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Government of Uttar Pradesh, India

UTTAR PRADESH STATE ROADS PROJECT Under IBRD Loan No. 4684-IN

Technical Assistance for Implementation of Institutional Reforms in the Road Sector of Uttar Pradesh

REPORT ON SYSTEMATIC PWD FUNCTIONAL WORK LOAD AND MANPOWER STUDY TO DETERMINE LONGER TERM 'MINIMUM NEEDS' STAFFING STRATEGY (FINAL)

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TABLE OF CONTENTS

1.	INTRODUCTION.....	1
1.1	THE IDS ACTION PLAN.....	1
1.2	OBJECTIVES OF THIS REPORT	1
1.3	STAFFING NEEDS FOR THE RESTRUCTURED PWD ORGANISATION.....	2
1.4	ROLE OF THE HRD CELL	2
2.	PWD FUNCTIONAL WORKLOAD: UP STATE ROAD POLICY	4
2.1	UP ROAD POLICY 1998	4
2.2	PRESENT FUNCTIONS OF PWD.....	5
2.3	PROPOSED UPDATE OF UP ROAD POLICY	6
2.4	MAJOR FUNCTIONAL TASKS TO BE EMPHASIZED IN THE UPDATED ROAD POLICY	6
2.4.1.	Road Network Planning	7
2.4.2.	Road Development, Maintenance and Management Functions.....	7
2.4.3.	Business Planning and Funding	8
2.4.4.	Capacity Building Measures: Organization and Management.....	9
2.4.5.	Mitigating Environmental and Social Impacts	10
2.4.6.	Strategic Road Network Planning	11
2.5	PWD PRIORITY TASKS FOR IMPLEMENTATION OF THE UPDATED UP STATE ROAD POLICY	11
2.5.1.	Establish a GIS / RMMS System	11
2.5.2.	Develop the Capacity of UP PWD	11
2.5.3.	Environmental and Social Development.....	12
2.5.4.	Road Safety	12
2.5.5.	Asset Management	12
2.5.6.	Private Sector Participation.....	12
2.5.7.	Dedicated Road Fund	13
2.5.8.	Stakeholder Participation	13
2.5.9.	Planning for Integrated multi-modal transportation.....	13
2.6	IMPACT ON PWD STAFFING NEEDS	13
3.	PWD FUNCTIONAL WORKLOAD STUDY: PWD RESTRUCTURING	14
3.1	EXISTING ORGANISATION STRUCTURE	14
3.2	FUNCTIONS AND DUTIES OF OFFICERS AT DIFFERENT LEVELS IN PWD	16
3.3	PWD WORK PROCESSES	20
3.3.1.	Divisions as Key Executing Units.....	20
3.3.2.	Work Process and Reporting Requirements	21

3.4	THE RATIONALE FOR RESTRUCTURING OF PWD	23
3.4.1.	New Units/Cells for Specialist Functions	24
3.4.2.	The Role of the Zones	24
3.4.3.	Changes in Work Processes.....	24
3.4.4.	Accountability to Stake Holders	24
3.4.5.	Road Development Policy.....	25
3.4.6.	Key Functions Expected of PWD.....	25
3.5	FUTURE ORGANISATION STRUCTURE OF PWD	26
3.5.1.	Role and Functions of Top Management.....	26
3.5.2.	Role and functions of Functional heads.....	29
3.5.3.	Role & Functions of Chief Engineer- Zone	36
3.5.4.	Structure at Circle	37
3.5.5.	Structure at Division.....	37
4.	LONGER-TERM 'MINIMUM NEEDS' STAFFING FOR PWD	40
4.1	PRESENT STAFFING	40
4.2	CATEGORISATION OF CIVIL ENGINEERING STAFF	40
4.3	STAFFING NEEDS: SANCTIONED POSTS.....	41
4.4	PRESENT STAFF POSITION (AS IN SEPTEMBER 2007)	42
4.5	STAFFING IN A TYPICAL CIRCLE AND DIVISION OFFICES.....	45
4.6	COMPUTATION OF MANPOWER NEEDS OF RESTRUCTURED PWD ORGANISATION.....	47
4.7	MINIMUM NEEDS CADRE STRENGTH OF UP PWD	56
4.7.1.	Training, Leave and Deputation Reserve	56
4.7.2.	Computation of Minimum Needs cadre strength for UP PWD.....	56
4.7.3.	Computation of Longer Term (2012) Minimum Needs cadre strength for UP PWD.....	57
5.	LONGER TERMS STAFFING STRATEGY FOR PWD	59
5.1	STAFFING STRATEGY IN RELATION TO PWD BUSINESS STRATEGY	59
5.2	STAFFING STRATEGY FOR PWD.....	60
5.3	STAFF RESOURCES PLANS	61
5.4	DISCUSSION IN THE FOCUS GROUP	62
5.5	ACTION PLAN	62
6.	PRESENTATION TO PROJECT STEERING COMMITTEE.....	63

LIST OF TABLES

Table 3.1 : UP PWD Zones, Circles and Divisions	15
Table 3.2 : Representative List of Reports for Division Office	21
Table 4.1 : UP PWD Zones, Circles and Divisions	42
Table 4.2 : UP PWD Staff Sanctions and in Position (Sep 2007).....	44
Table 4.3 : UP PWD Staff Strength: Electrical & Mechanical: (Sep 2007)	44
Table 4.4 : Circle Office.....	45
Table 4.5 : Division Office	45
Table 4.6 : Computation of Manpower Needs - Restructured, PWD	53
Table 4.7 : Manpower Needs, SE's and below, in Head Quarter Units.....	55
Table 4.8 : Minimum Needs cadre strength for UP PWD: Civil Engineers	57
Table 4.9 : Longer-Term (2012) Minimum Needs Cadre Strength for UP PWD (with additional 58 Non-Core Divisions).....	58

LIST OF FIGURES

Figure 4.1 : Possible Organisation Structure of PWD HQ-Option 2	48
Figure 4.2 : Possible Organisation Structure of PWD Zone - Option 1	49
Figure 4.3 : Possible Organisation Structure of PWD Circle - Option 1	50
Figure 4.4 : Possible Organisation Structure of PWD in Divisions - Core Roads and Non-Core Roads - Option 2A and 2B	51
Figure 5.1 : Staffing Strategy for UP PWD.....	60

Glossary

AC	Air Conditioning	GoUP	Government of Uttar Pradesh
ACR	Annual Confidential Report	GPF	General Provident Fund
ADB	Asian Development Bank	GSDP	Gross State Domestic Product
ACE	Additional Chief Engineer	HDM4	Highway Development and Management System
ADG	Additional Director General	HOD	Head of Department
ADGW	Additional Director General Works	HQ	Head Quarter
ADT	Average Daily Traffic	HR	Human Resource
AE	Assistant Engineer	HRD	Human Resource Development
ASCI	Administrative Staff College of India	HRM	Human Resource Management
BDD	Bridge Design Division	IBRD	International Bank for Reconstruction and Development
BHU	Benaras Hindu University	IDS	Institutional Development Study
BMS	Bridge Management System	IDSP	Institutional Development and Strengthening Plan
BOOT	Build Own Operate Transfer	IIM	Indian Institute of Management
BOT	Build Operate Transfer	IIT	Indian Institute of Technology
CAO	Chief Administrative Officer	IRC	Indian Roads Congress
CCL	Cash Credit Limits	IRSE	Indian Railway Service of Engineers
CE	Chief Engineer	IT	Information Technology
CEO	Chief Executive Officer	ISAP	Institutional Strengthening Action Plan
CPWD	Central Public Works Department	ISB	Indian School of Business
CR	Core Roads	ISO	International Organisation for Standardisation
CRF	Central Road Fund	JE	Junior Engineer
CRRRI	Central Road Research Institute	JE (T)	Junior Engineer (Technical)
CSDP	Core Skills Development Programme	LAN	Local Area Networking
CSR	Civil Service Reforms	MAS	Material at Site
DAO	Divisional Account Officer	MD	Managing Director
DASP	Diversified Agriculture Support Project	MDR	Major District Roads
DAVP	Directorate of Audio and Visual Publicity	MDI	Management Development Institute
DBC	Dense Bituminous Concrete	MLA	Member of Legislative Assembly
DCL	Deposit Credit Limits	MLC	Member of Legislative Council
DDO	Drawing and Disbursing Officer	MIS	Management Information System
DGW	Director General Works	MOST	Ministry of Surface Transport
DPR	Detail Project Report	MoSRTH	Ministry of Shipping, Road Transport & Highways
DRDA	District Rural Development Authority	MoRTH	Ministry of Road Transport and Highways
DRM	Divisional Railway Manager	MSS	Mixed Seal Surface
EE	Executive Engineer	NABARD	National Bank of Agricultural and Rural Development
EFC	Eleventh Finance Commission	NCR	Non-Core Roads
E-in-C	Engineer in Chief	NGO	Non Government Organisation
ENC		NITHE	National Institute for Training of Highway Engineers
E & M	Electrical and Mechanical	NH	National Highway
ESCI	Engineering Staff College of India	NHAI	National Highways Authority of India
ESDU	Environmental and Social Development Unit	NICMAR	National Institute of Construction Management and Research
FY	Financial Year	OD	Origin Destination
GIS	Geographic Information System	ODR	Other District Road
GNP	Gross National Product	PAC	Public Accounts Committee
GO	Government Order	PCC	Project Coordinating Consultant
GOI	Government of India		

PCI	Pavement Condition Index	UNDP	United Nations Development Programme
PCU	Passenger Car Unit	VOC	Vehicle Operating Cost
PMS	Pavement Management System	VR	Village Roads
PMGSY	Pradhan Mantri Gram Sadak Yojna	WB	World Bank
PPP	Public Private Partnership	WBM	Water Bound Macadam
PSP	Private Sector Participation		
PPU	Policy and Planning Unit		
PR	Public Relations		
PWD	Public Works Department		
QM	Quality Management		
R&BD	Road and Buildings Department		
RES	Rural Engineering Services		
RIDF	Rural Infrastructure Development Fund		
RMMS	Road Maintenance Management System		
RMIT	Royal Melbourne Institute of Technology		
RMR	Road Metal Return		
ROI	Return on Investment		
RSPEU	Road Safety Planning and Engineering Unit		
RSC	Road Safety Cell		
RTI	Right to Information		
SBU	Static Business Unit		
SDBC	Semi Dense Bituminous Concrete		
SE	Superintending Engineer		
SH	State Highway		
SRF	State Road Fund		
SRP-II	State Road Project-II		
SRB	State Road Safety Board		
SRSF	State Road Safety Fund		
STC	Staff Training College		
STP	State Training Policy		
TA	Technical Assistance		
TDCU	Temporary Departmental Construction Unit		
TCS	Tata Consultancy Services		
TDLR	Training Deputation and Leave Reserve		
TNA	Training Needs Assessment		
ToR	Terms of Reference		
UP	Uttar Pradesh		
UPAAM	Uttar Pradesh Academy of Administration and Management		
UPDESCO	Uttar Pradesh Development Systems Corporation		
UPRNN	Uttar Pradesh Rajikiya Nirman Nigam		
UPSBC	Uttar Pradesh State Bridge Corporation		
UPSRP	Uttar Pradesh State Road Project		
UPSHA	Uttar Pradesh State Highway Authority		

1. INTRODUCTION

The World Bank Supported UPSRP II presently under implementation contains a program to enhance the PWD Capacity to take up bigger challenges in the infrastructure development in the State. It is envisioned that the UP PWD should be capable of developing and managing a top quality road network in the State. Institutional Development of UP PWD is an integral component of the UPSRP. The Institutional Development Study (IDS) of the UP road sector carried out by TCE made several recommendations for Institutional strengthening and capacity enhancement of the PWD. Major IDS recommendations were endorsed by Government of UP in September 2001 and the resultant Institutional Development and Strengthening Plan (IDSP) is now taken up for implementation with the assistance from the TA Consultants.

The IDS study report stated the following:

“Need to carry out a comprehensive human resource planning and development program as a part of the Institutional strengthening program. Its components should include Manpower need assessment, human resource planning, human resource development policy/guidelines, training policy & objectives and finally performance appraisal and career planning. This study has to be in line with the attempts under the CSR process, underway, for the complete State administration“.

The IDSP involves a wide range of reforms in the organisational structure, systems and processes of the PWD. The implementation strategy for the reforms encompasses diverse catalytic interventions aimed variously at PWD road management, capacity building, legislation, policy and process modernisation, organisational, systems and technological enhancements.

Within the overall organisational capacity building initiative, the ‘Human Resource Management and Development’ is one of the critical areas for reforms and capacity enhancement. The HR and Training enhancements to be implemented in the PWD has a range of initiatives including Staff requirement study through robust work force planning exercise, Training Needs Assessment (TNA) of PWD officers and training for skills development under a Core Skills Development Programme (CSDP), Career Planning & development strategies, staff mobility etc.

1.1 THE IDS ACTION PLAN

The IDS Action Plan (serial 2C) objective states: “Strategic Planning of PWD skill mix, accountability, staffing profiles and levels”

Action milestone to be achieved in this direction is: “Conduct systematic PWD functional workload and manpower study to determine longer-term minimum needs staffing strategy

1.2 OBJECTIVES OF THIS REPORT

This report addresses the TA Consultants’ deliverable **Report No. 15: ‘Report on PWD functional workload and manpower study to determine longer-term “minimum needs” staffing strategy.** While doing so this report will take into account the functional workload in the ‘restructured organisation’ and the availability of existing manpower in the department and their skill sets.

1.3 STAFFING NEEDS FOR THE RESTRUCTURED PWD ORGANISATION

The TA Consultants are already working on the “**Progressive PWD Restructuring and staffing realignment including internal staff communications on all major aspects**” (Report No.11). This is a substantive report with wide-ranging ramifications for the PWD of the future especially in respect of the Human Resources. The restructuring exercise incorporates modernisation of various ‘functions’ in PWD operations by introducing and strengthening state of the art planning and management functions for effective decision making. The resultant ‘shift’ in the functional workload in PWD at strategic, managerial and operational levels would necessarily involve substantial changes in the staffing needs.

The Report no. 11 is a prerequisite for determining the ‘longer-term minimum needs staffing strategy’ of PWD. Therefore the work on the present report (report no.15) and that on Report no.11 have been taken up simultaneously and with wide-ranging consultations with cross sections of PWD Officers. While the report no. 11 is yet to be submitted in its final form, a broad view of the likely “Restructured PWD Organisation” has merged. The same are taken as the basis for development of a longer-term staffing strategy described in this report.

The restructuring exercise is essentially determining the ‘positions’ required to carry out various key functions assigned to PWD and their placement in an appropriate hierarchical structure. The implementation of restructuring of UP PWD will not be possible unless an appropriate staffing strategy to ensure that right people with the right skills and competencies are placed in the positions. The HR Unit within PWD will have a major role in implementation of the PWD restructuring project during each of its phases. The report no.11 would discuss the likely challenges in realignment of the existing staff with the revised PWD structure in the near-term. .

1.4 ROLE OF THE HRD CELL

The need for a dedicated HRD and Training Unit in PWD was accepted as essential for carrying on the HR and training interventions including staffing realignment for the restructured PWD Organisation. A beginning has been made towards the establishment of the HRD & Training Cell by issue of the necessary Government Orders on 05 October 2007. The next task would be to identify suitable officers as per Report no. 4, which has been discussed and accepted by the Project Steering Committee (PSC) meeting on 26 July 2007. The HRD & Training Cell functioning under a Chief Engineer (Human Resources) will be expected to undertake the wide ranging HRD, Organisation Development and Training activities.

