan International Cooperation Agency
KIC	Knowledge Information Centre
KSI	Key Strategic Issues
LRS	Laboratory and Research Services team
LVR	Low Volume Roads
LVRR	Low Volume Rural Roads
LVSR	Low Volume Sealed Roads
MGSI	Materials, Geotechnics and Site Investigation team
PMU	Programme Management Unit
RMC	Research Management Committee
RRA	Road Research Academy
RRC	Road Research Centre
RSC	Research Steering Committee
RSE	Road safety and Environment team
SFA	Strategic Focus Area
SS	Support Services
TRL	Transport Research Laboratory
TT	Transportation team
UK	United Kingdom

1. Introduction

AFCAP has been providing ongoing support to Ethiopia through the Ethiopian Roads Authority (ERA) since its inception in 2008. The support included the following:

- Preparation of new design manuals, specifications, standard drawings and bidding documents for Low Volume Roads (LVRs);
- The updating of their existing 2002 series of road design manuals which included:
 - The Geometric Design Manual;
 - Pavement Design Manual (Flexible and Rigid);
 - Rehabilitation Design Manual;
 - Site Investigation Manual;
 - Drainage Design Manual; and
 - Bridge Design Manual (in association with JICA).
- Development of new manuals:
 - Geotechnical Design Manual; and
 - Route Selection Manual.
- Updating and revision of the 2002 version of the Standard Specifications and Drawings.
- Training and capacity building for the design and construction of surfacing seals.
- Development of a guideline for surface sealing in Ethiopia.
- The construction and monitoring of Demonstration Sections related to the design philosophy of the LVR manual. The construction of the sections was organised by ERA as part of their ongoing construction and rehabilitation programme and the monitoring was in the form of mentorship and training carried out by international experts in association with the staff of the Road Research Centre (RRC).

This report provides a summary of the project scoping exercise for ongoing support of Ethiopia by AFCAP that was carried out through a short-term Technical Assistance project to identify and scope future projects that could be funded by AFCAP. In addition, support was identified for ongoing projects that were started in the first phase of AFCAP up to 31 July 2014 to take them to completion.

A dedicated Road Research Centre (RRC) was established by ERA as part of their Research and Development Directorate through a project from May 2011 to December 2012 as part of World Bank support to finance ERA's Modernization and Sector Capacity Building as one of the components of the Road Sector Development Stage-IV (APL-4). The business plans produced as part of that project and outlined in the report RRC/12/02 have been used as the foundation to develop the schedule of projects identified and scoped in this report and further developed following the stakeholder meeting of 24 March 2015 and presented in the report AFCAP/EthRRC/02.

This report was written based on a visit to Ethiopia from 2 – 14 November 2014 for detailed discussions with the Director, Research and Development who will have responsibility for managing all future research projects on behalf of ERA through the RRC; other relevant staff of ERA; and external stakeholders including other funding agencies.

The contents of the draft report were presented at a stakeholder meeting of 24 March 2015 where the following final deliverables were agreed:

1. The draft scoping report would be updated and retained for background and as a record of the status of development of the RRC as at November 2014;
2. A separate report outlining the project priorities agreed with ERA/RRC as a result of the stakeholder meeting of 24 March 2015 would be produced (AFCAP/EthRRC/02). This report would also provide Terms of Reference or Project Proposals to assist the AFCAP PMU in the procurement of services to undertake the identified projects whether new or ongoing.
3. An updated 2015 version of the RRC business plan (RRC/15/01) for ongoing use in the management of the RRC.

Ethiopia Scoping report

This report presents the updated scoping report presented at the stakeholder meeting and satisfies deliverable 1.

2. Project Objectives and Scope of Services

The assignment has the following main objectives:

1. To review existing plans and the strategy for the RRC produced by consultants to date;
2. To produce, in collaboration with the RRC, an update of the current Business Plans for presentation to the ERA Research Management Committee and the Research Steering Committee of stakeholders constituted under AFCAP 1; with subsequent approval after commenting;
3. To map out agreed priority research projects and concepts based on the above, and on preferences indicated at the Research Managers Meeting at TRL in September 2014, to enable detailed TORs to be produced. This should include potential funding from a range of Development Partners.
4. To rank the importance of identified plans and projects towards the AFCAP Research Strategy (being developed) and to the Logical Framework.
5. Produce TORs for selected priority projects for approval by ERA/RRC and AFCAP and/or identify individuals who would be suitable to prepare TORs for specific projects.

As part of the services, the Consultant will undertake the following tasks:

- Review recent key government policy, plans and programmes that would influence research programmes;
- Review AFCAP reports and projects;
- Consider opportunities for collaboration with current and proposed parallel Development Partner programmes, including DFID and WB;
- Investigate ERA/Road Fund programming of projects, and its influence on the RRC;
- Meet with key ERA/RRC personnel to develop cooperation actions;
- Map out key aspects of a Business Plan covering institutional, establishment, capacity building (structured mentoring programme for young researchers), training, programme management, operational management, quality assurance, budgeting and finances;
- Rank the importance of identified plans and projects towards achieving AFCAP objectives, targets and indicators;
- Outline priority actions for both research and laboratory implementation;
- Produce Concept Notes, proposal and/or Terms of Reference (ToRs) for Long Term TA and priority projects;
- For selected priority projects, produce TOR for approval by ERA/RRC and AFCAP, including VfM and Cost/Benefit;
- Explore the possibility of forming a long term collaboration arrangement between the Ethiopian Government and their preferred International Research Institute(s), including Heads of Agreement.

3. RRC Background

Some form of research capacity has been available to the road sector in Ethiopia since 1965. As part of the Road Sector Development Programme (RSDP) which started in 1997, it became increasingly obvious that the national road research and development capacity had to be strengthened and expanded to support the goals and objectives of the RSDP.

It is well recognised in the document "RSDP: 13 years Performance and Phase IV" of January 2011 that the provision of a cost-effective, efficient, safe and environmentally-friendly road network

Ethiopia Scoping report

requires an understanding of the influence of the local conditions and materials and cannot depend on the application of, in many cases, inappropriate international practice.

In response to the growing research needs of the sector and as part of the restructuring of ERA in 2010/11, the Research and Development Directorate was established with responsibility for the development, planning, implementation and dissemination of all ERA research activities including the establishment of the RRC. The following original objectives of the RRC are identified in the RSDP document:

- Establish, upgrade and maintain norms and standards for transport engineering in all aspects of planning, design, construction and maintenance;
- Conduct research on road technologies and applied technologies that promote delivery of the RSDP;
- Operate a data collection and information service that disseminates knowledge and developments to the industry at large;
- Assist organisations in Ethiopia with aspects of technology development, transfer and application to support the future road design, construction maintenance and management capability.

In 2009, as part of the expanding programme of research activities mainly supported by AFCAP, ERA established a Research Steering Committee (RSC) of relevant stakeholders to provide technical and logistical oversight on all planned and ongoing research programmes.

In 2011, the overall objectives identified for the RRC were translated into the following specific strategies as part of RSDP IV:

- Building a dedicated facility for road research;
- Establishing a road transport Knowledge Information Centre;
- Raising awareness amongst ERA's professionals and the industry at large on the importance of road-related research;
- Identifying and prioritising research needs and providing resource plans for road research activities;
- Ensuring mechanisms are available to get existing knowledge and new research applied in practice; and
- Continuing collaboration with research partners (eg AFCAP) and to expand regional and international linkages and partnership.

These strategies were used as a foundation to the business plans and actions developed to build and manage research capacity in the road sector.

3.1 RRC Business Plan Development (May 2011 to December 2012)

The Business Plan of the Road Research Centre (RRC) was developed as part of the project for a "Preparatory Study Towards Establishment of a Road Research Centre" being funded as part of a World Bank loan to finance ERA Modernisation and Sector Capacity Building. The project was completed in December 2012 by TRL UK Ltd and the 10 year business plan was consolidated in report RRC/12/02 that was intended as a working document to be used to manage the RRC through the Research and Development Directorate of ERA for the first 10 years of operations. The report was a consolidation of the 5-year business plan (report TRLRRC/09) and the 10-year business plan report (TRLRRC/17) that were submitted as part of the project.

The RRC Business Plan is based on the following assumptions:

- The RRC will be managed through the Research and Development Directorate (RDD) of ERA and be an integral part of the ERA structure for the tenure of the 10 year plans;

Ethiopia Scoping report

- The plans presented are in support of the following overall vision, mission and goals of ERA:
 - **ERA vision** – To assure the provision of an adequate and high quality road network to Ethiopia and open up all potential development areas in all parts of the country.
 - **ERA Mission** – Provide safe, comfortable and adequate road infrastructure to support the socio-economic development of the nation and satisfy road users by:
 - Improving the condition of the road;
 - Expanding the network;
 - Preserving road asset.
 - **ERA Goals**
 - Improving transport operating efficiency and reducing road transport costs;
 - Providing access to rural, neglected and food-deficit areas; and
 - Developing institutional capacity of the sector.
- Options for generating external funds from services provided by the RRC will need further investigation to supplement the funds provided through the ERA budget allocation.

Consequently, the development of the RRC is an integral part of the overall Road Sector Development Plan (RSDP) that has been driving the sector since 1997. The current phase, RSDP IV, covers the period July 2011 to June 2015 and is summarised in section 3.2 in relation to the RRC.

RSDP V covering the period July 2015 to June 2020 is currently in preparation by the Planning and ICT Department of ERA.

3.2 RSDP IV

As a major pillar of the overall national Growth and Transformation Programme (GTP), RSDP IV is intended to continue transforming the road sector by increasing the size and improving the quality of the road network; enhancing institutional capacity; and improving overall efficiency. However, unlike earlier phases of the RSDP, high emphasis will be placed on the construction of link roads and engineered low volume roads. The detail of the targets, strategy and objectives are summarised in the document “RSDP: 13 Years Performance and RSDP IV” published in January 2011 where the importance of building research capacity is highlighted in Section 7.2 of Part 2 of that document.

3.2.1 Objectives of the RSDP IV

The current objectives of the RSDP are to:

- Improve transport operating efficiency and reduce road transport costs for freight and passengers so as to encourage production, distribution and export;
- Provide access to previously neglected food deficit rural areas to support efficient production exchange and distribution throughout the country; and
- Develop adequate institutional capacity of the road sub-sector both at central and regional levels.

3.2.2 Targets of RSDP IV

The targets for road construction are shown in the Table 1.

3.2.3 Cost of implementation

The total cost of implementing RSDP IV is estimated at ETB 125.3 billion (US\$7.37 billion or £4.6 billion at current exchange rates) of which ETB 84.5 billion (67.4%) is allocated for federal road projects, ETB 14.4 billion (11.5%) for regional road projects and ETB 26.4 billion (21.1%) for Wereda road projects.

3.2.4 Financing Plan

The program is being financed from different sources which included the Government of Ethiopia (GoE) and development partners. The GoE is financing 70.4% of the total cost of the programme including matching funds; Donors are financing 17.3%; and the Road Fund Office is financing 9.1%

Ethiopia Scoping report

(ie the cost of maintenance activities included in the plan). The source of the remaining 3.2% of the cost of the programme was uncertain at the start of RSDP IV but it was expected that the GoE and Donors would meet the shortfall.

Item	Target (km)	Budget	
		ETB billions	US \$ billions
Trunk road rehabilitation	728	84.5	4.97
Upgrading Trunk and Link roads	5,023		
Construction of new Link roads	4,331		
Heavy maintenance of paved and gravel roads	4,700		
Routine maintenance of the network	84,649		
Construction of new rural roads through the Regional Road Authorities	11,212	14.4	0.85
Construction of Wereda roads through the Wereda road offices as part of the Universal Rural Road Access Programme (URRAP)	71,523	26.4	1.55
Totals	182,166	125.3	7.37

3.2.5 Policy and Strategy

Sector strategies identified to facilitate the implementation that could impact on the development and priority of research projects managed by the RRC are summarised as follows:

- Increasing rural accessibility;
 - Split of regulatory and operational departments as independent institutions;
 - Improvement of the institutional set-up of Regional Road Authorities and Wereda Road Offices;
 - Human resources development in Road Agencies and Wereda Road Offices;
 - Promoting access to rural transport services;
- Improving conditions, integration and reach of the road network;
 - Strengthen integrated road network planning and maintenance effectiveness;
 - Improve maintenance revenue and effectiveness of road maintenance;
 - Improve technology approaches;
 - **Build road research capacity;**
 - Enforce axle load regulations;
 - Climate change implications;
 - Safe road system.
- Cost minimisation and improved efficiency;
- Strengthen the domestic construction industry;
 - Build capacity of private local contractors and consultants and increase their participation in road sector development;
 - Build the capacity of local consultants and improve their participation in the road sector;
 - Build the capacity of state-owned contractors and consultants.
- Increase training and skills enhancement;
 - Increase the number of professional in the road sector;
 - Train road technicians under government vocational training programmes;
 - Improve road technician skills on paved road construction and maintenance;
 - Establish an equipment testing, handling and utilisation centre (Alemgena training centre).

Ethiopia Scoping report

- Improve management approaches;
 - Complete road projects on time and within budget;
 - Improve the quality of road project designs;
 - Improve right-of-way management;
 - Reform central garage;
 - Promote bulk purchasing of construction materials and equipment;
 - Local manufacture of intermediate equipment and tools;
 - Improved construction contract administration.

