

**Draft Report on the Road Map for Transforming the ARRTI into a  
formal Training and Research Institute**

**June 2017**

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# ABBREVIATIONS

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<b>Abbreviation used</b>	<b>Full form</b>
AB	Advisory Body of ARRTI
ADB	Asian Development Bank
ARIASP	Assam Rural Infrastructure and Agricultural Services Project
ARO	Assistant Research Officer
ARRTI	Assam Road Research and Training Institute
ASAC	Assam State Administrative College
ASRP	Assam State Roads Project
BOM	Board of Management of ARRTI
CBR	California Bearing Ratio
CIDC	Construction Industry Development Council
CRRRI	Central Road Research Institute
EC	Executive Committee of ARRTI Society
ESC	Engineering Staff College, Gandhinagar
GB	Gigabyte
GERI	Gujarat Engineering Research Institute, Vadodara
GoA	Government of Assam
GPRS	General Packet Radio Service
IAHE	Indian Academy of Highway Engineers
KC	Knowledge Creation
KD	Knowledge Dissemination
KM	Knowledge Management
KN	kilonewtons
LCD	Liquid Crystal Display
LMS	Learning Management Software
MoA	Memorandum of Association
NRRDA	National Rural Roads Development Agency
OMMAS	Online Management, Monitoring and Accounting System

PMGSY	Pradhan Mantri Gram Sadak Yojana
PRTC	Pre-Registration Training Centre
PWD	Public Works Department
PWRD	Public Works Roads Department
RCTRC	Rural Connectivity Training and Research Centre
RIDF	Rural Infrastructure Development Fund
RFD	Result Framework Document
RO	Research Officer
RoB	Rules of Business of ARRTI Society
RRL	Road Research Laboratory
SOW	Scope of Work
STC	Short Term Consultant
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TNA	Training Needs Assessment
TRL	Transport Research Laboratory, UK (It is now TRL Ltd.)
WB	The World Bank

# CHAPTER 1: BACKGROUND

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The short-term consulting assignment is intended to provide Assam PWRD, the required assistance to develop and implement a roadmap for transforming the Assam Road Research Institute (ARRTI) into a formal training and research institute primarily, but not limited to, catering to the North-Eastern Region of India. STC was entrusted with this short-term consultancy assignment by the World Bank for a total period of 32 days starting 6 February and ending 30 July 2017. The study has been initiated on February 6, 2017.

## 1.1. HISTORY OF ARRTI

The Road Research Laboratory (RRL) was established and the post of Director RRL (in the rank of Superintending Engineer) was created on 4 November 1977 vide Government of Assam, Public Work Department order number RBEB 136/773. The RRL was renamed as the Assam Road Research and Training Institute (ARRTI) vide order, by Governor of Assam, memo number RBEB.82/2013/31-A Dated 7 June 2013. The post of Director was upgraded to that of Additional Chief Engineer on 31 December 2004, vide PWD order number CON 66/2004/1. ARRTI was inaugurated by the then Chief Minister of Assam on 18 July 2013. On 3 March 2016, GoA notification for setting up the society to affect greater functional autonomy was issued.

## 1.2. STAKEHOLDERS' INPUT

The input, for this report, was obtained from:

- i. Discussions with the management and personnel (total of twenty) of PWRD, Past Directors of ARRTI, Director and other personnel of ARRTI, Pre-Registration Training Centre (PRTC) officers and consultant for computerization and the contractor for interiors of new building of ARRTI. List provided at **Annexure- 1**.
- ii. Feedback received on the list of documents/ information sought from PD and AEE, ARIASP
- iii. Report on Training Need Assessment for Assam PWRD personnel, conducted in 2013-14 during ADB assisted TA-7838 IND: MFF-North Eastern State Roads Investment Program (Facility Concept)-Institutional Development and Capacity Building Consultant (37143-013);
- iv. State specific report on establishment of Rural Connectivity Training and Research Centre (RCTRC) - Assam March 2014, under the ADB assisted Institutional development for rural roads asset management – support for establishment of Rural Road Network Management units and Rural Connectivity Training and Research Centers (TA 8110-IND)

## 1.3. HIGH LIGHTS AND STRUCTURE OF THIS REPORT

Report is divided into two parts:

- (1) As-Is a comprehensive Study of the "as is" organization, resources and operations of the ARRTI to determine its effectiveness and ongoing viability for current GoA and industry needs and expectations in the field of works (materials) Quality Research, Testing and Training of personnel at the present level of funding and with existing equipment and resources.
- (2) Draft Development Strategy that over a 0-6 years' timeframe, would enable the ARRTI to shift to a more sustainable and higher-performance 'business model', identifying the changes required in the funding / required facilities, equipment/ manpower and systems to endow ARRTI with modernized, cost-effective technology and service capabilities.

The issues identified in the AS-IS report have been addressed through recommendations in the Development Strategy appearing in the same sequence for consistency.

Effort has been made to provide precedents from other state PWDs, National and State level policy documents, reports and other documentation to justify the recommendations in this report.

The complete coverage of SOW of this STC has been ensured through the matrix presented at **Annexure-2** showing the para numbers addressing all the requirements, based on SOW, reported in the inception report.

The contents of this report have been summarized at the end of report, in the Matrix containing:

- (i) The issues identified in the As-Is report
- (ii) Current status of these issues also references of these as para numbers in AS-Is report
- (iii) Recommendations to address these issues, also relevant para numbers in Development Strategy
- (iv) Reference to precedence, policy documents, reports to justify these recommendations
- (v) Phasing of Recommendations: Short Term (0-2 years), Medium Term (2-5 years), Long Term (> 5 years)
- (vi) Financial implications of the recommendations made in this report
- (vii) Result Framework for evaluation and monitoring of implementation

# CHAPTER 2: ARRTI AS-IS

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## 2.1. ESTABLISHMENT AND OPERATIONS

### 2.1.1. METHODOLOGY – STUDY OF DOCUMENTS, REPORTS, DISCUSSIONS WITH STAFF

ARRTI is an important institution for the Government of Assam and has potential to play a key role in training for the State. In the past substantial efforts were made to enhance the role and performance of ARRTI.

ARRTI is further accessed as an important Government Organization taking into consideration the role it has been playing till now, and the future role it should play, in enhancement of human capital at Assam PWRD, including the higher ranks. The skill development and promotion of in-service staff is administered through examinations for which Director ARRTI is the chairperson.

To enable the ARRTI to meet the future challenges, a development strategy has been prepared. For this a candid review and assessment of ARRTI with respect to its current function and the approach towards performing its role and functions, along with the strengths and weaknesses has been undertaken. The review includes the existing training calendar of ARRTI and the training programmes run in the recent past and the current state of research and testing functions.

Extensive discussions with senior, middle and cutting-edge level staff were conducted and information related to ARRTI gathered through documents, reports, websites, past studies, etc.

### 2.1.2. GOVERNANCE AND MANAGEMENT

#### a. Registration as Assam Road Research and Training Institute Society

Assam Road Research and Training Institute was registered as Society under the Public Works Department, Government of Assam in accordance with Registration of Societies Act XXI of 1860, on 13 October 2016. The rules of business of the ARRTI Society have been framed.

The authorities of society are (a) Board of Management (BoM) and (b) Advisory Body (AB). Subject to the provisions of the rules of business, the management, supervision and control of society vest in the Board of Management. The BoM is chaired by the Chief Secretary, Government of Assam. Director ARRTI is the Member Secretary and the senior most Secretaries Administrative Reforms and Training Department, Finance Department, Personnel Department, the Commissioner and Special Secretary PWRD, the Heads of Department of Civil Engineering IIT Guwahati and Assam Engineering College Guwahati are members of BoM. Two members can be co-opted by Chairperson.

BoM may delegate, from time to time, such powers and functions to the Executive Committee (EC) as are considered necessary. EC has also been constituted with Commissioner and Special Secretary PWRD as the chairperson. Commissioners and Secretaries of Finance Department and Personnel Department, Secretary PWRD, Chief Engineers PWD (Roads) and ARIASP & RIDF, Joint Directors ARRTI, Deputy Directors of all sections of ARRTI, Accounts officer ARRTI are members. Director ARRTI is the Member Secretary. EC can also nominate members. Chairperson may decide about invitees.

The EC can exercise all powers as may be delegated by BoM. Since no meeting of BoM has taken place since registration of society, there has been no progress in this and other matters connected with the functioning of ARRTI as society.

#### b. Directors ARRTI -Tenure

Directors prior to December 2004 were of the level of Superintending Engineer, post 2004 these were of the level of Additional Chief Engineer (GoA Order number CON.66/2004/1 dated 31/12/2004). The tenure of Directors, as shown at **Annexure-3**, has rather been very less. A table at **Annexure-4**, shows the range of the tenures of a total of 32 Directors since inception of RRL/ ARRTI. According to this over 59% of the Directors stayed for less than six months. 18% had tenure of six months to two years. Only one Director, who joined during inception years, stayed for eight years.



### **c. Other ARRTI personnel -issues related to**

Existing list of officers and staff of ARRTI is available at **Annexure- 5**.

According to Table at **Annexure- 6**, at least seven Research officers/ staff are retiring within 1 to 3 years from now. In addition to Director there are 62 other cadre personnel charged to the salary budget of ARRTI. It was however observed that out of these eighteen staff members work in offices other than ARRTI as depicted in a table in **Annexure- 7**. As per Rules of Business (RoB) existing wings/ posts of RRL, PRTC & SATC are to be merged with ARRTI. Reorganisation proposed in RoB is available at **Annexure- 8**.

### **d. Training of ARRTI Personnel**

Some training for laboratory staff was arranged at CRRRI about 15 years back. Some training was provided, almost at same time (close to it) at Hyderabad also. There has been no training arranged for them since then.

## **2.1.3. PLANNING AND BUDGETING FOR TRAINING AND RESEARCH**

Budget provision for ARRTI is made by PWRD under four budget heads depicted in a table in **Annexure- 9**. These are Salary, Office expenses, Travelling allowance and medical reimbursement. It is evident that no permanent budget head exists for conducting research and holding training programmes. Revenue earned from testing work and training programmes of PMGSY, NRRDA is deposited in a current account, not available to ARRTI

Under these heads the year-wise budget provision for last four years has been Rs 3,01,76,600, Rs 3,27,70,000, Rs 3,46,71,548, Rs 3,75,94,095 as depicted in **Annexure- 10**. There has been budget provision neither for conducting training programmes nor for research work for last four years.

## **2.2. ARRTI'S CURRENT MISSION AND VISION**

### **2.2.1. VISION**

At the occasion of up-gradation of RRL to ARRTI its Vision was spelt out as, "Develop infrastructure to render the support in the construction of modern, safe, comfortable and durable roads, highways and related structures (culverts, bridges etc.), in the state of Assam and North East."

### **2.2.2. MISSION**

The mission of ARRTI is, "To enhance the Capacity Building of Engineers, Contractors, Masons, Carpenters and other Stakeholders in the state of Assam and other North-East states by creating State of the Art Test facility for the development of research for new construction techniques, materials and quality assurance of road works under one umbrella at Assam Road Research & Training Institute, Guwahati. Also, the Engineers and Contractors will be trained to develop skill in the areas of Construction, Design of Roads, Bridges, Culverts and other aspects related to maintenance etc. Further, guidance by resource persons in regards to Social and Environmental issues, road safety issues etc. will be imparted for strengthening the technical knowledge of the Engineers and Contractors. ". The Mission and vision of the proposed augmented ARRTI needs to be defined.

## **2.3. SERVICE DELIVERY FOR THE CORE BUSINESS AREAS**

**Research:** Some research work was carried out by RRL during 1970s. These were Research Scheme R1 (Survey of locally available materials), R2 (Spectrum of Axle Loads) etc. No research work is currently taken up. Following ARRTI laboratories are conducting routine testing of samples/materials /mixes/ surface evenness:

- Soil Section
- Soil Survey Section
- Aggregate Section
- Bitumen Section
- Cement Section

## **2.4. EQUIPMENT AVAILABLE IN THE LABORATORIES:**

Nineteen (forming 42%) out of total of 45 numbers of equipment are non-operational. The dates of last calibration of most of the equipment (leaving very few, about four) could not be traced.

## **2.5. TRAINING PROGRAMMES ORGANIZED BY AARTI**

### **2.5.1. TRAINING OF PWRD PERSONNEL**

ARRTI has organized numbers (as shown in parenthesis) of total 33 training programmes from 2013 (5), 2014 (13), 2015 (5), 2016 (1) and 2017 (9) as depicted at [Annexure- 11](#). During last four years 907 PW&RD personnel have been trained. Their cadre-wise breakup is available at [Annexure- 12](#). Thus, on an average about 230 personnel were trained every year.

### **2.5.2. REMUNERATION TO GUEST FACULTY**

There is no fixed rate of remuneration. It varies from one programme to another based on the estimate sanctioned by the sponsoring authority. For PMGSY sponsored programs it is Rs 5000 for three hours. Remuneration paid to CRRRI faculty for a workshop on new materials / technologies for Rural roads under PMGSY during 2 to 3 December 2014 varied from Rs 3500 to Rs 7000.

### **2.5.3. ARRTI'S PROGRAMME FOR TRAINING OF CONTRACTOR'S PERSONNEL**

To meet the skill development needs of road sector professionals and construction industry workers, a Contractors' Training Programme of two days duration on August 18-19, 2016, was organised as part of its Road Sector Modernisation Program under the World Bank aided Assam State Roads Project for enhancing performance of the road sector. It was attended by 64 participants

### **2.5.4. ARRTI'S ROLE IN HOLDING DEPARTMENTAL EXAMINATIONS**

Director ARRTI has been appointed as Chairman of the Committee for holding Departmental examinations vide Governors order dated 11 January 2017.

## **2.6. TESTING WORK DONE BY ARRTI FOR OTHER ORGANISATIONS – REVENUE EARNED**

Average annual income through this service provided by ARRTI is about Rs 93,000. ARRTI's Charges for testing compared with rates charged by a private laboratory in Guwahati are available at [Annexure- 13](#). The revenue earned is deposited in a current account, not available to be spent by ARRTI.