This report deals with a longer term minimum needs staffing strategy aimed at meeting the demands of the restructured PWD organisation. This will be followed by a more detailed “Human resource planning and management” programme (Report No.s 43 and 49).

The structure of this Report

This report is in sections as described below:

Section 2: Analyses the UP State Road Policy, PWD's role in implementation of the State Road Policy and the functional workload of PWD as per the demands of the State Road Policy

Section 3: Analyses the proposed restructuring of the PWD organisation and the functional workload arising out of the proposed reorganisation.

Section 4: Analyses the 'minimum staffing' (manpower) needs of PWD and estimates the staff requirements at various levels.

Section 5: Provides recommendations for a long term staffing strategy for UPPWD.

2. PWD FUNCTIONAL WORKLOAD: UP STATE ROAD POLICY

The PWD functions and the long term staffing needs are largely determined by the State Government's Road Sector Policy and the role and mandate assigned to PWD for its fulfilment. Therefore, in order to arrive at a strategic direction for the long term staffing needs, it would be necessary to ascertain the futuristic functions and outcomes expected of PWD as enshrined in the Government's Road Sector Policy.

In addition, in order to fulfil the mandated role, the PWD would require an appropriate organisation structure so that it can efficiently deliver the outcomes expected of it. The IDS study carried out in 2000-01 and the subsequent IDSP endorsed by GoUP includes a comprehensive restructuring of the PWD organisation and the work processes. We shall first discuss the PWD Road Policy as is being updated and likely to be operative in next 5 to 10 years and the likely impact on the functional workload of PWD. In the following sections we shall discuss the proposed reorganisation plan of PWD and its impact on long term staffing needs of PWD.

2.1 UP ROAD POLICY 1998

The Government of UP have been according high priority to the transport sector recognizing it to be the most effective driver for speedy economic development of the state. The State is embarked on road transport infrastructure development projects aimed at development of a modern road network. The PWD is the key player in the UP transportation sector with total responsibility of delivering and maintaining an efficient road network for all road users. The Uttar Pradesh Road Policy of 1998 incorporates following broad objectives covering various road development related aspects.

1. *To keep the roads free of potholes and patches all the time by continuously maintaining and repairing them.*
2. *To construct village roads under the Minimum Needs Program.*
3. *To maintain and modernize National Highways, State Highways, Major District Roads, Other District Roads and Village Roads in the State.*
4. *To construct and reconstruct bridges, Rail Overhead / Under Bridges and Flyovers in the State.*
5. *To construct bypasses, ring roads and expressways in the State.*
6. *To develop urban roads.*
7. *To arrange financial resources for the road development works.*
8. *To promote participation of the private sector in road development projects.*
9. *To ensure quality in construction and maintenance of roads.*
10. *To ensure financial discipline, delivery and dovetailing in the road construction work.*
11. *To check ribbon development, encroachment and to ensure road safety.*
12. *To bring about organizational and procedural improvements in the Public Works Department.*
13. *To conserve environment.*

2.2 PRESENT FUNCTIONS OF PWD

The existing functions of PWD are given below.

- a. PWD is responsible for construction repair and maintenance of roads and State owned building. It is also responsible for other related structures financed from the State and Central budget allocations in UP and for similar works outside the state.
- b. PWD also takes up construction and repair work of other government departments, autonomous bodies, local bodies, boards, corporations, trusts, institutions or private individuals as deposit works after levying agency charges as per Government rules.
- c. PWD is also responsible for execution of development, renewal and repair works of National Highways (NH) within the State of UP, Financed through the Ministry of Road Transport and Highways (MoRT&H), Government of India, after levying agency charges at the rates agreed between State and Central Government.
- d. PWD also takes up construction works of building, roads and bridges as relief works in the event of famine and floods. Such works are executed as per UP Famine Code and rules thereof framed from time to time by the Government.
- e. As a construction wing of GOUP, PWD has to undertake the following additional functions:
 - Technical guidance to various institutions, local bodies and other government undertakings, including execution and guidance to Local Bodies and police Department about safety for VIP visits and traffic management related activities during special events;
 - Research activities pertaining to buildings, roads and bridges;
 - Running and maintenance of ferry services;
 - Works of rostrum and barricading at the time of VIP visit as designed by District Administration;
 - Running and maintenance of circuit houses, rest houses, and inspection bungalows; realization of rent of Government buildings under PWD; assessment of rent and valuation of private buildings acquired by the government on hire or purchase. Maintenance and upkeep of Minister's bungalows and Government residences of MLA's and MLC and other office bearers nominated by Government
 - Issue of condemnation report of unserviceable Government buildings.
- f. PWD also maintains a register of land, buildings and properties belonging to the Government under the charges of PWD.
- g. PWD is also responsible for ensuring that no encroachment or structure, whether temporary or permanent, shall be erected on the land and property in the charge of PWD. It shall also be responsible for removal of all such encroachments as per the rules.

Analysis of above-mentioned functions shows that PWD has been entrusted with the complete responsibility of creating and maintaining physical infrastructure in the State. As the primary physical infrastructure agency it is also expected to guide other agencies and help in development of technical know-how and its larger adaptation.

Emphasis of the department on the different functions has changed over time to reflect the State's requirements emerging from socio-economic-political development. In the initial years, building works were the major activity. Now with most State buildings have already been constructed, road related activities constitute most of the departmental works.

The creation of specialized agencies like Uttar Pradesh State Bridge Corporation (UPSBC) for bridges and Uttar Pradesh Rajkiya Nirman Nigam (UPRNN) for buildings construction has reduced PWD's focus and commitment of resources towards shared responsibilities. With the establishment of Central Road Research Institute, (CRRI), Delhi, the mandate and resources committed towards basic research undertaken at the Research Institute of PWD has reduced substantially.

2.3 PROPOSED UPDATE OF UP ROAD POLICY

The IDSP included a task for TA Consultants to review the UP Road Policy 1998 and develop an updated Road Policy that meets the expectations of various stake holders to deliver quality and efficient road network for the travel needs of the people of Uttar Pradesh. Accordingly, the TA Consultants have (in Report no. 8) recommended several modifications and updations to be incorporated in the new Road Policy. The following functions/ deliverables have been emphasized in the proposed Road Policy:

- long term network planning;
- balanced development of the total network; integration of transport and land-use;
- widening and up-gradation of roads, road safety measures, wayside amenities, rural connectivity and inter-modal connectivity with airports, railways and ports.
- asset Management for deriving optimum value from investment made in the road network
- dedicated funding for road maintenance;
- clear measures to protect the environment and communities from road related impacts;
- training, awareness and education;
- implementation and monitoring of the road policies etc.

2.4 MAJOR FUNCTIONAL TASKS TO BE EMPHASIZED IN THE UPDATED ROAD POLICY

The new UP Road policy is expected to emphasise the following functions in the PWD. These functions are to be performed in a scientific manner and at significantly advanced levels using the state of the art technology and best management practices in network planning, design development and management.

2.4.1. Road Network Planning

1. Set targets in line with the expectations of other sectors and stakeholders for short, medium and long-term network planning involving preparation of a Road Development Plan
2. Devise a mechanism for evaluation of the Development Plan after each 5 year plan and then modify the target and the strategic network in line with the economic, environmental and social scenario
3. Integrate the development plans of other transport service providers such as railways; the overall transport plan should complement each other and work together to achieve a central objective.
4. Demarcate right of way of the roads as per long term Road Development Plan and devise a mechanism to notify all the responsible authorities to act accordingly to safe guard the state interest.
5. Responsibility of Road Network Planning and sending timely notification should be under a policy and planning unit which will consult all the stake holding in its mechanism
6. The Policy and Planning Unit would prepare an Annual Business Plan and Annual Report for the PWD.

2.4.2. Road Development, Maintenance and Management Functions

To develop, maintain and manage the vast road network most efficiently, PWD would need modifications in existing systems and processes adopt industry standard road development, maintenance and management practices. A GIS based road management system is essential for PWD to prioritize road works and allocate necessary funds to achieve optimal benefits. A policy of maintenance works based on needs and supported by updated data of road conditions etc. need to be adopted rather than a fixed time based maintenance.

The quality management process is to be strengthened to perform quality check, assurance and audit to ensure safe and efficient travel, reduce travel time, improve comfort and riding quality and reduce accidents.

1. Adoption and use of a GIS based road management system by the end of 2009 will stream line the process of prioritization of projects for development, maintenance, monitoring and resource allocation
2. Devise a framework for road data collection within the next 12 months, for both the Core and Non-Core road networks. This should be simple and sustainable for management of the assets.
3. Give priority to the strategic core road network and assets

4. Standardise methodologies for pre-qualification, feasibility studies, design tendering, bidding, Contract and procurement process; use of IT should be maximised to ensure transparency and efficiency
5. Incentives to contractors for using modern equipment and technologies that give a quality assured product
6. Supervision and monitoring mechanisms to be strengthened and made transparent to all the stake holders; information dissemination using websites should be encouraged
7. Concentrate more on efficient Road maintenance through standardisation of maintenance practices and works
8. Quality management unit to ensure quality control during the construction, quality assurance of the equipments and processes and quality audit and standardisation of mechanism for all.
9. Road safety cell in the department should ensure safety audit for road projects in all the stages and creating awareness among the road users
10. Inspection of the core road network to be under taken at regular intervals to check encroachments and ribbon development within the right of way.

2.4.3. Business Planning and Funding

The annual outlay for planned programmes has not kept pace with the requirements in terms of capacity or length under various road categories which move majority of the goods and passenger traffic. The way the state of UP is poised for a robust economic growth in coming years; there will be very large gap between the existing and required capacity for travel needs. The requirement for the maintenance works under Non-plan budget, according to a PWD estimate, is more than double, if not treble, of what is allotted. It is therefore envisaged that the gap will widen further unless the PWD looks for market borrowings and generates additional funds from its internal sources like;

- Granting commercial Development rights with in right of way and adjacent lands
- Granting advertisement rights and air space rights
- Inviting other sector to be a party to the investment in their industry specific connectivity projects

Private sector participation will play an important role in deficit funding provided conducive government mechanism is established through UPSHA and UPSBC.

The **Policy and Planning Unit** would prepare an Annual Business Plan and Annual Report for the PWD.

1. Arrange for dedicated funding for maintenance of the core roads from Road Fund
2. For development and up-gradation of core roads, frame work to facilitate deficit funding through market borrowing and private sector participation should be encouraged
3. Facilitate granting commercial development rights along selected corridors with in right of way to encourage private parties
4. Invite other sectors to be a party to the investment in their industry specific connectivity projects
5. Facilitate optimum allocation of available resources through scientific tools
6. Identify short, medium and long term projects through road development plan and carry out investment planning for it.
7. UPSHA and UPSBC to investigate and facilitate private sector participation.

2.4.4. Capacity Building Measures: Organization and Management

The IDSP implementation involves a number of areas of capacity enhancement and key process reorganization. Adopting necessary reforms and restructuring will ensure a better future of the road agencies and the road sector. It is envisaged that PWD will be the manager of their road assets in near future. In this regard, faster contract mechanism and award, remote monitoring of projects with the help of advanced communication techniques with the help of IT and road management systems will ensure delivery of quality product within time.

Changing role of the PWD officers will need training and skill upgradation as a part of comprehensive 'Human Resource Development programme ' covering manpower need assessment, human resource planning, policy and guidelines on human resource development, performance appraisal and career planning. Co-ordination mechanisms shall be set in place to integrate different aspects of transport currently handled by a multiplicity of agencies. As apart from PWD many other agencies are involved in road construction. However, maintenance of all roads is to undertaken by PWD.

The immediate tasks to be taken up by PWD are listed below:

1. Set-up policy and planning unit, road safety planning and engineering unit with in a committed time frame
2. Set-up quality management frame work
3. Frequently carryout manpower needs assessment. Human resource planning and training needs assessment should be undertaken out each year; this feed back will also help in enriching employees' database
4. Training and skill up gradation of PWD engineers to suit their new roles.

5. Frame policy and guidelines on human resource development, performance appraisal and career planning
6. Modify organisational arrangements to reflect priorities
7. Emphasis on Implementation and Monitoring with in a time frame (an implementation cell in PWD to look after the implementation of Road policy)

2.4.5. Mitigating Environmental and Social Impacts

The Government should publish environmental standards in line with the Govt. of India Environmental Protection Rules-1986, that include consideration of social aspects for maintenance, upgradation and construction activities associated with all public and private sector road projects.

New roads/bridges and major improvements, tolled or otherwise, will be subject to environmental and social impact assessment and require implementation of approved management plans and mitigation measures to avoid and off-set any adverse effects of road construction and operation. Minor projects will require contractors to complete documentation relevant to the environmental impact of the activities.

Funding will be provided for mitigation/ rehabilitation measures and the Government should promote re-vegetation and enhancement of streetscape planting. The use of new materials and procedures that have been tested and approved should be encouraged where it contributes to the long-term sustainability in road construction. Design guidelines to be published that incorporate these changes. The use of practices and selection of materials which provide environmental benefit are to be promoted where reasonable, in the areas such as vehicle technology, fuel quality, alternative fuels and improvement in inspection and maintenance practices. Research is to be undertaken on alternative fuel that is less polluting. Initiatives to reduce air pollution from private and public vehicles will be promoted including switching over to less polluting fuels and phasing out old vehicles / old technology vehicles.

The functions of PWD in regard to environment management are:

1. PWD to facilitate mitigation frame work for new roads and road widening projects subjected to environmental and social impact assessment, implementation of approved management plans and mitigation measures to avoid and off-set any adverse effects of road construction and operation
2. Ensure adequate funding for plantation along the roads
3. Promote the use materials which provide environmental benefits.
4. Provide a quicker settlement and rehabilitation of PAPs (Project Affected Persons).

2.4.6. Strategic Road Network Planning

Since 2001 a number of initiatives have been taken by the Government to drive the economy of the state towards development. These included constitution of Special Economic Zone Development Authority and SEZ Policy to facilitate setting up of SEZs in the state. Besides this, efforts have been made to set up Textile parks, Agro Parks, Export Promotion Industrial parks and Software Technology parks by UP State Industrial Development Corporation. These projects will require additional connectivity and capacity enhancement of the core road network of the state. Hence, a comprehensive road network planning should be a part of the frame work before each five year plan (short term to medium term) to assess the transport need to take care of the changing economic scenario of the state involving all transport service providers including railways. The short and medium term network planning should be in line with the long term goal.

2.5 PWD PRIORITY TASKS FOR IMPLEMENTATION OF THE UPDATED UP STATE ROAD POLICY

Implementation of the new UP Road Policy as described above would necessitate revamping and strengthening a number of key functions and tasks in the PWD. The functions /tasks in question are the ones which are either not established/ carried out in the PWD at present or are not carried out at the level of effectiveness required. These tasks are described below.

2.5.1. Establish a GIS / RMMS System

Develop and implement a GIS based road database to assist with the development of the Road Network Master Plan, and for the maintenance and development of the road network. This database would also link to the RMMS and managed by the IT Unit being established within the PWD. Much of the application of the GIS and RMMS would be taken up by the Policy and Planning Unit being established.