3.3 Achievements to December 2012

Research activities that have, and are being managed by the Research and Development Directorate include:

- **Application of design technologies for rural road access;** through the construction and monitoring of a number of research and demonstration projects on unpaved roads at the Chanco Training Centre. The purpose of the research was to evaluate the effectiveness of different compaction regimes that would typically be used for labour-based road construction and maintenance and to investigate the better utilisation of available materials for unpaved roads.
- **Preparation of Manuals, Specifications and Standard Bidding Documents for Low Volume Roads in Ethiopia** (Funded jointly by ERA and the UK Department of International Development (DFID) as part of their Africa Community Access Programme (AFCAP))
- **Upgrading of the 2002 Design Manuals for all road categories** (Funded jointly by ERA and the UK Department of International Development (DFID) as part of their Africa Community Access Programme (AFCAP))
- **Development of Pavement Design Standards and Specifications for Low Volume Roads;** through the construction and monitoring of demonstration sections designed and built to the standards outline in the new low volume roads manual. (Funded by the UK Department of International Development (DFID) as part of their Africa Community Access Programme (AFCAP))
- **A Review of Surface Treatment Practice in Ethiopia;** which investigated the causes of premature failures of surface treatment works in the country and highlighted several issues that required attention, including the standard of workmanship; lack of enforcement and understanding of specifications; inappropriate specifications; and a general lack of understanding of the design of surface treatments. (Funded by the UK Department of International Development (DFID) as part of their Africa Community Access Programme (AFCAP))
- **Training for the Improved Performance of Surface Treatments in Ethiopia;** as a consequence of the previous project (Funded by the UK Department of International Development (DFID) as part of their Africa Community Access Programme (AFCAP) and the EU)
- **Plans for the Establishment of a Knowledge and Information Centre (KIC);** this will now form part of the structure of the RRC and will be dealt with in more detail later in the document (Funded by the UK Department of International Development (DFID) as part of their Africa Community Access Programme (AFCAP))
- **Improving the Performance of Gravel Wearing Courses and Low Cost Surfacing in Ethiopia;** through the construction of various trial section on the Morocho-Leku road to provide recommendations on appropriate measures to reduce maintenance and whole-life costs of roads in the Southern Region. This was a collaborative project between ERA and the Southern Regions Road Authority and the findings will be fed back to the industry through a

Ethiopia Scoping report

series of workshops during 2012. (Funded by the UK Department of International Development (DFID))

- **Database of Landslide Areas and development of landslide mitigation measures:** through the development of a GIS system to identify areas where landslide could be expected and accounted for in the investigation and design stages. (Funded partly by JICA)

4. Outline of the RRC Business Plan

The business plan presented in the report RRC/12/02 sets out how the RRC will operate and develop over a 10-year period starting from July 2012 which marks the start of the ERA 2012/13 financial year.

The plan covers:

- The RRC identity in terms of its vision, mission, objectives, values, underlying operating philosophy and strategies;
- Its management structure and how it will serve ERA and other road sector stakeholders in Ethiopia;
- An evaluation of the institutional arrangements in which it will operate and how it will meet the many challenges it will face during its development;
- The products and services it will offer;
- Its facilities, equipment and operational procedures along with a transition plan for moving from the temporary facilities (completed in May 2014) to the new facility for which detailed design phase is completed and construction is expected to begin in the first half of 2015;
- A progressive and controlled staff expansion and development programme with specific emphasis on how to retain quality research staff;
- A prioritised list of the research programmes and projects on which it will focus;
- How the RRC will interface with potential local and international partners;
- A financial plan and budget projections over the first 10 years of operations; and
- Key performance measures and actions outlining accountability and deadlines for the delivery of outputs.

It is not the intention to duplicate the 10-year business plan in this report. However, after two years of RRC operations against the business plan, this project provides an ideal opportunity to revisit the plans and update actions and timelines based on what has been achieved over the past 2 years. The revised 2015 version of the business will be submitted to ERA/RRC as an output from this scoping project.

It should be noted that the business plan is a dynamic document that was structured to be sufficiently robust to accommodate changes during the ongoing management of the RRC based on the prevailing circumstance at any particular time during the 10 years of the plan. Therefore, it is only changes to the original plan that are highlighted in this report.

It must also be stressed at the outset that the overarching critical component and assumption forming the basis for the 2012 business plan was the ability of ERA to be able to recruit suitable staff at all levels to implement the ambitious plans agreed with ERA. In 2012, over 3 000 post-graduate engineers were registered for MSc courses at seven universities throughout Ethiopia and sponsored by ERA. It was anticipated that this training and capacity building intervention would provide a pool of suitable candidates for the RRC. Currently this has not happened and the staffing levels are far less than anticipated in 2012. The effect on the business plans will be reflected in subsequent sections.

Ethiopia Scoping report

The plans and actions anticipated in 2012 were structured around the following components:

- Staff Recruitment;
- The five Key Strategic Issues (KSIs) shown in Section 4.1;
 - KSI 1 – Sustainable Funding
 - KSI 2 – Staff Retention
 - KSI 3 – Research Credibility
 - KSI 4 – Human Capacity Development
 - KSI 5 – Coordination of the National Research Effort
- The functional areas of the management structure;
 - Research Delivery Teams
 - Laboratory and Research Services
 - Road Research Academy
 - Knowledge Information Centre
- Manageable time periods within the ten years for reviews of progress to be undertaken;
 - Year 1 (July 2012 to June 2013)
 - Years 2 and 3 (July 2013 to June 2015)
 - Years 4 and 5 (July 2015 to June 2017)
 - Years 6 to 10 (July 2017 to June 2022)

The original actions plans are shown in Appendix 1.

Appendix 5 of RRC/12/02 was provided to outline Action Plans and Measures that could be used as a management tool to monitor progress against the business plan and provide a record of progress; achievements; and changes to plans and timing where relevant. These action plans were used to evaluate the progress of the RRC since 2012 in consultation with the Director, Research and Development and are shown in Appendix 4 of this report and discussed in section 4.5.

4.1 Key Strategic Issues

The following Key Strategic Issues (KSI) based the relevant strengths, weaknesses, opportunities and threats were identified in the 2012 Business Plan:

- **KSI 1 - Sustainable funding:** The ongoing funding commitment of ERA (including the provision of land) and the responsible government departments to the development of a fully equipped and resourced facility is critical to the successful establishment and operations of the RRC. While this funding could be supplemented by funding sources external to ERA, the ongoing success of the RRC will be dependent on the majority of the funding coming from Government through ERA for at least the next 10 years. There does however need to be acceptance by ERA and Government that the RRC can generate external funds from its operations and services which could lead towards a more autonomous operation as the RRC matures and evolves.

As the RRC matures and develops, the procedures for financing the activities of the RRC on a sustainable basis through ERA, supplemented by additional external funds, will have been well established. However, marketing of the benefits of the research to stakeholders and funders will become an increasingly more important activity in ensuring sustainability of funds. In this regard, it will be critical to ensure that the findings from projects are being fed back to all the relevant sectors of the roads industry on a regular basis and implemented through interventions such as changes to best practice manuals; adoption of appropriate designs in terms of life-cycle costs; improved construction and maintenance practice; and improved specifications. Formal measures for reporting the benefits of the research will also need to be developed in terms of direct (cost/benefit analysis) and indirect (eg number of postgraduate qualifications; number of published papers and manuals; improvements to specifications and practice) benefits emanating from the research.

Ethiopia Scoping report

- **KSI 2 - Staff retention:** To achieve the vision of being an internationally recognised road research centre it is essential that the RRC develops and retains a core of dedicated research specialist that are committed to the work of the RRC. The ability of the RRC to offer competitive remuneration packages, incentives and career development opportunities to retain trained and experience research staff will be critical to its success and, based on current experiences, will need to be addressed as a major priority.

It is anticipated that with time, the current problems related to staff retention will have been resolved and qualified staff will see the benefits of being part of the RRC. However, it will also be important to accept that a certain percentage of annual staff turn-over is to be expected. One of the roles of the RRC will be to build improved industry capacity with the knowledge that individuals who move from the RRC to other sectors of the road industry in Ethiopia will have sound training and a good knowledge-base to improve the quality of the industry service delivery; whether it be in another government department or in the private sector. However, it will be important for the industry as a whole to provide competitive packages to minimise the loss of trained and experience staff to the international market outside Ethiopia.

- **KSI 3 - Building Research Credibility:** Building credibility of the RRC through well managed and implemented research projects that ultimately improve the delivery, performance and management of the Ethiopian road network is critical to the sustainability of the RRC. It will be essential that a credible research programme addressing the real needs of the industry stakeholders is implemented with constant feedback mechanisms to promote the findings and the benefits of the research.

Following the establishment of the permanent facility, it is anticipated that this will be the main focus area in the 5 to 10 year horizon of the RRC development process. It will be critical to ensure that the RRC establishes itself as a credible organisation with the publishing of well researched and internationally peer-reviewed information that is accepted by all sectors of the industry; and shows tangible and measurable improvements to road and road transport provision in Ethiopia.

- **KSI 4 – Human Capacity Development:** The RRC is currently a fledgling operation with limited research experience. It is essential that the research capacity of the organisation is grown over the next ten years through training and education programmes; continuous professional development interventions; mentorship; and technical and managerial support. In the establishment and development phases over the first five years, the RRC will require a significant technical and managerial assistance programme from research professionals and established road research organisations to support and build the staff of the RRC into a self-sustaining work force.

The human capacity development of the staff of the RRC will be ongoing through short and longer term training and experiential capacity building interventions. As part of the development, international exposure of staff through secondments/placements and attendance at international conferences, seminars and meeting will become increasingly important.

- **KSI 5 – Coordination of the National Road Research effort:** One of the major roles that should be fulfilled by the RRC is coordination of the national research effort to reduce overlap and ensure the optimal use of scarce research resources. It would also provide a central point for channelling best international practice into the country, customising it for use and feeding it back for use in the industry. To provide the coordination role, it is essential that the RRC has established national coordination structures in place involving all stakeholders; has a well-developed network of international linkages; and is seen to be

Ethiopia Scoping report

providing support and feedback to all sectors of the road industry. To facilitate this, it will be essential that modern communication and information infrastructure is available to the RRC.

The first 5 years of the RRC will be for development and establishment of the proposed RRC structure and facilities, expected to be fully functional by June 2017. During this period it will be important to ensure that the RRC is accepted locally and has established and functioning structures and linkage to coordinate the road and road transport related research in Ethiopia, with a secondary role of keeping abreast of regional and broader international coordination initiatives. Once the RRC is established in this role it will have greater credibility and mandate to act on behalf of the sector in international coordinating forums in the 10-year horizon. This will become increasingly more important.

The KSIs were developed to be relevant for the 10 year period. It is felt that the original KSIs are still relevant and will remain unchanged when the original action plans shown Appendix 1 are updated as part of the 2015 revision of the RRC business plans.

4.2 RRC Structure

The original management structure (organogram) of the RRC is shown in Figure 1 (Teams established as at November 2104 are shown in red) and is an integral part of the ERA structure through the Directorate, Research and Development reporting to the Deputy-Director General, Engineering Operations. Oversight of the activities of the RRC is managed through the Research Management Committee (RMC) of ERA.

The original Teams (which are the lowest level of management allowed in the ERA management structures) identified were:

- Research Project Delivery Teams:
 - Highway Design (HD) Team;
 - Construction and Maintenance Methods (CMM) Team;
 - Asset Management (AM) Team;
 - Materials, Geotechnics and Site Investigation (MGSI) Team;
 - Road Safety and the Environment (RSE)Team;
 - Transportation Team (TT).

Cross-cutting teams providing support to project delivery teams:

- Laboratory and Research Services (LRS) Team which includes:
 - Laboratory services;
 - Routine testing;
 - Specialist testing (including Accelerated Pavement testing (APT));
 - Reference laboratory services for certification, accreditation and proficiency.
 - Condition assessment surveys;
 - Traffic surveys;
 - Technical and Safety audits;
- Knowledge Information Centre (KIC) Team;
- Support Services (SS) Team;
- Roads Research Academy (RRA) Team.

As indicated in the Business Plan, the RRC is seen as a support function and valuable resource, not just to ERA, but to the whole of the Ethiopian road sector in providing well researched information for improved decision making related to the design, construction, maintenance and management of the whole of road infrastructure. As such, it was important to ensure that structures are in place to manage the interfaces between the RRC and relevant internal (ERA) and external stakeholders.

Ethiopia Scoping report

Internal oversight of the RRC within ERA is provided by the Research Management Committee (RMC) while the Research Steering Committee (RSC), constituted in 2009, acts as a research advisory body representing all stakeholders. Both committees are chaired by the Director-General of ERA or his designate.

During the current RRC establishment phase at Kality, the RMC has been the more active committee for overseeing and guiding the activities of the RRC. However, now that the RRC is fully established at Kality, it is intended to reconstitute the RSC to feedback the revised plans, actions and projects for comment. The constitution of the RSC is shown in Appendix 2.

4.2.1 Status as at November 2014

As at November 2014, three Operational Teams have been approved by the ERA Board as part of the Directorate, Research and Development. The Teams shown in red in Figure 1 are:

- Highway Design (which has now had its name changed to “Highway Research”);
- Laboratory and Research Services; and
- Support Services.

Any additional Teams to those currently approved will need to be submitted to the ERA Board for approval. It has therefore been decided that the RRC will continue to operate with a maximum of four Teams in the temporary facility at Kality. A “Landslide Stability and Site Investigation” is currently being motivated to ERA as the fourth team in the current structure. This is likely to replace the Materials Research, Geotechnical and Site investigation Team shown in Figure 1.

