Detailed Architecture

MeghEA: Strategic Pillar - Environment

Government of Meghalaya
Planning Department

January 2021

KPMG.com/in

DOCUMENT Control

Revision History

Version	Author	Date	Revision Remark
0.1	Titash, Vishal, Ramandeep	17-04-2020	First version submitted for review
0.2	Titash, Vishal, Ramandeep	20-04-2020	Review comments incorporated
1.0	Titash, Vishal, Ramandeep	25-04-2020	Review comments incorporated
1.1	Ramandeep	26-05-2020	Review comments incorporated
2.0	Ramandeep	29-05-2020	Review comments incorporated
2.1	Ramandeep	31-07-2020	Structural changes incorporated
3.0	KPMG Team	15-01-2021	Review comments incorporated

Review History

Version	Reviewer	Date Reviewed	Comments
0.1	Aurobind, Priyanka	20-04-2020	Review comments provided
0.2	Prasad	22-04-2020	Review comments provided
1.0	Dr. Pallab Saha	26-04-2020	Review comments provided
1.1	Titash Maitra	28-05-2020	Review comments provided
2.0	Forest & Environment Department	06-10-2020	Clarification requested
2.0	NIC Meghalaya	20-12-2020	Review comments provided

Approval Note

SL No.	Name	Date Approved	Comments
1			

Release Note

SL No.	Released To	Release Date	Comments

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1. Introduction

Government of Meghalaya has prudently adopted Sustainable Development Goal 2030 as the guided baseline for MeghEA framework and embarked on efficient and effective governance by establishing of four strategic pillars (Human development, Primary Sector, Infrastructure and Entrepreneurship) and two cross-cutting pillars (Environment and Governance).

Meghalaya has a fragile ecosystem[1]. Government of Meghalaya appreciates the need of Environment protection in order to have a Sustainable future. As a part of State Action Plan on Climate Change for Meghalaya, the Government has identified 150 climate adaptation actions across six sectors out of which, 76 actions have been prioritized.

While other north-eastern states like Nagaland, Sikkim, Arunachal Pradesh and other states like Himachal Pradesh and Goa have a negative emission intensity per capita income, Meghalaya has a positive CO2 emission intensity[2]. Government of Meghalaya is fully committed to ensure the sustainability of various natural resources and aware of the need to tackle the climate change. Government of Meghalaya believes in a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The pillar maintains a fine balance between the much-needed economic growth required by the state (which could be easily attained by extraction of natural resources) versus a responsible approach to ensure a continued availability of such resources. A strong environmental governance leads to development in order to promote a balanced integration of the economic, social and environmental dimensions of sustainable development.

Revenue Leakage in Departments under Environment Pillar

Forest & Environment Department

As per the report of CAG of India submitted in March 2016, test check of the records of 17 units relating to the F&E Department during 2015-16 revealed that there were several anomalies or irregularities:

- Under-assessment of tax
- Failure in license renewal/permit issuance and other irregularities

The F&E Department has faced issues in collecting revenue in revised rates, this is perhaps because of lack of availability of technology platform and collaboration among units, a loss of Rs. 13 Crore alone was reported by CAG in 2015-16

Other key revenue loss issues reported were:

- Cement companies concealed utilisation of 4.22 lakh MT of limestone resulting in evasion of royalty of Rs. 2.98 crore[3].

[1] Meghalaya State Climate Change Action Plan
[2] The Climate Group's report on Driving Climate Action: State Leadership in India dated May 2019, www.theclimategroup.org/
3. Report of the Comptroller and Auditor General of India for the year ending 31 March 2016

- There was loss of revenue amounting to Rs. 0.33 crore due to short realisation of royalty on minor minerals[3].
- There was under-reporting of 1.85 lakh MT of limestone by the forest check gate resulting in short realisation of revenue of Rs. 1.29 crore[3].
- Failure of the DFO to contain illegal activities in the reserve forests resulted in illegal felling and removal of 408.31 cu. m. of timber amounting to Rs. 0.22 crore[3].
- As per the report of CAG of India submitted in March 2017, The Divisional Forest Officers (DFOs) failed to detect under-reporting of export of 2.02 lakh metric tonnes of limestone by the forest check-gates under the control of the DFO, Khasi Hills and 1.05 lakh cubic meter of stone/boulders by forest check gate resulted in loss of revenue amounting to Rs. 6.72 crore.
- Further, The DFOs failed to monitor the utilization of minerals by three user departments, which resulted in short realization of revenue amounting to Rs. 2.52 crore.
- The DFO failed to realise minor mineral reclamation fund amounting to Rs. 36.12 crore from cement companies on utilization of limestone extracted from non-leased areas.