2.5.2. Develop the Capacity of UP PWD

- Implement changes in the PWD organisation structure, designed to improve management efficiency and effectiveness, taking into account the need for 'Change Management'.
- Establishment of a Human Resource Unit responsible for annual staff appraisals, performance related training, transparency in promotion and salary increases, and staff transfers.
- Establish training courses that encompass technical and management training, with training related to job performance criteria and promotion.
- Introduce Financial Management Systems which aid decision making, which are transparent, and which integrate cost reduction techniques into government standards.
- Implement standardised systems and processes for procurement, quality control, technical audits, and project management.
- Introduce standards for road designs, including intersections and lay-out in general, and for structures.

- Encourage the use of contractors in maintenance and construction works associated with the Core Road Network, and to introduce Performance Based Contracts.
- Establish specialist units for dealing with legal affairs, complaints, public relations, and right to information.
- Establishment of a Road Safety Unit within PWD and procedures for links with other agencies involved in road safety.
- Implement the e-Governance plan of the Govt such as proactive disclosure, e-tendering and Right to Information Act. Use the latest developments in IT in not only to comply with the orders, but use them proactively to provide better service to the Road users and other stake holders and make the internal work processes efficient and transparent.

2.5.3. Environmental and Social Development

To mitigate environmental impacts and provide quicker resettlement and rehabilitation of PAPs (Project Affected Persons).

- a policy should be developed for PAP along the lines of some of the PMGSY projects where such people are allocated land from the Gram Panchayat.
- a policy developed so that a list of PAP can be recorded in an official register along with the area of land in question and made available to the public.

2.5.4. Road Safety

- To ensure a proper road safety audit mechanism and to create road safety awareness among all road users.
- To develop and introduce road safety standards into all aspects of work undertaken by PWD, including design and development of the road network, and maintenance and construction activities. This should include the necessary warning signs and ensure that they are in place during the life of the works.

2.5.5. Asset Management

- Develop robust and supportable annual maintenance budgets based on need and on the gradual improvement of the quality of the road network.
- Timely rehabilitation and up-gradation of existing infrastructure using computer based road and bridge maintenance management system for the core road network prioritized on economic criteria.
- Maintenance management system for the Non-Core Road Network on above lines but in a simpler form.
- Carry out regular condition surveys for effective planning of maintenance interventions.

2.5.6. Private Sector Participation

- To mobilize market borrowings as well as generate funds from internal resources with private sector participation.

2.5.7. Dedicated Road Fund

- To establish and manage a dedicated road fund

2.5.8. Stakeholder Participation

- To establish the opportunity for Stakeholders to provide inputs to the PWD

2.5.9. Planning for Integrated multi-modal transportation

- To give adequate importance to integrated multi-modal transportation planning with due consideration to all the sectors with adequate space for special projects in order to achieve a balanced socio-economic growth in the region

2.6 IMPACT ON PWD STAFFING NEEDS

The existing UP Road Policy already requires that PWD play the role of the **Principal Road Agency** in the State. The proposed update of the Road Policy requires that the PWD performs these roles and responsibilities by embracing the state of the art Road planning, construction, maintenance and management methods coupled with the need to be responsive and proactive in meeting the needs of road users in a rapidly expanding economic development phase the State will be going through.

The need for structural changes of PWD organisation and work processes has been well established and are being addressed through concurrent IDSP actions (Report no. 11). These, in turn, would necessitate a staffing strategy that is much different from the present. The next sections shall analyse the salient changes to be effected in the organizational structure of the PWD and the staffing needs arising out of the restructured PWD.

3. PWD FUNCTIONAL WORKLOAD STUDY: PWD RESTRUCTURING

The IDSP implementation agenda includes a “Progressive PWD Restructuring and staffing realignment including internal staff communications on all major aspects”. In fulfilment of this mandate, the TA Consultants have been carrying extensive studies and wide ranging discussions with PWD officials at various levels in the HQ as well as field units. The Consultants are currently in the process of finalization of their recommend which will be submitted as Report No. 11.

A broad view of the likely “Restructured PWD organisation has emerged and the same has been taken into account for developing the longer-term staffing strategy described in this report.

The restructured PWD organisation incorporates rationalization of various ‘functions’ in PWD operations. It emphasizes many modern planning and management functions for effective decision making. The resultant ‘shift’ in the functional workload in PWD at strategic, managerial and operational levels would necessarily involve substantial changes in the staffing needs.

The strategy for implementation of restructuring of UP PWD will necessitate an appropriate staffing strategy to ensure that the positions are filled by right people with the right abilities, and competencies. It is expected that the organizational restructuring can be effected over several years and each phase of reorganization will have a staffing strategy. The report no.11 would discuss the likely realignment of the existing staff into the revised PWD structure in the near-term. Considering that this “staffing realignment” is likely to leave some gaps (and possibly a few redundancies), a longer- term staffing strategy need to be developed.

The PWD organisation has evolved over the ages based on the premise of aggregating, coordinating and integrating functions and decisions at different levels in a four tier geographically based structure, with responsibilities distributed to senior staff across functions. This structure has not altered significantly since its creation more than a century ago. PWD have never gone through a systematic organisational review in response to external environmental changes. Although the PWD has an excellent technical engineering capacity within the State's numerous departments, it currently suffers from a number of managerial and institutional problems, many of which are common throughout the public sector in Uttar Pradesh.

3.1 EXISTING ORGANISATION STRUCTURE

A. Government Level

The department is accountable to the State Government through the Minister of Public Works. One Minister of State assists him. The Principal Secretary heads the organisation at the Government level. He is assisted by two Secretaries in-charge of work and establishment. The structure in both the works and establishment divisions comprises of Special Secretaries, Joint Secretaries, Deputy Secretaries and Under Secretaries.

B. PWD Headquarters

PWD headquarters, located in Lucknow, houses the office of 3 ENC's and 7 Chief Engineers. Finance Controller is also placed at the Headquarters and report directly to ENC. Finance Controller is an officer who is on deputation from Finance Department of Government of Uttar Pradesh (GoUP).

The HQ coordinates and performs the planning, budgeting and resource allocation activities of the Department. It also provides information and progress reports to Government and interacts with other stakeholders in matters related to UP Road Network. There are 2 Chief Engineers (civil) designated as CE HQ I and CE HQ II respectively along with CE (Complaint) and 1 Chief Engineer (Electrical and Mechanical in the E-in-C Development organisation at HQ. The CE HQ I coordinates and performs the planning, budgeting and resource allocation activities of the Department. It also provides information and progress reports to the (Government of UP) and interacts with other stakeholders in matters related to UP Road Network and State Government Buildings. The distribution of responsibilities among the Chief Engineers is across functions and appears to be primarily guided by an equitable distribution of quantum of work load.

C. PWD Field Organisation: Zones, Circles and Divisions

The State is geographically divided into zones, circles and divisions, for administrative convenience. PWD organisation has a four-tier hierarchy with Zones, Circles and Divisions headed by Chief Engineers, Superintending Engineers and Executive Engineers respectively.

The existing Zones, Circles and Divisions are given below. Working Circles/ Divisions are the ones which are responsible for specific 'Works' pertaining to roads, bridges and buildings etc. The Circles and Divisions that are performing other functions such as planning, design, establishment etc but not specific 'Works' are termed as 'non-working'.

Table 3.1 : UP PWD Zones, Circles and Divisions

Details	Zones	Circles		Total Circles	Divisions		Total Divisions
		Working	Non-working		Working	Non-working	
Civil	12	29	3	32	160	18	178
National Highways	1	3	1	4	15	2	17
World Bank	1	7	2	10	16	2	18
PMGSY	3	8	1	9	55	2	57
Electrical and Mechanical	1	4	0	4	21	1	22
Maintenance (Building)	1	1	0	0	3	0	3
DASP/SODIC	1	1	0	1	3	0	3
Total		53	7	60	273	25	298

At present, the jurisdiction of the circle offices mostly coincides with that of the districts. With a total of 70 districts and 29 Circles, a Circle caters for the works in 2 or 3 districts. The Circle offices provide technical expertise, guidance and approvals of various types to the Divisional offices; which is the basic unit for implementation and the Executive Engineer in charge of a Division has the Prime responsibility of execution of 'works' consisting of contracting, procurement, project management, administration and payments. The Divisional office also interacts with the local administration for resource procurement and progress reporting on works financed through Government, apart from that through local administration under various schemes.

The organization is based on the need for effective geographic coverage of the entire State, to execute the Works' in coordination with the local administration. There are predefined norms defined in terms of value, which each division should manage. Presently it is Rs. 12 crores per division.

3.2 FUNCTIONS AND DUTIES OF OFFICERS AT DIFFERENT LEVELS IN PWD

Hierarchy

Functions, Duties & Activities

Engineer-in-Chief

Function

The Engineer-In Chief is the administrative and professional head of the organization and responsible to the government for its efficient functioning

Duties & Activities:

Exercise control over the duties over the officers of the Department

Enforce the rules and regulations of the department

Chief Engineer

Function

A Chief Engineer is the administrative and professional head of the branch in the overall organization and is responsible for its efficient functioning

Duties & Activities:

To exercise control over the officers of the Branch of Department

Enforce the rules and regulations of the Department
Prepare annually the portion of budget estimates relating to works under his control Administer the financial allocation for each year and keep close watch over the expenditure against it Ensure that financial allocation of each year is fully expended Arrange to keep the Auditor General fully cognizant of all proceedings and proposals to enable the latter to fulfil his functions

Superintending Engineer

Function

Circle Level The administrative unit of a Department is the Circle with an in-charge of a Superintending Engineer who is responsible to the Chief Engineer for administration and the professional control of the work to be undertaken by officers of the department within his Circle

Duties & Activities:

A superintending engineer is authorized to correspond directly with any Local Authorities, civil or military within his Circle area. He will address General officers Commanding Divisions through their staff officers and other officers. Inspect the state of works within his Circle Ensure to his satisfaction that the prevailing system of management is efficient and economical. Items in stock are verified as per rules laid down and no stock accumulation beyond requirements occurs. Inspect Divisional Offices reporting to his Circle at least once a year.

Report to the Chief Engineer on the results of his inspections in the prescribed format for:

Initial accounts

Accounts of stock

Tools and Plants and Stock Manufacture

Register of works and

Other divisional accounts and papers

Mode of preparation of estimates

Contract Agreements

Contractors Accounts

Revenue registers and

General Office Work

Ensure that authorised system of accounts is maintained throughout his Circle and examine the books of divisional officers and their subordinates

Monitor works register and call for reports from Divisional officers about expenditure against heads

Investigate excess expenditure over sub-heads and determine if revised estimates are required and submit them on time

Ensure that reports are prepared and submitted timely

Executive Engineer

Function

Division level

The divisional officer. Executive Engineer is ex-officio the professional advisor of all departments of the administration and of the district boards within the limits of his charge " It is the Divisional officer's duty to advise the Commissioner professionally on all Municipal matters referred to him by that official

Duties & Activities:

Executive Engineer is entitled to attend any meeting of a district or a local board and to address the board with permission of the chairman on any matter affecting public works

He will transact business of this sort with the chief of civil and military authorities within his division and it will be incumbent on him to see that no formalities are allowed to interfere with the performance of these duties which are essential or pressing. Accountable to the Superintending Engineer for the execution and management of all works within his division

Divisional engineers are responsible that proper measures are taken to preserve buildings and works in their division

They are responsible for preventing encroachments on government lands in their charge. They should take care that their subordinates make themselves acquainted with the boundaries and see that they are adequately mapped, marked and respected.

A divisional officer is responsible for that proper arrangements being made throughout his division for the good preservation of public property. He must keep all tools and implements in efficient order, protect surplus stock from deterioration, and take precautions to prevent the loss of public stores by fire.

Ensure that commencement of work and payments are made only after sanction from competent authority. Ensure that designs are implemented without deviation from that approved and any deviations are done with the consent of the superintending officer. Close accounts and prepare completion report immediately after completion of work.

Mobilise and disburse cash for works under his control. Submit monthly account reports after due verification and scrutiny. Provide information for preparation of revised estimates. In all matters concerning the giving of advice or the execution of works for other Departments (both civil and military) the divisional officer should correspond directly with the local head of the department concerned or in case of military work with the Garrison Engineer.

Assistant Engineers /

Sub-Divisional level

Function

Sub-divisional officer is responsible to the divisional officer in-charge of the division for the management and execution of works within his sub-division.

Duties & Activities:

The sub-divisional officers or the officer in-charge of the Assistant Engineer's section is the professional advisor of all departments of the Administration and of the District Boards & Town Area & Notified Committee within his jurisdiction but not of the Municipal Board.

He should attend meetings of the District Boards, Town Area or Notified area committee whenever requested to do so by the president or chairman, as the case may be.

3.3 PWD WORK PROCESSES

3.3.1. Divisions as Key Executing Units

The Divisions are the key executing units of works. Other offices act as coordinating, guiding and monitoring units. The one permanent Division in each Circle is termed as the 'Provincial Division.' Each Division office is responsible for execution of a certain quantum of works which varies from year to year, but in recent time they are invariably on the rise. Additional Divisions are created from time to time or are closed down and the staff redeployed elsewhere to cater to changes in workload.

The Executive Engineer in charge of a Division is entrusted with multifarious tasks as follows:

1. Engineering Works - concept, feasibility, planning, design, estimating
2. Bidding
3. Contracts
4. Procurement
5. Construction
6. Supervision
7. Quality Control and Testing
8. Payments to contractors (disbursement)
9. Financial Accounting
10. Legal aspects
11. Public Complaints
12. Court Cases
13. Welfare
14. Social obligations
15. Meeting with District Authorities, Public Representatives, etc
16. Establishment matters

The PWD structure is based on the need for effective geographic coverage of the whole State to execute the "Works" in coordination with the local administration. There are norms regarding the average annual Workload (defined in terms of Value), which each division should manage.

At present, the jurisdiction of the circle offices mostly coincides with that of the District. The circle offices provide technical expertise, guidance and approvals of various types to the Divisional office; which is the basic unit for implementation and the Executive Engineer has the Prime responsibility of execution of 'works', contracting, procurement, project management, administration and payments. In addition, the divisional office also interacts with the local administration for resource procurement and progress reporting on works financed through local administration under various schemes

The basic structure of the Executive Engineer as the field level execution agency has remained intact while the volume of works have increased manifold. Additional tasks are constantly getting added, many of which are not engineering related. The inevitable result is that there is a work overload and it is almost impossible for an Executive Engineer to perform all the activities well. The most damaging casualty is the site inspections for quality monitoring. The fact that PWD has not leveraged the recent advances in computerisation and communications; and continues to work in a manual mode, has made the situation grave. A complete overhaul of the work process of the Division would be necessary if the Divisions are to deliver services as per the expectations of the stakeholders.