## **2.7. EXISTING INFRASTRUCTURE**

- 1) Campus Area -238.2 Are (including parking / lawn)
- 2) Power back up – Not provided yet.
- 3) Laboratories - 5 Nos. (Soil, Bitumen, Aggregate, Cement, Soil Survey)
- 4) Class Room (Training Hall) -2 Nos.
- 5) Auditorium- 1 No.
- 6) Conference Hall - 1 No.
- 7) Group discussion Room - 1 No.
- 8) Computer Center - 1 No.
- 9) Library - 1 No.

### **2.7.1. LABORATORIES**

#### ***a. Soils and Soil Survey section***

Current Status

- i. List of testing equipment available, their condition, information on calibration in the Soil section is available at [Annexure- 14](#)
  - ii. List of testing equipment available, condition, information on calibration in the Soil survey section is available at [Annexure- 15](#)
  - iii. List of laboratory staff working in Soil and Soil Survey Section is available at [Annexure- 4](#)
- Weaknesses/ issues in the current status

- Proving rings for CBR 50 KN (AIMIL Make) were calibrated on 14/05/2014. Next date was 13/07/2016 (information about actual date not available)
- Following are, non-operational, very old machines, (1) Direct Shear Test Machine (Box Shear), and (2) Pulverizer
- CBR penetration load frame is defective and non-operational
- Following Soil survey equipment are also non-operational, (1) Porewater pressure apparatus, (2) Volume change apparatus, (3) Electric Oven, (4) Pressure meter, (5) Vane shear apparatus, (6) Plummet balance, (7) Permeability apparatus
- Illustrations to support above at **Annexure- 19-A**.

### ***b. Aggregates Section***

Current Status

- List of testing equipment available, their condition, calibration in the Aggregate section is available at **Annexure- 16**
- List of laboratory staff working in Aggregate Section is available at **Annexure- 4**

Weaknesses/ issues in the current status

Following equipment are non-operational, (1) Polished stone value test apparatus, (2) Skid resist tester, (3) Profile Graph apparatus, (4) Devel Apparatus, (5) Electrical Oven, and (6) Direct Shear Machine (large for coarse aggregates)

- Illustrations to support above at **Annexure- 19B**.

### ***c. Bitumen Section***

Current Status

- List of testing equipment available, their condition, information on calibration in the Bitumen section is available at **Annexure- 17**
- List of laboratory staff working in Bitumen Section is available at **Annexure- 4**

Weaknesses/ issues in the current status

- Marshal Stability Apparatus, dial gauge was calibrated on 14/05/2014 next date was 13/07/2016, but details are not being seen.
- Illustrations to support above at **Annexure- 19C**.

### ***d. Cement Section***

Current Status

- List of testing equipment available, their condition, information on calibration in the Cement I section is available at **Annexure- 18**
- List of laboratory staff working in Cement Section is available at **Annexure- 4**

Weaknesses/ issues in the current status

- Compression testing machine (2000 KN) was calibrated on 07/04/2014. Next calibration was due on 25/05/2016.
- Compression testing machine (3000 KN) was calibrated on 07/04/2014. Next calibration was due on 25/05/2016
- Benkelman Beam Deflection equipment is required to be calibrated
- Flexural testing machine (50 KN) is required to be calibrated
- Universal testing machine (1000 KN) is non-operational. It is also required to be calibrated
- Illustrations to support above at **Annexure- 19D**.

### **Poor maintenance of Laboratory buildings and furniture**

The furniture was observed to be in poor state of repair as illustrated at **Annexure- 19E**. Windows were infested with cobwebs, illustration at **Annexure- 19E**.

## **2.7.2. CLASS ROOMS**

The classrooms in the new building are well designed and furnished.

There are, however, following issues which need to be attended and improved:

- i. Provision for light in lectern to lit up face of speaker when other lights are off to sharpen the projected slides.
- ii. LCD projector too close to the screen, even after using internal adjustment, the projected image may not cover full screen.
- iii. Illustrations to support above at **Annexure- 19F**.

These issues were explained to Mr. Tejpal Singh Gandhi, Contractor for ARRTI new building (including interiors).

## **2.7.3. AUDITORIUM**

Auditorium of adequate capacity (ten rows, eight seats in each row), exists in the new campus of ARRTI. Illustrations at **Annexure- 19G**.

## **2.7.4. COMPUTER AVAILABILITY AND 3G NETWORK CONNECTIVITY**

Fifteen hundred data card/ dongle hardware were provided at a cost of Rs. 11,02,500 in October 2015. Monthly GPRS connectivity 2GB Data plan, to Laptop computers of engineers of Assam PWRD was ensured for one year, in October 2015, through Bharti Airtel Ltd. at a cost of Rs 92,34,000. Computer Centre of ARRTI is yet to be provided computers. Illustrations at **Annexure- 19H**.

## **2.7.5. LIBRARY**

There are no books/ manuals/ periodicals currently available in the ARRTI library. There are some old reports, on research works carried out in the past, stored in a cupboard. Illustrations to support above at **Annexure- 19I**.

## **2.8. VEHICLES AVAILABILITY IN ARRTI**

There are three drivers on the roll of ARRTI, but no car and no bus). There is an old jeep not in working condition.

## **2.9. SWOT ANALYSIS OF ARRTI**

SWOT analysis of the existing situation of ARRTI is available at **Annexure- 20**.

# CHAPTER 3: DEVELOPMENT STRATEGY

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## 3.1. GOVERNANCE AND MANAGEMENT

### 3.1.1 DELEGATION OF REQUISITE POWERS TO DIRECTOR

Director should be able to exercise necessary powers. As per MoA the EC can exercise all powers as may be delegated by BoM. Since no meeting of BoM has taken place since registration of society, there has been no progress in this and other matters (such as powers of Director) connected with the functioning of ARRTI as society. As a guideline, the functions of and powers delegated to Director, Indian Academy of Highway Engineers (IAHE) are available at [Annexure- 21](#)

### 3.1.2 RETAINING OFFICERS AND PERSONNEL WITH RIGHT APTITUDE AND CAPABILITIES FOR LONGER DURATIONS

Tenure of any incumbent holding Director's position should be at least five years (unlike the current situation 74% with tenure less than one year). The Assam State Training policy 2012, however stipulates that, "A minimum tenure of three years to the heads of training institutions and of five years to the academic and training faculty of the training institutes shall be offered"

To ensure longer tenure for competent incumbents as Director and other staff there can be motivation, for attracting personnel with right aptitude and capabilities, in the form of training allowance. Note on incentives to Director and other staff of ARRTI to attract personnel with right aptitude and capabilities and to retain them is available at [Annexure- 22](#)

The Assam State Training Policy also stipulates that, "Training Allowance be granted to the personnel of Assam Administrative Staff College and all other eligible state- level training institutes, as per existing State Government rules and Government of India guidelines"

### 3.1.3 RECRUITMENT OF ADEQUATE RESEARCH STAFF – FILLING SOON UPCOMING VACANCIES DUE TO RETIREMENT

At least seven research personnel at the level of RO. ARO, Senior Observers, Field Assistants are retiring in one to three years from now. Also, out of 62 officers and staff shown to be working in ARRTI, 18 are working in organisations other than ARRTI. The technical staff working in laboratories are only 13 against the requirement of 33 (Director -1, Dy Directors -3, Assistant Directors -6, Assistant Engineers – 10, Junior Engineers-13). Proposal for staffing of ARRTI, based on proposals framed in the past for institutional and infrastructure development of ARRTI is available at [Annexure- 23](#)

## 3.2. PLANNING AND BUDGETING FOR TRAINING AND RESEARCH

There has been budget provision neither for conducting training programmes nor for research work for last four years. Training programmes have mostly been organized through ad-hoc funding through CIDC, Under PMGSY for OMMAS, Consulting organisations such as LASA, Scott Wilson Pvt Ltd, ICT Pvt Ltd, under ASRP, NRRDA.

The National Training Policy issued vide GoI Ministry of Personnel, Public Grievances and Pensions, Department of Personnel and Training (Training Division) dated 19 January 2012 has recommended setting aside 2.5% of salary budget for training).

Also the Assam State Training Policy – 2012 stipulates that, "Each department of the State Government shall set aside an amount equivalent to at least 0.5% of its total salary budget for training showing separately in the Budget under appropriate Head of account for initial period of three years. Thereafter, the position will be reviewed by Government and the amount to be earmarked for training will be decided after ascertaining the training needs and requirements of the concerned departments. State Plan support will be provided annually for building, developing and sustaining "

Revenue earned from testing work and training should be available to ARRTI for maintenance of equipment, cleanliness in its buildings etc.

### 3.3. PROPOSED MISSION AND VISION OF ARRTI

#### 3.3.1. MISSION

Existing documentation on mission and vision for ARRTI is available in chapter 2. The revamped ARRTI will have wider coverage and therefore the modified draft mission is presented here. The mission of the ARRTI should be to support the PWRD and other sector stakeholders by:

Conducting sector-focused research to improve the quality and performance of Highway sector infrastructure.

Developing the GoA's capacity for managing and maintaining highway infrastructure

Assisting PWRD and stakeholders to implement best practice, modern technology, and quality systems for economically efficient sector management.

To impart in-service Engineers and Technical persons of PWRD Professional training to maintain an up-to-date knowledge of the rapidly changing and advancing technology of Engineering science, practice and Research both applied and conceptual. ARRTI has vision to give in service training to all engineers of PWRD, other stakeholders in the state and other NE States.

The draft mission for ARRTI may be - "To provide technical and management training/ research and testing support to both the public and private sector (including contractor, consultants, auditors, who are related to the projects) to enable them to provide value for money to the tax payers in the development and maintenance of the road network related activities.

Given below are the components of knowledge that establish the framework for and guide service delivery within the context of the ARRTI's vision and mission. These components, which reflect global best practice for road research institution and training management, are (i) knowledge creation; (ii) knowledge management; and (iii) knowledge dissemination.

**Knowledge Creation(KC)** refers to the need for sector-specific institutions. In the ARRTI's case this links with professional engineering and technical workforce development to overcome the shortage of knowledge could lead to a serious future impact. Without this, for example, effective road maintenance means having enough people with the needed expertise and knowledge now and in the future to minimize costly deterioration of the infrastructure.

**Knowledge Management(KM)** is an important aspect of best practice. It refers to how knowledge is sourced, collected, stored, and made accessible for potential users

**Knowledge Dissemination(KD)** is the third common component. The best practice includes comprehensive training programs to develop capacity delivered through a variety of modes; marketing communication and operational plans for disseminating research findings and transferring technology.

#### 3.3.2. VISION

ARRTI is to support the vision of PWRD. It will include imparting training to in-service Engineers and Technical persons of PWRD, Other NE State PWDs personnel and also ultimately to some extent contracting and consulting organisations personnel. Professional training to maintain an up-to-date knowledge of the rapidly changing and advancing technology of Engineering science, practice and Research both applied and conceptual. ARRTI has, primarily the vision to give in service training to all engineers of PWRD. It also envisions applied research thus Initiating, sponsoring and coordinating a sustainable Assam State level technical research program in highway infrastructure including:

Identification and classification of local materials for use in infrastructure works

Economically-sound engineering, planning and management best practice

Innovative technologies and practices that address national challenges in highway infrastructure and systems provision, operation and management

Effective management and dissemination of road research including road safety

Also, to develop and use guidelines and standard procedures to evaluate new highway sector materials and products. Assist to implement and support a database of approved-products for use in infrastructure construction, maintenance and operation that is readily accessible on-line by sector stakeholders.

A checklist of activities to achieve the ARRTI vision is available at [Annexure- 24](#)

### **3.4. SERVICE DELIVERY FOR THE CORE BUSINESS AREAS**

#### **3.4.1. RESEARCH AND TESTING OF MATERIALS**

There is a broad spectrum of potential research activities, within which prioritization is needed. **Annexure- 25** provides an indication of the general scope of research that is typically carried out by road research organizations.

The ARRTI will only conduct applied technical research, not basic research. The ARRTI may carry out both field and laboratory work to:

- Review relevant research that has been carried out, for applicability to Assam;
- Inventory (to the extent possible) which standards have been applied where in the National road network (NHAI & PMDSY etc.), and specify which standards will supersede on account of latest versions (BIS, IRC etc.)

Figure at **Annexure- 26** illustrates the breadth of technical research typically carried out by road sector research organizations. These 15 areas could ultimately be the scope of the ARRTI's research but literally spawn 10's if not 100's of specialized studies. This daunting scope becomes the backdrop for selecting and prioritizing research to support the PWRD's requirements and will lead directly to the measurable improvements in maintenance and performance (road user satisfaction) of the road network.

The recommended scope of activities during the ARRTI's formative years are:

- Road Condition Research Survey
- Bridge Condition Survey
- Geotechnical Engineering
- Hydrology / Hydraulics
- New Technology for Road Maintenance

By focusing its attention on these priority areas, the ARRTI is expected to be able to demonstrate an important contribution to sector betterment, that is visible to the general public, not just to its own stakeholders.

Nonfunctioning equipment as identified in chapter 2 to be repaired or weeded out if repairs not possible. Calibration schedule to be regularly adhered to. Calibration inadequacies pointed out in chapter 2.

#### **3.4.1 a New products and Material Evaluation**

In the past Research Scheme R-1 (Survey of local materials) was conducted. The attributes of available road construction materials in all the districts in the country were documented. The deficiencies and methods of addressing these were documented. It was conducted in Assam also. ARRTI may carry out similar evaluations of new product and materials in relation to compliance with a known specification or product acceptance criteria. For example, a product might need to meet an environmental regulation

The ARRTI would also record, decide on suitability of items or technologies evaluated and disseminate results and make appropriate recommendations to PWRD. The ARRTI could advise and recommend to PWRD on evaluation procedures to be used for new sector products

It is recommended that this service be given a relatively lower priority and start during the latter part of the formative years.