Mining & Geology Department

Coal and limestone are the primary minerals in the State. In respect of limestone mining, the function of the Mining Department includes granting the leases for mining, enforcing the provisions for scientific mining practices, collection of royalty and mineral cess.

As per the report of CAG of India submitted in March 2017, below were several anomalies or irregularities:

- The coal mining in the State was illegal during the audit coverage period 2013-14 to 2017-18 though the Department was collecting royalty and Meghalaya Environment Protection and Restoration Fund (MEPRF) on illegally extracted coal.
- Department failed to take action against the cement companies for non-payment of royalty and cess on limestone consumed. The arrears of revenue stood at **Rs. 318.62 crore** as on March 2018.
- Department irregularly allowed the lessees to carry out mining activities without obtaining mandatory environmental clearance, forest clearance, wildlife clearance and non-renewal of NOCs.
- The Department failed to comply with the NGT order and allowed transportation of coal without collecting royalty amounting to **Rs. 313.75 crore** on over-declarations.
- The Mining Department irregularly issued MTCs and allowed transportation of 54.50 thousand MT of coal thereby encouraging transportation of illegally extracted coal.
- The inventory management of coal stock and record keeping in the Department was extremely poor.
- A total of 11.31 lakh Mineral Transport Challans were issued during the period from November 2014 to May 2018, which authorized transportation of 103.71 lakh MT of coal against the total assessed quantity of 94.04 lakh MT.

- Systemic failure of the officials posted at the check-gates in preventing illegal transportation of coal out of State had resulted in loss of revenue amounting to at least `**296.82 crore** during the period 2013-14 to 2017-18.

Purpose of Detailed Architecture Requirement

The document explains pragmatic enterprise architecture approach from Vision to actionable framework to improve the cohesiveness amongst the services of Departments, responsible for the growth of Environment Pillar. List of departments contributing and responsible are as below,

- Forest and Environment Department
- Mining and Geology Department

This document remains part of overall Meghalaya Enterprise Architecture document, focusing on detail on Environment pillar and should be read accordingly. The interconnected flow and rest details can be found in main document, various common systems and their architecture.

Target Audiences

The Detailed Architecture includes inputs from various key stakeholders. This document would be further reviewed and used for implementation by the following stakeholders:

- Forest and Environment Department
- Mining and Geology Department
- NIC Meghalaya
- Project Coordination Committee,
- National E-Governance Division (NeGD)

The Detailed Architecture document and incorporated artifacts would lead to an overall project plan with measurable business success metrics post stakeholder buy-in.

This document is organized as per the below Sections

Chapter 1 – Introduction

Chapter 2 – About the Pillar

Chapter 3 - Environment - Business Architecture

Chapter 4 – Application Architecture

Chapter 5 – Data Architecture

Chapter 6 – Technology Architecture

Chapter 7 – Security Architecture

Chapter 8 – Architecture Realization

Chapter 9 – Annexure of various key analysis

2. About the Pillar

2.1 Environment Sector Overview

With 9,496 square km of recorded forest areas, forests accounts for over 42% of Meghalaya's total geographical area[2]. Unlike other States, forests in Meghalaya are largely under the community and private ownership and only 1,113 square km of forests, in Reserved Forests, Protected Forests, National Parks and Sanctuaries are under the direct control of the State Forest Department[1].

Meghalaya is a mineral rich state. Coal and limestone production in Meghalaya stood at 1.39 million tonnes and 6.68 million tonnes, respectively, in 2018-19[2]. Coal, Coke and Briquettes account for over 50% of the share in the overall exports of the state[3]. The state falls in seismic zone V and hence it is critical that the state save environment by controlling illegal mining activities. Meghalaya has rich mineral deposits. Important mineral resources found in the state are coal, limestone, feldspar, quartz, glass sand, sillimanite, clay, and kaolin. Of these, coal is found in every district in the state, has low ash content, and is very high in calorific value, although it is also high in Sulphur content.