3.3.2. Work Process and Reporting Requirements

Table 3.2 : Representative List of Reports for Division Office

Report	Prepared by	Submitted to	Purpose
Preparation of Estimates	J.E and AE under guidance of EE	Circle Office	<ul style="list-style-type: none"> Decision making and onward transmission
Proposal of road renewals	A.E under guidance of EE for identified kms	-do-	<ul style="list-style-type: none"> Decision making and onward transmission
Proposals for special repairs	A.E under guidance of EE	-do-	<ul style="list-style-type: none"> Decision making and onward transmission
Monthly Progress Report	JE (T) under guidance of EE	-do-	<ul style="list-style-type: none"> Information and onward submission to ENC through CE Control
Proposals for special repairs	AE under guidance of EE	-do-	<ul style="list-style-type: none"> Decision making
Project Completion Report	A.E under guidance of EE	SE	<ul style="list-style-type: none"> Information
Village Connectivity Report	J.E (T) under guidance of EE	-do-	<ul style="list-style-type: none"> Information
Road Inspection Register	EE	SE	<ul style="list-style-type: none"> Information
Monthly Account	Senior Clerk under Supervision of DAO.	A.G.U.P. Allahabad through EE	<ul style="list-style-type: none"> By the fixed date for checking of expenditure with respect to allocation of funds
Variation Statement	Senior Clerk under Supervision of D.A.O.	A.G.U.P. Allahabad through EE	<ul style="list-style-type: none"> Information and checking for expenditure control (Third Monthly)

Report	Prepared by	Submitted to	Purpose
Toll Collection Report	Clerk and DAO	SE through EE	• Information and onward submission to CE and ENC
Master Plan of Roads	JE (T) under the guidance of EE	SE	• Information and onward submission to CE and ENC
Closing of stock form-12	Senior Clerk under the supervision of DAO	SE through EE	• Half Yearly Closing and report is sent to CE and ENC
Closing of T&P Form-i5	Senior Clerk under the supervision of DAO	SE through EE	• Annual Closing and report is sent to CE and ENC
C.C.L. Inputs	Cashier and DAO	Treasury officer through EE	• Information and report is sent to CE and ENC
Register of Bridges and culvert	JE(T) under guidance of EE	SE/CE/ENC	• Information and also for sanction of needful rehabilitation work
Reimbursement claim (NABARD, SODIC and SRP works)	Senior Clerks and DAO under guidance of EE	NABARD under information to SE/CE/ENC	• Reimbursement
Legislative Assembly Questions	EE	ENC through SE and CE	• For onward submissions to Government on top priority basis
<i>Source: Division office, PWD</i>			

The Quarterly Reports indicate, for each contract, the amount sanctioned, the financial and physical progress up to the end of the previous fiscal year, the financial and physical targets for the current year, and the quarterly targets and achievements for the current year. In these reports some of the important contract information, such as contract start and scheduled completion dates, and estimates of projected time and cost overruns etc are often missing.

The monthly physical and financial progress reports at Division level comprise of about 60 pages. On an average there are 3 to 7 divisions per circle. Therefore, SE at Circle level receives about 300 pages of data every month. These reports are then compiled and sent to the Zonal CE. A zone has about 10 to 15 divisions on an average. Therefore, CE (Zone) receives about 800 pages of data every month. There is limited consolidation of reports as these are forwarded up the levels of hierarchy within PWD. These reports are often' delayed; therefore the information that is sent is often not up to date. Further, the general opinion within the PWD is that some of the reported data is not reliable.

Besides the reports, following registers are maintained by the EE at the Divisional Level, updated manually on a yearly basis

- Register of Benchmarks
- Register of Bridges and Culverts
- Road Register (Form D to I)
- Stock Account Register (Form 7 to 12)

The effectiveness of multiple layers reporting (monitoring) as prompted by the current organization structure is regularly questioned by staff at all levels, as evident during interactions. Excessive reporting may arise out of the need felt by divisional engineers for detailed technical inputs from those higher in the hierarchy. It could also be a result of higher levels' need to ensure control. Due to standardization of engineering techniques and an increase in the number of highly experienced officers at divisional offices (because of slow career progression), the felt need for technical inputs from circle office is waning.

3.4 THE RATIONALE FOR RESTRUCTURING OF PWD

The vision statement for UPPWD is "*Creation and Maintenance of an Available, Accessible and Affordable Road Network in Uttar Pradesh which is Safe, Encroachment Free and Eco-friendly for Everyone at all Times.*" To achieve this vision, strategic reorientation is necessary for sourcing and utilizing the resources. Such reorientation will be enabled by appropriate changes in the design of the organisation. The redesign of the organisation will entail changes in the structure, systems and processes, in an integrated manner. The proposed restructuring aims to address the following concerns / weaknesses identified in the PWD organisation and working:

- i. multiple functions of the PWD, including being both a client and provider as well as managing roads at different administrative levels (i.e. state and local);
- ii. lack of PWD autonomy, particularly for financial planning (unpredictable and unreliable resources) and staff management (high transfer rate);
- iii. geographic rather than functional separation of responsibilities;
- iv. inadequate coordination amongst the various agencies having a role in the road transport sector;
- v. ambiguity in ownership of road assets leading to poor maintenance and accountability for road operations and safety;
- vi. lack of multi-year or strategic planning leading to ineffective resource allocation and investment inefficiency;
- vii. lack of customer focus and absence of role for road users in monitoring the sector performance;
- viii. lack of modern human resource management techniques;
- ix. poorly developed management information systems;
- x. outdated core processes in areas such as financial management, procurement, maintenance planning which are generally over centralized.

3.4.1. New Units/Cells for Specialist Functions

The following Units/ Cells are being established within the PWD as a part of IDSP implementation:

- HRD and Training
- Environmental and Social Development
- Quality Management
- Projects Policy and Planning
- IT Management and Planning
- Road Safety Planning and Engineering
- PSP/PPP Development. This work is assigned to a dedicated body, UPSHA, created for the purpose. PWD would be required to work closely with/in conjunction with UPSHA for increasing private sector participation in Road projects.

3.4.2. The Role of the Zones

For PWD to become a more effective and efficient organisation, the Zones need to play a greater role in the work of the PWD. The Zones are to be fully empowered and made responsible for all operational aspects of roads i.e. preparation of annual budgets, planning, procurement, award, supervising, and monitoring new construction and maintenance works, including quality control and financial management. The Zones would be supported by Headquarters and act in accordance with the regulations and guidelines.

Present arrangement is characterised by multiple agencies with Government playing the role of policy maker, implementer, financier and evaluator. Recourse to stakeholders' "concerns" is indirect and diffused and often very time consuming. In years to come, PWD would act as managers rather than just an implementing and construction organisation.

3.4.3. Changes in Work Processes

PWD needs to change bring a change in its working system, whereby,

- Policy and Planning or Strategic Planning to be separated functionally from operations
- Ownership of the whole road network established
- Resource allocation process should be based on a rational basis

3.4.4. Accountability to Stake Holders

Accountability to Stakeholders is very essential for any Public Sector Organisation especially like Public Works Department (PWD).

3.4.5. Road Development Policy

Report No. 8 had focused on the review of the present UP Road Policy of 1998 and identifies the areas which need attention. The proposed updated road policy aims to facilitate an efficient road transport system, which is safe and meets the aspirations of citizens for improving the travel needs and quality. This policy also aims to integrate transportation demands of other sectors.

The proposed UP Road policy has several objectives to meet like:

- Establish a GIS/RMMS
- Capacity Building Measures
- Environment and Social Development
- Road Safety
- Asset Value
- Private Sector Participation
- Dedicated Road Fund
- Stakeholder Participation
- Integrated multi-modal transportation

Achieving objectives needs strong policy statements and commitment from the PWD which has to be implemented through right strategic direction and appropriate action plans. The following should help and guide the PWD in the preparation of its short, medium and long term business plans.

- Road Network Planning
- Road Development, Maintenance and Management Functions
- Business Planning and Funding
- Capacity Building Measures: Road Administration Organization and management
- Mitigate Environmental and Social Impacts

3.4.6. Key Functions Expected of PWD

The key functions that have to be carried out by the PWD are segregated into the following:

- *Policy making*, dealing with broad level issues which would impact the sector and hence impact the State economy as whole.
- *Planning*, which includes a gamut of issues ranging from the long and short term strategic planning for the sector to project level planning for individual projects
- *Implementation*, which can be further broken down into Procurement (procurement of consultants, contractors and other service providers); Management and monitoring (cover physical and financial progress of the projects as also quality monitoring of the work on new projects or maintenance)

- *Regulation*, needed to ensure the service delivery meets the standards and quality guidelines set for the sector in addition to safeguarding the stakeholder's interests

Good road sector management involves a clear demarcation of key functions and the agencies/units that would be assigned to carry them out. This is necessary to achieve accountability and clarity of roles of each Unit. Ideally, key functions of Policy making, Planning, Implementation and Regulation should be handled by different agencies/units. Organisational design should be aimed at achieving separation of key roles in the long term.

3.5 FUTURE ORGANISATION STRUCTURE OF PWD

The future organisation structure for PWD to cater for the above demands is discussed in Report no. 11. Some of the major changes that would impact the staffing needs are described below. The details are given at Appendix....

3.5.1. Role and Functions of Top Management

The top Management will consist of a DG, an ADG and 5 E-in-Cs. The role and responsibilities of various positions are as follows:

Director General 'Works'.

The Head of PWD. The Director General 'Works' will represent the PWD at the highest levels in the State and successfully negotiate with both Ministers and Civil Servants. This role is of vital importance because of the onerous responsibilities placed upon the PWD.

Additional Director General 'Works'.

Second in command and supervisor of following units:

- **Policy and Planning Unit:** Responsible for strategic planning, identify the areas of development/potential for development within the state; maintain a database of the existing road network; identifying the roads which are most strategic for balanced development in the state.
- **Management Information System / Information Technology Cell / Unit**
- **GIS / Road Maintenance Management System**
- Quality Audit Unit
- The **Finance** function:

Engineer-in-Chief 'Roads'

The Roads Wing is headed by an ENC (Roads) divided into twelve zones, each headed by a Chief Engineer. He will be responsible for the core business of PWD i.e. the roads and bridges, along with the development and maintenance works associated with roads. In addition, there are two Chief Engineers who will look after 'Monitoring and Development' and 'Electrical and Mechanical' wings of the Department. The function of the 'Monitoring and Development' will be the monitoring of the physical and financial progress of works with respect to the budget allocation on a regular basis at his own level as well as at the level of the Government

ENC (Roads) is concerned mainly with matters relating to development and maintenance of roads for both core and non-core. The basic difference between core roads and non-core roads related to the ways in which the roads were to be managed and maintained. The core road network would be managed using a pavement management system linked to HDM-4 and maintenance work would be outsourced.

A Strategic Core Road network could then be selected from the roads that make up the Core road network. In this Report the term 'Strategic Core' has the same meaning and definition as Core used in reports written by other Consultants. (Report No 23). But for preparation of estimates for providing overlays (strengthening) and for widening of the existing roads, PWD conducts the traffic study departmentally.

There is a proposal for use of the RMMS for maintaining a record on the status of the strategic core roads in the state of UP. For this the data collection has to be specific to the RMMS. Currently PWD is utilizing external service providers to carry out the data collection on their road network. For example PWD appointed CRRRI to undertake traffic count surveys on the state's strategic core road network¹. (Report No 23)

The first step in prioritising is to identify the core road network. This could be based on a number of criteria, such as:

- Traffic volume;
- Essential linkages;
- Developmental aspects;
- Population and population growth potentials;
- The study of trips and trip frequencies;
- Origin and Destination matrices;
- Settlement analyses; flow/gravitational analyses;
- Socio-economic factors,
- Military or strategic importance to GoI, etc.

¹ the study was entitled 'Traffic count Surveys Uttar Pradesh State Core Road Network ' August 2006

These and other criteria are discussed with the relevant techniques that can be used to develop a road network master plan / strategic core network in Report No. 29: "Review report development of road network master plan". Report No. 3: Inter-Agency Working Group study to facilitate GoUP decisions, legislation and other actions on an affective long-term ownership and funding framework for non-core UP roads, addressing sustainable devolution of village roads and orphan roads" also addresses the selection of Core roads.

The consultants confirmed their agreement with the figure of some 44,000 kms made up of State Highways, Major District Roads, and the majority of Other District Roads.

The basic split between core and non-core roads was based on management requirements. It is envisaged that maintenance of the core road network will be based on a suitable RMMS program linked to HDM-4. This system will produce a prioritised list of roads for maintenance based on specific maintenance criteria and available budget. It is also anticipated that the greater majority, if not all, of maintenance work will be outsourced.

The non-core road network will NOT use such a sophisticated software program. It is anticipated that the greater majority of the maintenance work will not be outsourced.

Functions pertaining to Core Road Network and Non Core Road Network would be assigned to different Divisions i.e. Division (Core Road) and Division (Non-Core Road) respectively. Each Circle may have 2-3 Divisions for Core Roads and 4-6 Divisions for Non-Core Roads.

Engineer-in-Chief 'Special Projects'

Head activities associated with 'Aided Projects, either funded by Government of India or World Bank etc.

These are as follows:

- Projects which are funded by World Bank and other donor agencies,
- National Highways (since their budget is provided by Central Government and not by the State and the work is executed by State PWD

Engineer-in-Chief 'PMGSY'

A dedicated post of Engineer in Chief 'PMGSY' has been created due to the huge amount of work being carried out during current financial year 2007-08 and also anticipated in the succeeding years in future as the spirit and the objective of the Pradhan Mantri Gram Sadak Yojana (PMGSY) is to provide good all-weather road connectivity in all the States of the country to unconnected habitations. In spite of all efforts made, over the years, at the State and Central Government levels, through different Programmes, about 40% of the habitations in the country are still not connected by all-weather roads. It is well known that even where connectivity has been provided, the roads constructed are of such quality (due to poor construction or maintenance) that they cannot always be categorised as all-weather roads.

Engineer in Chief Administration

To head up those activities which could best be described as supporting the core business activities. These activities include:

- HRM / HRD and Training
- Legal aspects
- Complaints
- Public Relations
- Right to Information

Engineer-in-Chief 'Technology Development'

To head up those activities which are a necessity for the smooth functioning of the PWD but which are not part of the core business. These activities include:

- Procurement
- Technical Audit
- Quality Control
- Road Safety and Traffic management
- Environmental and Social Development Unit
- Research and Development
- Public Private Participation / Public Sector Participation since their work is related to arranging funds from the sources other than through the State government

3.5.2. Role and functions of Functional heads

Chief Engineer (Monitoring)

A Chief Engineer will have the following functions for Monitoring and Development and mostly he will deal with the functions of Chief Engineer HQ I:

- Monitoring for works (physical and financial) sanctioned in the budget and convene meeting at ENC and Government level

Chief Engineer (Electrical and Mechanical)

- Management and allocation of Tools, Plants, Machines, Vehicles and Equipments owned by PWD, through electrical divisions
- Responsible for all Mechanical/Electrical Works in all the Civil Works handled by PWD.
- Monitor the work of the Contractors so as to restrict their monopoly (usually, the work has to be completed through PWD owned plants and machineries, as most of the Contractors who are awarded with the contract are unable to bring in the machines to execute the work, even if they bring the machines, most of them are condemned).

- The Government's policy is to retain Gang Labour; hence the Electrical and Mechanical wing of the Department plays a very crucial role.