Only when the new RRC facility has been completed (anticipated to be during the 2016/17 financial year) will the ERA Board be approached to approve more new Teams in the structure.

Under the current arrangement the following is included:

- A Knowledge Information Centre has been established and a librarian/manager appointed as part of the Highway Research Team;
- Materials Research is being undertaken as part of the Highway Research Team;
- There is currently an acting Team Leader for the Highway Research Team under which most of the current research projects fall;
- Any projects or activities related to materials and geotechnical issues are undertaken through the Highway Research Team or part of the Laboratory and Research Services team.
- The capacity building intervention by JICA related to landslide management is cross-cutting and all RRC professional are involved. However, if a new Team is included in the current structure, it would be a Landslide Stability and Site Investigation team.

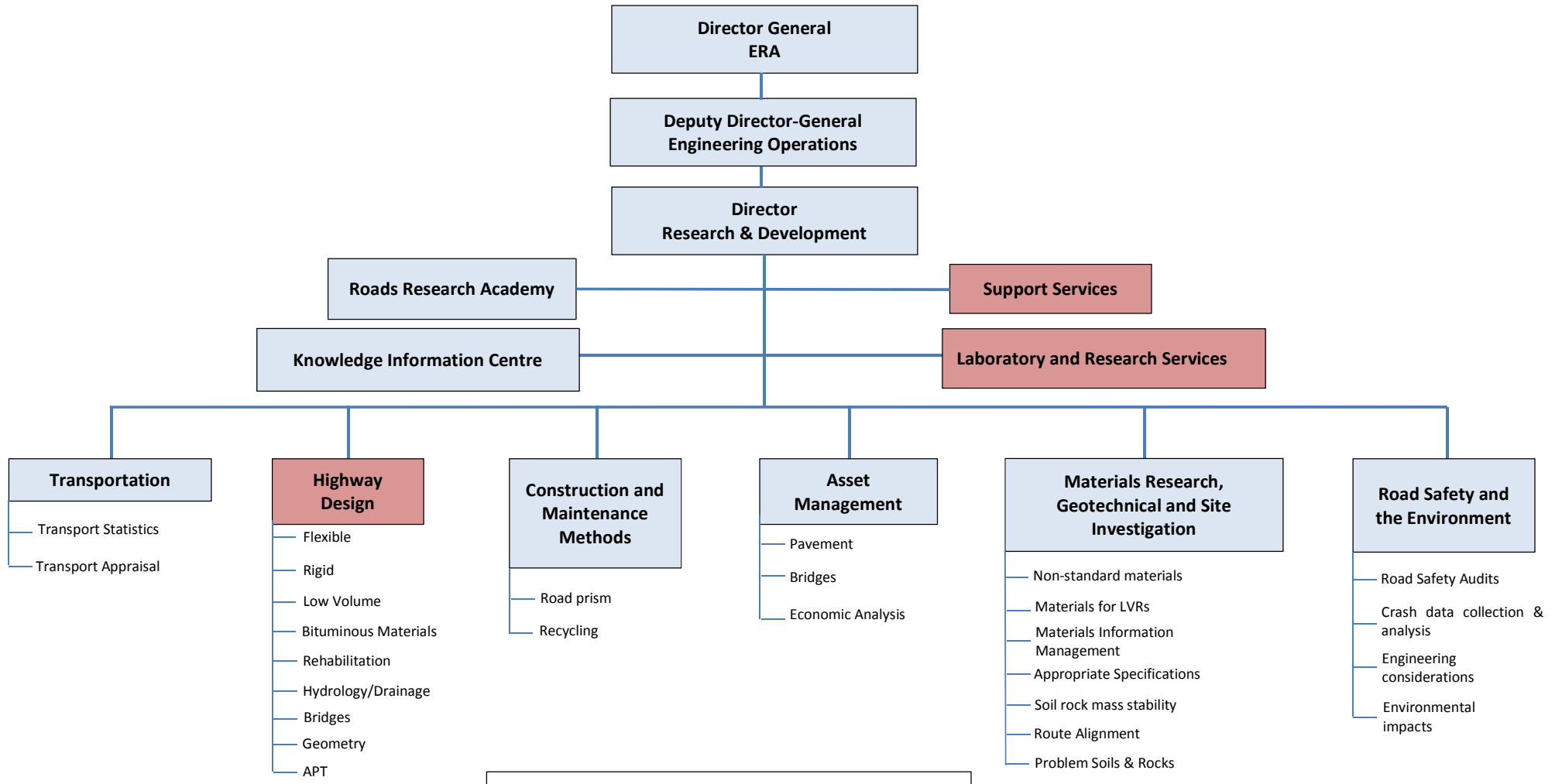


Figure 1: RRC organisational structure

4.2.2 Staffing Levels at November 2014

The current staffing levels of the RRC are shown in Table 2:

Category	Number	Comments
Professionals	16	<ul style="list-style-type: none"> This includes the Director, Team Leader Support Services and one qualified Librarian; The professional staff is made up of Civil Engineers, Materials Engineers, Geologists, Survey and Mapping specialist and a Mathematician; It is expected that the Acting Team Leader, Highways Design will be appointed permanently in the next month once the initial 3 month probationary period required for all new ERA staff has been completed; A lead researcher (civil engineering) and a chemist are in the process of possible appointment to the RRC; The professional staff will be grown to a maximum of 20 at the temporary facility
Laboratory Technicians and Assistant Technicians	10	<ul style="list-style-type: none"> This includes a laboratory manager
Drivers	5	
Administration & Financial Support	21	
Other Support	4	<ul style="list-style-type: none"> This includes cleaners, gardeners and canteen staff
Total	56	

It should also be noted that the initially high turnover experienced in 2012/13 has now stabilised over the past 18 months and the numbers of professional staff with experience is now starting to grow. The move to the temporary RRC facility at Kality in June 2014 has also contributed to the improved staff stability.

4.3 Development of the Temporary and Permanent RRC at Kality

As part of the Business Planning process in 2012, it was anticipated that the temporary facility would be available for occupation during 2012. In reality, the temporary facility was only occupied in June 2014 which has had a significant impact on the progress anticipated in 2012.

In terms of the permanent facility, the following applies:

- The detailed design, based on the concept design presented as part of the business planning process between 2010 and 2012, has been completed and was submitted to ERA at the beginning of November 2014.
- It was originally anticipated that the contract for the detailed design would be completed by the end of 2013 and construction of the permanent facility would be finalised by June 2015.
- The contract for the construction of the permanent facility is likely to be awarded in the first quarter of 2015 and is anticipated to take two years to complete.
- In the original plans, the appointment of staff for the RRC was linked to the anticipated completion and occupation of the temporary and permanent facility. The appointment of staff in the original 2012 Plans will now need to be revised based on the new anticipated completion date of the permanent facility.

- It is now expected that the staff complement of the RRC will remain similar to that shown in Table 2 until the permanent facility is completed and commissioned. The focus for the next period will be on improving the experience and competence of the current research staff through the delivery of quality research outcomes. The portfolio of projects will also need to be modified to accommodate this change in strategic approach.

4.4 Priority Projects

The proposed projects or programme of linked projects, in the various Teams and Strategic Focus Areas (SFAs) are shown in Table 4 of the 2012 Business Plan with the Project schedule shown in Table 5. The additional projects identified during the needs analysis undertaken in 2011/12 are also shown in Table 6 of the plan. The six programmes identified in the Business Plan for undertaking projects are:

- Demonstration of appropriate designs provided in the LVR design manual (2011) including the selection & demonstration of appropriate technologies for LVR construction and maintenance;
- Whole life performance of flexible pavements;
- Contract management;
- Use of local, non-standard materials;
- Data collection for improved traffic statistics; and
- Environmental impacts.

These programmes are still deemed to be relevant to group the various projects and continue to encourage a combination of team expertise for cross-fertilisation of ideas to undertake the programme.

It should also be noted that the projects shown in the Business Plan were in addition to the ongoing, mainly AFCAP, projects being managed through the Planning and ICT Department under the Deputy-Director General who is the AFCAP coordinator for Ethiopia. It is now likely that these projects will also fall under the responsibility of the RRC for management purposes and will be included in future list of priority projects

The three projects that had already been approved by the RMC and assumed to start in February 2012 were also included in the tables of the Business Plan. These projects were:

- Develop DCP-CBR correlations for Ethiopian materials for pavement design and construction quality control;
- Review the suitability of surface treatments in Ethiopia;
- Evaluation of productivity rates of road construction equipment in Ethiopia

The following priority projects in the respective teams were identified for detailed project proposals to be drawn up. The detailed proposals are provided in Appendices 1 to 5 in report TLRRC/11:

- **Materials, Geotechnics and Site Investigation Team (MGSI)**
 - Develop a national database of construction materials recording quality, quantity, location and cost, incorporating:
 - A pilot study in typical regions to develop a materials database (including Gambella region)
 - Characterisation and specifications for local materials for use in LVRR pavement & surfacing options;
- **Highway Design (HD)**
 - Investigating the performance of different pavements structures and quantification of whole life benefits;

Ethiopia Scoping report

- Causes and remedial measures for asphalt concrete pavement damages;
- **Construction and Maintenance Practices (CMP)**
 - Causes of poor performance from contractors;
 - Causes of cost overruns on ERA works contracts.

Following further discussions with the RRC and other stakeholders, it was agreed that the two projects in the Construction and Maintenance Practice (CMP) Team could be combined into one project called:

- Research into the Performance of Contractors on Road Construction and Maintenance projects in Ethiopia;

The four projects shown in the MGSI and HD teams and the combined project for the CMP team were scheduled to start between July and October 2012 and are in addition to three projects already approved by the Research Management Committee (RMC).

The 2012 Business Plan also stated that, “the timing and start dates of other priority projects will be dependent on the ability to recruit staff; the successful implementation of the ongoing, approved and recommended projects to start between July and October 2012; and the completion of the temporary facility and laboratory”. The original planned schedule of projects and timeline for the duration of the projects is shown in Appendix 3. This schedule will need review and update based on progress to date.

As at November 2014, the “National Database for Construction Materials” project has been started under the Highway Design team with technical assistance from TRL.

4.4.1 Longer Term Projects

The project list of needs shown in Appendix 5 of report TRLRRC/09 shows the additional projects that could be started after the establishment of the permanent facility.

It should however be noted, that as time progresses and circumstances change, projects that were given a lower priority during the initial, 2012 evaluation may increase in priority later. It is therefore important that the project portfolio is flexible and reviewed regularly. At the time, it was recommended that any changes in priorities and postponement of projects should be captured through the RRC management structure and approved by the RMC.

In addition, it was acknowledged that during the 10 year period, new projects, not yet captured in the project list but with high priority, would be identified. Flexibility in the RRC project portfolio was recommended to accommodate these projects.

No project schedule was presented for the 5 – 10 year period but indications of the likely duration of the project and a tentative start date were provided in the Business Plan. These will be reviewed and updated in the 2015 revision of the Business Plan

4.4.2 Status as at November 2014

The current portfolio of projects anticipated to be managed by the RRC is shown in Table 4. They include a combination of ongoing AFCAP projects that overlap from AFCAP 1; ongoing projects funded by ERA and approved by the RMC; and new projects with a variety of funding sources. The projects shown for AFCAP funding have been listed in priority order from the top in Table 4. These projects were presented at the stakeholder meeting of 24 March 2015 as an input to obtaining agreement on the priority projects for funding by AFCAP.