#### **3.4.1b General Conditions for outsourcing**

The ARRTI may ensure that there are opportunities for involvement with the private sector, academic and other government stakeholders, which extends beyond involvement in any Advisory Board of ARRTI. For example, a number of opportunities will be supported including: (a) Joint delivery of services by the ARRTI ;(b) Coordination by the ARRTI of services delivered by others; (c) Outsourcing of services to the private sector construction industry for field studies and developing case studies for use during ARRTI 's training programs; (d) Outsourcing of research-related training to training providers – universities, polytechnic and private and other public sector training organizations;(e ) Joint research with national and international research centers based on memoranda of understanding and agreements of cooperation; (f) Temporary secondments of ARRTI engineers and researchers at other institutions. This management approach provides services in an economically efficient and practical manner. For example, the ARRTI will build its initial capacity to carry out field research through reliance on the private sector to assist.

#### **3.4.1 c Augmentation of Laboratories through further procurement of state-of-the-art advanced equipment.**



Proposals were framed and some equipment procured for modern survey and investigation and quality assurance equipment for ARRTI under the World Bank assisted RRP -II Projects during the year 2016. Proposals were also prepared for procurement additional equipment at a cost of Rs. 36.6 Lakhs, against savings in procurement already done.

Mobile Testing Laboratory to be provided to enhance effectiveness of testing on site. Proposals for setting it up available at

#### **Annexure- 27**

#### **3.4.1d Training of ARRTI Research Laboratories Staff**

Officers and staff of Laboratories should be provided training in use of advanced and state-of-the art laboratory equipment organized through CRRRI and IAHE.

**3.4.1 e Realistic rates for testing work:** Rates of testing work by ARRTI to be analyzed and made realistic. Proposals based on rates charged by other such organisations like GERI to be submitted to advisory group/ EC/ BoM.

### **3.4.2. TRAINING AND DEVELOPMENT**

#### **a. Training related business overview of ARRTI**

The Corporate Plan of ARRTI would comprise (a) Objectives (b) Strategies (c) Structure (d) Staffing (e) Budgets, annual and five years into future (f) Courses & Curricula and (g) Programs.

In their first 2 years of its development the revamped ARRTI will demonstrate its viability in terms of campus development and maintenance, training outcomes, financial position, regional contribution and credibility as a positive initiative towards training mainly in the Assam state but also catering to the training needs of other NE states PWDs.

During the early years the ARRTI's development, it will draw on the experience of other institutions in the state/ in India and abroad, their structures and functions, and commence with training programs based on the Training Needs Assessment of the target groups. In a second wave of development ARRTI will be committed strongly to professional programs, and focus heavily on engaging with the target groups in terms of concepts, practical aspects and modern tools of asset management and maintenance of roads professional certification and accreditation.

Advisory Board may review the topics, yearly calendar, syllabus and faculty selection of ARRTI training programmes regularly but not less than once in a year.

#### **a. Aspect that needs Focus and Attention - to meet current and Future/Emerging Needs**

The issues related to required improvements to training programs and delivery which is 'more inward' looking and the larger issue of widening the role of the ARRTI which is more 'outward looking'. The aspects that need focus and attention are depicted at **Annexure- 28**

#### **b. Potential Training Needs of PWRD**

Structured TNA for all PWRD personnel needs to be conducted. Training of PWRD officers and staff to achieve targets set in training plan based on TNA can be achieved by including the training targets in the yearly Results – Framework Document (RFD) of PWRD. In the past, some of the officers nominated to training programmes failed to attend. This can be addressed in a positive manner by recognizing high performing attendees as "Best performer", "Top scorer" etc.

#### **d. Remuneration to guest faculty**

To attract well respected, experienced and competent guest faculty, the remuneration should compensate, to some extent, the effort. IAHE provides Rs 3500 per session of 1<sup>1</sup>/<sub>2</sub> hrs. in addition to travel expenses.

#### **e. Setting up E learning System**

Training needs of PWRD personnel will be assessed through systems approach. It will be observed that the training needs at such extensive scale cannot be fully addressed through classroom lectures and other conventional training approaches. The traditional approach also has the constraints of sparing large number of personnel for attending training programmes away from their work place. This is borne out from less than optimal presence in the training programmes conducted in the past.

Most economical, efficient and feasible solution lies in providing training opportunities to personnel at their workplace through E learning accessible through Cloud computing. This proposal will have following components:

- Hiring of E-Learning and Cloud computing expert



- E learning and Cloud computing expert to prepare the specifications for Learning Management System Software (LMS) and for procuring Cloud Vendor.
- Hiring of consultant for "Development of Learning Management Software (LMS) and Setting up of Cloud hosted E learning platform for imparting training to PWRD personnel
- Off-the-shelf content in the form of Training Videos to be procured from the International Road Federation (IRF)
- Building in house capacity in ARRTI for developing High Impact Training materials for E learning as well as conventional training programmes. Procurement of Mac System and training related software

### **3.4.3. COOPERATION AND COLLABORATION WITH RESEARCH AND TRAINING ORGANIZATIONS**

- The opportunities to cooperate and collaborate with other sector organizations and stakeholders is a mode of delivery of ARRTI services. The working relationships with GoA organizations and on the opportunities and necessity to have technical assistance from the start for some research activities. The need for this technical assistance is important and necessary. It will necessitate agreements of cooperation and collaboration with the various important and influential stakeholders.
- The ARRTI could collaborate with State and National Level Engineering Institutes such as IIT, IAHE, CRRI, GERI, ESC etc. – Guest Faculty, Exchange programs. ARRTI could operate in Joint Venture with other local training organisations such as Assam State Administrative College ASAC, IIT Guwahati etc. These may include training, joint quality testing, developing technical content, applied technical research. Suggested actions within next 12 months include tie-up with IAHE in the NRRDA- IAHE MoU for providing training to 7000 engineers in states including Assam.

### **3.4.4. STANDARDIZING PROCEDURES AND GUIDING MANUALS**

Operations manual for various functions of ARRTI are required to be developed for use by ARRTI personnel. It may include the following guidelines/ manuals:

Training Related

- i. Conducting Training Needs Assessment (TNA)
- ii. Preparing Training Plan
- iii. Designing Training Programmes
- iv. Developing High Impact Learning Material
- v. Delivering Training
- vi. Evaluation of the impact of Training Programmes

Research related

- vii. Conducting Applied Research
- viii. Locating published information, relevant websites , Information sources and their usage,
- ix. Search strategies, Keeping record of searches

Source for these guidelines are:

- i. CRRI Research Notes <http://crridom.gov.in/content/recent-publications-journals>
- ii. TRL Research notes and publications (<https://trl.co.uk/publications>)
- iii. Series of guideline documents on HRD and Training developed under ADB TA-7838 IND: MFF-North Eastern State Road Investment Program (Facility Concept) – Institutional Development and Capacity Building.

### **3.5. AVAILABILITY AND 3G NETWORK CONNECTIVITY TO LAPTOPS OF ENGINEERS OF PWRD**

Provision of data card/dongle hardware to laptop computers of engineers of PWRD has been done in the past. Purchase order costing of Rs 11,02,500 for 1500 dongles @ Rs 735/ each was placed in October 2015. Additionally, the 3G GPRS network connectivity of 2GB data plan per month was ensured through purchase order of October 2015, at a cost of Rs. 92,34,000. This needs to be continued.

### **3.6. POOR MAINTENANCE OF LABORATORY BUILDINGS AND FURNITURE**

Adequate number of helpers to be engaged for cleaning of laboratory buildings and equipment. This is possible only through empowering Director with sufficient funds and powers delegated to Director ARRTI.

### **3.7. VEHICLES AVAILABILITY IN ARRTI**

Mobility of the Director, the staff of ARRTI, guest faculty and of the trainees for site visits needs to be ensured through provision of at least following vehicles:

- Director's Car
- Staff car for use of staff and guest faculty
- Bus for movement of faculty and trainees for field visits necessary for effective training

### **3.8. FORMATION OF TECHNICAL FORUM**

ARRTI- as a research institute for GoA can potentially act as the common platform, where various Government and private organizations can discuss, deliberate innovative research works, studies and any other technical issues. ARRTI as a leading research institute can take it further in adapting the research work carried out to industry needs.

ARRTI can take the lead in organizing workshops/ seminars/ conferences where delegates from all over the State of Assam and also from other NE States will participate and discuss on research work done by them for knowledge sharing; this will also help ARRTI to establish it as a Centre of Excellence in the future.

### **3.9. FORMULATION OF "STANDARDS AND SPECIFICATIONS" EMANATING FROM R&D WORK**

The expertise of Research and Development activities carried out by ARRTI should be leveraged in the formulation of various Standards and Specifications for GoA, which will be used as a benchmark for other institutions and stakeholders to follow. ARRTI should develop these through a consultative process. The Advisory Board should take a lead to start such initiative by encouraging ARRTI in this regard.

### **3.10. AUGMENTATION OF LIBRARY AND E- LIBRARY**

Make available suitable e-copies of technical papers, toolkits, guidelines, manuals, IRC codes, training videos.

Although ARRTI does have a Library it is not the sort of place that encourages anyone to spend time there. It is in need of refurbishment so that it can serve the purpose for its existence, which is to provide a source of reference material for both the public and private sector.

### **3.11. COMPARISON OF TESTING RATES CHARGED BY ARRTI AND THE PRIVATE SECTOR.**

**Annexure- 13**, tests setting out the rates for ARRTI and the rates for two laboratories operating in the private sector

Unless a test by test analysis made, and this is not the thrust of this report, it would seem that there is some disparity between ARRTI and the Private Sector Laboratories with the latter charging some more than ARRTI for similar tests.

What is not known is the time required by any of the laboratories to undertake these tests and to submit a report. Again, the quality of the reports submitted is not known.

What is clear is that the private sector laboratories include a number of factors in their rate make-up which may not necessarily be incorporated within the rates quoted by ARRTI. For example the private sector will base its rates upon the following:

- 1) Labour costs associated with undertaking the test
- 2) Provision of testing equipment
- 3) Provision of buildings (laboratory and office), including their maintenance
- 4) Maintenance and replacement of testing equipment
- 5) Provision of services (water, electricity, etc)
- 6) Administration
- 7) Profit

It is doubtful if ARRTI would need to include all of the above components in the calculation of their testing rates since it could be assumed that provision of buildings (laboratories and offices) and maintenance of same, provision of services, and

administration costs would be covered under the budget which ARRTI receives from Government. Since ARRTI is a wholly owned Government entity the need to make a profit is not an essential requirement, although it could be in the future.

### 3.12. COMMUNICATION STRATEGY FOR DISSEMINATING ARRTI'S SUCCESSES

ARRTI should develop and maintain its website to disseminate information about its activities related to Research, Testing and Training & Development. Detailed guidelines for developing, hosting and maintaining this website are available at [Annexure- 29](#)

### 3.13. RESULT FRAME WORK DOCUMENT

ARRTI development result framework document is available at [Annexure- 30](#)

### 3.14. CONCLUSION: MATRIX CONTAINING CURRENT STATUS, ISSUES AND RECOMMENDATIONS TO ADDRESS THESE ISSUES

Matrix containing current status, issues and recommendations to address these issues is available at [Annexure- 31](#).

This action plan is presented in a Gant Chart below:

Sl no	Particulars of issue	Duration					
		Short Term		Medium Term			Long Term
		1 Year	2 Years	3 Years	4 Years	5 Years	>5 years
1	Delegation of powers to Director						
2	Proposed mission of revamped ARRTI						
3	Training of Laboratory officers and Staff						
4	Business overview related to training						
5	Quality enhancement of Training material						
6	Rolling training plan/ training calendar						
7	Collaboration with other institutions						
8	Availability of 3G network						
9	Poor maintenance of laboratory buildings and						
10	Procurement of required vehicles						
11	Library to be equipped						
12	Rates of testing work by ARRTI to be analyzed						
13	Retaining competent personnel for longer durations						
14	Recruitment of Staff						
15	Planning & Budgeting – Revenue earned by ARRTI						
16	Procurement of advanced equipment						
17	Quality of training sessions						
18	PWRD Training needs						
19	Remuneration to guest faculty						

<i>Sl no</i>	<i>Particulars of issue</i>	<i>Duration</i>					
		<i>Short Term</i>		<i>Medium Term</i>			<i>Long Term</i>
		<i>1 Year</i>	<i>2 Years</i>	<i>3 Years</i>	<i>4 Years</i>	<i>5 Years</i>	<i>&gt;5 years</i>
20	<i>Standardizing procedures &amp; guiding manuals</i>						
21	<i>Cooperation and Collaboration with Research and Training Organizations</i>						
22	<i>Research &amp; Testing of Materials</i>						
23	<i>New products and material evaluation</i>						
24	<i>General conditions for outsourcing</i>						
25	<i>Setting up E learning system</i>						

**Annexure:1 List of PWRD, ARRTI and other Stakeholder's personnel interacted with regarding this report**

**Past Directors ARRTI**

Name	Organization	Designation
Er. R A Singh	ARRTI	Past Director
Er. Biswa Dev Sarma	ARRTI	Past Director
Er. G. C. Bhagawati	ARRTI	Past Director

**PWRD Officers**

Name	Organization	Designation
Er. Rajesh Kemprai	PWRD	Secretary to the Government of Assam PWRD
Er. Deepak Kr. Gogoi	PWRD	Chief Engineer PWRD – ARIASP & RIDF

**ARRTI Officers and Personnel**

Name	Organization	Designation
Er. M. C. Poddare	ARRTI	Director ARRTI
Er. Diganta	ARRTI	Assistant Executive Engineer (AEE)
Er. Rubi Das	ARRTI	Assistant Engineer (AE)
Er. Bijoy Sarma	ARRTI	AE ARRTI
Mr. Makbul Ali Khandekar	ARRTI	In charge SOIL Section
Mr. Bipin Boro	ARRTI	Research Asstt.
Mr. Champak Boro	ARRTI	Research Asstt.
Mr. Habibur Rehman	ARRTI	In charge Aggregate Section
Mr. Mukut Sarma	ARRTI	In charge Soil Survey
Mr. Tapan Kalita	ARRTI	Scientific Asstt. Soil Survey Section
Mr. Upendra Nath Choudhuri	ARRTI	Assistant Research Officer (ARO)