Chief Engineer 'Structures, Design and Standards'

- Collection of data regarding requirement of missing bridges on PWD roads from Zonal Chief Engineers, over different rivers, ROBs and very urgently needed flyovers
- Data collection for reconstruction / rehabilitation needed for the damaged / special repairs for existing bridges / ROB / flyovers on different PWD roads from Zonal Chief Engineers under their jurisdiction
- Prioritization of these structures to be taken up for sanction during the year as per budget provisions and approval of such prioritised proposal from the Government
- Preparation of estimates of approved prioritised structures from UPSBC and for the approach roads of bridges from Zonal Chief Engineers and their checking by the division under SE 31st Circle Bridges and sending it to the Government for sanction. After the sanction is received allocation of funds as per the budget provision during the year to UPSBC for the construction of structures and for approaches to the Zonal Chief Engineers under intimation to concerned Superintending Engineers / Executive Engineers
- Monitoring of the execution of structures (physical and financial) with respect to the fixed target and control / watch over the quality of works
- Evaluation of standards for roads and bridges and formulation of specifications

Chief Engineer for HR, Training and Legal

Will be responsible for establishing the professional HR services in the PWD and fulfilling the set of HRM, HRD and Training tasks of:

HR Policy Formulation

Training Needs Identification

Training Database

Organising Training Programmes

Planning and Establishment of PWD Training Centre

IT Skills Development

HR Database Management

Manpower Planning

Recruitment

Performance Management and Career Management

Communications and Change Management

Chief Engineer (Complaints & Public Relations)

- Investigate department related complaints.
- The complaints are from Government, Public Representatives and road users. Also receive reports on complaints investigated by Zonal Chief Engineers and Superintending Engineers for further action.
- To liaison with the Government in the matters of punitive actions against the departmental officers and officials
- To promote public understanding of and support for PWD programmes, policies, and strategies;
- Provides information about Departments operations and programs to the media and public for example, the Annual Plan and Strategic Plan of PWD. The Strategic Plan will set out long-term programmatic, policy, and management goals and planned accomplishments. The Strategic Plan will also provide an opportunity to bring together government, industry, academia, and other stakeholders to work toward a shared vision.
- Provides support and assistance to PWD headquarters and field offices

Chief Engineer for Contract Management

Will be responsible of development of Contract documents and policy guidelines on contracting procedures for different kinds of works.

Chief Engineer for Technical Audit

He will be responsible for several functions as the objective of quality audit is to determine to what extent the quality system achieves its objectives, conforms to your requirements, complies with regulatory requirements, contractual requirements, and conforms to a recognized quality standard, to improve the efficiency and effectiveness of your quality management system and to verify that your quality system continues to meet requirements. The G.O No. 4031-EBR/XXIII-PWB-183-EBR/1958, through which the State Government in the year 1958, introduced a system of administrative audit of works in the Public Works Department and there by created Chief Technical Examiners cell in the Uttar Pradesh, specifically excludes "any inquiry into the suitability of plans, designs and specifications."

Various Aspects of a Project to Be Audited Project Planning Project planning is the initial stage of a project which affects later each and every stage of the project such as overall cost and duration of construction.

- Collection of data, adequacy and accuracy of data, documentation.
- Data interpretation, solutions based on codes and practices, taking into account for relevant local and past experience, documentation.
- Documentation of all alternatives considered.
- Review before finalization.

Hence the specific functions will be for:

- Designs, Estimations and Drawings
- Procurement of Works (Organisation and Management of Contractors, Material Procurement, Construction Materials)
- Management and Organisation

It is also recommended that a third party audit on the line of the PMGSY be instituted. An independent third party audit system, which will include the best form the PMGSY audit procedures and from the IRC's 'Guidelines on Quality Systems for Roads' can be drawn up and instituted which would result in a proper quality audit system to examine all aspects of the workings of UPPWD, i.e., policy, procedures, systems, documentation etc. all the way from planning, surveying, pre-engineering investigation, design, specifications, tendering, construction to maintenance of roads and bridges. For this purpose senior retired highway i.e., PWD engineers can be empanelled to carry out audit on a pre-agreed cycle. It is important that these engineer-auditors should be trained in conducting audit in accordance with ISO 19011 standards.

This outsourcing will, in addition to having the benefit of a proper audit of the PWD's processes and products, result in relieving 10 engineers from the Irrigation Department, including one Chief Engineer, who can go back to their Department to carry on their normal duties. The same would be the case with the ten engineers from PWD who are presently deputed to carry out audit of irrigation works, who can return to their parent department which is already short of engineers.

Chief Engineer Quality Management

- Direction, administration and management of Quality Unit in the PWD
- Ensure that adequate resources are available at HQ and field offices
- Framing of quality policy & quality system, including criteria, procedures and documentation,
- Monitoring implementation of quality policy and system,
- Constant review of quality assurance and quality control criteria,
- Appraisal of quality of works executed
- Quality surveillance of designs and construction and Technical Audit of works,
- Maintenance of QA/QC training of PWD staff,
- Advise the Government and organisation staff on all technical matters relating to quality in construction and design of works in PWD,
- Carry out the instructions/directions of Government regarding quality policy matter, quality assurance, work audit,
- Investigations the issues referred to in respect of quality of works,
- In order to perform the responsibilities stated above the CE (Quality) will:
- Keep in touch with the latest developments on use of latest quality assurance tools, new materials, quality control methods and R&D activities in the state and elsewhere.

- The CE (Quality) shall ensure that periodic independent quality audit is conducted of the work executed by the contractor.
- The CE (Quality) will advise on issues pertaining to development of QC/QA specifications for all items/activities involved in road construction with emphasis on quality control/quality assurance.
- Develop QC, QA and TA training programmes; arrange seminars, quality control workshops, training programmes and assist in nomination of the PWD staff for training in India and abroad. He shall frame and organise the training programmes for new entrants and in service staff of PWD.
- Regularly coordinate and interact with the Chief Engineers of other Wings of PWD with an objective to ensure high-class quality in works executed through PWD and to identify the gray areas where improvement is necessary.
- Keep in close touch with UP PWD Research Institute to keep him abreast with research activities in the state regarding construction materials and QC testing.
- Verify the implementation and maintenance of PWD's quality policy and detailed quality procedures.
- Review all quality activities and provide assistance to CE (Execution/Construction) in the development of quality plans of major projects of PWD.
- Initiate suitable measures for prevention and resolution of problems related to quality.
- Prepare new manuals or update the old ones for quality assurance, quality system, maintenance, construction practices etc
- Prepares new specifications or update the old ones wherever required
- For discharging the above-mentioned responsibilities the CE (Quality) shall be assisted by the SE in the zonal offices.

Chief Engineer (Road Safety)

UPPWD can act as the nodal road design and construction standards approval organisation for all other agencies. Any road safety elements incorporated by PWD in its own final designs can therefore only enhance accident reduction resulting from bad highway design and road maintenance. Therefore a **Chief Engineer for Road Safety and Traffic Management** will be responsible for the following functions:

(a) At Macro Level

- To carry out road safety appraisal of all new road up gradation projects being undertaken by the PWD and all other agencies in the State
- To identify deficiencies of existing roads by undertaking road safety audit, and suggest mitigating measures
- To oversee the execution of work at projects implementing black spot mitigating measures.

- Development of IRC type safety standards for road projects or the adopting of IRC standards for the state of Uttar Pradesh

(b) At Micro Level

- To consider and approve/deny approval for 'road cut, for utilities and, to establish safety installations.
- To take immediate action to rectify any damage to the carriageway which may affect road safety, such as, improperly restored road cut for utilities,
- To carryout by specifying a time-limit, the actions required for the eviction of encroachers and removal of materials from the road side.
- To arrange training of highway engineers and town planners in road safety, in coordination with the PWD Training Cell.

The PWD Road Safety cell should work in close coordination with the Road Safety cell of the department of Road Safety and Highways under the Ministry of Shipping, Road Transport and Highways, Government of India. This central unit acts as a Nodal Unit in all matters relating to National Road Safety Planning. At the State level, the cell should work in coordination with the State Road Safety Council (the State level policy maker) and the State Road Safety Board (the lead state level implementer).

Other areas in which the Unit at HQ may have full or partial involvement, and/or require close coordination with other departments in order to obtain information etc., may include:

- enabling of appropriate legal, institutional and financial environment for raising road safety standards
- reporting of accidents
- provision of a road safety database
- road and road infrastructure design
- ensuring maintenance of roads for safety reasons
- enhancing the safety of vulnerable road users
- emergency medical services for road accidents
- human resources for reforming road safety
- research into road safety

Chief Engineer (Environment and Social Development) (ESDU)

The Environment and Social Development Unit (ESDU) proposed to be established in UP PWD is unique in character. The strengthened unit would adopt a “Preventive Environmental and Social Policy” rather than mitigative and corrective process. It. The UPPWD should look into cross sectoral policies: agriculture policy, land use policy, State Forestry Act etc as it affects road construction, linear development of settlement (ribbon development), other induced development activities which may deprive the communities for water, land for irrigation and healthy environment. The nature and human environmental aspects has to be combined in taking hierarchical decisions and establish synergies in relevant cross-sectoral policies.

The functional responsibilities of ESDU are as follows:

1. Ensuring compliance of projects with national policies on environment and resettlement and rehabilitation
2. Effective Management of Environmental and Social Impact Assessment Processes –
3. Implementation of Management information (MIS)
4. Preparation of Terms of Reference
 - i. Preparation of ToR for EA and SIA Processes
 - ii. Preparation of ToR for Independent Reviews
 - iii. Preparation of ToR for Supervision Consultancy
 - iv. Preparation of ToR for NGOs Implementing RAP
 - v. Preparation of ToR for Monitoring and Evaluation Consultancy
 - vi. Preparation of ToR for Technical Audit and Quality Assurance Consultancy
5. Appraising Environmental and Social Issues at the Inception Stage of Project
6. Enhancing Effectiveness of Environment and Social Screening
7. Baseline Data Collection
8. Analysis of Impacts and Mitigation Measures
9. Analysis of Alternatives
10. Community Consultations in Social Impact Assessment Processes
11. Management of RAP Implementing NGOs
12. Independent Reviews / Review of Reports and Documents

Finance Controller

Issue cash credit limits to the respective Finance Managers in the Zones. Finance Manager in the Zonal HQ will in turn issue cash credit limits to the Circles/ Divisions.

The Finance Manager will receive copies of the Expenditure Statement for all Projects being undertaken in all the Divisions. These will be used as the basis for management decisions regarding progress, payments, and other contractual issues.

Establishment related expenditure in the Divisions, Circles, and Zones including payroll for all classes of staff employed in the Zone, will be the responsibility of the Finance Manager.

The Finance Manager will also be involved in the preparation and production of the annual budget for maintenance, new works, etc.

There will be an Internal Auditor at every Zone serving under the Finance Manager. This officer will visit all Divisions throughout the year, conducting the audit by checking cash books, works registers and other records on a test-check basis. The Internal Auditor will report all serious discrepancies observed at Divisional level to the Finance Manager, who will seek rectification, clarification, and take action on the basis of the reports. The Finance Manager will report to the Finance Controller of PWD and will coordinate the working of the Section with the Statutory Auditors in their periodical audit visits.

3.5.3. Role & Functions of Chief Engineer- Zone

At the Zonal Chief Engineer level, the functional requirements in management of road network (core and non-core roads) are given below:

- Function as an “**Executive**” who will plan and direct all aspects of the Department's planning, construction and maintenance function. The majority of time will be consumed by ensuring all projects are completed on time, within budget, and according to pre-established specifications.
- Assessment of the present situation
- Refer the Annual Report, Business Plan and Corporate Plan prepared by the Policy and Planning Unit (PPU)
- Review the network master plan
- Develop an Agenda which would lead to a Mission Statement or a Strategic Framework / Strategic Goals
- List of decisions which are the driving factors
- Performance management and measurement / evaluation
- Resource Allocation
- Budget Estimates
- Planning of Investment Strategy

- Assessing internal strength and weaknesses
- Monitoring external threats and opportunities
- To take decision on up gradation and maintenance
- Devise specific maintenance strategy

3.5.4. Structure at Circle

Executive Engineer Project Management

MIS Assistant Engineer

Project Planning Assistant Engineer

RMMS/GIS Assistant Engineer

Assistant Finance Manager

Assistant Finance Manager will receive details of cash credit limits from the Finance Manager for the works to be undertaken in the Circle. It is proposed that all Deposit Credit Limit works are channelled through this officer in conjunction with the Superintending Engineer. It may be necessary to set an upper limit on the DCL which can be handled at Circle level. DCL works in excess of this figure would need to be channelled through the Zone.

3.5.5. Structure at Division

The structure at division will be divided between the Core and Non-Core road. The organisation for Core Road will be replicated for Non-Core Road.

Executive Engineer (EE) 'Core Roads'

- To be a "**Project Manager**" who will oversee and direct construction management. Responsible for allocating time between communicating directly with contractors/designers concerning project cost, staffing, and scheduling as well as working to ensure plans adhere to contract specifications.
- Also function as a "**Contract Manager**" to assist in the preparation, review, and administration of contractual proposals relating to construction projects. Preparing bids, negotiating specifications for materials or other construction services and securing all necessary approvals
- Maintain a database of the existing Core Road Network with its condition, capacities, traffic levels, origin and destination survey (OD) etc
- Decision to start survey for selected locations
- Engage external service provider for data collection
- Undertake network level analysis for preparation of long term strategic plan and policy on road maintenance management
- Prepare priority list of the Core Road Network

- Prepare list of works to be undertaken based on the analysis
- Preparation of estimates for Widening & Strengthening,
- Invite Tenders
- Maintenance of Core Road Network based on suitable RMMS program linked to HDM-4
- Address major deficiencies like crust and width requirements, drainage / cc roads requirements in abadi areas
- To look for agencies who will carry out the maintenance work
- Coordinate the road survey with bridge inventory and condition survey

Executive Engineer (EE) 'Non-Core Roads'

- Maintain a database of the existing Non-Core Road Network with its condition, capacities, traffic levels, settlement pattern and hierarchy etc
- Decision to start survey for selected locations
- Prepare priority list of the Non-Core Road Network
- Prepare list of works to be undertaken based on the analysis
- Preparation of estimates for Up gradation & Strengthening
- Maintenance of Non-Core Road Network
- Address major deficiencies like crust and width requirements, drainage etc

Divisional Accounts Officer (DAO)

The **Divisional Accounts Officer** should make a cross verification of cash inflow and cash out flow on a monthly basis to ensure that they balance. If the volume of entries per day is high this audit should be carried out more frequently and possibly on a daily basis. If the data has been entered correctly these two sets of figures, cash inflow and cash outflow, should be the same, i.e. they 'balance'. Without such verification the financial data produced cannot be relied upon for any form of decision-making. In accounting terminology this is known as a 'Trial Balance'.

Assistant Engineer 'Core Road'

- As a "**Field Superintendent**" oversee the daily construction activities at a work site, including scheduling of workers, delivery of equipment and materials, and progress of the project. Work with contractors to complete projects within the given budget and timeframe, resolve contract disputes and arrange any necessary order changes.
- **Supervise the surveys:** Inventory, Condition and Traffic
- **Checking** of survey data
- **Enter** Inventory, Condition and Traffic Data in the RMMS program linked to HDM-4
- **Analysis** of survey data
- **Compilation** of data with respect to structures

Assistant Engineer 'Non-Core Road'

- **Supervise the surveys:** Inventory, Condition and Traffic (surveys to be undertaken as per the requirement)
- **Checking** of survey data
- **Enter** Inventory, Condition and Traffic Data in the excel spreadsheet
- **Analysis** of survey data
- **Compilation** of data with respect to **structures**
- **Train** the **Gang labour** with respect to the **maintenance** of the **village roads**

4. LONGER-TERM 'MINIMUM NEEDS' STAFFING FOR PWD

4.1 PRESENT STAFFING

PWD staff comprises both technical staff and non- technical and are classified under different cadres. PWD's role as the engineering services provider of the Government, it is the technical staffs that perform the various engineering tasks assigned to the PWD. The technical staffs belong to various disciplines of Civil Engineering, Mechanical Engineering, Electrical Engineering and Architecture. However, Civil Engineers form the core of the staff strength of PWD (over 90%), and having the responsibility of fulfilling the major functions of PWD assigned to executive positions as head of the units like Divisions, Circles and Zones.