The following is a heat-map for Indian states on Environmental Sustainability Index (ESI) based on data compiled by IFMR[4]

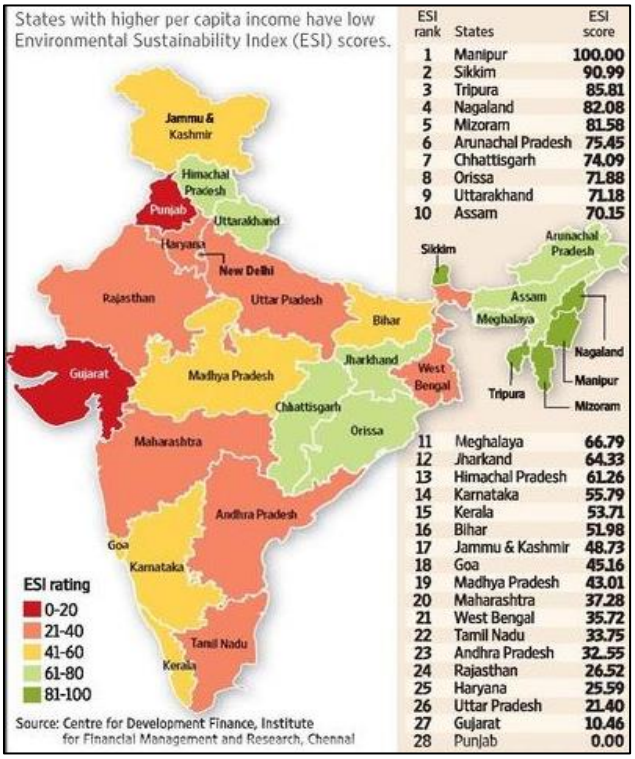


Figure 1: Meghalaya's performance under Environment Sustainability Index

[2] Forest Survey of India, 2019 accessed from www.fsi.nic.in on 09 April 2020.
[3] *Till Feb. 2019.* Data source: Indian Bureau of Mines
[4] www.ifmr.ac.in accessed on 08 April 2020

2.2 Vision of Environment Pillar

Government of Meghalaya believes in maintenance of ecological balance including atmospheric equilibrium which are vital for sustenance of all lifeforms, human, animal and plant.

Government of Meghalaya is cognizant of the fact that focussing on environment sustainability can help us attain the *"Future We Want"*. Accordingly, its vision is:

"To be in the top 5 states in the country in Environmental Sustainability Index".

2.3 Mission of Environment Pillar

Mission of Environment Pillar

The mission of Environment Pillar is to achieve the 4 P's:

- **Protect** – Protect forest flora and fauna through a sustainable model
- **Preserve** – Preserve rich biodiversity, heritage, endangered species and culture
- **Prevent** – Prevent and eliminate revenue leakages
- **Promote** - Promote empathy for wildlife and restricted tourism