**Pre-Registration Training Centre (PRTC)officers**

Name	Organisation	Designation
Er. Gokul Chandra Gogoi	Pre-Registration Training Centre (PRTC)	Superintending Engineer
Er. Saleh Ahmed Choudhury	PRTC	Assistant Executive Engineer

**Consultants and contractors currently working (relevant to ARRTI & Computerization)**

Name	Organization	Designation
Mr. Manvendra	Price Waterhouse Coopers (PWC)	IT Expert
Mr. Tejpal Singh Gandhi	Acme Trade & Agencies (Furnishing contractor for ARRTI New Building)	Proprietor

## Annexure:2 Provisions based on SOW in Inception Report and Relevant paras in this report

SI No	Provision, based on SOW, in Inception report	Relevant paras in this report
1	ARRTI's MISSION & VISION	2.2,
2	Planning to manage service delivery	2.1.3, 2.3, 2.4, 3.3,
3	Standardizing procedures and guiding manuals	3.4.4
4	Applied Research. Organising Research, testing and Quality Control related activities	2.6, 2.7.1, 2.7.4, 2.7.5,3.4.1, 3.11
5	New products and materials evaluation	3.4.1c
6	Training and Capacity Development services. Organising Training activities	2.5.1, 2.5.2, 2.5.3, 2.7.2, 2.7.3, 3.4.2c
7	Administrative and Support services	2.7.1, 2.7.2, 2.7.3, 2.7.4, 2.7.5, 3.1.1, 3.1.2, 3.1.3, 3.2, 3.5, 3.10
8	Co-operation and collaboration with Research and Training Organizations	3.4.3, 3.8,
9	General considerations on outsourcing	3.4.1b
10	Governance and Management Structure	2.1.2, b,c,
11	Communication strategy for disseminating ARRTI's successes	
12	Training Quality Management	2.7.4, 3.4.2a, 3.4.2b,3.4.2d, 3.4.2e
13	Training Content	3.42e

**Annexure-3: INCUMBENCY OF DIRECTORS' OF ROAD RESEARCH LABORATORY/  
ARRTI**

SL NO.	NAME OF THE INCUMBENT (IN THE SE RANK)	FROM	TO	TENURE	Range of tenure	% of total of 32
1.	ER. S.H. RAHMAN, B.SC, BE	16.01.78	24.02.79	12	<1 M	7
2.	ER. D.N. SARMA, B.E.	24.02.79	06.09.79	7	<1 M	
3.	ER. R.A. SINGH, B.TECH (HONS), FIE	07.09.79	25.09.87		8 YR	1
4.	ER. B.P. HAZARIKA, M.E.	25.09.87	11.05.88	240	6M-1 YR	5
5.	ER. K.K. BARUAH, BE	11.05.88	02.11.92	4YRS 6 MONTHS	4- 5YR	3
6.	ER. J.N. BAISHYA, BE	02.11.92	16.11.92	I/C 13	<1 M	
7.	ER. P.C. GOSWAMI, BE	16.11.92	22.09.93	300	6 M-1 YR	
8.	ER. J.N. BAISHYA, BE	22.09.93	01.10.93	I/C 30	<1 M	
9	ER. K.C. DEKA BE	01.10.93	28.02.94	I/C 120	3-6 M	5
10	ER. J.N. BAISHYA, BE	28.02.94	26.06.94	120	3-6 M	
11	ER. S.H. MAZUMDAR, BE	26.06.94	30.06.94	4	<1 M	
12	ER. J.N. BAISHYA, BE	30.06.94	15.07.94	I/C 30	<1 M	
13	ER. P.L. PATHAK, BE	15.07.94	31.07.95	350	6 M-1 YR	
14	ER. K.C. KALITA, BE	31.07.95	16.08.96	400	1 YR-2 YR	
15	ER. H. DEKA, BE	16.08.96	31.03.2001	4.5 YEARS	4.5 YR	
16	ER. S. ALAM	31.03.2001	05.06.2001	I/C 90		
17	ER. B.K. DAS, BE	05.06.2001	11.09.2001	90	1-3 M	4
18	ER. S. ALAM	11.09.2001	16.11.2001	I/C 60		
19	ER. L. BHUYAN, BE	16.11.2001	30.04.2003	1 YEAR 5 MONTHS	1-2 YR	1
20	ER.B.C. SARMA, BE, FIE	30.04.2003	31.12.2004	240	6 M-1 YR	
	IN THE RANK OF ADDL. CE. RANK					
21	ER. B.C. SARMA, BE, FIE	01.01.05	10.08.07	2 YRS 7 MONTHS	2-3 YR	3
22	ER. PATANJALI BHAGAWATI, BE (HONS)	10.08.07	30 .06.2009	2 YEARS	2-3 YR	
23	Er. B.D. Sarma	01.01.2010	13.05.2010	120	3-6 M	
24	Er. Ranjeet Kr. Das	13.05.2010	12.08.2013	3 YEARS	2-3 YR	
25	Er. SM Hassan	12.08.2013	30.05.2014	270	6 M-1 YR	
26	Er. BD Sarma	30.05.2014	31.12.2015	210	6 M-1 YR	
27	Er. Utpal Sarmah	31.12.2015	09.05.2016	180	3-6 M	
28	Er. D. Pathak	09.05.2016	23.09.2016	120	3-6 M	
29	Er. G. C. Bhagawati	23.09.2016	13.10.2016	90	1-3 M	3
30	Er. Z. A. Hazarika	13.10.2016	31.12.2016	60	1-3 M	
31	Er. G. C. Bhagawati	31.12.2016	10.02.2017	40	1-3 M	
32	Er. M. C. Poddar	Since 10-02-2017	28.02.2017	18	<1 M	

**Annexure-4: Range of the tenures of a total of 32 Directors since Inception of RRL/ ARRTI**

	<b>Range of Tenures</b>	<b>Number of Incumbents falling in this range</b>	<b>Percentage</b>
1	Less than one month	7	22%
2	One to three months	7	22%
3	Three to Six months	5	15%
4	Six months to One Year	5	15%
5	One year to two years	1	3%
6	Two to Three years	3	10%
7	Four to Five Years	3	10%
8	Eight years	1	3%



## Annexure 5: ARRTI STAFF THEIR AGE AND CURRENT ATTACHMENT

Sl. No.	Name & Designation	Age	Years left for Retirement	Current Attachment
1	Sri M.C. Poddar, Director.	59Years,11 Months	1 Month (Date Birth 07-04-1957)	ARR&TI
2	Sri Zakir Hussain, R.O.	58	2 Years	Research Officer (as in charge)
3	Sri Debabrata Naug, Dy,Director	59	1 Years	ARR&TI
4	Sri Bipul Ch. Barman, AEE	51	9 Years	Dispur Officer
5	Sri Diganta Kalita, AE.	42	18 Years	Chief Engineer Office (PMGSY CELL)
6	Sri Kushal Ch. Deka, AE	50	10 Years	Chief Engineer Office (PMGSY CELL)
7	Sri Tarun Ch. Nath, AE	59	1 Years	Morigaon Division
8	Sri Sajjal Sarma, AE	41	19 Years	Dispur Office
9	Sri Mukut Sarma, AE	48	12 Years	ARR&TI
10	Sri Bijoy Sarma, AE	48	12 Years	ARR&TI
11	Sri Upendra Nath Choudhury, ARO	57	3 Years	ARR&TI
12	Sri Habibur Rahman, ARO	57	3 Years	ARR&TI
13	Sri Niren Baruah, AEE	54	6 Years	Chief Engineer Office (PMGSY CELL)
14	Sri Khaleque Uddin Ahmed, AE	49	11 Years	Guwahati Road Division
15	Sri Ruby Das, AE	38	22 Years	ARR&TI
16	Sri Runa Sarma, AE	38	22 Years	Chief Engineer- World Bank Office
17	Sri Nareswar Deka, Dy.A.O.	53	7 Years	ARR&TI
18	Md. Nuru Jwamal Ali, Dy.A.O.	51	9 Years	ARR&TI
19	Sri Dhiraj Ch. Das, Asstt.A.O.	47	13 Years	ARR&TI
20	Sri Nirupam Talukdar, Asstt.A.O.	39	21 Years	ARR&TI
21	Sri Mahbub Ali Khandakar, Sr.Observer	57	3 Years	ARR&TI
22	Sri Bipin Ch. Baro, F.A	59	1 Years	ARR&TI
23	Sri Sirish Ch. Malakar, F.A	59	1 Years	NRC duty
24	Sri Pradip Baishya, Gr-IV	48	12 Years	NRC duty
25	Sri Kanak Das, Gr.IV	53	7 Years	NRC duty
26	Sri Tarani Das, Gr.IV	56	4 Years	NRC duty
27	Sri Khagen Kalita, Gr IV	49	11Years	NRC duty

Sl. No.	Name & Designation	Age	Years left for Retirement	Current Attachment
28	Sri Mazaharul Islam, Gr IV	49	11 Years	ARR&TI
29	Sri Haidar Ali Ahmed,Gr-IV	51	9 Years	ARR&TI
30	Sri Kalyan Choudhury, Gr.IV	55	5 Years	ARR&TI
31	Sri Madan Deka, Gr.IV	56	4 Years	ARR&TI
32	Sri Matindra Choudhury, JE	55	5 Years	ARR&TI
33	Sri Bidyut Talukdar, J.E	50	10 Years	Chief Engineer Office (PMGSY CELL)
34	Sri Kanak Kalita, J.E	50	10 Years	ARR&TI
35	Sri Manaj Brahma,, L.D.A	43	17 Years	NRC Duty
36	Sri Champak Baro, R.A	41	19 Years	ARR&TI
37	Sri Manoj Sutradhar, Peon	42	19 Years	ARR&TI
38	Sri Janaki Devi, Chowikidar	56	4 Years	ARR&TI
39	Sri Dhiren Baishya, Driver	59	1 Years	ARR&TI
40	Sri Mani Ram Das, Driver	56	4 Years	ARR&TI
41	Sri Kaliprasad Das, Chowkidar	55	5 Years	ARR&TI
42	Sri Jagadish Sarma, Mali	49	11Years	ARR&TI
43	Sri Ramani Nath, Bearer	55	5 Years	ARR&TI
44	Sri Mina Das U.D.A	56	4Years	ARR&TI
45	Sri Ashim Baishya L.D.A	54	6 Years	NRC Duty
46	Sri Daya Ram Bharali L.D.A	53	7 Years	NRC Duty
47	Sri Tapan Kalita, Sc.Asstt	57	3 Years	NRC Duty
48	Sri Dharanidhar Deka, Peon	52	8 Years	ARR&TI
49	Sri Nurul Islam, Khalashi	50	10 Years	Chief Engineer Office (PMGSY CELL)
50	Sri Ramji Sah, Khalashi	59	1 Years	ARR&TI
51	Sri Sanjib Das, Khalashi	38	22 Years	ARR&TI
52	Sri Amit Ranjan Das, Drftory	48	12 Years	ARR&TI
53	Sri Amal Barman, L.D.A	41	19 Years	ARR&TI
54	Sri Bulu Kalita, Steno	37	23 Years	ARR&TI
55	Sri Ramen Kr. Kalita, Lab.Asstt	40	20 Years	ARR&TI
56	Sri Nayanjyoti Medhi, Electrician	28	32 Years	ARR&TI
57	Sri Bijumani Talukdar, Peon	50	10 Years	ARR&TI
58	Sri Raju Basfor, Sweeper	32	28 Years	ARR&TI
59	Sri Bedanta Kumar Baruah, Store Keeper	58	2 Years	Chief Engineer Office (PMGSY CELL)
60	Sri Ranjit Kumar Saroha, AE	51	9 Years	ARR&TI
61	Sri Birash Brahma, Khalashi	44	16Years	ARR&TI

**Annexure -6: Research officers and staff retiring within 1 to 3 years from now**

	<b>Name &amp; Designation</b>	<b>Age</b>	<b>Years left for Retirement</b>
1	Sri Zakir Hussain, Deputy Director	58	2 Years
2	Sri Debabrata Naug, Deputy Director	59	1 Years
3	Sri Upendra Nath Choudhury, Assistant Research Officer, Bitumen Section I/C	57	3 Years
4	Sri Habibur Rahman, Assistant Research Officer, Aggregate Section I/C	57	3 Years
5	Sri Mahbub Ali Khandakar, Sr. Observer, Lab.(Cement Section )	57	3 Years
6	Sri Bipin Ch. Baro, Field Assistant, Lab.(Cement Section)	59	1 Years
7	Sri Sirish Ch. Malakar, Field Assistant Lab.( Cement Section)	59	1 Years

**Annexure-7: List of staff supposed to be working in ARRTI but deputed to other offices**

<b>S.N.</b>	<b>Charged to ARRTI but Organizations where actually working</b>	<b>Numbers working in these other organisations</b>
1	SQC	6
2	NRC	8
3	Secretariat	2
4	Morigaon State Road Project	1
5	GHY Road Division	1