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Table 4 ERA/RRC Project Priorities as at November 2014						
Project Title	Original Project Number ¹	Duration (mnts)	Original Start date	New Start Date	Funding Source	Comments
Final Review of the Standard Specifications and Drawings	n/a	2	Ongoing	Dec '14	AFCAP	Finalisation of the Specifications and Drawing that was undertaken as part of the Manuals projects in AFCAP 1.
Development of a national database of road construction materials	49 & 48	30	Feb'14	Ongoing	ERA/AFCAP	Started as part of the TRL technical assistance projects but needs ongoing capacity building support from AFCAP
Finalisation of the Draft (2011) Low Volume Roads manual (including stakeholder workshops)	n/a	8	Ongoing	Feb '15	AFCAP	This was held over from AFCAP so that sufficient funds would be available for the updates and final stakeholder workshops. The original team of authors will be required to finalise the manual.
Guideline document for the Standard Specifications	n/a	3	Ongoing	Feb '15	AFCAP	Requested during AFCAP 1 but could not be written until the Specs are finalised
Materials Testing manual to complement the Standard Specifications	n/a	2	Ongoing	May '15	AFCAP	Complimentary manual for the Standard Specifications
Development of a sustainable framework for LVRs	45, 6, 5, 33, 34, 50, 38, 28	36	New	March'15	ERA/AFCAP	AFCAP contribution would be for capacity building, mentorship and technical support in association with RRC staff. This project combines aspect of smaller projects identified in RRC/12/02.
Investigation of the use of cinder gravels in LVRs	45	18	New	July '15	ERA/AFCAP	Capacity Building and mentorship of RRC staff to undertake a research project from inception
LTPP monitoring of demonstration sites	12	2 weeks twice/year	Ongoing	May'15	ERA/AFCAP	Ongoing monitoring of demonstration sites built and monitored as part of AFCAP 1
Accelerated pavement testing (APT) of demonstration sections	5, 15	12	New	Aug '15	ERA/AFCAP	Needs to be a jointly funded project with an APT programme for all roads. AFCAP could possibly support capacity building and technology transfer while testing LVR demonstration sections.
Develop DCP-CBR correlations for Ethiopian materials for pavement design and construction quality control	47	15	Feb '12	Ongoing	ERA	Approved by RMC in 2011. Could be jointly supported and expanded by AFCAP as part of a broader regional project related to capacity building for DCP design
Review of suitability of surface treatments in Ethiopia	11	24	Feb '12	Ongoing	ERA	Approved by RMC in 2011
Evaluation of productivity rates of road construction equipment in Ethiopia	24	3	Feb '12	Ongoing	ERA	Approved by RMC in 2011
Cause of time and cost overruns on ERA works contracts	27 & 26	18	Jul '12	Ongoing	ERA	Priority project from RRC/12/02

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Table 4 ERA/RRC Project Priorities as at November 2014						
Project Title	Original Project Number ¹	Duration (mnts)	Original Start date	New Start Date	Funding Source	Comments
Assessment of the reliability of road designs	5, 6, 16, 14	36	New	TBA	ERA	Applicable to all roads
Forensic investigation of asphalt concrete performance and improvements to asphalt concrete design	16, 14	24	New	TBA	ERA/other donors possibly	Identified an urgent need but not for funding by AFCAP. Could be tied into an APT programme for funding from alternative sources. Possible support from World Bank, EU or AfDB
Investigation of Failure mechanism of foamed bitumen section (Ambo-Gedo road)	n/a	4	New	TBA	ERA	Possible capacity building project with RRC staff to undertake forensic investigation of the performance of foamed bitumen
Landslide monitoring, evaluation and countermeasures	41	56	July '11	Ongoing	JICA/ERA	Capacity building with ERA staff related to countermeasures for landslides in the Abay Gorge

¹ Original Project Number as shown in the Table 4 and 5 of RRC/12/02

4.5 Progress against the Business Plans

Progress against the actions and plans developed for management purposes in the 2012 Business Plan (Appendix 5 of RRC/12/02) are presented in Appendix 4 of this report for information. These will be revised in the 2015 version of the Business Plan to be compiled as a deliverable of this project.

The following is noted:

- The move to the temporary facility in Kality was only completed in June 2014, which was much later than the anticipated move in early 2013 that formed the basis of the Business Plans. This had a significant impact on the progress against the original plans, although the plans were developed to be sufficiently robust to accommodate delays of this nature. The anticipated start dates of some activities will need to be reassessed as part of this process.
- The equipment purchased as part of AFCAP 1 has been commissioned for use in the laboratories established at the temporary facility. Despite some initial problems with the equipment, most of the equipment is now working. The main problem is the concrete cube crushing apparatus which was purchased and has never worked. Despite several follow-ups with the suppliers (purchased under AFCAP 1), no support has been forthcoming to commission the apparatus and resolve the problem. The apparatus was supplied by Protea Surveying Equipment (also called Protsurv) from South Africa through a competitive tender process. Should equipment be provided through AFCAP projects in the future, the track record and support of this company should be thoroughly checked before any contract is awarded; even if it is the lowest quotation received.
- The staff complement at November 2014 is 56, of which 16 are professionals and 10 are laboratory technical staff. The professional staff may increase to 20 but it is intended to keep the total professional staff close to its current numbers until the permanent facility is completed. It is also important to note that the initial high staff turn-over of the RRC has now stabilised in the last 18 months.
- Three teams have been established as part of the RRC management structure (see Figure 1) with the name of the “Highway Design” team being changed to “Highway Research”. The establishment of a fourth team likely to be called “Landslide Stability and Site Investigation” team is in progress. This will be equivalent to the “Materials Research, Geotechnical and Site Investigation” team shown in Figure 1. Materials research is now undertaken by the Highway Research Team.
- The detailed designs for the permanent facility have been completed and the motivations and approvals for funding to construct the research centre have been completed. It is anticipated that a contract will be awarded to begin construction in the first quarter of 2015 and will take to years to complete. ETB 50 million has been budgeted in the 2014/15 financial year to start this work.
- Technical Assistance for capacity building of the RRC and ERA staff has been provided as follows:
 - By JICA through a project focusing on capacity building in landslide countermeasures.
 - By the World Bank through an extension to the TRL contract for the establishment plans of the RCC. This contract extension ran for one year from November 2013 to November 2014 and further details are provided in section 4.6.
 - Korean Exim Bank, along with the African Development Bank, is financing short term training for RRC staff.
- Apart from the capacity building support from JICA and the World Bank, all funds for the RRC have been provided as part of the ERA budget. Preliminary discussions are being held with

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the Road Fund to identify and fund RRC projects of interest to them particularly related to maintenance and asset management.

- The three projects approved by the RMC have been started plus the “Materials database” and “Cost Over-runs” project.
- One paper has been prepared with TRL and accepted for publication at the TRB Low Volume Roads conference in the USA in July 2015 on the Environmentally Optimised Design Approach for the design of LVRs.
- The first RRC conference was organised in April 2014 to feedback the latest research findings to the Ethiopian roads and transport stakeholders. A second conference is planned for 2015.
- A broader “Forum for Industry and University Linkages” managed by ERA has been established through the Ministry of Transport and Ministry of Science and Technology and to coordinate the national road research effort. This would supersede some of the activities of Roads Research Academy Team planned in the original RRC structure for coordination of this nature.
- ERA is supporting five MSc programmes; Highway Engineering, Geotechnical Engineering, Construction Management and Technology, Structural Engineering, and Hydraulic Engineering. ERA is also now supporting Environmental Engineering and support for laboratory technicians is being investigated.
- A number of university students are using the laboratory facilities and are being advised by RRC staff on their MSc projects.
- Formal linkages have been established through MoUs with TRL, CSIR, ARRB and the Korea Transport Institute; seven MoU’s have been signed with local universities; and a MoU has been signed with Geological Survey of Ethiopia.

5. RRC Capacity Building

As indicated in section 4.5, there have been two major capacity building initiatives for the RRC from the World Bank through an extension to the TRL contract for establishment of the RRC and from JICA for landside countermeasures which was a broader ERA capacity building initiative. There have also been short –term support for overseas visits from other agencies such as the Korean Exim Bank and the African Development Bank.

For future capacity building through the RRC, the main sources of support will come from the EU and from AFCAP. It is therefore important that clear boundaries for the support are defined for the coordination of future capacity building interventions and that these build on the interventions that have already taken place or are ongoing (eg JICA capacity building for landslides).

Based on the information presented in this section, the AFCAP project portfolio, priorities, details and actions shown in Section 6 have been developed. Some additional projects for consideration by the RRC and areas of possible collaboration between AFCAP and other donors have also been identified based on the information provided in this section.

Based on discussions with other donors such as the World Bank and the DFID office in Ethiopia, it is unlikely that capacity building support to the RRC will be forthcoming. In term of the World Bank, their main focus is on funding a section of a new expressway from Mojo to Awassa and on to the Kenyan border in association with the African Development Bank (AfDB). They would however consider projects related to improved designs and construction of expressway pavements and could be approached as a possible partner to an APT programme discussed later in this report.

DFID Ethiopia was considering including rural roads in a broader Economic Development plan but this has now been shelved. They are however establishing an Infrastructure Advisory Facility of which a significant part will be focused on Trade Logistics and Urbanisation. It was suggested that

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future capacity building interventions for ERA and the RRC could be linked to that area related trade in rural areas and the access required.

5.1 TRL Technical Assistance

TRL UK Ltd were contracted to provide Technical Assistance (TA) to the RRC for one year from November 2013 to November 2014. This was an extension to the project for a “Preparatory Study Towards the Establishment of a Road Research Centre” funded as part of a World Bank loan to finance ERA Modernisation and Sector Capacity Building. The initial project for the development of a 10-year business plan was completed in December 2012.

At the time of preparing this draft report, the final report for the TA support is unavailable for review. However, based on discussions with the project team, the following was achieved over the one year period:

- Update and restructuring of the Research Management and Procedures Manual (RRC/12/1) prepared as part of the original project;
- Preparation of an induction course for new RRC staff based on the Research Management and Procedures Manual;
- Preparation and delivery of 4 training courses, namely:
 - Bitumen and Asphalt use
 - Setting up and monitoring research sections
 - Surfacing technology
 - Use of locally available materials.
- Assistance with active research projects and report:
 - Support has mainly been for the Materials Database project which will be reported on in the final TRL project report.

As part of the outputs of the TA, a monitoring report on RRC capacity building progress against the Business Plan is being compiled and should be part of the final TRL report. This will be included in the 2015 revision of the Business Plan.

A possible future project identified by TRL, and in association with the TA support provided by JICA, was a project on bio-engineering for landslide countermeasures based on principles developed in Nepal. This would need further discussion with the Director, Research and Development and if seen as a priority, a proposal would need to be prepared and financial support identified and motivated for the project.

5.2 JICA Technical Assistance

This project was started in July 2011 and focused on capacity building in landslide countermeasures. The project is scheduled for completion in February 2016 and has a total value of about \$8.5 million. This amount excludes some of the investigation and construction of countermeasures being carried out in Abay Gorge which is covered by the ERA budget.

5.3 Future Donor Support

AFCAP and the European Union (EU) have been identified as the main supporters of capacity building for the RRC in the immediate future. Projects identified for AFCAP support are covered in Section 6 based on the priority projects shown in Table 4. Details of the EU support to the RRC are shown in section 5.3.1.

5.3.1 EU support to the RRC

Capacity building support to the RRC from the EU is being funded through the Fourth Road Sector Policy Support Program in Ethiopia (SPSP IV) CRIS number: FED/2014/037-753 which has a total budget of:

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- €138 million for budget support; and
- €2 million for complementary support.

The general objective of the Sector Reform Contract (SRC) is to contribute to sustainable and inclusive growth, eradicate poverty and improve sector governance through the implementation of the Fifth Road Sector Development Program (RSDP V). Specific objectives are:

- To support the Government of Ethiopia (GoE) in fighting poverty through the development of an effective road network to improve access to basic services and markets;
- To support the implementation of the RSDP V with a specific focus on rural access;
- To contribute to the modernization process of roads management authorities;
- To improve road safety, maintenance of assets, quality and impact of works.

The expected results of this sector reform contract are the enhancement of the performance in implementing the RSDP V. The main aim of the RSDP V is to continue expanding and rehabilitating Ethiopia's road network, with specific attention on regional corridors and rural access. The RSDP V, currently under preparation (1st draft due to be ready in early 2015), is expected to continue focusing on physical achievements and also put more emphasis on three main areas: capacity, quality and efficiency. This will be built on an overall modernizing process of Roads Authorities at different level, also involving the Ministry of Transport.

The following support has been motivated for the RRC as part of SPSP IV:

- Research capacity building:
 - Placement of lead and senior researchers in international research organisations for a six (6) month period for experiential training in fields such as:
 - Road materials research;
 - Field investigation monitoring;
 - Data analysis;
 - Research methodology; and
 - Road safety.
 - Placement of research managers and team leaders in international organisations for six (6) months for experiential training in fields such as:
 - Business development and management;
 - Research methods;
 - Research project management; and
 - Knowledge and technology transfer.
 - Postgraduate training programmes (PhD and MSc programmes in selected international universities).
- Implementation of research projects focusing on the performance of asphalt concrete pavements, including the construction of trial sections.
- Provision of specialist research equipment for the laboratory including:
 - One wheel tracking apparatus, auto armlift with all accessories;
 - One automatic extractor of binder and separator of mineral matter (sieving, centrifuge extraction and solvent recovery);
 - One gyratory compactor with all accessories;
 - Two skid resistance testers (standard);
 - One ground penetrating radar;
 - One oven of 225 l, 240 v
 - One falling weight deflectometer with all accessories and software; and
 - One lightweight dynamic penetrometer.

The estimated cost of the EU support to the RRC is shown in Table 5.

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Item	Category	Unit cost (£)	Quantity	Total Cost (£)
Research Capacity Building	Senior researcher	20 000	6	120 000
	Research managers	15 000	4	60 000
	PhD/MSc	100 00	2	200 000
Research projects		70 000	3	210 000
Equipment		Lump sum		400 000
Total				990 000

While the funding of research capacity building could complement some of the AFCAP interventions, the other identified areas for EU support are more related to higher volume roads with the investigation of asphalt concrete and the supply of equipment mainly related to asphalt concrete design. This would not overlap with proposed AFCAP projects.

However, investigation of asphalt performance and the introduction of new innovative asphalt mixes based on revised mix design procedures that is being funded by the EU could benefit significantly from an Accelerated Pavement Testing (APT) programme. APT has also been suggested for some of the demonstration section built under AFCAP 1 and being monitored on an ongoing basis. Should ERA wish to embark on an APT programme, funding from the EU and AFCAP could be investigated further as a joint initiative with ERA for specific projects on the basis that the APT equipment for the testing would be purchased or hired by ERA.

6. Project identified for AFCAP Support

Table 6 shows a summary of the projects identified for support by AFCAP and presented to the stakeholder meeting of 23 March 2015. This table is based on the priority project identified during the original business planning process (shown in Table 4), the ongoing AFCAP projects funded as part of AFCAP 1 and the additional capacity building and technical assistance provided by other donors such as JICA and the EU.

The approved list of projects agreed at the stakeholder meeting of 23 March 2015, including Terms of Reference or Project proposals for further action from the AFCAP PMU are provided in a separate report on the project priorities (AFCAP/EthRRC/02).