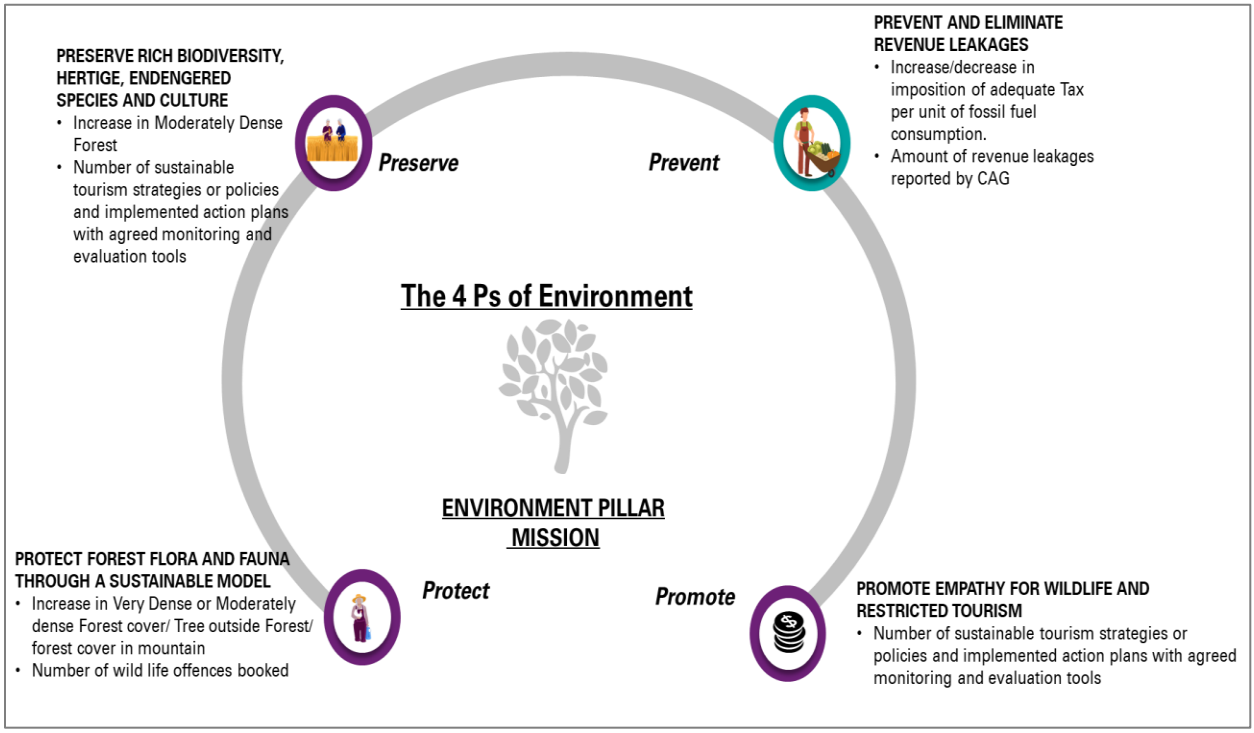


Figure 2: Environment Sector Mission

2.4 Environment Pillar - Departments Structure

The departments under Environment Pillar have exclusive functional role and responsibilities. The below illustration is a broad representation of departments and the government agencies/ directorates under Environment Pillar.

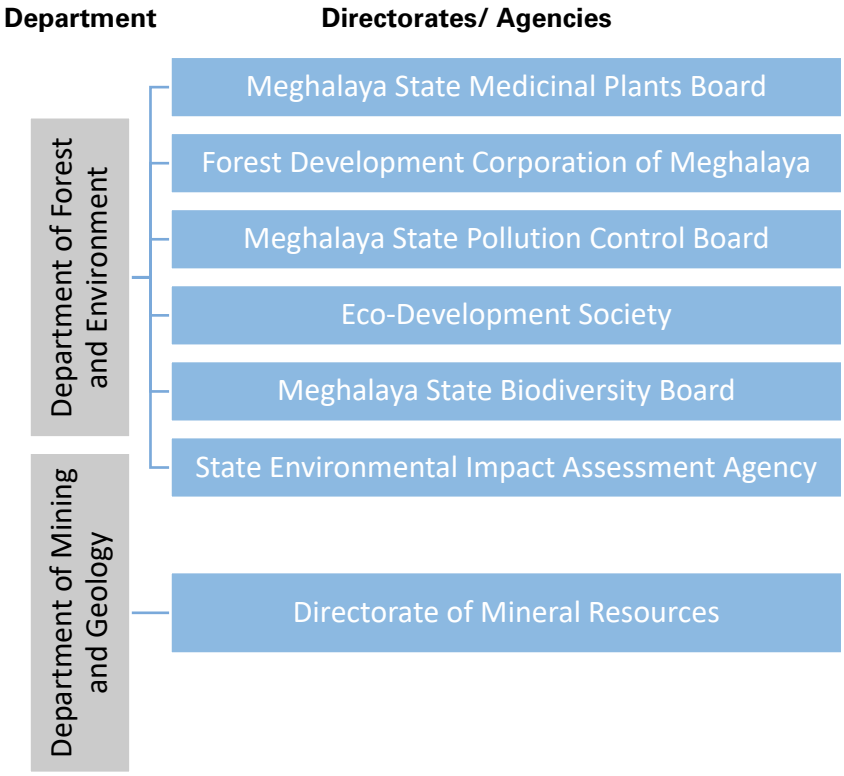


Figure 3: Organization Structure of Environment Pillar Departments

The detailed functions of the departments and their directorates/ agencies along with detailed organization charts has been detailed in Annexure 9.12

Various stakeholders applicable to Environment Sector are as below:

Government:

- Head Office Officers such as Principal Secretaries, Commissioner & Secretary, OSD, Directors etc.
- Other officers in Divisions/ Districts/ Field including Senior Geologist, Senior Drilling Engineer, Divisional Mining Officer, Deputy Conservator of Forests, Range Forest Officer, Chief Forest Officer etc.