## Annexure 8: Reorganization of ARRTI staff as envisaged in the Rules of Business

	<b>Designation</b>	<b>Proposed posts</b>	<b>Total</b>	<b>Existing posts of RRL/ ARRTI, PRTC &amp; SATC to be used</b>
1	Director cum Chief Executive Officer 9(in the rank of Additional Chief Engineer)	One	1	ARRTI -1
2	PS to Director	One	1	ARRTI -1
3	Joint Directors (in the rank of Superintending Engineer)	One each for Training, Research and RCTRC	3	1. SE PRTC 2. SE Traffic Engineering 3. SE IBRC
4	Deputy Directors (in the rank of Executive Engineer)	One each for Training, HR, Research, Geology and RCTRC	5	1. EE PRTC 2. Research officer ARRTI 3. DY. Director ARRTI 4. DY. Director ARRTI 5. Asstt. Director ARRTI
5	Assistant Directors (in the rank of Assistant Executive Engineer)	Training (2) and One each for , Research and RCTRC	4	1. AEE ARRTI (2) 2. AEE PRTC 3. AEE SATC
6	Assistant Research Officer	Research	1	ARO ARRTC
7	Coordinator (in the rank of Assistant Engi(Assam)	One for HR and Two each for Training, , Research, RCTRC	7	1. AE ARRTI – 7
8	Account Officer (Assam Finance Service)	One	1	ARRTI -1
9	Deputy Account Officer	Two	2	DAO in ARRTI -2
10	Research Assistant	One research	1	ARRTI -1
11	Scientific Assistant	One in research	1	ARRTI -1
12	Senior observer	One in research	1	ARRTI -1
13	Laboratory Assistant	One in research	1	ARRTI -1
14	UDA	One each in training, HR and RCTRC	3	ARRTI -3
15	LDA	One each in training, HR, research and RCTRC	4	ARRTI -4
16	Laboratory support staff	Five in research	5	ARRTI -5
17	Peon	Training (4), HR (5) RCTRC (4)	13	ARRTI -13
18	Khalasi	Five in Research	5	ARRTI -5
19	Rigman	One in research	1	ARRTI -1
20	Security	3 in HR	3	ARRTI -3
21	Driver	1 in HR	1	ARRTI -1
22	Mali	1 in HR	1	ARRTI -1
23	Electrician	1 in HR	1	ARRTI -1

**Annexure 9: Four budget heads under which funds are allocated by PWRD to  
ARRTI**

<b>S.N.</b>	<b>Budget Head</b>	<b>Subject of expenditure</b>
1	3054-R&B-80-General_001-Director & Admi._1382_Execution (General)-0001-Salary-Non Plan Voted	Salary
2	3054-R&B-80-General_001-Director & Admi._1382_Execution (General)-000-0-O.E.-00- Non Plan Voted	Office Expenses (OE)
3	3054-R&B-80-General_001-Director & Admi._1382_Execution (General)-000-03-T.E-00- Non Plan Voted	Travelling Allowance
4	3054-R&B-03-SH-337 Roads Works-0189-R&M-590-01-Salaries-08-Medical Re-imburement-Estt.- Non Plan Voted	Medical reimbursement

## Annexure 10: Expenditure Details

Subject of Expenditure	Year-wise budget provision (Rs)			
	2013-14	2014-15	2015-16	2016-17
Salary	3,00,00,000	3,25,00,000	3,45,00,000	3,74,00,000
Office Expenses	85,000	114,000	101239	Nil
Travelling Allowance	91,600	156,000	70,309	59,500
Medical Reimbursement	Nil	Nil	Nil	134,595
	30176600	32770000	34671548	37594095

**Annexure 11: Training programmes organised by ARRTI during last five years**

<b>S.N.</b>	<b>Year</b>	<b>Numbers of training programmes organized during the year</b>
1	2013	5
2	2014	13
3	2015	5
4	2016	1
5	2017 (proposed)	9
	<b>TOTAL</b>	<b>33</b>

**During last four years cadre-wise breakup of 907 PW&RD personnel trained is:**

CEs	16	AEs	219
SEs	77	JEs	113
EEs	167	Accounts staff	104
AEEs	219	Contractors' staff	23
		STA	13
Total of 907 personnel trained in four years			



**Annexure 12: Nos. of Trainees participated in the Training/Workshop held in ARR&TI, the period March/2013 - Jan/2016**

Year	Period of Training/ Workshop	Training Course	Training Centre	Nos. of Trainees									
				JE	AE	AEI	EE	SE	CE/ Addl. CE	Accounts Staff	Contractors/ Contractor's Staff	STA	Total
1	2	3	5	6	7	8	9	10	11	12		13	14
2013	4-9 March	DPR Preparation	ARR&TI	10	18	17	2		1				48
	18-19 July	Contract Management	ARR&TI		6	11	8	6					31
	30 Sept	Environmental & Social safeguard	ARR&TI	6	12	14	9	2					43
	28-31 Oct	Total Station Survey	ARR&TI		20								20
	30-31 Dec	DPR Preparation/Quality Control & Quality Assurance	ARR&TI	21	20								41
2014	26 Feb	Bridge Design	ARR&TI		16	3	2						21
	27 Feb	Routine Maintenance	ARR&TI	5	10	8	21	8	2				54
	9-10 June	Essential Contract Management	ARR&TI		4	4	10	16	2				36
	13-14 June	OMMAS New Versiomn	ARR&TI	7	9	3	6			43			68
	23 June	Asset management	ARR&TI	8	7	19	14	11	1				60
	24-26 June	Road Safety	ARR&TI	12	12	16	12	5	1				58
	27 June	OMMAS New Versiomn	ARR&TI	27	21	5				61			114
	26-29 Aug	Road Safety & Contract management	ARR&TI	5	6	10	5	1					27
	4-5 Sept	Contract Management	ARR&TI	1	8	13	12	3	2			8	47
	8-13 Sept	Project Management	ARR&TI		4	4	18	5					31
	22-26 Sept	Inventory & Road Surface Condition Survey and Traffic Road Survey	ARR&TI	5	5	6	1	1					18
14-15 Oct	Contract Issues & its resolution	ARR&TI		4	1	4	1	1			15	26	

	2-3 Dec	Workshop on New Materials/Technologies for Rural Roads on 2nd & 3rd December, 2014	ARR&TI	2	5	1	6	6	6			14	40
2015	27Jan - 01	Project Management	ARR&TI		3	3	9	4					19
	27-28 Feb.	New Technologies on Environmentally Optimized	ARR&TI		8	11	9	2					30
	18 - 22 May	Social & Environmental Safeguard	I.I.E.,NH-	4	10	5	3	1					23
	7-12 Sept	Project Management	"The Lily Hotel"		1	8	8	1					18
	23-24 Sept	Contract Management	The Lily Hotel		8	2	7	4					21
2016	4-9 Jan	Project Management	I.I.Engg, Panbaza		2	10	1						13
				113	219	174	16	77	16	104	23	27	

**Annexure 13: Rates of testing charged by ARRTI compared with rates by other local laboratories**

<b>S No</b>	<b>Particulars of test</b>	<b>Rates in Rs. charged by ARRTI/ Test</b>	<b>Rates charged by other laboratories</b>
	<b>Soil Survey Section</b>		
	Direct Shear Test	173	600
	Triaxial Compression Test	77	900
	Consolidation Test	777	1200
	Particle Size analysis (wet test)	105	300
	Particle Size analysis (dry test)	91	210
	Specific gravity	98	200
	Moisture Content	42	60
	<b>Soil Section</b>		
	Sieve Analysis	91	210
	Limit Tests	231	500
	Proctor Test	473	600
	CBR Test	1001	1000
	<b>Bitumen Section</b>		
	Bitumen Content	784	
	Ductility Test	266	400
	Softening Test	305	625
	Penetration Test	280	625
	Mix Design	3643	4200
	<b>Cement Section</b>		
	Tensile Strength of Steel	300	–
	Bending and Rebending	350	–
	Compressive strength of concrete cube	76	250
	Compressive strength of bricks	151	–
	Concrete mix design	5000	6000
	Compressive strength of cement moulding	151	1350 (including moulding & curing)
	Soundness test of cement	289	550
	Setting time of cement	136	750
	Fineness test of cement	318	520
	Flexural strength of concrete	76	
	<b>Aggregate Section</b>		
	Aggregate impact value test	287	390
	Crushing value test	371	425

<b>S No</b>	<b>Particulars of test</b>	<b>Rates in Rs. charged by ARRTI/ Test</b>	<b>Rates charged by other laboratories</b>
	Los Angles abrasion value test	335	715
	Flakiness and elongation test	223	410
	Grading test	260	250
	Density test	132	80
	Specific gravity test	157	200
	Water absorption test	161	120

**Annexure14: ARRTI's Soil Section Equipment, their condition and dates of last calibration**

Sl. No.	List of Equipment/Apparatus	Name/ Brand	Year of Installation	Operational/ Non operational	Date of Last Calibration	Date of Next Calibration	Remarks/ other relevant information any
1	2	3	4	5	6	7	8
1	Proving ring for CBR 50 KN	AIMIL	Before my joining record could be found	Operational	14.05.14	13.07.16	Certificate No. DVG/PR/05-14/003
2	CBR mold with fillings set	AIMIL	20,032,015	Operational	Not required	not required	
3	Universal penetration load frame	Record could not be found	Before my joining record could be found	Operational	Not required	not required	Old machine
4	Proctor mold and set	AIMIL	2003	Operational	Not required	not required	
5	Limit test apparatus	AIMIL	2014	Operational	Not required	not required	
6	Pouring cylinder Calibrating cylinder Tray with central hole	AIMIL	Before my joining record could be found	Operational	Not required	not required	
7	Core cutter cylinder, Dolly, Rammer	AIMIL	2003	Operational	Not required	not required	
8	Moisture meter	AIMIL	2003	Operational	Not required	not required	
9	Direct shear test machine (Box shear)	Record could not be found	Record could be found	Non-Operational	Not required	not required	Old machine
10	Pulverizer	Record could not be found	Before my joining record could be found	Non-Operational	Not required	not required	Old machine
11	CBR penetration load frame	AIMIL	2003	Non-Operational	Not required	not required	due to defective cannot be used

**Annexure15: ARRTI's Soil Survey Section Equipment, their condition and dates of last calibration**

Sl. No.	List of Equipment/Apparatus	Name/Brand	Year of Installation	Operational/ Non operational	Date of Last Calibration	Date of Next Calibration	Remarks / other relevant information on any
1	2	3	4	5	6	7	8
1	Direct shear apparatus	AIMIL	N/A	Operational			Servicing required
2	Tri-axial Apparatus	AIMIL	N/A	Operational			Servicing required
3	Consolidation apparatus	AIMIL		Operational	Not available		Calibration required
4	Atterberg's Limit apparatus	AIMIL		Operational			
5	Water level indicator	AIMIL		Operational			
6	Vertical Extruder	AIMIL		Operational			
7	High speed stirrer			Operational			
8	Penetration apparatus for Liquid Limit	AIMIL		Operational			
9	Electronic balance	ESSA		Operational			
10	Tri-axial Apparatus	HICO		Non Operational			Servicing required
11	Pore water pressure apparatus	AIMIL & HICO		Non Operational			Servicing required
12	Volume change apparatus	AIMIL		Non Operational			Servicing required
13	Electric Oven	AIMIL		Non Operational			Servicing required
14	Pressure meter	AIMIL		Non Operational	Not available		Servicing required
15	Vane shear apparatus	AIMIL		Non Operational			Servicing required
16	Plumet Balance	AIMIL		Non Operational			
17	Permeability apparatus	AIMIL		Non Operational			

**Annexure 16: ARRTI's AGGREGATE SECTION- STATUS OF LABORATORY EQUIPMENT/ APPARATUS**

ARRTI's AGGREGATE SECTION							
STATUS OF LABORATORY EQUIPMENT/ APPARATUS							
Sl. No.	List of Equipment/Apparatus	Name / Brand	Year of Installation	Operational/ Non operational	Date of Last Calibration	Date of Next Calibration	Remarks / other relevant information any
1	2	3	4	5	6	7	8
1	Aggregate Impact Value Test Apparatus	AIMIL		One Operational / another Non-operational	No calibration carried out as of now	Does not arise	
2	Loss angles abrasion test apparatus	AIMIL		Operational			
3	Core cutting & grinding machine			Operational			
4	Water Bath			Operational			
5	File abrasion machine	AIMIL		Operational			
6	Flakiness gauge			Operational			
7	Elongation gauge			Operational			
8	Polished stone value test apparatus	HEICO		Non-operational			
9	Skid resist tester	AIMIL		Non-operational			
10	Profile graph apparatus	AIMIL		Non-operational			
11	Devel apparatus			Non-operational			
12	Electrical Oven			Non-operational			
13	Direct shear machine (large, for coarse aggregate)			Non-operational			

**Annexure 17: ARRTI's BITUMEN SECTION- STATUS OF LABORATORY EQUIPMENT/ APPARATUS**

ARRTI's BITUMEN SECTION							
STATUS OF LABORATORY EQUIPMENT/ APPARATUS							
Sl. No.	List of Equipment/Apparatus	Name/ Brand	Year of Installation	Operational/ Non operational	Date of Last Calibration	Date of Next Calibration	Remarks/ other relevant information any
1	2	3	4	5	6	7	8
1	Marshall Stability Apparatus (Dial gauge)	AIMIL		Operational	14.05.14	13,07.16	DG76025-Dial gauge No. Certificate No. DVG/PR/05-14/002.
2	Ductilo-meter	AIMIL		Operational			
3	Penetrometer	AIMIL		Operational			
4	Softening Point apparatus	AIMIL		Operational			
5	Bitumen Extractor			Operational			
6	Fural Viscometer	AIMIL		Operational			



**Annexure 18: ARRTI's CEMENT SECTION- STATUS OF LABORATORY EQUIPMENT/ APPARATUS**

**ARRTI's CEMENT SECTION  
STATUS OF LABORATORY EQUIPMENT/ APPARATUS**

<b>Sl. No.</b>	<b>List of Equipment/Apparatus</b>	<b>Name/ Brand</b>	<b>Year of Installation</b>	<b>Operational/ Non operational</b>	<b>Date of Last Calibration</b>	<b>Date of Next Calibration</b>	<b>Remarks/ other relevant information any</b>
1	2	3	4	5	6	7	8
1	Compression testing machine (2000 KN)	AIMIL		Operational	7/4/2014	25/05/16	
2	Compression testing machine (3000 KN)	AIMIL		Operational	7/4/2014	25/05/16	
3	Benkelman Beam apparatus (Dial gauge)	AIMIL		Operational			Required calibration
4	Flexural testing machine (50 KN)	AIMIL		Operational			Required calibration
5	Universal testing machine (1000 KN)	ENKAY		Non-Operational			