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Table 6					
Summary of Projects Proposed for AFCAP Funding and presented to the Stakeholder Meeting of 24 March 2015					
Priority	Project Title	Status	Length (months)	Start Date	Comments
1	Final review of the Standard Specifications & Drawings	Ongoing from AFCAP 1	2	Dec '14	Proposal submitted to AFCAP and project approved.
2	Development of a National Database of Road Construction Materials	Ongoing RRC project	12	Jan'14	Capacity Building with RRC. Supported by TRL as part of TA in 2014
3	Finalisation of the Low Volume Roads manual (including workshops)	Ongoing from AFCAP 1	8	Feb '15	To be finalised by original development team as agreed with ERA during AFCAP 1
4	Guideline for the use of the Standard Specifications	Ongoing from AFCAP 1	3	Feb '15	To be written by team who updated and reviewed the Specs (L Sampson/Bekele Jebessa/R Geddes)
5	Materials Testing Manual to complement the Standard Specifications	Ongoing from AFCAP 1	2	Feb '15	To be written by team who updated and reviewed the Specs (L Sampson/Bekele Jebessa/R Geddes)
6	Development of a Sustainable Framework for LVRs with consideration for climate and environmental factors	New RRC project	36	Mar '15	Capacity Building with RRC for 3 years. Possible TRL/CSIR joint support
7	Cinder Gravels investigation	New RRC project	18	July'15	General mentorship of Researcher(s) for undertaking a research project from inception
8	Monitoring of Demonstration Sections	Ongoing from AFCAP 1	2 weeks twice/year	May'15	Cost for 6 years. Previously supported by TRL (A Otto/T Greening)
9	APT testing of demonstration sections	New RRC project	12	Aug '15	Only some capacity building & training from AFCAP. Detailed justification in preparation for consideration by ERA, AFCAP and possibly other donors for joint support

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7. Action plan

The following actions are recommended:

- The RRC Business Plan developed in 2012 is sufficiently robust in terms of the identity and structure. However, the plans, actions and timing (shown in Appendix 1) will need to be updated based on the progress against the business plan summarized in section 4.5 and detailed in Appendix 5. It was agreed that a 2015 version of the Business Plan would be produced for ongoing management of the RRC.
- Inputs into an updated business plan are a required outcome of the TRL technical assistance that was completed in November 2014. Relevant recommendations from the TRL final report will be included in the 2015 version of the business plan.
- The final priority list of projects for AFCAP funding agreed at the stakeholder meeting of 24 March 2015 will be submitted as a separate document to the AFCAP PMU with the appropriate supporting document for further action and implementation.

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Appendix 1

Plans and Actions from the 2012 Business Plan

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The plans and actions presented in this section have been based on the information and analysis presented in the previous sections, especially the Key Strategic issues (KSIs) plus the summary Team business plans in TRLRRC/09, Appendix 6. Plans were developed in the following areas because of the potential variations in the way the teams will need to plan and operate:

- Research Delivery Teams - A generic summary business plan has been developed for the six research delivery teams as most of the plans and actions are common to all the teams.
- Laboratory and Research Services Team;
- Roads Academy Team;
- Knowledge Information Centre Team;
- Support Services Team.

Specific plans in the various teams will be highlighted as necessary. The plans presented have been divided into:

- Year 1 – which will be critical to the establishment and ongoing success of the RRC;
- Years 2 and 3;
- Years 4 and 5; and
- Years 6 to 10

Appendix 5 of RRC/12/02 shows the detailed action plans with appropriate performance measures for use in the ongoing management of the RRC. The plans are intended for use at the internal management meetings of the RRC (ie Director and Team Leaders) and for reporting progress to the RMC of ERA.

1 Plans for Year 1 (July 2012 to June 2013)

The following overall plans and strategies will be initiated in year 1 and assumes that the temporary facility will be operational by July 2012. The plans have been structured into overall RRC plans to address the KSIs and into specific team plans that need to be implemented to effect establishment and operations of the team.

1.1 Staff recruitment

- Prior to this business plan coming into effect in July 2012, all Teams need to be formally constituted as shown in the Organogram in Figure 2 with staffing levels indicated in Table 9 for 29 researchers at the start of the business planning cycle in July 2012 building to the 52 during the first year. Possible combinations of Team Leader roles in the early stages.
- Technicians and other support should be based on the figure in Table 13.
- During year 1, staff recruitment will continue with an initial emphasis on Team Leaders and senior technical staff.

1.2 KSI 1- Sustainable Funding

- ERA needs to ensure that sufficient funds are budgeted for 2012/13 to facilitate the establishment, recruitment and retention of RRC staff;
- Funds need to be made available for the detailed designs expected to be completed by July 2013.
- Provision need to be made for the purchase of supplementary equipment for the temporary laboratory and phase over the first two financial years.
- RRC needs to be linked into the formal ERA structures with donor bodies (eg AFCAP/DFID, World Bank, EU) to enable the motivation of funding for specific projects. This is particularly important for the preparatory research projects for the Safety Corridor study and National Traffic Census where the ToRs have been developed through this project and could be used to develop RRC capacity in the Transportation and Road Safety Teams.

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- Further discussion and plans should be instigated with the Road Fund Office to identify their research needs related to improved maintenance practice and road safety issues that could be funded by the Road Fund to supplement the funding for projects through ERA.
- The LRS team will need to develop detailed funding structures for services being offered on a cost-recovery basis.

1.3 KSI 2 – Staff Retention

- Staff retention policies will need to be developed as a matter of urgency; even before the start of the 2012/13 financial year. Further details are provided in Section 11.1 of possible retention policies and incentives that could be implemented.
- It is important that RRC management is involved in the discussions related to policies being developed by the Civil Service department for staff retention, especially valued and experienced research staff.
- It will be important for the management of RRC to be closely aligned to the Civil Service Department initiatives investigating better remuneration and incentives packages to retain researchers.

1.4 KSI 3 – Research Credibility

- The research projects shown in Section 10.2 will be launched with a view to making early deliverables within 6-9 months.
- The Research newsletter should be published through the KIC on a regular basis to feedback research findings and successes.
- Local and international conferences and seminars should be identified for submission and presentation of papers on research outcomes.

1.5 KSI 4 – Human capacity Development

- The short term training plans developed as part of the TRL Preparatory Establishment Study will be delivered between May and October 2012. A schedule for the annual delivery of the courses in future years should be developed.
- Initiation of training and a Continuous Professional Development (CPD) Programme (including assistance in attaining professional registration for engineers and scientists) with a base level survey of staff skills and research groups' skills requirement will be required once new staff have been recruited. This will be managed through the Road Research Academy.
- A framework of specialist external managerial and technical support should be developed to assist in research development and staff mentoring. Sources of funding for ongoing technical assistance will also have to be motivated.

1.6 KSI 5 - Coordination of the National Road Research Effort

- Initiation of an internal RRC management committee, comprising the Director and the Team Leader to internally prioritise resources, manage and coordinate research initiatives on a monthly basis and also to link with ERA Research Management Committee.
- The Research Steering Committee of external stakeholder will be reconstituted and used as an Advisory Body for coordination, feedback and possible implementation of road research in Ethiopia.
- RRC will continue to support the local universities through the provision of specialist lectures as part of MSc course in highway engineering. The specialist road research facilities at the RRC will be made available for PhD research students who could be co-opted to work at the RRC during their studies.
- Linkages to international road research organisations will continue to be developed through Memorandum of Understanding and other formal agreements where appropriate for

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ongoing capacity building and to ensure that the Ethiopian road sector is kept abreast latest international best-practice.

- RRC will open formal discussions with AFCAP to provide an “African home” for the programme through the provision of offices at the RRC.

1.7 Research Delivery Teams

- Projects will be initiated in line with the prioritised list shown in Section 10.2.
- A detailed baseline inventory of resources for each research team will be drawn up to be in line with the initial research projects scheduled to start between July and October 2012 (see Section 10.2); including a list of resources/equipment available for in situ and laboratory testing.
- An internal research skills certification programme will be developed.
- An ongoing review process will be initiated for research project priorities.
- A programme of individual research team workshops will be drawn-up that is linked to early research deliverables.

1.8 Laboratory and Research Services (LRS)

- The initial senior staff comprising Team Leader and two “Services Managers” will train the inexperienced technicians in the basic tests and survey procedures and also ensure that the qualified technicians are also working correctly.
- A programme of training for the technicians will be devised so that they can continually increase the number of tests and measurement procedures that they can confidently carry out accurately and thereby progress up the scale towards Senior Technician.
- Initially, laboratory-based technicians and field survey technicians will form two separate groups. These will amalgamate at a senior level when staff have sufficient experience to be capable of carrying out the majority of tests in both areas.
- A certification format will be devised so that the competence of a technician to carry out a particular test can be verified and rewarded.
- It is of the highest priority to review, with the research staff, the equipment of the RRC to identify any shortfalls or deficiencies for carrying out the research plan and the proposed programme of work. Procurement of any additional equipment should begin as soon as possible.
- The development and implementation of the QA system for internal use should begin with the appointment of a Lead Researcher to manage the process.
- A start is made on determining the true costs of the services provided by the LRS team.
- Additional data collecting and surveying functions will be introduced to satisfy the needs of Safety, Environmental and Transport Research activities. These will be brought in to coincide with the beginning of research in those areas.

1.9 Road Research Academy (RRA)

- Recruit a Team Leader (HR function) and identify administrative assistant (immediate)
- The Team Leader will establish the unit and lead an information dissemination programme on the RRA, both internally and externally, with appropriate literature and a website, within three months.
- The unit will establish the Academy Fellowship of representatives from RCC, ERA, all relevant National stakeholders and representatives from the Road Sector, within six months.
- Launch short term training programmes.
- Initiate National MSc programme immediately.
- Establish formal linkages with relevant Universities and academia throughout the year.
- Arrange short term secondments and international qualification programme, as required.

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1.10 Knowledge Information Centre (KIC)

- Establish a KIC team within the RRC, by employing relevantly qualified and experienced staff for the roles identified.
- Procure basic facilities that are adequate and appropriate for running the KIC at the temporary facility.
- Identify a training programme for KIC staff, as required.
- Identify a library system that is appropriate and will be transferable when the RRC moves to the new building.
- Establish linkages to other libraries (local and international – See Appendix 1).
- Establish and manage an RRC website.

2 Plans for Years 2 and 3 (July 2013 to June 2015)

2.1 Staff recruitment

- Staff recruitment will continue building towards the 103 professionals required for the permanent facility at the start of the 2015/16 financial year.
- Technicians and support staff will be appointed to meet the needs of the research projects and externally funded service contracts undertaken by the LRS.

2.2 KSI 1- Sustainable Funding

- ERA will continue to fund the research projects in line with identified industry needs.
- Funds will be available for the start of construction and commissioning of the permanent facility. Construction will be completed and the permanent facility ready for occupation by the end of year 4.
- Projects related to the Safety Corridor study and National Traffic Census will be underway and funded by donors.
- Projects will be undertaken for the Road Fund Office.
- Specialist laboratory and site service will be offered by LRS on a cost-recovery basis.
- Funding will have been secured for ongoing international technical assistance and support for the whole of the two year period.

2.3 KSI 2 – Staff Retention

- Staff retention policies will be in place and implemented.

2.4 KSI 3 – Research Credibility

- Some research projects shown in Section 10.2 will be completed during this period and the findings fed back to the industry for implementation.
- New projects will be started as indicated in Section 10.2.
- At least three international papers will have been published at international conferences
- The Research newsletter will have been published at least every six months.
- A needs analysis and prioritisation of potential projects (including those not prioritised in the originally) will be undertaken on an annual basis prior to the start of each new financial year. This should involve all stakeholders through the Research Steering Committee.

2.5 KSI 4 – Human Capacity Development

- The short term training courses developed as part of the TRL Preparatory Establishment Study will be delivered by RRC on an annual basis in line with a schedule devised in year 1.
- The Continuous Professional Development (CPD) Programme developed in year 1 will be implemented mainly through the RRA as part of the training plans in Section 12.

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- Specialist external managerial and technical support will continue to assist in research development and staff mentoring. Sources of funding for ongoing technical assistance will have to be motivated.

2.6 KSI 5 - Coordination of the National Road Research Effort

- All internal management systems will be in place and RRC will be operating to the procedures and systems.
- The Research Steering Committee of external stakeholder will meet at least twice a year to provide advice to the RRC on its research programme and to be involved in providing assistance as required for any feedback workshops and seminars of research findings to held centrally and regionally. The RSC will also assist in any implementation processes that may be required.
- RRC will continue to support the local universities as part of MSc and PhD qualifications in highway engineering.
- Formal linkages to international road research organisations will continue and capacity building and technology transfer programmes with other international research organisations will have started.
- AFCAP will be housed at the RRC.

2.7 Research Delivery Teams

- All managerial, research and service systems within the RRC research groups are fully operational by the middle of year 2 with all Team Leader and Lead Researcher staffing levels at the required 5–year target in place.
- Early in Year 2 a suitable framework of charge out rates and costing guidelines are in place for external projects undertaken by the Research Teams.
- The research teams continue to undertake projects shown in Section 10.2 as part of the ERA priorities and also start undertaking external contracts;
- The research outputs delivered in Year 1 have established the RRC as a credible national road research centre and this reputation is further enhanced by outputs in Years 2 and 3.
- Towards the end of Year 2 and into Year 3 major research outputs from strategic research programmes are delivered and disseminated.
- A second tranche of research projects are initiated during year 3 alongside extensions and spin-offs from outputs of completed or ongoing projects and other projects identified during year 1 and 2
- RRC staff make major contributions to regional workshops and conferences based on their research programmes.
- Towards the end of Year 3 a major “mid-term” review is initiated on the achievements and research capability of RRC and how this impacts upon the 10 and 20 year visions.