Business:

- Various Businesses, Miners, Firms who have been allotted licenses, permits for timber/ minerals extraction etc.

Citizens:

- Citizens who want to seek permission for felling of trees.

- Students pursuing graduation in the field of mining.
- Victims of Animal Conflicts in the forest adjoining areas.

2.5 Goals of Environment Pillar

There are 235 indicators defined as part of the MeghEA Vision which are public service delivery centric and intended to measure the progress of the state in-terms of citizen centric service delivery. Out of these 235 indicators, 38 have been mapped in Environment Pillar to achieve the targets and goals as defined by State SDG. Since Environment is a cross-cutting sector with significant overlap with other sectors, 14 out of the identified 38 indicators are covered in other pillars and 12 are covered as a part of this Environment Pillar Detailed Architecture document. Remaining 12 indicators belong to **departments not in-scope of assessment.** The Goals and Indicators with baseline data and targets to be achieved are detailed in Annexure 9.1

- Indicators Assigned to Environment –**38,** please follow list in section **9.1.1**
- Indicators under Environment and assigned to departments under Environment- **12**, please follow section 9.1.2
- Indicators under Environment but marked to departments **out of scope** – **12**, please follow section 9.1.3
- Indicators under Environment but marked to departments in Other Pillars – **14**, please follow list in section 9.1.4
- Indicators under Other Pillars but marked to departments under Environment – **1**, please follow list in section 9.1.5

Goals	1 NO POVERTY	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION	15 LIFE ON LAND
Number of Indicators	7	1	11	7	12
In-scope departments	-	• Forest & Environment	-	• Mining & Geology	• Forest & Environment
Departments covered in other pillars	• Planning • FCS & CA • Community & RD	-	• Community & RD • PHE	• Tourism • Commerce & Industries • PHE	• Planning
Other departments/ key agencies	• Revenue & Disaster Management	-	• Housing • Meghalaya PCB • Urban Affairs	-	• Water Resources

Figure 4: Goal, indicators and department mapping

2.6 Business Capability for Environment Pillar

A business capability is an ability or capacity that Departments under Environment Pillar possess or exchange to deliver specific services. Environment Pillar takes care of the relevant needs of the citizens, businesses and communities applicable to the pillar.

Please refer MeghEA metamodel to understand the relationship between capabilities and services (refer Annexure 9.8). The identified Capabilities are as below:

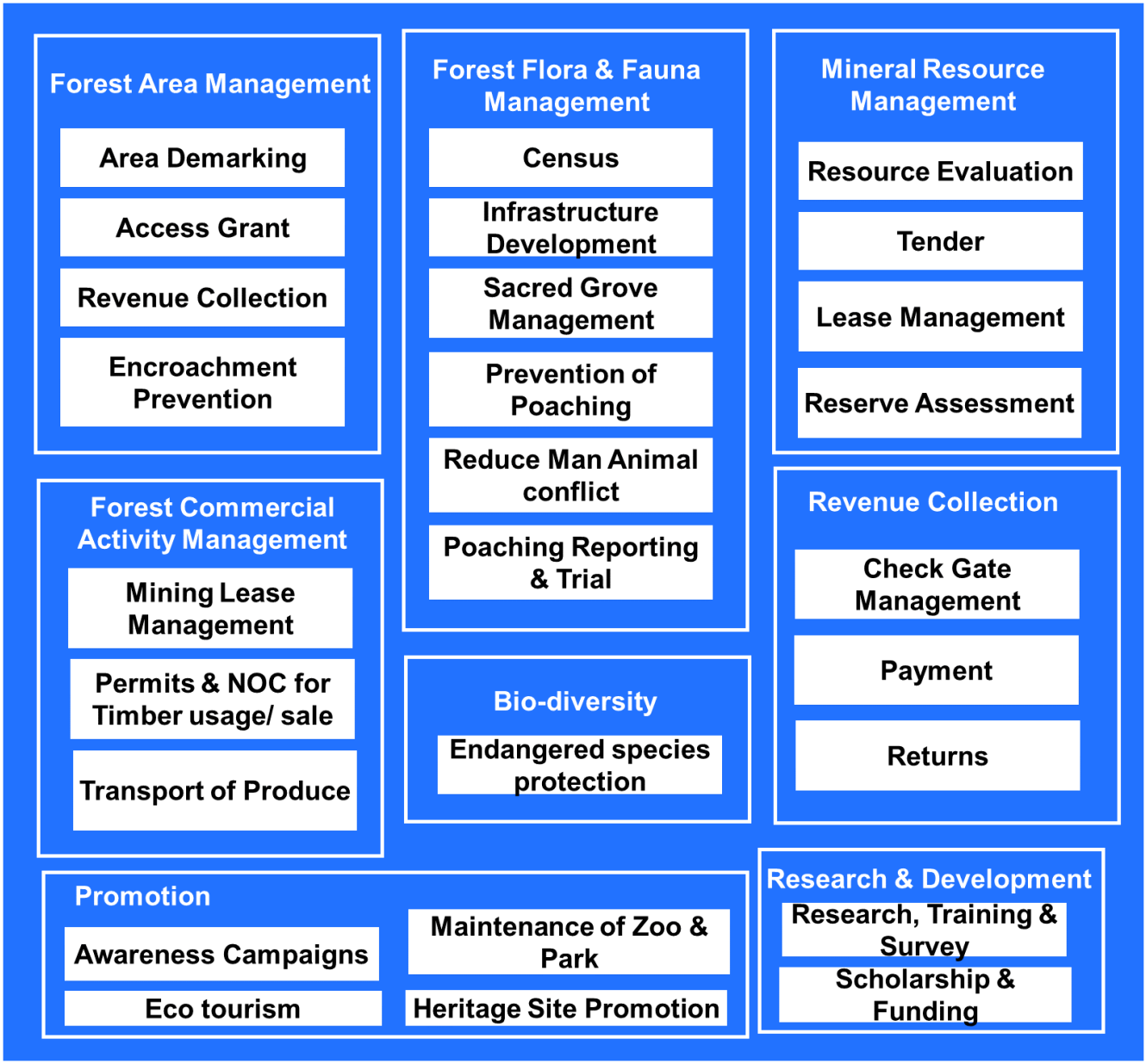


Figure 5: Environment Pillar- Business Capability Model

A brief explanation of each of the capabilities is described below:

Forest Area Management: The concerned departments are entrusted with protecting the existing forests and forest lands and to enhance their productivity in a sustainable manner and reduce or

eliminate encroachment

Forest Flora & Fauna Management – Capability to inventorize forest resources, development of forest infrastructure, conduct regular patrolling (in order to detect poaching and illegal trade), reduce man-animal conflict etc.

Mineral Resource Management - Capability to regulate mineral resource and extract their maximum potential.

Forest Commercial Activity Management: Capability to regulate the commercial activities in the forests/ mines in the state so as to limit the emission of pollutant and to protect the Environment.

Biodiversity promotion: Improve the status of Biodiversity by safeguarding ecosystems, species and genetic diversity; i.e. to maintain, conserve, promote and enhance Biodiversity.

Revenue Collection – Capability to collect royalty, lease etc.

Promotion - Involves **c**apability to train communities and individuals to make them aware about forest & environment conservation, promote ecotourism, maintain and promote Zoos/ Heritage sites within their jurisdiction

Research and Development -. This capability includes in-house Research, capability to undertake surveys, providing scholarships and funding for undertaking higher studies and research on environment conservation and scientific methods of mining

Note: All above capabilities would be useful in defining micro-service or application service, while implementation of the system aligned to the Micro-Service based architecture/SOA principles. These capabilities are at macro-level, further analysis is required to drill down to more granular level to qualify them as micro-service.

3. Environment Pillar - Business Architecture

3.1 Key Concepts, Definitions Principles and Approach

The Business Architecture is an essential key for the design of a good Enterprise Architecture, as it looks at the business vision and the functions/ services required to fulfil that vision, but not the technologies required to be used. The key entity in Business Architecture is Service, be it citizen centric, business centric or employee centric Business Architecture takes a journey that begins with pillar goals, departmental goals, identifies critical issues, and shows how business architecture turns strategy into solutions. Along the way, it takes approaches and guidelines from standards like IndEA, how business architecture can be used, ways the proven components of IndEA core platform tools are vital to support these transformational efforts and achieving business / IT alignment delivers quantifiable indicators.