## Annexure 19: Illustrations from the Laboratories, classrooms, auditorium, library and computer center

### A. Soils and Soil Survey section

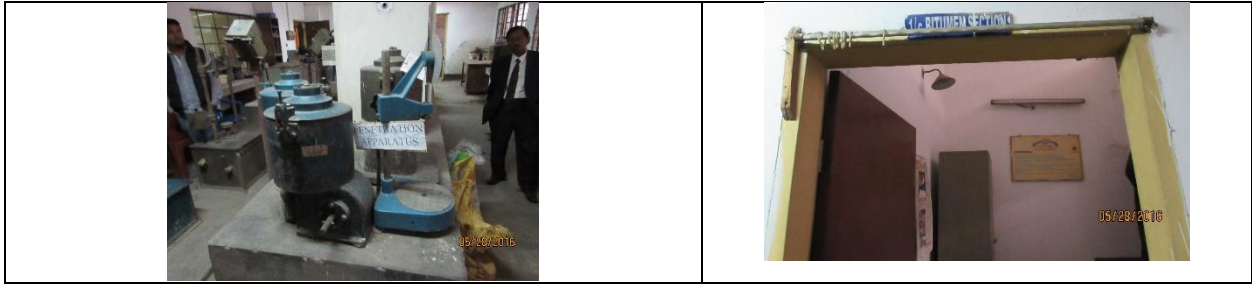


### B. Aggregates Section



Dirty Cob-Web infested windows

### C. Bitumen Section

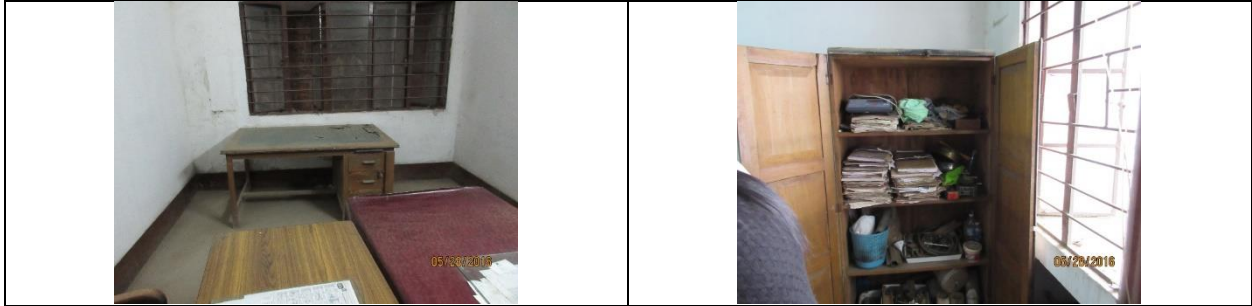


### D. Cement Section

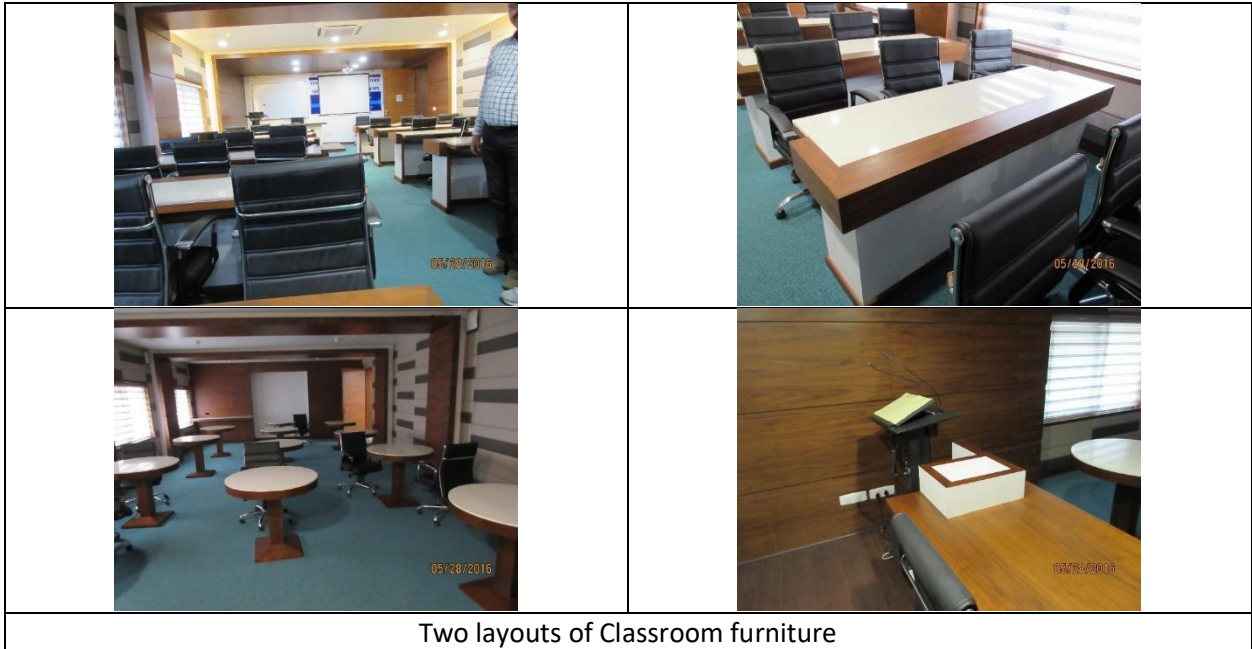


### E. Poor maintenance of furniture and buildings of Laboratories





### F. Class rooms



Two layouts of Classroom furniture

### G. Auditorium





## H. Computer Centre



ARRTI Computer Center sans computers

## I. Library Building



Empty shelves in the library

## Annexure 20: SWOT Analysis of the Existing Status of ARRTI

<b>Strengths</b>	<ul style="list-style-type: none"> <li>➤ Assam Road Research and Training (ARRTI) Society already registered on 3 October 2016. This is a very forward looking step. Many of other state do not have their staff training institutes functioning as a registered society. This provides autonomy to ARRTI</li> <li>➤ Board of Management is chaired by the Chief Secretary – High level support</li> <li>➤ Director holds the post of Additional Chief Engineer</li> <li>➤ Own campus with infrastructure, hostel construction is proposed</li> <li>➤ Good facilities for stay of guest faculty</li> <li>➤ Funding for all requirements of ARRTI is to be provided by the Government</li> <li>➤ Pre-Registration Training Centre for contractors set up by GoA</li> <li>➤ Director ARRTI Chairs the PWRD committee to conduct departmental examinations in engineering</li> <li>➤ During 2013-14 training programmes were organized on, Modern technologies in construction industry &amp; preparation of DPR under construction, research &amp; education program, Contract management, (iii) Environmental &amp; social safeguard of PMGSY works,(iv) Total station survey &amp; computer aided road design, (v). DPR preparation, quality control and quality assurance, (vi) Bridge design, (vii). Maintenance of PMGSY roads, and (vii) Mobile based application for 2nd tier of quality monitoring in PMGSY</li> <li>➤ During 2014-15 training programmes organised on, (i) Essential contract management, (ii) PMGSY OMMAS, (iii) Asset management, (iv) Road safety , (v) Contract management, (vi) Project management, (vii) Inventory and road condition survey &amp; analysis and traffic &amp; axle load survey and analysis</li> <li>➤ WB funded procurement of modern survey and investigation equipment and quality control equipment in the year 2016</li> <li>➤ 3G GPRS connectivity available to ARRTI laptops</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>➤ Transferrable staff specially Director and other senior technical personnel– such staff are not assigned on a permanent basis</li> <li>➤ No criteria for posting of officers/ staff in ARRTI – aptitude for training not taken into account</li> <li>➤ No regular faculty</li> <li>➤ Remuneration rates for the Guest Faculty not defined for adequacy</li> <li>➤ Powers to be delegated to Director for efficient functioning of ARRTI</li> <li>➤ No Training Needs Analysis is undertaken on a regular basis</li> <li>➤ Only ad-hoc organization of training programmes no structured rolling training plan based on TNA, say for five years, prepared</li> <li>➤ Library not equipped with Codes, manuals, E publications, training videos</li> <li>➤ There are no vehicles (Staff Car for movement of staff and guest faculty and bus for movement of trainees to sites)</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>➤ Changes in Technology and Management Science - hence opportunity to develop and run new courses</li> <li>➤ Conducting of Training Need Assessment and preparation of rolling training plan for PWRD and other stakeholders</li> <li>➤ Expansion of base of trainees in Government, Public Sector and the Private Sector</li> <li>➤ Opportunity of joint ventures with other Training and research organisations</li> <li>➤ Generate resources from service to private sector on commercial lines</li> <li>➤ Structured Induction Training and Mentoring of new recruits</li> <li>➤ Knowledge creation through research activities and knowledge management and dissemination through training programmes</li> <li>➤ Procurement of Mobile Testing Laboratories</li> <li>➤ Procurement of State-of-the-art modern equipment for research and quality control work</li> </ul>
<b>Threats</b>	<ul style="list-style-type: none"> <li>➤ Rapid Change in Technology</li> <li>➤ New Training Organizations and private testing facilities springing up</li> <li>➤ Lower priority given to training - not mandatory to send for training courses</li> </ul>

## **Annexure 21: Functions and powers of Director IAHE as delegated in its bylaws**

1. The Director shall be the executive head of the Society and shall be guided by the Governing body in his work. He will have full powers in the day to day running of the society and will be reporting direct to the governing body.
2. Subject to any order that may be passed by the Government of India, or by the chairman in exercise of the powers delegated to him or the recommendations/ decisions of the Governing Body, the Director shall be responsible for the proper administration of the affairs and funds of the society. He shall be vested with such executive and administrative powers of the society as any necessary or incidental for the purpose, subject to the rules and the bylaws of the society.
3. The Director shall subject to the provisions of the rules and bylaws of the society and decisions of the Governing Body and Chairman, exercise generally supervision and disciplinary control over the officers and the staff of the society and prescribe their duties and functions. He may delegate specific powers to the officers of the society with the approval of the Chairman.
4. The Director shall coordinate and exercise general supervision over all the activities of the society.

## **Annexure 22: Incentives to Director and other staff of ARRTI to attract \personnel with right aptitude and capabilities and to retain them for longer durations**

### **Background**

The National Training Policy – 2012 stipulates that:

“The Sixth Central Pay Commission has proposed major incentives such as 30 percent Training Allowance, rent-free accommodation etc. for Central Training Institutions for Group A officers, in recognition of the importance of this function and to attract a wider range of officers to this function. It is recommended that *State Governments provide similar incentives* to the faculty of the State Training Institutions.”

Based on this the Governing Body of Indian Academy of Highway Engineers (IAHE) has taken the following decision in the 50<sup>th</sup> Governing Body of IAHE held on July 2013:

“The Governing Body approved the payment of Training allowance of 30% of the basic plus grade pay with effect from 1/7/2013 to all the employees of IAHE irrespective whether they are regular, on deputation or additional charge, so as to make service conditions attractive, retain experienced staff and attract new incumbents.” “Rent free accommodation for all staff”

In keeping the provisions in State/ National Training Policy -2012, it is proposed that Government of Assam approval may be sought for following incentives to the staff of ARRTI:

5. Payment of Training allowance of 30% of the basic plus grade pay to all the Training Cell employees, irrespective whether they are regular, on deputation or additional charge,
  
6. Preference in allotment of Government residential accommodation.



**Annexure 23: Re-Organization of Laboratories/Divisions and List of Optimum  
Man power Required**

SI no	Name of Laboratory/Division		Staff Available/Requirement				
			EE	AEE	AE	JE	Non Technical Staff
1	Concrete Division	Rigid Pavement	1	Er. Manoj Das	Er. Runa Sarma	Kanak Kalita	Manoj Sutradhar.
							Bidyut Talukdar
	Bridge & Other Structures	1		Er. Bijoy Sarma	M K Chowdhury	Haidar Ali Ahemad	
					Hasinur Rahman	H. Islam	
						Champak Boro	
						S. Malakar	
2	Flexible Pavement Division	Bitumen & other Materials	1	Er. Manoj Baruah	Er. Manoj Baruah	Wahidur Rahman	Ramen Nath
	Road Investigation Lab.	1		1	2	Upen Chowdhury	
						Bipin Boro	
						Madan Deka	
						Tapan Kalita	
3	Geotechnical Engg. Division	Geotechnical Engg. Division	-	1	Subhas Deka (Geologist)	2	Sanjiv Das
							Tarani Das
							M A Khandakar
							D K Das
4	Road Safety Division	Road Safety Division		1	1	2	Kanak Das
							Nurul Islam
							Khagen Kalita
5	Training Division	Training Division			Ruby Das	Nishipad Chowdhury	Baneshwar Roy
							Bulu Kalita
	<b>Minimum Additional Requirement in No</b>		<b>2</b>	<b>5</b>	<b>2</b>	<b>7</b>	<b>Total 16 nos additional required</b>

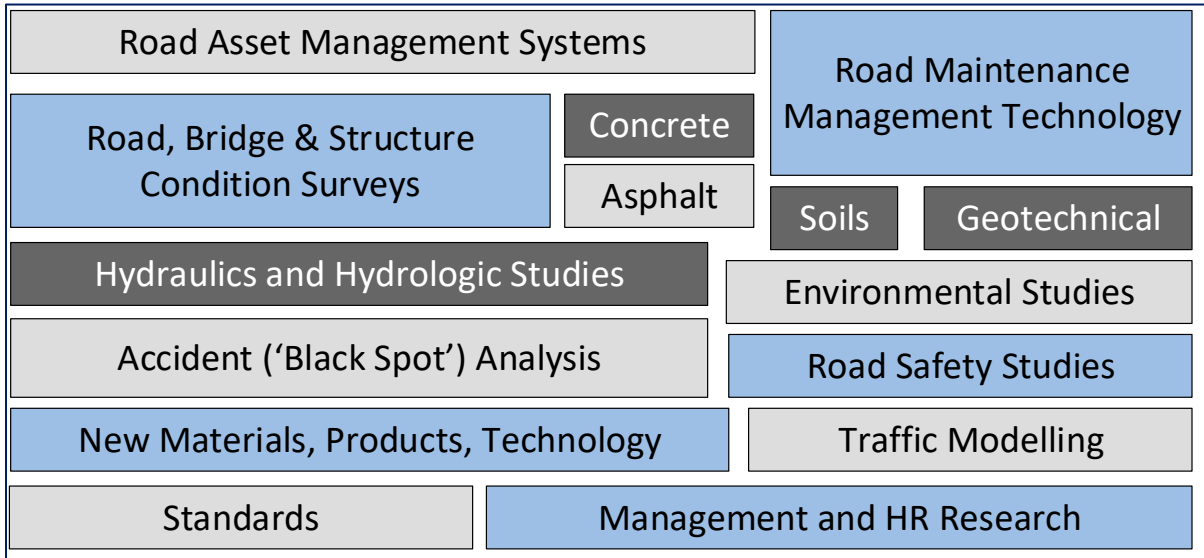
## Annexure 24: Vision for ARRTI - Checklist of activities