2.8 Laboratory and Research Services

- The recruitment and training of technicians continues as in year 1.
- A technician training programme is devised based on LRS’s experience and the LRS is promoted as a training centre for technicians to provide additional funding resources for RRC.
- QA procedures are completed and implemented.
- A review of the LRS QA system and the ERA QA system needs to be undertaken to advise on the practicality, the advantages and disadvantages of external review and certification. (The ERA system is not a true ISO9001 system but could easily be developed to comply if this is deemed appropriate)
- All LRS senior staff are in-post and fully operational by the middle of year 2.

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- Early in year 2 a suitable framework of charge out rates and costing guidelines are completed for external projects.
- Procedures for auditing and certifying other laboratories are developed and piloted internally before being implemented.
- Early in year 3 a start will be made in setting up a national scheme for auditing and certification of laboratories in Ethiopia.
- Towards the end of year 3 a major 'mid-term' review is initiated on the achievements and capability of the LRS and how this impacts upon the 10 and 20 year visions

2.9 Road Research Academy (RRA)

- National and international conferences, workshops and seminars will be hosted.
- Eastern Africa Research Coordination Programme meetings will be organised.
- Research programme findings are disseminated through publications and other media.
- Support to the National MSc programme is broadened.
- There will be active participation in PhD programmes.
- Medium term secondment programmes with international organisations will be initiated.

2.10 Knowledge Information Centre (KIC)

- Develop the most effective access plan to the RRC information.
- Continually develop and adjust to the market needs, review effectiveness of information delivery and dissemination.
- Set a plan for digitisation of all relevant ERA information.
- Explore and develop plans for collaborations outside of ERA both locally and internationally for two-way information transfer (eg with Universities, other government departments, the private sector and other international road research organisations and libraries).
- Begin planning for the move from the temporary facility to the new building.

3 Plans for Years 4 and 5 (July 2015 to June 2017)

3.1 Staff recruitment

- All professional, technical and support positions identified for the permanent facility shown in Table 8 will have been filled and the RRC will be fully operational;
- Any resignations of key managerial and research personnel will be filled quickly.

3.2 KSI 1- Sustainable Funding

- ERA continues to be the major funder of the RRC with 75 - 80% of funding derived from this source;
- The permanent facility will be completed during this time and no further capital expenditure will be required for this purpose.
- Procedure for managing external funded projects through the RRC will be well established and 20% of the RRC funding will come from these sources.
- The Road Fund Office will be a major client of RRC.

3.3 KSI 2 – Staff Retention

- Staff retention policies will be implemented and modified in line government requirements.
- Performance monitoring procedures will be developed and established to reward good performance.

3.4 KSI 3 – Research Credibility

- The permanent RRC facility is launched and inaugurated by the Minister of Transport.
- Initial research projects will have been successfully completed and fed back to the industry.

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- The first biannual International Roads Conference will be organised at the new RRC conference centre featuring papers from the RRC.
- Staff of the RRC will have published at least six peer reviewed papers in journals or at international conferences.
- The Research newsletter continues to be published through the KIC on a regular basis to feedback research findings and successes.
- Senior researchers and staff of the RRC will be recognised for their work both locally and internationally.

3.5 KSI 4 – Human capacity Development

- The training plans in Section 12 will be implemented.
- The Continuous Professional Development (CPD) Programme will be ongoing and managed through the Roads Academy.
- Once the permanent facility is fully established and operations are stable, full-time management support for the development and establishment of the RRC should be reduced. This is expected at the start of year 4.
- Some specialist external technical support will still be required.

3.6 KSI 5 - Coordination of the National Road Research Effort

- The RRC will be accepted as the national road research coordinator.
- The RRC will be the primary driver in establishing an East Africa (and possibly a Sub-Saharan) research coordinating body of national research centres for information exchange and possible joint projects; and will provide specialist research equipment and resources for any joint regional projects. This coordination could also involve other AFCAP members from southern Africa.
- The Research Steering Committee will continue as an Advisory Body of national stakeholders.
- RRC will continue to support the local universities through the RRA.
- Linkages to international road research organisations will be established and method of collaboration in place.

3.7 Research Delivery Teams

- RRC research teams reach full capacity in terms of resources (see Table 8 for researcher staffing levels)
- The first RRC Biannual Research Conference is organised.
- Research outputs establish RRC as the major regional centre for road and transport related research and advice.
- The RRC moves from its temporary facilities to its purpose built facility and the Research Teams are fully established there by the end of Year 4 with a minimum of 50 trained researchers and 50 other researchers in training.
- Research Teams are increasingly utilised on externally funded projects through the LRS and take part in major donor funded programmes in collaboration with national and international consulting groups.
- Key milestones for the 10 year and 20 year horizons are confirmed and long term research themes are established, especially related to APT.
- RRC staff routinely will not only make major contributions to regional /international workshops and conferences based on their research programmes but are invited as key-note speakers on major road-related issues.

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3.8 Laboratory and Research Services

- The LRS move from its temporary facility to its purpose-built laboratories, test site and services centre and is fully established there by the end of Year 4.
- A major publicity campaign is developed and launched to re-advertise the services offered to the industry now that the new facilities are fully functional.
- The national scheme for auditing and certification of laboratories in Ethiopia will be completed and implemented.
- Following on from the auditing and certification of testing laboratories, a start will be made to develop a QA and certification scheme for new products and processes entering the highways industry. This scheme will be for all contractors and material suppliers and will need to be developed in close collaboration with the industry.
- Key milestones for the 10 year and 20 year horizons are confirmed.
- LRS reaches the full 5-year planned capacity in terms of resources but recruitment needs to continue to cover resignations and retirements.

3.9 Road Research Academy (RRA)

- Manage and host the first biannual international conference at the new conference facility.
- Manage and provide Secretariat support for Eastern Africa Research Coordination Programme meetings.
- Disseminate research programme findings through publications and other media.
- Continue to manage the industry capacity development programmes including managing the linkages with local and international universities and other international research organisation.

3.10 Knowledge Information Centre (KIC)

- Consolidate the KIC as a core facility in supporting the success of the RRC.
- Digitise all relevant ERA information.
- Establish links and collaborations for information exchange outside of ERA.
- Develop plans for collaborations outside of Ethiopia.

4 Plans for Year 6 – 10 (July 2017 to June 2022)

4.1 Staff recruitment

- Optimum staffing levels will have been reached by the end of year 5. Staff recruitment should only involve replacement of staff that resign and should be recruited in line with the relevant job description for the specific position.
- Consideration may have to be given to increasing the staff numbers in the KIC and RRA Teams during this period depending on the growth and workload in these areas over the first 5 years of operations. However, any increases in professional staff are unlikely to be more than two or three additional personnel. Suitable job descriptions will need to be developed to accommodate additional staff in these areas.

4.2 KSI 1- Sustainable Funding

- The establishment of a permanent RRC facility in this period will confirm the commitment of ERA and Government to the RRC. However, it will be necessary for ERA to commit funding for the next 20 years to ensure the RRC becomes an established and credible research centre for the country and the East Africa region.
- It is recommended that 30% of the RRC funds could be generated from sources external to the ERA budget to ease the burden on public sector funding. However, it is highly unlikely that the RRC would have the experience or credibility to operate as an independent research

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agency for at least 20 years should funding be cut from ERA. For the survival of the RRC it is essential that ERA and government understand and commit to the investment that will be needed for the centre to succeed and grow.

- The 5 to 10 year period will be one of consolidation following the rapid growth phase over the first 5 years. To ensure the sustainability of funds from all sources it will be critically important for the RRC to disseminate the findings of its research to the broader road sector and ensure their findings are being implemented through the appropriate channels for the betterment of the road sector. The benefits of the research will need to be constantly monitored, measured and promoted to sustain the funding levels for the Centre.

4.3 KSI 2 – Staff Retention

- The reality is that if staff retention is not sorted out in the first five years, the chances of the RRC establishing itself in line with the plans presented here will be remote.
- Should staff retention still be a problem after 5 years, it will be necessary to revise the business and recruitment plans to accommodate this during the annual review process; and as a major component of the 5-year review. Most of the actions and plans presented here will remain valid but the timing and scheduling of the actions will need to be extended to accommodate the loss of staff and the inexperience of new incumbents.

4.4 KSI 3 – Research Credibility

- By the end of the 10 year period the RRC will have successfully completed at least 20 research projects with relevant industry interventions to feedback the results. Typical interventions could include:
 - Development of a new best-practice manual;
 - Updates to the current series of design manuals;
 - Updates to specifications;
 - New test methods and specification limits to better evaluate materials and the quality of construction and maintenance works;
 - Improved construction and maintenance methods;
 - Peer-reviewed papers for publication in journals and conferences both local and international;
 - Industry feedback seminars and conferences;
 - Training courses and updates to tertiary education curricula.
- Biannual International Roads conferences are being run from the conference centre with at least 20 papers from international contributors. (eg Conference on Ethiopian Roads and Road Transport, CERRT or Conference on Roads and Road Transport for East Africa, CoRRTEA)
- At least 30 peer reviewed papers will have been published by June 2022.
- The RRC will be seen as an extension of the university structures for specialist research leading to post-graduate qualifications.
- Staff of the RRC will give specialist lectures at universities to support the full-time lecturing staff on post-graduate Highway Engineering and Geotechnics courses.
- Acceptable measures of the benefits of research will have been agreed with ERA and external stakeholders that will be monitored and reported on an annual basis.

4.5 KSI 4 – Human capacity Development

- At least 60 of the professional staff will be educated to MSc level, with at least 10 staff progressing to PhD level by 2022.
- Staff will identify and agree at least one training intervention per year to improve their competence as part of their annual performance review.

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- A Continuous Professional Development programme will be well established and managed by the RRA.
- Mentorship and technical support from international research organisations to the research delivery team will continue for the period.
- At least 3 staff members/year will be placed overseas for at least 6 months with international research organisations to gain experience.

4.6 KSI 5 - Coordination of the National Road Research Effort

- At least four MoUs will be in place with international research organisations who are actively supporting the RRC through technical assistance, mentorship and joint projects
- Staff of the RRC will be actively involved in international research coordination committees both regionally and globally. The following is suggested:
 - A Sub-Saharan Africa research coordination committee is established through ARFMFA and the RRC is an active participant. Close collaboration with the Road Fund Office will be required to facilitate this.
 - The KIC will be linked into at least 20 international libraries and knowledge sources and will be seen as a major resource for the Ethiopian Road Sector.
 - The RRC will be an associate member of FEHRL.
 - The RRC will be represented on relevant PIARC committees.
 - RRC staff will be actively involved with the IRF.
- Staff of the RRC will attend at least 5 international conferences and meeting per year to keep abreast of the latest research activities and findings.
- A register of road and road-transport related research projects will have been established to monitor all research projects being undertaken by the RRC and universities to encourage collaboration and prevent overlap and duplication of effort.

4.7 Research Delivery Teams

- The Research Delivery Teams will be fully established and focussed on delivering and implementing approved projects in line with agreed targets within the respective teams.
- At least one new project per team will be approved by the RMC and started annually in line with agreed industry priorities.
- The Road Safety and Environment (RSE) team and Transportation (TT) teams will be fully established and a list of priority projects will have been identified and approved based on the experience gained from the initial preparatory studies.
- At least two projects being undertaken by the RRC will be collaborative projects with other countries of the Sub Saharan region, with particular emphasis on East Africa.

4.8 Laboratory and Research Services

- The RRC laboratory will be recognised as a reference laboratory for the testing of road construction materials and will have established a laboratory proficiency scheme involving commercial laboratories to improve the confidence and consistency of test results from those laboratories. The system will be run on a cost-recovery basis.
- Laboratory accreditation will be obtained during the period in line with the requirements of the appropriate international accreditation body for Ethiopia.
- A certification scheme for the evaluation and quality assurance of new products and processes entering the roads industry will be operational. Schemes such as the Agrément system used in Europe and South Africa should be investigated for this purpose.
- Specialist testing services and research will be undertaken by post-graduate students from local universities.

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- The specialist testing facilities will be used for at least two regional collaborative projects during the period.

4.9 Road Research Academy (RRA)

- The RRA team will be fully established and managing all local and international linkages, alliances and partnerships with stakeholders, research organisations and coordination groups on behalf of the RRC.
- The capacity development programme of RRC staff will be well established and coordinated by the RRA team in association with the Support Services (SS) team.
- The biannual conference will be organised and managed by the RRA team from 2017.
- The short term training courses developed by TRL as part of the establishment programme will be organised by the RRA team on an annual basis for presentation by selected RRC specialists.
- The RRA team will coordinate and keep a register of staff attending regional and international research coordination meetings. Where agreed by the RRC management group the RRA team will represent the RRC at specific meetings.
- The RRA Team Leader will liaise on an ongoing basis with the D-G of the Road Fund Office, if a regional research coordination group is established under ARMFA.