The primary responsibility today is planning, design, construction, maintenance and project management of road sector projects. The works concerning buildings and other engineering works having been reduced to a low level and involving only a small section of PWD staff and organisation. The present project, which is a part of UPSRP II, is aimed at capacity enhancement of the 'Roads Organisation' of PWD, where over 95% of the PWD staff are employed. The staffing needs assessment is focussed on the Road sector organisation of PWD which accounts for over 95% of the professionals in the Department.

4.2 CATEGORISATION OF CIVIL ENGINEERING STAFF

The categorisation of Civil Engineer cadres in PWD is based on the types of entry, minimum qualifications for entry to a cadre, and the standard career pattern available to the cadre. On the basis of the above, the engineering / technical staffs are in the following three categories:

- a. **Graduate Engineers:** Minimum qualification for entry is a Degree in Civil Engineering. The recruitments are made by the State Public Service commission. This cadre consists of AEs (class II) and Class I officers in the ranks of EEs, SEs, CEs and E-in-Cs. All entries are made in the level of AEs and the higher level positions are filled exclusively by promotions from the next lower levels
- b. **Diploma Engineers:** Minimum qualification is a Diploma in Civil Engineering. JE (civil) and JE (Technical) belong to this category. The recruitments are made by the Staff Selection Commission.
- c. **Other Technical Staff:** Draughtsmen & Tracers belong to this category. They are generally ITI qualified in the respective discipline. The number of staff in this category is smaller and showing a dwindling trend.

It is however to be noted that there would be a number of graduate (and a few post-graduate) degree holders in the JE cadre, because, either they decided to join the cadre for which the minimum entry requirement is a Diploma or have acquired a degree subsequent to joining the PWD. Similarly there would be some Diploma Engineers in the AE cadre who have been promoted from amongst JE's.

In this study we shall focus on Civil Engineers, JE's and upwards at (a) and (b) above. Another report will deal with career development opportunities of a graduate engineer joining as AE to move up in the hierarchy to EE and above and a diploma engineer joining as JE moving up to AE onwards. Within this set of Civil Engineers in the PWD, the first category- the Graduate Engineers have a bigger contribution to working of PWD and we shall devote more attention to that category.

Among the Civil engineers there is no concept of specialisation. All are 'generalists' and are therefore posted to any of the functions /positions in PWD without any limitations and can be inter changed easily. This means that any of the EEs can be posted to any of the 366 sanctioned EE posts without any impunity.

There is no scheme for lateral induction to a position higher than AE (unlike in some other State where direct class I entry is possible). There is no induction of specialists like transport planners, transport economists, environmental engineers and social scientists. Such specialists are not available in the department and their likely role in a modern day PWD

4.3 STAFFING NEEDS: SANCTIONED POSTS

Sanctions for positions are accorded based on the justification of workload. Like any other Government Department, the process of sanction of additional posts is a long one. Most often, bans are operative on creation of new posts in pursuance with various cost cutting measures. Sanctions for new positions are issued after a long process of paperwork and justifications. Generally, whenever new or additional works are to be taken up, the work is assigned to an officer as an additional charge/task, in addition to his own. A single officer holding the charge of 3-4 posts/positions for long periods is not rare.

The situation is aggravated on account of the general impression that the Government departments are overstaffed. The situation has been created on account of unplanned and unregulated recruitments effected by successive Governments as a policy of the State's responsibility of generating employment. However, the overstaffing is much more common at lower levels than at the Officers level. In the case of PWD, it is widely felt that there is an excess of clerical and class IV staff and PWD may be better off by reducing their numbers. At higher levels, however, the situation is reversed. Creation and filling of higher level positions are subject to many stringent conditions.

In the absence of a pre-agreed manpower plan based on advance planning for manpower, decisions are made on case to case basis. The process itself is so daunting that the Departments generally do not persist with the cases and learn to live with the shortages as can be seen from the manpower sanction and the existing manpower in the PWD.

The effects of the shortages are highly detrimental to the functioning of PWD. The department and its various units struggle to manage the most pressing ('urgent') works, often in a fire fighting mode. In the process, some of the 'important' functions of planning of works, prioritisation based on economic criteria, management of assets, improvement of work processes for higher efficiencies etc. are not attended to as it is difficult to have dedicated people assigned for these tasks; and all the senior position holders have little time to devote to these non-urgent but vital activities. In the case of PWD, which is required to implement works of over Rs. 7000 crores of State Budget, the additional Rs. 1600 Crores of Central Govt funded PMGSY works, World Bank Project implementation and agency works for NHA maintenance etc. without any additional manpower is a daunting task.

4.4 PRESENT STAFF POSITION (AS IN SEPTEMBER 2007)

The present PWD field level organisation consists of Zones, Circles and Divisions as given below:

Table 4.1 : UP PWD Zones, Circles and Divisions

Details	Zones	Circles		Total Circles	Divisions		Total Divisions
		Working	Non-working		Working	Non-working	
Civil	12	29	3	32	160	18	178
National Highways	1	3	1	4	15	2	17
World Bank	1	7	2	10	16	2	18
PMGSY	3	8	1	9	55	2	57
Electrical and Mechanical	1	4	0	4	21	1	22
Maintenance (Building)	1	1	0	0	3	0	3
DASP/SODIC	1	1	0	1	3	0	3
Total		53	7	60	273	25	298

The PWD has a geographical structure to cater for all the regions/locations in the State. The 12 civil Zones and their associated Circles and Divisions are of the nature of permanent establishments to be tasked with engineering related works in the respective regions. In addition to the basic structure, Divisions, Circles and Zones are established from time to time to implement specific projects such as World Bank funded projects or PMGSY works.

The following special units are presently in operation and are likely to exist only till the works relating to them completed.

- a. The National Highways Zone, Circles and Divisions are engaged in agency work for NHAI for maintenance of the NH sections running through the State. This work is strictly not of PWD as the ownership of the roads is with NHAI and the UP PWD provides man power and establishment out of its resources though compensated in monetary terms by NHAI.
- b. The World Bank Zone, Circle and Divisions are likely to continue so long as the UPSRP is continued.
- c. The large PMGSY organisation which has been recently created within PWD (3 Chief Engineers, 9 Circles and 57 Divisions) to take up the centrally funded PMGSY works utilises 25-30% of PWD's manpower and establishment resources. These units have been created in PWD by taking out manpower from within the PWD organisation and reassigning them as PMGSY units. The Divisions, Circles as well as the manpower available for the original PWD works, which also has increased three-fold, is thus severely reduced.
- d. The DASP/SODIC units will no longer be needed.

Table 4.2 : UP PWD Staff Sanctions and in Position (Sep 2007)

Designation / Position	(Total Number of Officers)			
	Sanctioned Post		In-position	
	General	Deputation	General	Deputation
Engineer-in-Chief (ENC)	3	Nil	2	Nil
Chief Engineer (CE) Civil – Level I	3	Nil	2	Nil
Chief Engineer (CE) Civil – Level II	29	7 (out of 29)	18	4 (out of 18)
Chief Engineer (CE) Electrical/Mechanical	1	Nil	-	Nil
Superintending Engineer (SE) Civil	85	14 (out of 85)	73	12 (out of 73)
Superintending Engineer (SE) Electrical/Mechanical	4	Nil	4	Nil
Executive Engineer (EE) Civil	366	40 (out of 366)	349	18 (out of 349)
Executive Engineer (EE) Electrical/Mechanical	28	1 (out of 28)	27	Nil
Assistant Engineer (AE) Civil	1225	Nil	676	14 (out of 676)
Assistant Engineer (AE) Electrical/Mechanical	124	Nil	113	16 (out of 113)
Junior Engineer (JE) Civil	4176	Nil	3087	Nil
Junior Engineer (JE) Electrical/Mechanical	322+385	Nil	267+289	Nil
Junior Engineer (JE) T	467	Nil	325	Nil
Draftsman	319	Nil	344	Nil
Tracer	208	Nil	61	Nil

Source: Establishment 'A' (Staff Officer), Establishment A ('AE' Section), Senior Staff Officer Establishment E-2 and PA Ministerial

Table 4.3 : UP PWD Staff Strength: Electrical & Mechanical: (Sep 2007)

Designation / Position	(Total Number of officers)			
	Sanctioned Post		In-position	
	Total	Deputation	Total	Deputation
Chief Engineer (CE) E/M	1	Nil	-	Nil
Superintending Engineer (SE) E/M	4	Nil	4	Nil
Executive Engineer (EE) E/M	28	1 (out of 28)	27	Nil
Assistant Engineer (AE) E/M	124	Nil	113	16 (out of 113)
Junior Engineer (JE) E/M	322+385	Nil	267+289	Nil

4.5 STAFFING IN A TYPICAL CIRCLE AND DIVISION OFFICES

The existing staffing norm for Divisions and Circles in PWD is given below.

Table 4.4 : Circle Office

Category	Number of Staff
Superintending Engineer (SE)	1
Staff Officer (SO) of EE level	1
Administrative Officer (AO)	1
Junior Engineer (Technical)	2
Draftsman	1
Clerks	14
Class IV staff: Peon	2
Class IV staff: Chowkidar	1
Class IV staff: Waterman	1
Class IV staff: Daftari	1
Class IV staff: Sweeper	1

Table 4.5 : Division Office

Category	Number of Staff
Executive Engineer (EE)	1
Divisional Accounts Officer (DAO)	1
Assistant Engineer (AE)	4
Junior Engineer (JE)	12
Junior Engineer (Technical)	1
Draftsman	2
Clerks	14
Class IV staff: Peon	3
Class IV staff: Chowkidar	1
Class IV staff: Waterman	1
Class IV staff: Daftari	1

The above shows that the proportion of technical staff is relatively higher in the Division office, as it is mainly involved in work supervision and execution. On the other hand the proportion of ministerial staff is high at Circle level, because of higher paper/documentation work.

The present position with respect to field units is that there is an acute shortage of AE's in the Divisions, where their presence is crucial for proper planning, execution and physical supervision of works. As against a requirement of 4 AE's in a Division, most Divisions are left with only 2 AE's (only 1 in some) on account of acute shortage in the AE cadre. This has happened on account of progressive retirements and no fresh recruitments over last 10- 15 years. Promotions of JE's to the AE cadre has also not been effected to the extend they are required on account of court cases.

The shortage of AE's in the Divisions, where they have the most important role of quality assurance and project supervision, severely restricts the capacity of Divisions to execute works. At the same time, the demands on a Division for a bigger work volume in money terms (from the norm of Rs 12 crores per Division per annum to about Rs 30 crores) have naturally led to the following situations:

- Neglect of the quality monitoring, supervision, road condition survey & data collection, road safety, network management, environment management functions.
- Selective implementation of 'more pressing' and "more lucrative" works. The maintenance works which are generally of lower value, but need more time are given a lower priority. This is brought out in another Report on 'Maintenance of Roads' (Report no.)

"Under the present set up, the EE of the district is responsible for all kinds of activities related to planning, construction, maintenance and public relations for works connected with government buildings and roads under his jurisdiction. Besides this, the EE is to discharge administrative responsibilities. Because of multifarious activities under the charge of EE, the road maintenance activities mostly remain neglected. The EE can hardly spare time for planning and programming of maintenance works of the roads under his jurisdiction. With a strategic aim to contribute sustainable development by maintaining, operating and improving the core network in support of Government policies, restructuring of organizational set up of PWD is suggested. Under the restructured organizational set up, road activities at district level should be entrusted to a separate unit, which should be responsible exclusively for the operation and maintenance of existing core network including supervision of maintenance activities of all kinds. This unit should liaise with road users and development councils.

In UP PWD the work load norms of a working division is based on the yearly average budget allocation to the division. According to current norms the minimum work load of a normal PWD division should be around Rs.12.00 crores. Fixing of norms based on budget allocation has its own drawbacks. It does not take into consideration the amount of activities and efforts needed to accomplish the job assigned. It will be more appropriate if the norm of a core road division is based on physical assets i.e. length of roads to be maintained by it. It is suggested that norms should be set for performance monitoring role of PWD staff responsible for maintenance at all levels. Performance monitoring norms for a circle, division, sub division and section are suggested as under;

For administrative convenience there should be one working division for core road activities in each and every district of the state."

4.6 COMPUTATION OF MANPOWER NEEDS OF RESTRUCTURED PWD ORGANISATION

The proposed restructured PWD organisation at the PWD HQ, the Zones, Circles and Divisions are worked out in the Report No. 11. The representative organisation structures of the PWD Headquarters, PWD Zone, Circle and Division are given at Figures 4.1 to 4.4 below.