SI No	PARTICULARS
<b>A</b>	<b>RELATED TO TRAINING PROGRAMMES</b>
1	Sponsored Programmes
2	Programmes for developing countries
3	Improving the quality of programmes
4	Providing Certificates / Diploma by ARRTI
5	Linking with other institutes
6	Increasing participation from NE State PWDs/ private sector construction / consulting organisation
7	Publishing a ARRTI Newsletter
8	Dissemination of Case studies to trainers by faculty from Contracting / Consulting organisation
<b>B</b>	<b>RELATED TO LOGISTICS</b>
9	Class Rooms - Wi-Fi and other IT/ICT inputs
10	Computer Centre equipped with at least i5 systems, Scanner, Wi FI Printers, Plotters
11	Reprography - Coloured photocopiers
12	Internet Connections
13	Upkeep & Maintenance of toilets
14	Reception - Registration Kiosks
15	Library equipped with training videos
16	CCTV from lecture hall to Directors chamber
17	Creating a museum Comprising models / posters / photographs / display / brochure
18	Water Coolers
19	Proper stands for water filters
20	Arrangements for Leafy / seasonal and parenial plants in the lawns of the institution
21	Engagement Of Core Faculty & Other Required Staff On Contract
<b>C</b>	<b>RELATED TO TESTING AND RESEARCH</b>
22	Procuring advanced equipment - Nuclear Meters, Rebound hammers, Ultra sound and other non destructive testing
23	Taking up identified applied research projects
24	Training of Research Staff
25	Collaboration with other Research Organisations at Regional. National and International Level

## Annexure 25: Table – General Scope of Sector Research

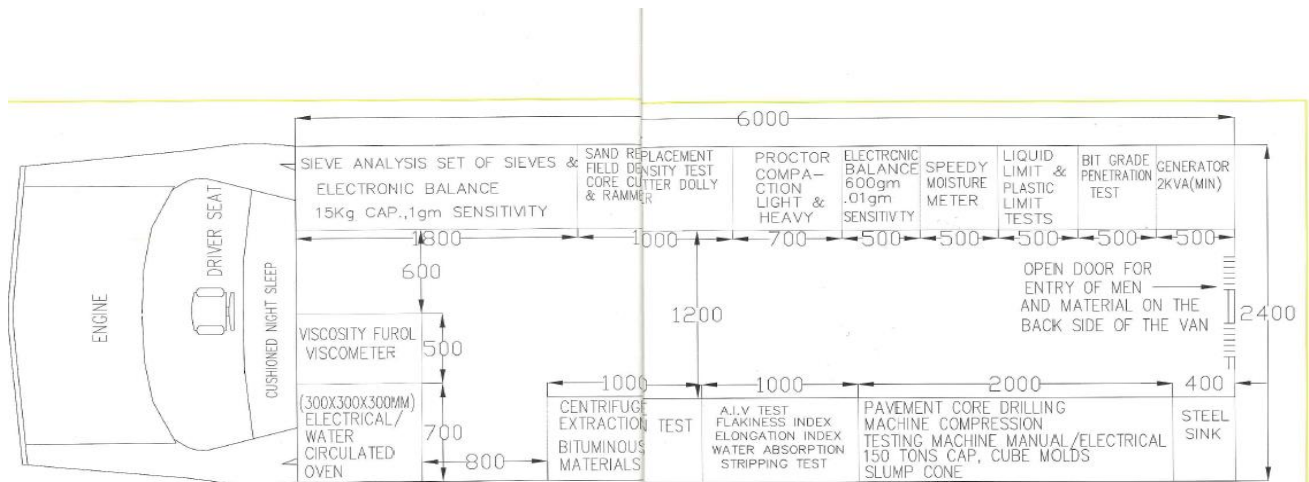
ROAD INFRASTRUCTURE ENGINEERING	INFRASTRUCTURE DELIVERY
Traffic & Operational Environment	Construction & Maintenance
Geometric Design	Contracting Systems for Construction & Maintenance
Optimising the Use Of Local Materials in Road Construction	Quality Assurance Systems
Structural Design of Road Pavements	Safety of Road Workers
Structural Design & Performance	Environmental Impact of Roads
Innovation in Road Design & Structural Design Of Pavements	Preservation of Natural Resources
Road Furniture, Structures and Drainage	PLANNING & OPERATIONS
Management of Assets	Land Use & Infrastructure Planning
Advanced Research Topics	Accessibility & Mobility
Standards and specifications:	Road User Information Systems
	Road Infrastructure Safety Management
RESOURCES	POLICY, ECONOMICS & DECISION SUPPORT
Human Capital	Funding & Transport Economics
Management of Knowledge & Information	Performance Measures

**Annexure 26: Areas of Research**



## Annexure 27: MOBILE LABAROTARY FOR ARRTI (Vehicle, Equipment and Layout of interior)

	 <p style="text-align: center;">Vehicle Interiors</p>
<p><b>Equipment required:</b></p> <ul style="list-style-type: none"> <li>➤ Sieves for gradation ( for fine aggregate, coarse aggregates, GSB,WMM)</li> <li>➤ Flakiness and elongation index</li> <li>➤ Aggregate impact value tester</li> <li>➤ Bitumen extractor</li> <li>➤ Stripping Value apparatus</li> <li>➤ Surface evenness</li> <li>➤ Nuclear density moisture meter</li> <li>➤ Asphalt nuclear density meter</li> <li>➤ Ultrasonic pulse velocity Apparatus</li> <li>➤ Portable Generator ( 2KV)</li> <li>➤ Core Drilling Machine</li> <li>➤ Balance ( 10Kg, 5Kg, 500gm)</li> </ul>	<p><b>Advantages of mobile lab:</b></p> <ul style="list-style-type: none"> <li>➤ fast and efficient</li> <li>➤ Time saving</li> <li>➤ Transportation cost of the samples saving</li> <li>➤ Quick discussion taken for speedy progress</li> <li>➤ Improvements suggestion can be done in order to have effectiveness in monitoring and in quality.</li> <li>➤ Less man power and quick testing</li> <li>➤ Can order dismantling of concrete slabs if the UPV tests fails and warning to the contractor to improve the quality and workmanship.</li> </ul>



- (i) COUNTER AT 1M HEIGHT FROM FLOOR LVL.
- (ii) CUPBOARD(WOODEN) UNDERNEATH COUNTER ON ALL SIDES.
- (iii) NO. OF AXLE MAY BE 2-4 DEPENDING UPON LENGTH OF VAN.

**MOBILE LABORATORY VAN  
LAYOUT PLAN (6M X 2.4M)**

Designed by **Bhupinder Singh**  
Ex. Scientist C.R.R.L. & Guest Faculty of NITHE

Drawing No. 04

## **Annexure 28: Areas of Training that need focus and attention**

### **i. Quality of Training Sessions to be enhanced with**

- Some Permanent Faculty
- Site visits (Technical tours)
- Group discussion and panel discussion.
- Visuals and graphics used in the presentations
- Usage of modern techniques
- Issues related to on-field/on-site problems to be adequately addressed

### **ii. Quality enhancement of Training Material by incorporating**

- Updated written material that incorporates technical advancements
- Circulation of newsletters/emails regarding updated course materials
- Representational images and figures to be adequately included in the material for better understanding
- Training course materials to be distributed beforehand to gain knowledge
- E-books to be available on website
- References are to be mentioned in the training material

### **iii. Training plan for five years and yearly training calendar**

- Training Calendar, to be prepared
- Training programs to cater to designations above Executive Engineer.
- Faculty Development Programs for the Guest Faculty be used by ARRTI
- Topics covered currently need to be modified to include the newly emerging areas.

## Annexure 29: Suggestions for ARRTI Website

A checklist of guidelines that the ARRTI can use is provided below:

Sl. No.	Guide Lines
<b>1. Government of Assam Identifiers</b>	
1	Association to Government of Assam is demonstrated by the use of Emblem/Logo, displayed on the homepage of the website prominently
2	Ownership information is displayed on homepage and on all important entry pages of the website.
3	Complete and self explanatory title of the homepage (appearing on the top bar of the browser) is provided.
4	Website is registered under 'gov.in' or 'nic.in' domain.
<b>2. Building Confidence</b>	
5	Website has a Copyright Policy, prominently displayed on the homepage.
6	Due permission have been obtained for publishing any content protected by copyright.
7	Source of all documents, whether reproduced in part or full, is mentioned.
8	Website has a comprehensive Hyper Linking Policy
9	Clear indication is given when a link leads out to a non-government website.
10	The mechanism is in place to check the accuracy of Hyperlinked Content.
11	Mechanism is in place to ensure that there are no 'broken links' (internal as well as external) or 'Page not found' errors.
12	Website has comprehensive Terms and Conditions statements, linked from all important pages.
<b>3. Scope of Content : Primary Content</b>	
<b>About us</b>	
13	All information about ARRTI, useful for the PWRD personnel and other stakeholders, is present in ' About Us' section and mechanism is in place to keep the information up to date
<b>Testing &amp; Research</b>	
14	The complete title of the tests ARRTI can conduct.
15	The website provides a complete description of the tests along with the rates
16	The Research Schemes undertaken/ proposed to be taken up.
<b>Services</b>	
17	Self explanatory title of the services provided is published.
18	The website provides a complete description of the service along with the procedure to avail the same.



Sl. No.	Guide Lines
<b>Forms</b>	
19	The website provides the complete title of the downloadable forms (say for participation in training programs) along with the purpose it is used for
20	Language of the Form (other than English) is mentioned clearly.
<b>Content</b>	
21	The complete content of training programmes is mentioned.
22	Course fee if applicable
23	Names of and brief description about the course faculty
<b>Documents</b>	
24	The complete title of the document is mentioned on the website.
25	The language of the Document (other than English) is mentioned clearly.
26	Validity of the notification is mentioned.
<b>News and Press Release</b>	
27	News / Press releases are displayed along with the date and these are organized as per the archival policy of the website
<b>Contact Us</b>	
28	Website has a 'Contact Us' page, linked from the home page and all relevant places in the website.
29	The complete contact details of important functionaries in the Department are given in the 'Contact Us' section
30	The website has a readily available Help section
31	Complete information including title, size (playing time for audio/video), format, usage instructions and plug-in to view the file is provided for downloadable material including documents.
32	Mechanism is in place to ensure that all downloadable material is free from virus.
34	Minimum content as prescribed in the guidelines is present on the homepage.
35	Subsequent pages of the website have the minimum content as prescribed in the guidelines.
36	Website is free from offensive / discriminatory language.
<b>4. Quality of Content</b>	
37	Content is compiled and packaged with PWRD personnel orientation.
38	Home Page and every important entry page of website displays the last updated / reviewed date.
39	ARRTI has a Content Review Policy(CRP) for the website.
40	All Documents / Reports have a time stamp at least on the main page.

Sl. No.	Guide Lines
41	The ARRTI have a clearly laid out Content Archival Policy(CAP) for the website.
42	Clear and simple language has been used throughout the website.
43	The language is free from spelling and grammatical errors.
44	Whenever there is a change in the language of a web page it has been clearly indicated.
45	Consistency in nomenclature is maintained across the website.
46	Documents / pages in multiple languages are updated simultaneously.
<b>5. Design</b>	
47	Visual/textual identity elements highlighting the ARRTI's ownership of the website are prominently placed on the page.
48	A consistent page layout has been maintained throughout the website
49	National identity symbols like Flag, National Emblem etc., are in a proper ratio and colour.
50	Assamese language fonts have been tested on popular browsers for any inconsistency (loss of layout)
51	Web Pages allow resizing of text without the use of assistive technology.
52	Text is readable both in electronic and print format and the page prints correctly on an A4 size paper.
53	There is adequate contrast between text and background colour.
54	All information is conveyed with colour is also available without colour.
55	Alternate text is provided for non-text elements (e.g. images).
56	Websites provide textual description of audio / video clips and multimedia presentation.
57	Caption have been provided for all important audio content.
58	Web pages do not contain any content that flashes for more than three times in a second.
59	There is a mechanism to control scrolling, blinking content.
60	There is a mechanism to control (stop, pause....) audio that starts automatically.
61	All pages on the website have a link to the home page.
62	The positioning and terminology used for navigation items and navigation scheme is consistent across the website.
63	There are no links to 'under construction' pages.
64	Each page is a stand-alone entity in terms of ownership, navigation and context of content.
65	Web pages allow the user to bypass repeated blocks of content.