4.10 Knowledge Information Centre (KIC)

- The KIC will be fully established in the new facility and will comprise a functional library and information centre with on-line facilities for researchers to interface and search relevant international information sources.
- Linkages will be established with at least 20 international libraries and information sources.
- Systems will be established for the storage and archiving of all reports, papers and other deliverables emanating from RRC projects and will manage the International Standard Book Number (ISBN) system for registration of appropriate documentation.
- All relevant ERA documentation will be digitised and stored as part of the KIC.
- The KIC will be responsible for ensuring the IT systems of the RRC related to knowledge transfer are current and utilising the latest international technology and standards.
- Linkages of local universities and industry bodies to the KIC will be established for better access to, and dissemination of, best practice information.

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Appendix 2

Constitution of the Research Steering Committee

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Research Steering Committee (RSC)

1 Roles and Responsibilities

The role of the RSC is to provide a formal linkage to representatives of the external stakeholder community for technical and logistical advice related to planned and ongoing research programmes being carried out under the auspices of ERA and the RRC (coordinated as part of the Research and Development Directorate) and to provide a platform for sharing experiences with others.

The RSC will act in partnership with RRC/ERA to undertake the following responsibilities:

- Identifying needs and providing advice on research activities;
- Ensuring the full cooperation of collaborating agencies to facilitate the successful conclusion of the projects;
- Provide access to any previous research, data or information related to research programmes and projects;
- Provide timely technical review and other comments on draft outputs, documents, papers, inception and progress reports submitted by the projects, as required;
- Keep the local industry aware of the research activities and promote a wide dissemination of project results;
- Promote collaborative working arrangements with like-minded organisations in Ethiopia, the Africa Region and elsewhere.

The Research Management Committee (RMC) will oversee all activities of the RRC including all approval processes (see Section 5.1). The RSC will act as a support structure to the RMC in providing valuable and essential stakeholder advice and inputs into the research programme being undertaken by the RRC and the implementation of the findings from the research.

2 Membership

The RSC should be chaired by the Director-General of ERA or his designate and the recommended membership of the RSC should comprise representatives from the following institutions and organisations:

- Ethiopian Roads Authority;
- All Regional Roads Authorities;
- Addis Ababa and Dire Dawa City Roads Authority;
- Road Fund Office;
- Contractors Association;
- Consultants Association;
- Civil Engineering Association;
- National Road Safety Office (NRSO); and
- A representative of the Universities that have a formal Memorandum of Understanding (MoU) with ERA/RRC for capacity building.

Other organisations or individuals may be invited to meetings on ad hoc basis or invited to become full members of the RSC, as agreed and minuted by the committee.

3 Frequency of Meetings

The RSC should meet at least twice-a-year, once in March, as part of the annual review and business planning process to advise on specific research needs at that time; and once in October to discuss progress and present the annual research progress report to stakeholders.

4 Management of Meetings

- The meeting will be managed and coordinated by the Research & Development Directorate of ERA. This will include Secretariat functions for the meetings.

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- Notices, agendas and supporting documentation for all meetings will be circulated at least two weeks prior to meetings.
- Minutes from meetings will be compiled and circulated within one week of the meeting.

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Appendix 3

Project Schedules from the 2012 Business Plan

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**Table 5
5 Year Project Schedule**

Team	Programme	No	Title	2012	2012/13			2013/14			2014/15			2015/16			2016/17		
				Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun
Materials, Geotechnics & SI	Natural Geomaterials	40, 44 & 46	Performance of problem geomaterials and countermeasures																
		49 & 48	National database of construction materials																
	Corridor Hazard and risk assessment	41	Identification & characterisation of slopes																
			45	Characterisation & Specs for LVR pavement & surfacing options															
			47	DCP-CBR correlations															
Highways Design	LVR designs	10	Feasibility of cold mix asphalt for LVRs																
		12	Demonstration of Otta seal technology																
		13	Double seals on lateritic gravels																
	Whole-life performance of flexible pavements	6	Common design defects																
		5	Investigation of different pavement performances																

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**Table 5
5 Year Project Schedule**

Team	Programme	No	Title	2012	2012/13			2013/14			2014/15			2015/16			2016/17		
				Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun
		15	Demonstration & evaluation of ne rehab methods																
		16	Causes & remedial measure for asphalt pavement damage																
		14	Asphaltic concrete design for severe conditions																
		11	Review of suitability of surface treatments																
		33	Review of road investment models																
Asset management		34	Performance models for economic evaluation																
		35	Standardisation of economic analysis criteria																
		24	Evaluation of productivity rates																
Construction & Maintenance practices	Contract Management	26	Cause of poor contractor performance																
		27	Cause of cost overruns																
		1, 2 & 3	Improvement to the national census																

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**Table 5
5 Year Project Schedule**

Team	Programme	No	Title	2012	2012/13			2013/14			2014/15			2015/16			2016/17		
				Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun	Jul-Oct	Nov-Feb	Mar-Jun
Safety & the Environment	Statistics	53	Economic models for crash & casualty costs																
	Dust control	50	Impact of dust emissions																
	Climate Change	38	Impact of changing weather patterns																
		28	Pilot study in Gambella region																



Prioritised projects to be motivated and approved



Projects approved by RMC



Part of ongoing projects



Part of Priority Research projects

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Appendix 4

Progress against Actions and Measure in the 2012 Business Plan

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1 Management

1.1 Staff Recruitment

Action plan

	Steps			By whom	By when	Measures	Status (November 2014)
a)	Advertise for staff and produce a shortlist	Interview potential candidates	Appoint 29 professional staff including five Team leaders	Director	July 2012	29 staff appointed, including 5 Team Leaders	<ul style="list-style-type: none"> • Staff complement as shown in Table 2 of this report. • Total staff 56 of which 16 are professionals and 10 are laboratory technical staff. • The professional staff may increase to 20 but it is intended to keep the total staff close to its current numbers until the permanent facility is completed. • Three teams in place and the establishment of one more team is in progress.
b)	Advertise for an additional 23 professional staff in line with recruitment plan	Interview candidates	Appoint 23 additional staff	Director	July 2013	Staff compliment of 54 professionals plus technicians and support staff in place	
c)	Advertise for an additional 46 professional staff	Interview candidates	Appoint 46 additional staff to coincide with the commissioning of the permanent facility	Director	June 2015	Staff compliment of 100 professionals plus technicians and support staff in place	
d)	Replace staff who resign in line with the relevant job description	Interview candidates	Appoint as required	Director/Team Leaders	Ongoing from June 2015	Staff compliment maintained at the numbers for the permanent facility in the 5-yr business plan	

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1.2 Financial

Action plan

	Steps			By whom	By when	Measures	Status (November 2014)
a)	Prepare budget for next financial year	Submission and approval by ERA management	Start implementing budget from 1 July annually	Director	30 June annually	Budget in place for new financial year	<ul style="list-style-type: none"> Budget submitted annually and approved by ERA. Current budget ETB 30m. Only 50% of budget spent in previous financial year mainly on construction of trial sections.
b)	Motivate funding for constructing and equipping the new facility based on detailed design	Submission and approval by ERA management		Director	December 2012	Funding approved for new facility	<ul style="list-style-type: none"> Motivation completed and approved. ETB 50m available to start the construction on the 2014/15 financial year.
c)	Identify research priorities of Road Fund Office	Proposals to undertake projects funded by the Road Fund	Submission and approval by Road Fund	Director/ Team Leaders	December 2012	At least two project funded by the Road Fund Office by June 2013	<ul style="list-style-type: none"> Discussions have been held between the Director and the CEO of the Road Fund Office. Maintenance and asset management a priority. Nothing finalise for funding
d)	Develop funding structures for the LRS for external services	Market external services	Establish external service contracts	Team Leader LRS	June 2013	At least two externally funded contracts in place by June 2013	<ul style="list-style-type: none"> No progress Still establishing the laboratory
e)	Develop a plan for 3 years of funding for international technical support	Submit plan to ERA (or possibly donors) for funding	Appoint technical support for 3 years from January 2013	Director	November 2012	Technical support appointed and funding in place for 3 years	<ul style="list-style-type: none"> TRL appointed for TA as an extension to the World Bank project to establish the RRC. 1 year contract from Nov 13 to Nov 14. JICA providing TA support for capacity building in land slide monitoring, evaluation and management. Future TA support expected from AFCAP and EU
f)	Develop measure to evaluate the benefits of research	Approval by RMC	Manage performance against the measures and promote to funders and decision makers for ongoing funding	Director	June 2016 Ongoing	Budget prepared and approved annually	<ul style="list-style-type: none"> No progress

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1.3 Staff Retention

Action plan

	Steps			By whom	By when	Measures	Status
a)	Develop staff retention policies	Interact with Civil Service Ministry	Implement policies from July 2012	Director/ Team Leader Support Services	30 June 2012 reviewed and updated on an annual basis	Policies in place and being implemented	<ul style="list-style-type: none"> • Additional increment approved for researchers. • No progress from Civil Service Ministry related to the national problem of retaining staff at Government research centres
b)	Maintain annual staff turnover at 5 - 10%	Replace staff who resign		Director/ Team Leader Support Services	Ongoing	Staff turnover <10% per year	<ul style="list-style-type: none"> • Staff turn-over stabilised in the last 18 months. • Team Leader Highway Research moved to Safety and Quality Management Directorate. Acting Team Leader in place. • One other researcher (geologist) left but has been replaced.

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1.4 Research Credibility

Action plan

	Steps			By whom	By when	Measures	Status
a)	Start three projects that have been approved	Undertake for the duration of the projects	Submit final deliverables	Researchers	As indicated in business plan	Projects completed and deliverables approved	<ul style="list-style-type: none"> All three projects started. No outputs to date.
b)	Develop detailed proposals for identified priority projects for 2012/13	Submit to RMC for approval	Begin projects in line with schedule in business plan	Director with Consultant	As indicated in business plan	Projects approved and started	<ul style="list-style-type: none"> Projects started
c)	Obtain articles for a Research Newsletter	Edit and produce a newsletter	-	Team leader KIC	End July and January annually	Two newsletters published per year	<ul style="list-style-type: none"> 4th newsletter in preparation. One newsletter per year to be published from 2014.
d)	Identify subjects suitable for publication	Write papers or articles for local and international conferences and journals	Submit to conferences and seminars or journals for acceptance and publication	Researchers	June 2013 Ongoing	At least three papers published per year	<ul style="list-style-type: none"> One paper prepared with TRL for the TRB Low Volume Roads conference in the USA in July 2015 on the Environmentally Optimised Approach for the design of LVRs.
e)	Organise a bi-annual conference to feedback research findings	Identify papers and develop a programme	-	Team Leader Research Alliance	Bi-annually from the launch of the new permanent facility	Conference organised bi-annually from 2016 Number of international papers published (target to be agreed) Number of RRC papers published (target to be agreed)	<ul style="list-style-type: none"> First conference organised in April 2014 Second conference planned for 2015
f)	Re-establish the Research Steering Committee as a stakeholder advisory body	Organise annual meeting to identify research needs and feedback progress on projects	Develop project proposals in line with needs	Director	Meeting annually by end of February	At least one RSC meeting per year	<ul style="list-style-type: none"> No meetings organised during establishment of the RRC. Meeting planned to coincide with the feedback from this AFCAP scoping project.
g)	Complete projects and feedback to industry	Seminars to feedback research results	Implementation of findings	Director Team Leaders Researchers	From July 2013 Ongoing	At least two projects completed per year	<ul style="list-style-type: none"> Feedback provide at the conference in April 2014.
h)	University post-graduate students using specialist equipment in the RRC for research projects	Agreement between Universities and RRC	Identification of suitable agreed projects	Team Leader Research Alliance	From July 2017 Ongoing	At least two projects undertaken in collaboration with universities with post-graduate student seconded to the RRC	<ul style="list-style-type: none"> Currently a number of university students are using ERA's laboratory and are being advised by the RRC on their MSc projects
i)	RRC staff support universities with specialist lectures in line with curricula	Prepare lectures as required	Present lectures	Researchers	From July 2017 Ongoing	At least 10 lectures presented per year by RRC staff	<ul style="list-style-type: none"> No lectures provided. RRC providing advice on the contents of the MSc courses

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1.5 Human Capacity Development

Action plan

	Steps			By whom	By when	Measures	Status
a)	Finalise short-term training plans	Develop training material	Present short term courses	Consultant	October 2012	8 courses presented	<ul style="list-style-type: none"> TRL have developed and presented four courses a part of the TA support.
b)	Appoint staff	Develop CPD programmes based on skills requirements of staff	Implement programmes through the Roads Academy	Team Leader RA	Ongoing	CPD programme for each staff member agreed and in place	<ul style="list-style-type: none"> No progress Roads Academy will only be considered after permanent facility has been established.
c)	Develop a framework for external international technical support for research development and staff mentoring	Identify funding for 3 years	Appoint technical support	Director	November 2012	Technical support in place for 3 years from January 2013	<ul style="list-style-type: none"> TRL provided TA support for one year from Nov '13 to Nov '14. JICA providing TA for capacity building in Landslide management. AFCAP and EU support for capacity building in preparation Korean EximBank in collaboration with AfDB are financing short-term training for RRC staff
d)	Identify presenter of the short courses developed as part of short-term training intervention	Organise short course	Present courses	Team Leader RA	Ongoing	At least four courses presented per year	<ul style="list-style-type: none"> No progress Courses presented by TRL not RRC staff.
e)	Develop long-term training plans	Approve training plans	Implement the long-term training plans	Consultant/ Director/ Team Leader RA	Ongoing from January 2013	Plans implemented 60 staff to at least MSc level by 2022 At least 10 staff to progress to PhD level.	<ul style="list-style-type: none"> Plans in place and being developed on an ongoing basis. Two research staff identified for placement on an MSc course at the University of Surrey Director of the RRC and D D-G Engineering Operations identified to possibly undertake a PhD (still under discussion and not yet approved)
f)	Identify staff for secondment overseas (6 – 12 months)	Identify international road research organisation	Agree projects, workload and logistics with international partner	Director Team Leaders	Ongoing from July 2013	At least 3 staff members per year placed overseas	<ul style="list-style-type: none"> No progress but will be discussed further as part of capacity building interventions from AFCAP and the EU.