Figure 4.1 : Possible Organisation Structure of PWD HQ-Option 2

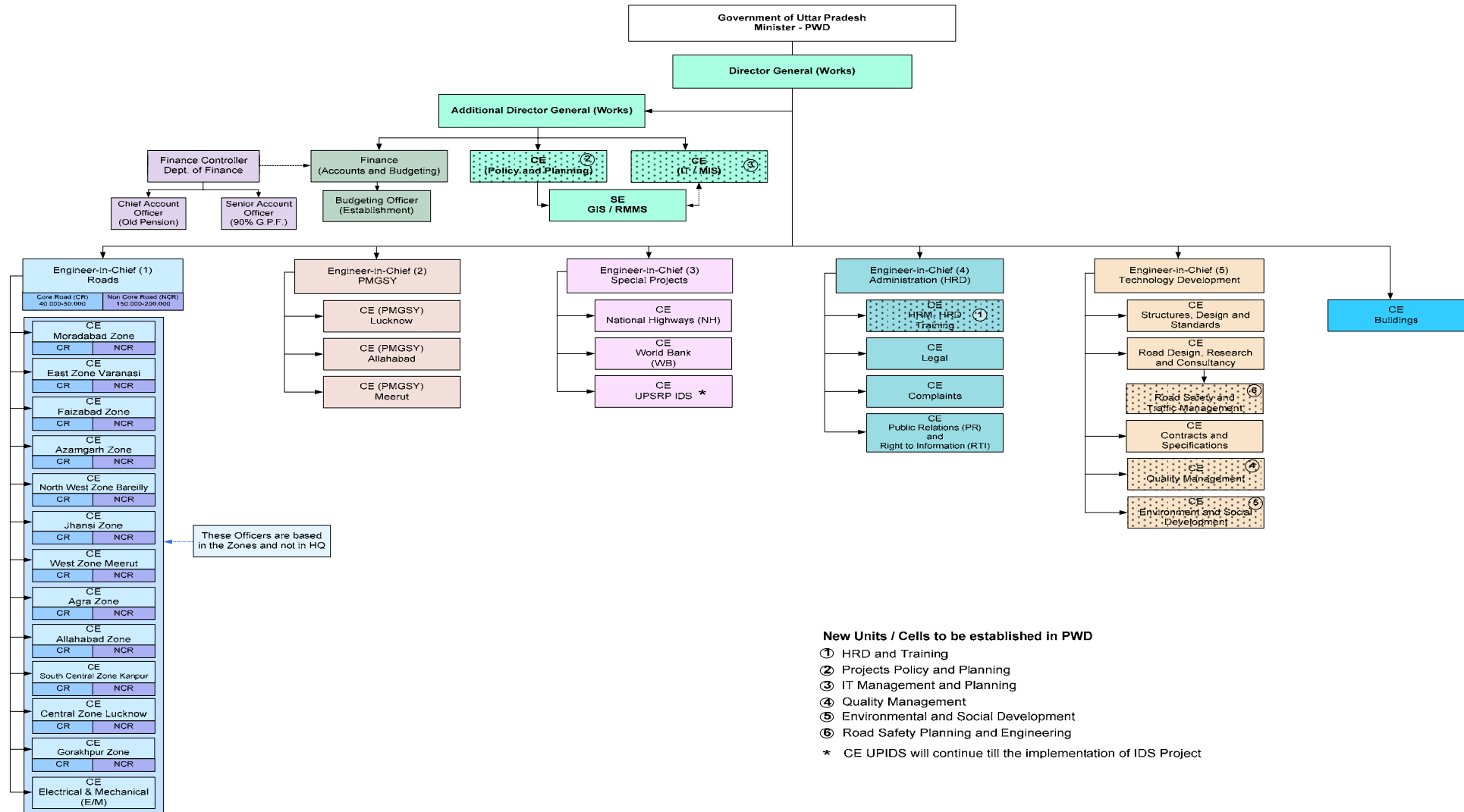


Figure 4.2 : Possible Organisation Structure of PWD Zone - Option 1

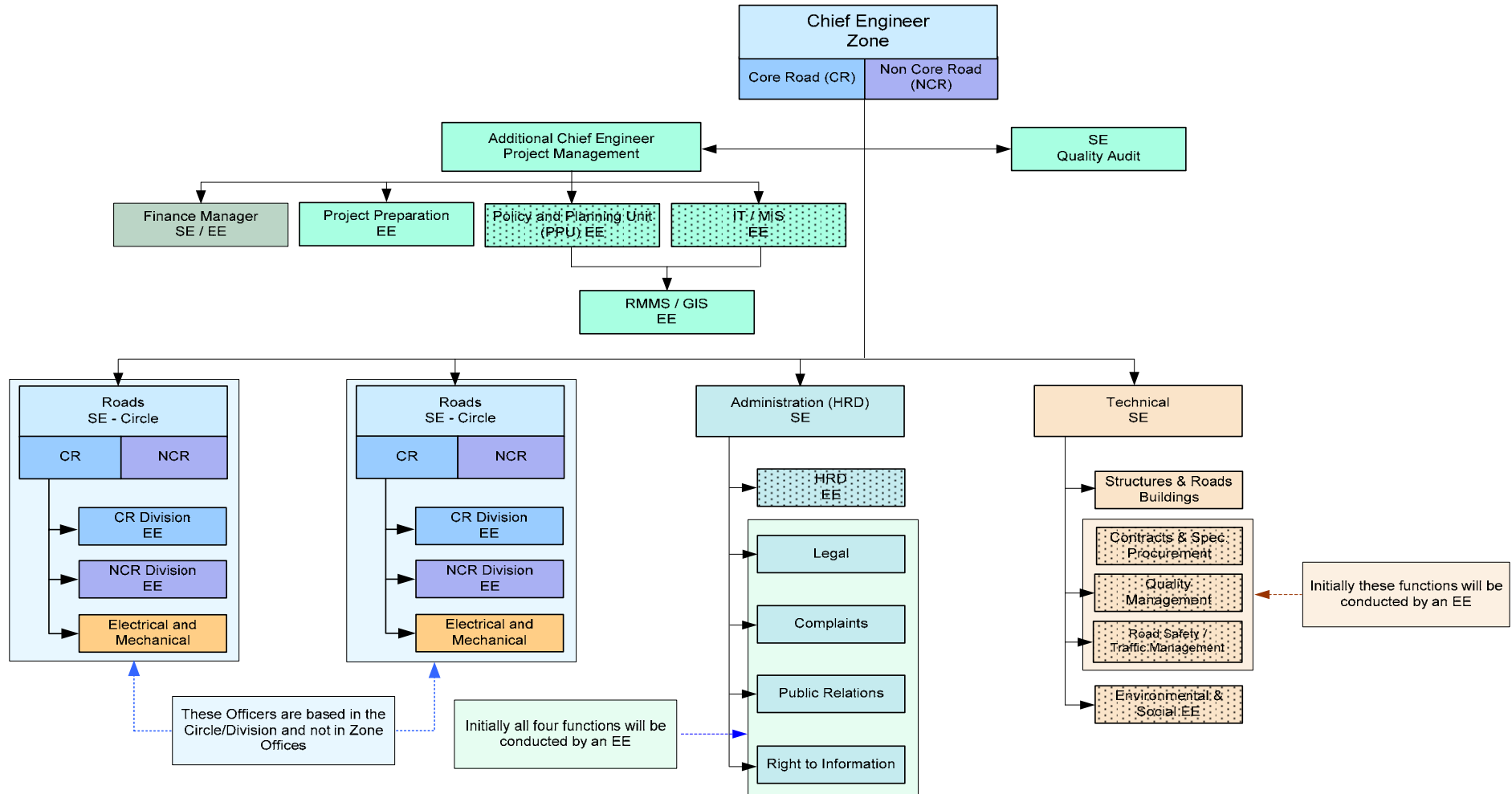


Figure 4.3 : Possible Organisation Structure of PWD Circle - Option 1

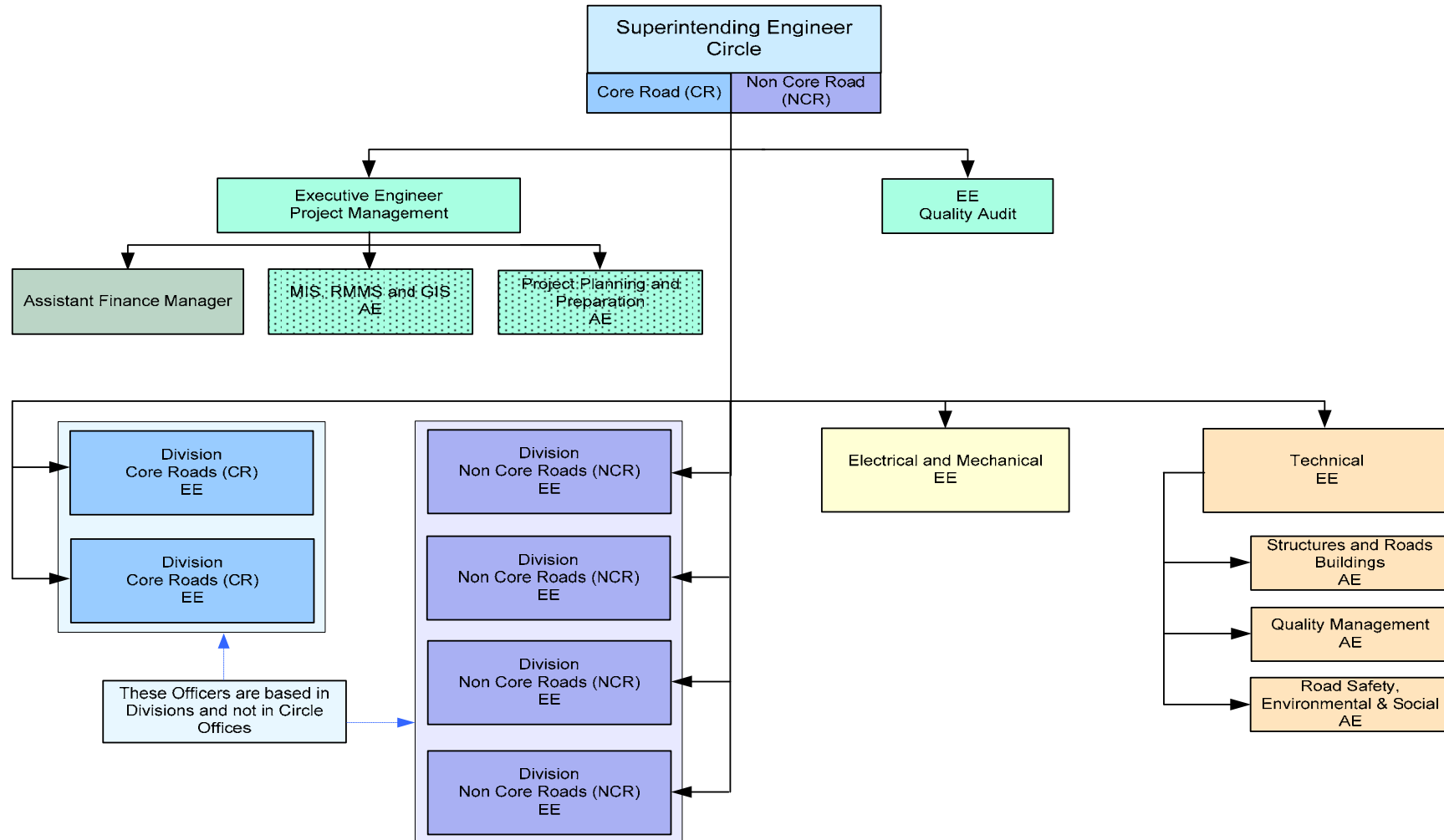
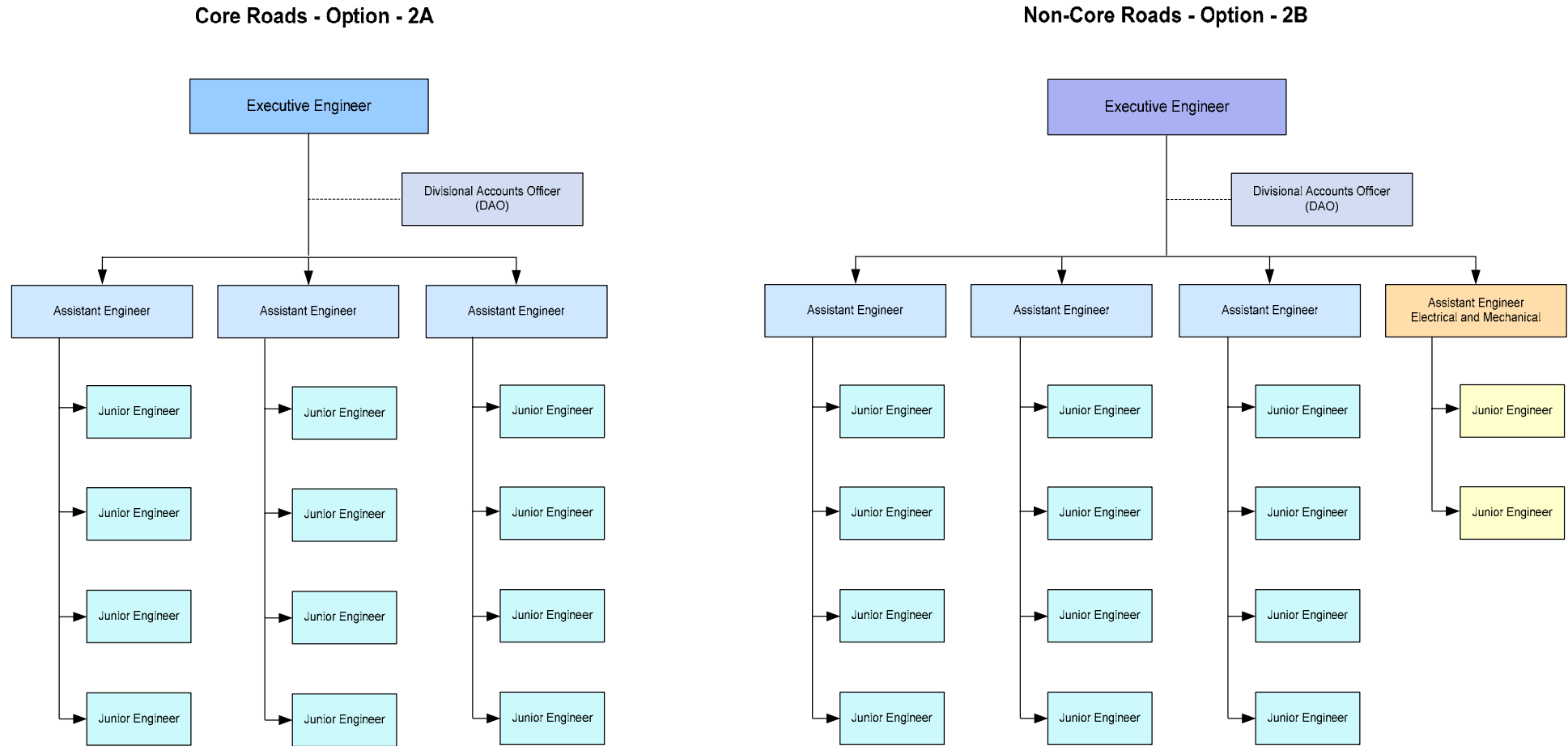


Figure 4.4 : Possible Organisation Structure of PWD in Divisions - Core Roads and Non-Core Roads - Option 2A and 2B



The minimum level manpower needs at various levels/ cadres in the Restructured PWD have been computed based on representative structures of PWD HQ, Zones, Circles and Divisions suggested in Report no.11. The manpower needs will be subject to fine tuning based on the decisions of PWD/ Govt. of UP in respect of the final organisation structure accepted for implementation.

In the original IDS recommendations, there was a suggestion that Electrical & Mechanical wing be gradually phased out and the machineries available with the PWD be disposed off. However, in subsequent years, PWD, instead of reducing the machineries, have procured more machinery for timely & qualitative completion of works. Under the changed circumstances, it is felt that the Electrical & Mechanical wing will continue to function in the present manner in the medium term. It is ascertained that the existing E & M manpower would be sufficient to manage with efficiency enhancements. The strength of E & M manpower is maintained at existing level in the computations that follow.