Sl. No.	Guide Lines
66	Website has either a "search" box or a link to a "search" page from every page of the website.
67	Website has an up to date Site Map that is linked to the Home Page as well as to all important entry pages of the website.
68	If the site uses frames, each frame is properly titled.
<b>6. Development</b>	
69	Website uses Cascading Style sheets to control layouts/styles
70	Website is readable even when sheets are switched off or not loaded.
71	Web pages are usable even when scripts, applets etc are turned off.
72	Documents are provided either in HTML or other accessible formats. Instruction / Download details for viewing these formats are provided.
73	In content implemented using mark up languages, the elements have been use according to specification.
74	Labels have been provided when content requires input from the users.
75	Time limit for time dependent web functions can be adjusted by the user (also refer exceptions).
76	Instructions for operating/ understanding content do not rely solely on characteristics like shape, size, location etc.
77	All input errors are flashed in text.
78	Functionality of content is operable through keyboard.
79	Focus is not trapped in any component while navigating through keyboard only.
80	Purpose of each link is clear to the user.
81	When any component receives focus it does not initiate change in context.
82	Changing the setting of a component does not change the context unless the user has been informed of the same.
83	Metadata for pages like title, keywords, description and language is appropriately included.
84	Data tables have been provided with necessary tags / mark up.
85	All components receive focus in an order that preserves the meaning / operation.
86	Role of all interface components can be programmatically determined.
87	The websites have been tested on multiple browsers.
88	Website has cleared Security Audit by certifying agency and has a Security Policy.
<b>7. Website Hosting</b>	

Sl. No.	Guide Lines
89	Websites are accessible to the intended audience in an efficient and secure manner on 24 x 7basis.
90	The hosting Service Provider possesses state-of-the art multi-tier security infrastructure as well as devices such as firewall and intrusion prevention system.
91	The hosting Service Provider has redundant server infrastructure for high availability.
92	The hosting service provided performs regular backup of the web site.
93	The Hosting Service Provided has a Disaster Recovery (DR) Centre in a geographically distance location and a well crafted DR plan for the website.
94	Website Hosting Provider provides Helpdesk & Technical support on 24x7x 365 basis.
95	All possible secure measures have been taken to prevent defacement/ hacking of the website and the ARRTI has been contingency plan in place for situation like these.
<b>9. Website Management</b>	
96	ARRTI has nominated a Web Information Manager as defined in the guidelines.
97	The websites has a website monitoring policy.
98	All policies and plans are approved by Director ARRTI.

## ANNEXURE 30- : ARRTI DEVELOPMENT OBJECTIVES AND RESULTS FRAMEWORK & MONITORING

<b>Project Development Objective (PDO):</b> The project development objective is to enhance the capabilities of ARRTI													
PDO Results Indicators	Level	Unit of Measure	Baseline	Target/Achievement	Cumulative Target Values <sup>1</sup>					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition, etc.)
					Year-2	Year-3	Year-4	Year-5	Year-6				
Organizing training programs for PWRD personnel		numbers	12 <sup>2</sup>	60	20	30	40	50	60	Yearly	Programs conducted in last three years	ARRTI	As per the proposed ARRTI operational manual / instructions from EB of ARRTI
Organizing training programs for NE State PWDs personnel		numbers	0	7	1	3	4	5	7	Yearly	Programs as per TNA of NE PWDs personnel	ARRTI	As per the proposed ARRTI operational manual / instructions from EB of ARRTI
Organizing training programs for Contractor's/ Consultant's personnel		numbers	1	5	1	2	3	4	5	Yearly	Programs as per requirement from contracting and consultancy organisations	ARRTI	As per the proposed ARRTI operational manual / instructions from EB of ARRTI
Quality Enhancement of Training Material (High Impact)				Procure Multimedia equipment	Procure Multimedia equipment	Train trainers/ computer operators/ DTP operators	Produce High Impact Learning Material	Produce High Impact Learning Material	Produce High Impact Learning Material	Yearly	Enhancement of effectiveness of training	ARRTI	As per the proposed ARRTI operational manual / instructions from EB of ARRTI
Preparing 5 year Rolling Training Plan				Conduct TNA	Conduct TNA	Design Training	Prepare Rolling Plan	Implement Rolling Plan	Implement Rolling Plan	Yearly	Enhancement of effectiveness of training	ARRTI	As per the proposed ARRTI operational manual / instructions from EB of ARRTI
Research Programmes		Specific schemes	0	Identified areas	Survey of locally available materials	Use of locally available waste materials	Soil stabilization using local materials	modifiers for construction/ maintenance materials in	Technology for low cost cross drainage structures	Every Year	Recommended in earlier development studies	ARRTI	use of improved and appropriate materials/ practices

<sup>1</sup> The project has a six-year duration. The result monitoring will start from the second year of project implementation.

2. Based on Programmes organized during 2012, 2013, 2014, 2015, 2016

							high rainfall areas					
Setting up E learning	Specific actions	0		Procuring/ Developing content	1.Developing LMS software 2. Finalising Cloud computing provider 3. Uploading content 4. Training of stakeholders 5. Testing and take off					Experience from other states (e.g. Karnataka)	ARRTI	Cost effective and available 24x7 training
Procurement of Required Vehicles				Prepare convincing proposal	Get administrative and Financial approvals	Procure					ARRTI	
Arranging adequate funding as per Training Policy				Prepare convincing proposal	Get administrative and Financial approvals	Make it a budget line item	Make it a budget line item				ARRTI	
Incentives to ARRTI personnel (Training Allowance)				Prepare convincing proposal	Get administrative and Financial approvals	Make it a budget line item	Make it a budget line item				ARRTI	
Library to be equipped				Identify sources and prepare proposal. Procure							ARRTI	

**ANNEXURE 31: Matrix containing current status, issues and recommendations to address the issues**

<b>Sl no</b>	<b>Particulars of issue</b>	<b>Current situation with reference to para of As-Is</b>	<b>Recommendation and reference to relevant para number in development strategy</b>	<b>Reference to relevant documents</b>	<b>Priority (short, medium or Long Term) *</b>	<b>Administrative action only /Financial Implication</b>	<b>Financial Implication of the recommendation</b>
1	Delegation of powers to Director	2.1.2 :Powers not delegated	3.1.1-Powers delegated in line with other similar institutions	Director IAHE's powers attached	Short Term	Administrative	Not Applicable
2	Proposed mission of revamped ARRTI	2.2:Spelt out at up-gradation from RRL to ARRTI	3.3- Needs to made broad based all-encompassing for augmented ARRTI	Draft Mission included in the Development Strategy	Short Term	Administrative	Not Applicable
3	Training of Laboratory officers and Staff	2.1.2d: No structured training of laboratory officers and staff has been organized since last 15 years.	3.4.1 d- Recommendations have been made for training through CRR I and IAHE		Short Term	Administrative and also financial	Rs 3 Lakh per annum
4	Business overview related to training	Phasing of activities not available	3.4.2a-Phasing in short term / medium term suggested		Short Term	Administrative	Not Applicable
5	Quality enhancement of Training material	High Impact Learning/ Training material to be developed	3.4.2b -ii Suggestions included in the report		Short Term	Administrative as well as financial	One time Rs 5 Lakhs
6	Rolling training plan/ training calendar	Currently training plan for long term (5 years) not framed	3.4.2b -iii Conducting TNA for the ARRTI Target group, and based on it a five-year rolling	To ensure training effort as per approved	Short Term	Administrative as well as financial	One time for TNA – Rs 24 Lakhs

<b>Sl no</b>	<b>Particulars of issue</b>	<b>Current situation with reference to para of As-Is</b>	<b>Recommendation and reference to relevant para number in development strategy</b>	<b>Reference to relevant documents</b>	<b>Priority (short, medium or Long Term) *</b>	<b>Administrative action only /Financial Implication</b>	<b>Financial Implication of the recommendation</b>
			training plan and annual training calendar has been suggested. Advisory Board to review every year	training plan, inclusion of this in RFP of PWRD has been suggested, as has been done in other states			
7	Collaboration with other institutions	Structured collaboration needs to be ensured	3.4.3 -Suggestions made for structured collaboration. Training, Joint quality testing, Developing Learning content, applied technical research.		Short Term	Administrative	Not Applicable
8	Availability of 3G network	Provision exists	3.5-Recommendation for continuation of these in future		Short Term	Administrative as well as financial	Rs 93 Lakh per annum
9	Poor maintenance of laboratory buildings and	Regular cleaning not possible due to unavailability of cleaning help	3.6- With powers delegated to Director this can be addressed.		Short Term	Administrative as well as financial	Rs 5 Lakhs per annum



<b>Sl no</b>	<b>Particulars of issue</b>	<b>Current situation with reference to para of As-Is</b>	<b>Recommendation and reference to relevant para number in development strategy</b>	<b>Reference to relevant documents</b>	<b>Priority (short, medium or Long Term) *</b>	<b>Administrative action only /Financial Implication</b>	<b>Financial Implication of the recommendation</b>
10	Procurement of required vehicles	Currently no functional vehicle. Though 3 drivers are on roll.	3.7 Two cars and one bus required for mobility of the Director, the staff of ARRTI, guest faculty and of the trainees for site visits		Short Term	Administrative as well as financial	Rs 30 Lakhs one time
11	Library to be equipped	2.7.5 Hardly any books, codes, manuals available. Almirahs and shelves are mostly empty.	3.10 Making available suitable e-copies of technical papers, toolkits, guidelines, manuals, IRC codes, training videos.		Short Term	Administrative and financial	Rs 10 Lakhs one time and Rs 2 lakh per annum recurring
12	Rates of testing work by ARRTI to be analyzed	2.6 Rates of most of tests conducted by ARRTI are old and lesser compared to the charges by private laboratories	3.4.1e Rates of testing work by ARRTI to be analyzed and made realistic. Proposals to be submitted to advisory group/ EC/ BoM		Short Term	Administrative	Enhanced revenue
13	Retaining competent personnel for longer durations	2.1.2 b Directors, tenure 59% < 6 months, 18% >6 months< 2 years	3.1.2 Training allowance to Director and other staff	National/ Assam Training Policy/ Provision in IAHE – 30% of salary allowance	Medium Term	Administrative and financial.	Rs 24 Lakhs per annum
14	Recruitment of Staff	2.1.2c: Seven research officers retiring within 1 to 3 years	3.1.3- Manpower planning to be adhered to for timely filling vacancies		Medium Term	Administrative	

<b>Sl no</b>	<b>Particulars of issue</b>	<b>Current situation with reference to para of As-Is</b>	<b>Recommendation and reference to relevant para number in development strategy</b>	<b>Reference to relevant documents</b>	<b>Priority (short, medium or Long Term) *</b>	<b>Administrative action only /Financial Implication</b>	<b>Financial Implication of the recommendation</b>
15	Planning & Budgeting – Revenue earned by ARRTI	2.1.3 No fixed budget provision for research & training activities. Only ad-hoc funding case to case Revenue earned from testing work and training programmes of PMGSY, NRRDA is deposited in a current account, not available to ARRTI	3.2- It should be a budget line item. Revenue earned from testing work and training should be available to ARRTI for maintenance of equipment, cleanliness in its buildings etc.	As per - a. National Training Policy 2.5%, b. Assam State Training Policy .5%, of total salary budget	Medium Term		
16	Procurement of advanced equipment. Also, Mobile Testing Laboratory	Procurement of survey and testing equipment done in 2016.	3.4.1c - Additional state-of-the-art advanced equipment suggested to enhance ARRTI's competence		Medium Term	Administrative and financial	Rs. 25 Lakhs for Mobile Testing Laboratory
17	Quality of training sessions	Needs to be upgraded	3.4.2b -i Suggestions listed out to enhance quality. Advisory Board may review the topics, yearly calendar, syllabus and faculty selection of ARRTI training		Medium term	Administrative	Not Applicable

Sl no	Particulars of issue	Current situation with reference to para of As-Is	Recommendation and reference to relevant para number in development strategy	Reference to relevant documents	Priority (short, medium or Long Term) *	Administrative action only /Financial Implication	Financial Implication of the recommendation
			programmes regularly but not less than once in a year.				
18	PWRD Training needs	1.2 iii: Very limited TNA was conducted in 2014 under ADB TA	3.4.2c Conducting comprehensive TNA recommended..	Guidelines for conducting TNA prepared during earlier institutional development projects recommended to me made use of.	Medium Term	Administrative and financial	Rs 24 Lakhs one time already covered above in item number 6 of this matrix
19	Remuneration to guest faculty	Provision of adequate remuneration on a regular basis (not ad-hoc) missing	3.4.2d To ensure high quality of guest faculty adequate remuneration as done by IAHE is recommended.	Adequate Honorarium paid by IAHE – Rs 3500/ session of 1.5 hrs.	Medium Term	Administrative and financial	Rs 18 Lakhs per annum (for 50 programs)

<b>Sl no</b>	<b>Particulars of issue</b>	<b>Current situation with reference to para of As-Is</b>	<b>Recommendation and reference to relevant para number in development strategy</b>	<b>Reference to relevant documents</b>	<b>Priority (short, medium or Long Term) *</b>	<b>Administrative action only /Financial Implication</b>	<b>Financial Implication of the recommendation</b>
20	Standardizing procedures & guiding manuals	Operations manual and guidelines need to be developed	3.4.4-Sources for Operation Manual and guideline documented		Medium Term	Administrative	Not Applicable
21	Cooperation and Collaboration with Research and Training Organizations	Some programmes were got organized through CRR I, CIDC, IIMA, Scott Wilson Pvt Ltd., in the past	3.4.3 The ARRTI could collaborate with State and National Level Engineering Institutes such as IIT, IAHE, CRR I, GERI, ESC etc. – Guest Faculty, Exchange programs. ARRTI could operate in Joint Venture with other local training organisations such as Assam State Administrative College ASAC		Medium Term	Administrative	Not Applicable
22	Research & Testing of Materials	2.3 No research work currently taken up.	3.4.1- Breadth of applied research suggested in Development Strategy	Scope of required activities suggested in the report.	Long Term	Administrative	Rs 8 Lakhs per annum
23	New products and material evaluation	2.3 In the past Research Scheme R-1 (Survey of local materials) was taken up	3.4.1a - Similar projects should be taken up to update these reports. Also new materials may be included		Long Term		

SI no	Particulars of issue	Current situation with reference to para of As-Is	Recommendation and reference to relevant para number in development strategy	Reference to relevant documents	Priority (short, medium or Long Term) *	Administrative action only /Financial Implication	Financial Implication of the recommendation
24	General conditions for outsourcing	No conditions currently spelt out	3.4.1b- Conditions for outsourcing to gainfully complement the output of ARRTI's staff suggested		Long Term		
25	Setting up E learning system	No such facility exists	3.4.2e - Proposal to set up E learning platform and using LMS recommended	Precedence of E learning set up in KPWP&IWTD	Long Term	Administrative and financial	Rs 40 Lakhs for one time + maintenance for 3 years
TOTAL FINANCIAL IMPLICATION							One time: Rs <b>158</b> Lakhs Recurring per annum: Rs <b>156</b> Lakhs