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1.6 Coordination of the National Road Research Effort

Action plan

	Steps			By whom	By when	Measures	Status
a)	Appoint Team Leaders	Create an RRC management committee	Manage and coordinate research activities in line with the approved business plan and budget	Director/ Team Leaders	Ongoing from July 2012	Minutes of monthly management meetings	<ul style="list-style-type: none"> RRC currently managed by the Director in collaboration with the Support Services Team Leader. Acting Highway Research Team Leader in place. Management is meeting every week to discuss progress on research projects. Every two weeks the Director holds meetings with the whole staff
b)	Establish the internal management structure and systems for coordination of road research	Implement structure and systems	Major review of plans, achievements and progress after 3 years in August 2015	RRC Management Group	Ongoing	Achievements are in line with the measures in the business plan	<ul style="list-style-type: none"> No progress Superseded by the broader Forum described in (d).
c)	Re-establish the Research Steering Committee as a stakeholder advisory body	Organise annual meeting to identify research needs and feedback progress on projects	Develop project proposals in line with needs	Director	Meeting annually by end of February	At least one RSC meeting per year	<ul style="list-style-type: none"> Planned to be reconvened in Jan/Feb 2015.
d)	Develop formal structure to support local universities	Finalise and approve the TRL proposal	Implement a formal lecture programme for MSc courses in Highway Engineering to support seven universities	Team Leader RA with Consultant	Ongoing from September 2012	MSc courses being run	<ul style="list-style-type: none"> A broader Forum for Industry and University Linkages managed by ERA has been established through the Ministry of Transport and Ministry of Science and Technology and to coordinate the national road research effort ERA is supporting five MSc programmes; Highway Engineering, Geotechnical Engineering, Construction Management and Technology, Structural Engineering, and Hydraulic Engineering. ERA is also now supporting Environmental Engineering. Support for laboratory technicians being investigated The Director of the RRC is providing advice and mentorship to three MSc students.
e)	Finalise framework for establishing formal linkage to local and international research organisations	Establish an E Africa road research coordinating group	Identify possible joint collaborative projects	RRC management group	July 2014	At least two formal agreements in place per year	<ul style="list-style-type: none"> Formal linkages established through MoUs with TRL, CSIR, ARRB and the Korea Transport Institute. Seven MoU's signed with local universities. MoU also signed with Geological Survey of Ethiopia

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f)	Initiate formal discussions with AFCAP to provide infrastructure to manage the AFCAP programme within Africa	Set up an agreement with AFCAP	Run the AFCAP programme from the RRC office with AFCAP appointed personnel	Director/ AFCAP coordinator for Ethiopia	June 2013	AFCAP offices as part of the RRC facility	<ul style="list-style-type: none"> No Progress Superseded. Not an option under AFCAP 2.
h)	Attend international conferences and meetings for CPD and strategic focus	Report on visit to include latest best practice and new technologies for implementation	Identify new projects with proposals	Director Team Leaders Researchers	From July 2013 Ongoing	Two new projects identified and approved per year. Business plans and actions updated through the annual review process	<ul style="list-style-type: none"> Ongoing
i)	Coordinate all national research projects	Register of project at universities and RRC developed	Coordination meeting with universities	Team Leader, RA	From July 2014 Ongoing	Register of projects established and updated regularly. Coordination structure with universities established and meetings annually	<ul style="list-style-type: none"> No progress Superseded by the broader Forum described in (d).

1.7 Other Management Issues

Action plan

	Steps			By whom	By when	Measures	Status
a)	Commission temporary facility	Commission new laboratory equipment	Move to temporary facility	Director/ Team leaders	July 2012	RRC established in temporary facility	<ul style="list-style-type: none"> Done Temporary facilities occupied from June 2014
b)	Let a contract for the detailed design of the permanent facility	Approve detailed designs	Approve ToRs and tender document for construction of the facility	Director	December 2012	Detail designs approved and contractor appointed	<ul style="list-style-type: none"> Done Detailed design completed and submitted in November 2014
c)	Oversee construction of permanent facility	Appoint a Transition Manager from internal staff and commission building	Manage move from the temporary facility to permanent building in line with transition plan in the business plan	Director/ Transition Manager	December 2015	RRC housed in the permanent facility	<ul style="list-style-type: none"> Contract for the construction of the permanent facility to be awarded in first quarter of 2015
d)	Identify additional equipment for the permanent facility	Develop a procurement plan for additional equipment	Issue procurement tenders and obtain additional equipment	Director/ LRS Team Leader	December 2015	Additional equipment procured and commissioned	<ul style="list-style-type: none"> Ongoing

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2 Research Delivery Teams

Action plan

	Steps			By whom	By when	Measures	Status
a)	Appoint Team Leaders for the Research Delivery Teams	Appoint research staff in line with the business plan	Appoint technicians/support staff as required	Director/ Team Leaders	Ongoing	Staff numbers as agreed in the business plan	<ul style="list-style-type: none"> Only the Highway Research Team established in current RRC structure. Establishment of a new team is in progress. Next Team to be established would be the Landslide and Site Investigation Team.
b)	Identify priority projects in each research team in line with the business plan	Begin research on priority projects	Identify new projects with detailed proposals for approval by RMC	Team Leaders/ Researchers	Ongoing from July 2012	Projects completed with agreed deliverables in line with the project proposals	<ul style="list-style-type: none"> Projects identified with schedules developed.
c)	Develop an internal skills certification programme	Implement the programme	Annual review	RRC management group	By July 2013 and annually	Programme in place and being implemented	<ul style="list-style-type: none"> No progress
d)	Identify suitable vehicles for publication of research finding	Write research papers related to deliverables	Approval, peer review and publishing of papers	Researchers	Ongoing	At least one paper per research delivery team per year	<ul style="list-style-type: none"> Ongoing
e)	Develop a framework for undertaking and costing external projects undertaken by the Research Teams	Identify projects and possible partners for research	Undertake externally funded projects within the Research Teams	Team Leaders	July 2015	At least one externally funded	<ul style="list-style-type: none"> No Progress Will be considered when the permanent facility is completed.
f)	Identify new projects in line with industry needs	Develop proposals and agree with RSC	Submit to RMC for approval	Director/ Team Leaders Researchers	April 2013 Ongoing	One new project per team per year identified and approved	<ul style="list-style-type: none"> Current focus on the project already approved and ongoing projects
g)	Identify national partners to undertake regional collaborative projects	Develop project proposal and obtain approval and funding	Undertake projects	Director/ Team Leaders	July 2017 Ongoing	At least two project being undertaken with international partners to June 2022	<ul style="list-style-type: none"> Ongoing

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3 Laboratory and Research Service (LRS)

Action plan

	Steps			By whom	By when	Measures	Status
a)	Appoint Team Leader	Appoint two service managers for Laboratory and Site Services	Appoint technicians/support staff as required	Director/ Team Leader	Ongoing	Staff numbers as agreed in the business plan	<ul style="list-style-type: none"> Laboratory Manager in place with nine technical support staff.
b)	Develop internal training programme of technicians initiated to build skills levels	Monitor training programme	Provide certification of the competence of technicians to do specific tests	Team Leader/ service managers	Ongoing	Technicians learn at least 3 new test per year and are certified as competent to do the tests	<ul style="list-style-type: none"> No progress
c)	Move to temporary facility	Commission new equipment in temporary facility (including calibration)	Training with new equipment	Team Leader/All	July 2012	Temporary Laboratory fully operational	<ul style="list-style-type: none"> Done Occupation of temporary facility from June 2014.
d)	Development of a QA system for the Labs	Manage according to the QA system	Monitor performance	Team Leader	February 2013	QA system developed and implemented	<ul style="list-style-type: none"> No progress
e)	Develop a framework for costing services to external clients	Market services	Undertake externally funded projects	Team leader/ services managers	July 2013	At least two externally funded projects are undertaken per year	<ul style="list-style-type: none"> No progress
f)	Introduce additional data collecting and survey service	Transfer existing condition survey equipment to RRC	Manage services	Team leader/ services managers	December 2012	All site and condition survey, data collection and audits are undertaken by the LRS	<ul style="list-style-type: none"> No progress
g)	Introduce management structures in line with an accredited laboratory	Identify a suitable accreditation body	Attain accreditation for the laboratory	Team leader/ services managers	June 2019	Laboratory accredited	<ul style="list-style-type: none"> Accreditation is planned for the permanent facility which will have fully equipped laboratories. (still on target for 2019)
h)	Develop a suitable proficiency scheme as part of the accreditation process	Establish RRC as a Reference Laboratory for Ethiopian road testing laboratories	Instigate and manage a proficiency scheme	Team leader/ services managers	Ongoing from June 2016	Proficiency scheme in place	<ul style="list-style-type: none"> Ongoing
i)	Investigate international product assessment procedures	Develop a suitable assessment procedure for new products in the market	Implement the product assessment service	Team leader/ services managers	Ongoing from June 2017	Product assessment service in place by June 2019	<ul style="list-style-type: none"> Product assessment is addressed through the technology transfer strategy and guidelines which have been developed and are in use. The product testing currently being carried out related to soil stabilisation and other maintenance products is in line with the guidelines

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4 Road Research Academy

Action plan

	Steps			By whom	By when	Measures	Status
a)	Appoint Team Leader	Appoint support staff		Director	July 2012	Staff appointed in line with business plan	<ul style="list-style-type: none"> No progress Will only be considered when the permanent facility is completed
b)	Develop an information dissemination programme	Develop appropriate promotional documentation	Develop a web page	Team Leader	October 2012	Functional web page and information dissemination process	<ul style="list-style-type: none"> No progress
c)	Coordinate MSc training programme	Formal linkage with local universities	Coordinate presentation with international service providers	Team Leader	Ongoing from September 2012	Coordinated international support to local Highway Engineering MSc courses	<ul style="list-style-type: none"> Superseded by the Forum for Industry and University Linkages as indicated in 1.6 (d)
d)	Manage local and international capacity building, training, secondments and post-graduate studies for RRC staff	Develop CPD programme with individuals	Manage and coordinate the programmes	Team Leader	Ongoing from January 2013	At least two RRC staff members/year initially being trained internationally growing to three staff members by 2016	<ul style="list-style-type: none"> Ongoing under the responsibility of the Director.
e)	Manage MoUs and collaborations with international research organisations	Agree collaboration arrangements	Keep register of interventions	Team Leader with Research Delivery Team Leaders	Ongoing	At least one activity arranged with a MOU partner	<ul style="list-style-type: none"> Ongoing. Four MoUs established to date with international research organisations. Seven MoUs established with local universities. One MoU established with Geological Survey of Ethiopia
f)	Manage the short-term training programme	Arrange annual programme, presenter and attendees	Manage presentation and feedback	Team leader	Annually	Programme run as agreed.	<ul style="list-style-type: none"> Ongoing Current courses presented by TRL through the TA support.
h)	Organise the bi-annual conference	Call for papers	Manage programme and registration	Team leader	Bi-annually from the launch of the new permanent facility J	Conference run bi-annually	<ul style="list-style-type: none"> Done First conference organised in April 2014
i)	Identify appropriate linkages to international organisations and research coordinating bodies	Identify RRC staff to participate in international research coordination meetings	Manage the attendance of RRC staff and keep and up-to-date register	Team Leader	June 2013 Ongoing	At least two meetings attended by RRC staff/year	<ul style="list-style-type: none"> Ongoing

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5 Knowledge Information Centre (KIC)

Action plan

	Steps			By whom	By when	Measures	Status
a)	Appoint Team Leader	Appoint support staff		Director	July 2012	Staff appointed in line with business plan	<ul style="list-style-type: none"> • Librarian appointed to manage the KIC under the Highway Research team.
b)	Identify a library system appropriate to RRC and transferrable from the temporary facility to the new facility	Establish linkage with other road research laboratories	Identify training programmes for RRC staff	Team Leader	June 2013	Fully functional library	<ul style="list-style-type: none"> • Ongoing • KIC in place
c)	Develop a RRC web page for inclusion on the ERA web site	Update page	Monitor number of hits	Team Leader	January 2012	Interactive web page	<ul style="list-style-type: none"> • Currently, the ERA web site is being used and Research and Development has its own dedicated page.
d)	Develop an information accessibility plan for RRC	Digitise all relevant RRC/ERA information	Monitor and review the effectiveness of information dissemination and delivery	Team Leader	Ongoing from June 2013	Information accessibility plan is implemented and all relevant information has been digitised by 2022	<ul style="list-style-type: none"> • Ongoing
e)	Linkages to international libraries and information sources	Set up agreements and on-line links	Capacity building and training of RRC staff	Team Leader	Ongoing from appointment of Team Leader	At least 20 international libraries and information sources linked by 2022	<ul style="list-style-type: none"> • Under consideration
f)	Linkages to local universities and industry bodies	Identify relevant institutions and organisation	Establish on-line linkages	Team Leader	Ongoing from appointment of Team Leader	Link established to all relevant universities and industry bodies	<ul style="list-style-type: none"> • Linkages with seven universities and Geological survey (see earlier)