Table 4.6 : Computation of Manpower Needs - Restructured, PWD

Civil Engineers

Post	Required	Existing Sanction	Surplus +/- Deficit -	Present Sept 07	Remarks
DG (Works)	1	-	(-) 1	-	
ADG (Works)	1	-	(-) 1	-	
E-in-C	5	3	(-) 2	-	
CE (Civil)	36 (including 7 deputation)	32 (including 7 deputation)	(-) 4	-	
Total Civil ENGINEERS (CE & above)	43	35	(-) 8	22	
CE (E & M)	1	1	-	-	As existing
SE (Civil)					
1. HQ SE positions (Table 4.7)	27	-	-	-	
Zonal HQ : 15 x 3 (PWD 12 + PMGSY 3)	45	-	-	-	
2. PWD Circles : 29 x 1	29	-	-	-	
3. WB Circles : Circles : 9 (7 + 2)	9	-	-	-	
4. PMGSY Circles : 9 (8 + 1)	9	-	-	-	
5. NH Circles : 4	4	-	-	-	
6. Building Circles	1	-	-	-	
Total Cadre Posts	124	-	-	-	
7. Deputations (as per existing sanction)	14	-	-	-	
Total Posts	138	85 (including 14 deputation)	(-) 53	73	
EE (Civil)					
1. PWD Divisions (2 Core road divisions & 4 non core road divisions) per circles 2 (Core Roads) x 29 circles = 58 4 (Non-Core Roads) x 29 circles = 116	174	-	-	-	-

Post	Required	Existing Sanction	Surplus +/- Deficit -	Present Sept 07	Remarks
2. PMGSY Divisions + 2	55	57	-	-	-
3. WB Divisions + 2	16	18	-	-	-
4. NH Divisions	15 + 2	17	-	-	-
5. Building Division		3	-	-	-
6. HQ Positions ((Table 4.7)		47	-	-	-
7. Zonal Head Quarters (12 PWD Zone + 3 PMGSY Zone) @ 8 per Zonal HQ	120	-	-	-	-
8. Circle HQ (29 PWD Circle + 8 PMGSY + 4 NH + 7 WB) 48 x 1 EE per Circle HQ	48	-	-	-	-
9. Deputation Posts (as per current sanction)	40	-	-	-	-
Total	524	366	(-) 158	349	
AE (Civil)					
1. In Divisions 174+57+18+7 = 266 @ 4 AEs per Division : 266 x 4	1064	-	-	-	
+ 3 Building Division	12	-	-	-	
HQ Positions ((Table 4.7)	57	-	-	-	
Zonal HQ - 15 x (2 AEs per EE) 15 x 7 x 2	210	-	-	-	
Circle HQ - (4 per circle HQ) 48 circles x 4	288	-	-	-	
Building Division: 3 x 4	12	-	-	-	
Total	1547	1225	(-) 322	676	The shortage in the cadre is critical.

Post	Required	Existing Sanction	Surplus +/- Deficit -	Present Sept 07	Remarks
JE (Civil)					
Divisions 266 x 16 @ 4 JEs per AE	4256	-	-	-	
Building Division	48	-	-	-	
HQ & Miscellaneous (Table 4.7)	50	-	-	-	
Total	4354	4176	(-) 178	3087	
JE Civil (Technical)					
Divisions 266 x 1 Provincial Division @ 1 JE (T)	266				
Circles 48 x 2	69				
Zone Circles 15 x 2 and Miscellaneous	96	-	-	-	
HQ (Table 4.7) 30	30				
Total	491	467	(-) 24	325	-

Table 4.7 : Manpower Needs, SE's and below, in Head Quarter Units

Civil Engineers

Unit	SE	EE	AE	JE (Civil)	JE (T)
DG Office	1	-	1	-	-
ADG	-	-	-	-	-
E-in-Cs (S)	-	6	6	-	-
CE (Policy & Planning)	3	5	9	-	-
CE (IT & MIS)	1	4	4	-	-
CE (Monitoring)	2 including 1 (Ambedkar Cell)	4	6	-	-
CE (Structures, Buildings Designs & Standards)	3	2	3	-	-
CE (Roads Design) Research & Consultancy (including Road Safety)	1	2	4	-	-
CE (NH)	1	2	2	-	-
CE (WB)	2	2	4	-	-
CE (IDS)	1	2	4	-	-
CE (HR, Training & Legal)	7	7	7	-	-
CE (Complaints & PR)	1	3	1	-	-

Unit	SE	EE	AE	JE (Civil)	JE (T)
CE (Quality Audit)	-	2	2	-	-
CE (Quality Management & Contract)	2	2	2	-	-
Road Safety & Traffic Management Cell (under CE Structures)	1	1	1	-	-
CE (Environment & Social)	1	3	6	-	-
Total	27	47	62	50 Distribution as per requirements	30 Distribution as per requirements
ELECTRICAL & MAINTENANCE					
CE (E & M)	-	1	2	2	1

4.7 MINIMUM NEEDS CADRE STRENGTH OF UP PWD

4.7.1. Training, Leave and Deputation Reserve

The above tables have been computed for the no. of persons required to be in position in identified assignments at all times. However, it is certain that not all personnel are present on duty in the respective posts due to various reasons as Leave, sickness, training and being away on deputations. The cadre strength (sanctioned strength) of PWD for minimum needs staffing would need to take into account 'RESERVES' for the above needs.)

As per GOI norms, the cadre strength is calculated by adding the following reserve to the sanctioned positions:

- a. Training Reserve @ 3.5 % of total posts
- b. Leave Reserve @ 16.5 % of total posts
- c. Deputation Reserve: calculated based on the actual needs.

For UPPWD the Training and leave reserve is taken as **20 % of total posts**. The reserve for deputation posts are taken as per existing sanction (CE - 7, SE - 14 & EE – 40).

4.7.2. Computation of Minimum Needs cadre strength for UP PWD

In the following tables, the minimum needs staffing requirements are calculated including training & leave reserve requirements. This has been for the three cadres of Class I (EE's and above), Class II (AE's) and Class III (JE- Civil and JE-T)

Table 4.8 : Minimum Needs cadre strength for UP PWD: Civil Engineers

Cadre	Total Posts	Training / Leave Reserve 20 % of total posts	Total Requirement	Sanction Existing	Surplus / Deficit
CE & Above	43	-	-	35	-
SE	138	-	-	85	-
EE	524	-	-	366	-
Total Class I	705	141	845	486	(-) 359
AE	1547	310	1857	1225	(-) 632
JE (Civil)	4354	871	5225	4176	(-) 1049
JE (Technical)	491	98	589	467	(-) 122

4.7.3. Computation of Longer Term (2012) Minimum Needs cadre strength for UP PWD

One of the major additions to the PWD functions during the next 5-10 years time span would be the responsibility of maintaining additional village roads on account of transfer of Orphan Roads / Roads constructed by PMGSY and other agencies. It is estimated that by the end of next 5 years an additional 50,000 Km of non-core roads will get added to PWD, which would necessitate additional Divisions. It is estimated that at least 2 non-core roads Divisions will be added to each Circle. Thus there would be additional 58 Divisions for non-core roads by 2012.

The minimum staffing need for additional 58 Divisions:

EE	:	58
AE 58 x 4	:	232
@ 4 AE per Division		
JE (Civil) 58 x 4 x 4	:	828
@ 4 JE (Civil) per AE		
JE (T) @ 1 per Division	:	58

The Longer-Term (2012) Minimum Needs Cadre Strength for UP PWD with 58 Additional Non-Core Divisions is computed in Table 4.9 below:

**Table 4.9 : Longer-Term (2012) Minimum Needs Cadre Strength for UP PWD
(with additional 58 Non-Core Divisions)**

Cadre	Post in 2007	Additional in 2012	Total in 2012	Reserve 20 %	Total Requirement	Sanction Existing	Surplus / Deficit
CE & above	43	-	43	-	35	-	-
SE	138	-	138	-	85	-	-
EE	524	58	582	-	366	-	-
Total Class I	705	58	763	153	916	486	(-) 430
AE	1547	232	1779	356	2135	1225	(-) 910
JE (Civil)	4354	928	5282	1056	6338	4176	(-) 2162
JE (T)	491	58	549	110	659	467	(-) 192
Total Class I	705	58	763	153	916	-	-

5. LONGER TERMS STAFFING STRATEGY FOR PWD

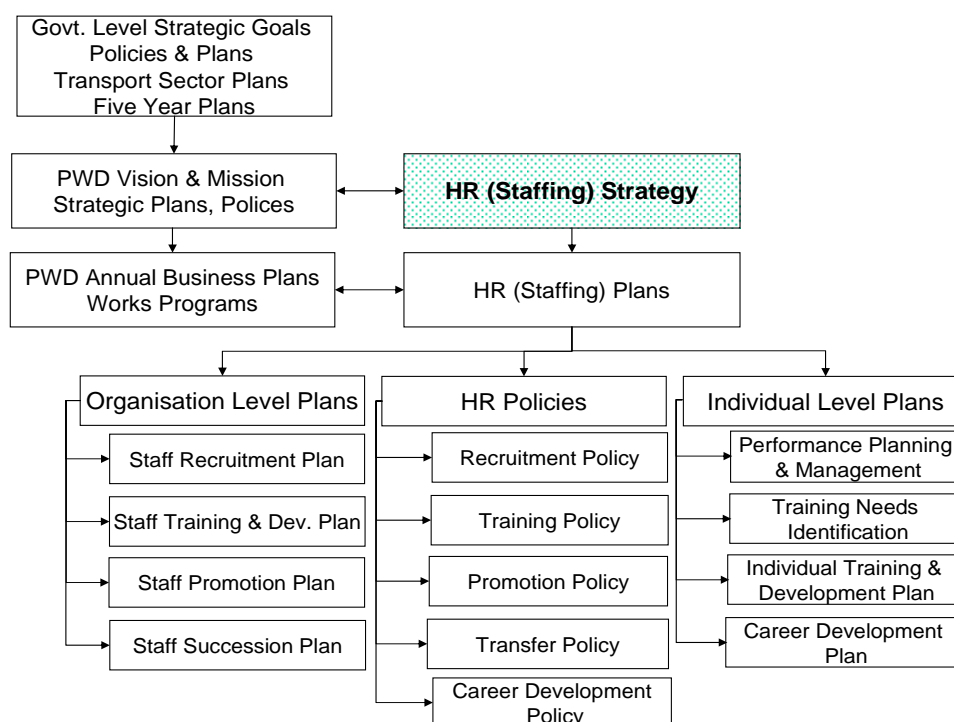
For PWD to function effectively to fulfil the rapidly escalating societal expectations placed on it, it is essential that the PWD organisation have the right staffing at all levels and right people with necessary competencies and commitment are in right place at the right time. This calls for an appropriate staffing strategy and the necessary authorisations from the Government to implement the strategy in a consistent manner. Being a Government Department, PWD will continue to operate within the overall policies of the State Government and will need to develop a pragmatic strategy for speedy decisions from the Government for the organisational and HR change initiatives included in the IDS Action Plan.

The end result of a successful staffing strategy for PWD is to have the right people, in right numbers, with right skills, in right places, at the right time. The staffing activities have long lead times and lengthy procedures to be gone through. For example if PWD needs to recruit a batch of AE's in 2009 the lead time may be as much as two years with actions initiated in 2007 to obtain approvals for the number to be recruited, requisitioning the State Public Service Commission (PSC) to include the recruitment in their plan, the PSC's procedures for notifications, examinations and interviews, final selections, appointments; and on joining, an induction training program. Achievement of this objective is possible by first developing an appropriate HR (staffing) strategy for the short and medium term, get them pre-agreed by the Government; and based on the strategy, develop annual staffing plans and implement them consistently. PWD will need a proactive approach to plan and implement the staffing strategy. PWD, which accounts for almost one fourth of the budget of the State, can proceed in the reforms path by leveraging the tremendous strength of its size, reach and resources at its command. The need for advance planning and planned implementation by the dedicated HRD & Training Cell cannot be overemphasised.

5.1 STAFFING STRATEGY IN RELATION TO PWD BUSINESS STRATEGY

The staffing strategy, its relation with the PWD business strategy and the staffing plans that flows from the staffing strategy are shown in a relationship diagram in Fig. 5.1 below. This report will list out a broad range of Staffing Strategies for the PWD to meet the longer term staffing needs as identified in the previous section. Subsequent Reports (Reports 43 and 47) will deal with PWD specific workforce plans.

Figure 5.1 : Staffing Strategy for UP PWD



5.2 STAFFING STRATEGY FOR PWD

1. Large scale shortage in the AE cadre to the extent of 45% of the existing sanctioned cadre strength. Only 676 AE's were on rolls (as September 2007) against the sanctioned strength of 1225. Effectively the shortage is 52%, as 42 of the AE's should have already been promoted as EE if timely promotions in all higher cadres were made.
2. The shortage in the JE cadre is 26%. This needs to be corrected for efficient field level working.
3. Shortages in the cadres of EE, SE, CE and E-in-C is however not a matter of concern as they need be filled through promotions. What is of concern is that the important senior level positions are allowed to remain vacant for long periods of time in spite of the fact that qualified staff at the next lower levels have been kept waiting for the same, having already waited too long in the queue. Many such staff members would even reach superannuation waiting for promotion, but not effected even when vacancies are there. This instance is an indicator of failure of the HR function in the organisation. Timely promotions are essential from organisational point, for having dedicated persons for performance of key tasks; and also for individuals who would have otherwise been promoted earlier.
4. Taking into account the estimation of minimum needs staffing for the reorganised PWD the gaps which need to be filled, is huge, as given at Table 4.8. In addition to these, staffing will be needed to address the existing shortages and the attritions expected. This will be discussed at another report (Report no. 43)

5. The average age of the PWD technical staff was estimated to be 47 years (2001 IDS Report). This is likely to have gone up by at least 2 years by now. This is a severe strain on field level working. Though this cannot be corrected quickly, the longer term staffing strategy would address to progressively reduce the average age.
6. The Career progression of PWD officers being very slow, the selected few who reach the top level positions of CE and E-in-C have generally very short tenures.
7. The average age of PWD staff suggests that in the next five years, about 25% of the technical staff would retire from service. This would deplete the experienced resources.
8. During the last 5 years the work load on PWD has increased by at least 3 times and this trend is likely to continue.
9. Since 1992 regular recruitments to the primary graduate engineers cadre has been stopped except under special category recruitment for SC/ST/OBC. The resulting backlog needs to be filled in a planned manner rather than in an ad hoc manner as per a thought out recruitment plan that
10. There is large scale discontinuity in the leadership pipeline on account of irregular recruitments. The stoppage of recruitments over the last 16 years would mean that the impact of this discontinuity would be felt acutely in next 10-15 years when there would be a severe crunch of mid level officers. The workforce planning exercise (to be carried out as per Report no. 43) would include a study of this effect.
11. PWD has been so far, a purely generalist service and any officer can be posted to any assignment. There are no specialists like transport planners, transport economists, environment planners, social specialists, HR specialists, training specialists, IT specialists etc. in the PWD cadres. Specialists are essential for the updated PWD mandate and the revised organisation structure in which dedicated Cells for specialist functions are included. The establishment of six cells for HRD and Training, Policy & Planning, Quality Management, Environment and Social development, Safety planning & Engineering and IT & MIS is already in progress.

5.3 STAFF RESOURCES PLANS

The next report (Report No. 27) will include recommendations on long term staff resource plans for the PWD.

Subsequent Report (Report No. 43) will deal with a PWD specific Human Resource Planning methodology.

5.4 DISCUSSION IN THE FOCUS GROUP

The Report, along with Report No. 27, was discussed in the meeting of the Focus Group 'E' on HR and Training on 22 November 2007. The meeting also included the newly appointed EE in the HRD Cell (Mr. Sumesh Kumar Sinha) and the CE (HQ II) (Mr. Shailendra Kumar) under whose charge the HRD and Training Cell is formed.

The two reports were taken up together as both of them pertain to 'staffing needs' of PWD and the HR Strategy and HR Planning process required to be established in the PWD. The Report No. 27, additionally takes into account the developments / progress / guidelines that have been made by the Civil Service Reform (CSR) initiatives.

Suggestions offered by the Focus Group Members have been incorporated in the Final Report.

5.5 ACTION PLAN

An action plan for implementation of this report and the Report No. 27 is included in the Report No. 27 (Final).

6. PRESENTATION TO PROJECT STEERING COMMITTEE

A presentation (combined for Report Nos. 15 and 27) is included in the Report No. 27 (Final).