3.1.1 Key Concepts

- **MeghEA Meta Model:** MeghEA Meta Model describes the types of entities described in Business, Application, Data and Technology architecture domains and the relationships between them. Refer Annexure 9.8 for details.
- **Government Services:** Government Service is one that is provided by a government agency to its citizens, businesses, employees or other government agencies, in any form of delivery. A service may have several components, process steps, service levels and performance metrics. A service should have ONE beneficiary (Citizen, Business, Employee or Other Government Agency) and only ONE key outcome such as:
    - Certificate, License, Information, NOC, Approval letter (Digital Outcomes)
    - Seedlings, Compensation etc. (Physical Outcome)

3.1.2 Key Definitions

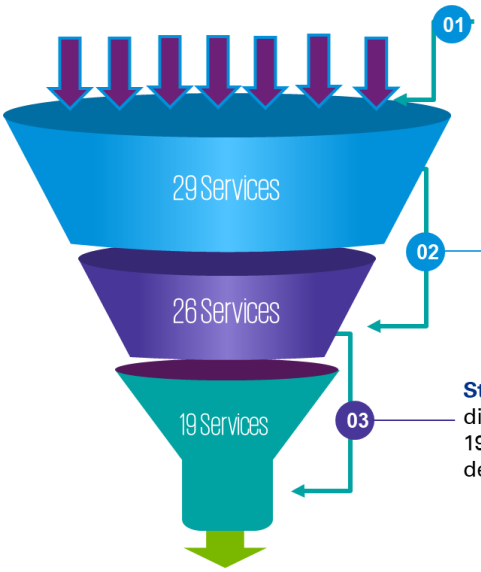
- **Service Domain**: Service Domain is a broader group into which services are categorized based on the outcome. E.g. various services related to renewal, transfer, grant, surrender, termination etc. of lease has been categorized under “Lease”.
- **Service Definition**: Service Definition is the process of specifying the attributes of a service in terms of its Type, Category, Class, Priority and Service Level.

3.1.3 Approach - Business Architecture

One of the main objectives of Meghalaya Enterprise is to transform the services of the departments through effective assessment and holistic implementation plan. The key entity in business architecture is Service, be it citizen-facing, employee-facing or internal among departments. The critical outcome related to business architecture – Service Portfolio finalization, deriving plans to ensure services have the Citizen/Business-centricity, Service Prioritization for implementation and Integration of processes. A successful implementation of the aforesaid plan requires a fundamental re-engineering of the Business Processes, elimination of non-value-adds and above all, identification of cross-cutting services that are common across the departments.

The approach towards business architecture is current state service identification, rationalization of

service, prioritization of services, re-engineering of the prioritized and plan for implementation of the re-engineered services. The approach and the steps taken to realize the objective is illustrated below:



Stage – 01: Service Portfolio from the department stakeholders. 29 services identified with regards to the service delivery channel, service type, locations of service delivery, and several other details regarding the service

Stage – 02: Detailed analysis, subsume, de-duplication:3 services were merged/ subsumed within an existing service or marked as duplicate. Post this 26 services were mapped to Indicators

Stage – 03: Prioritization based on Service Assessment against DSS basis digital maturity- categorized to high, medium and low maturity.
19 services identified as priority services basis "value to stakeholders", degree of complexity in service transformation

Accomplishments:
19 services prioritized for First Phase consideration for Implementation
12 services are planned for new implementation

Figure 6: Service Identification, Rationalization and Prioritization

3.2 Current State Assessment

3.2.1 Service Overview

Government Service is one that is provided by a government agency to its citizens, businesses, community, employees or other government agencies, in any form of delivery. A service may have several components, process steps, service levels and performance metrics.

A service should have ONE beneficiary (Citizen, Business, Employee or Other Government Agency) and only ONE key outcome such as:

- Challan, Certificate, License, Permission, NOC, Approval letter, Payment (Digital Outcomes)
- Lease Document, Vendor Agreement, Infrastructure Development etc. (Physical Outcome)

The services of Environment Pillar have been categorized in different service domains. These are illustrated below:

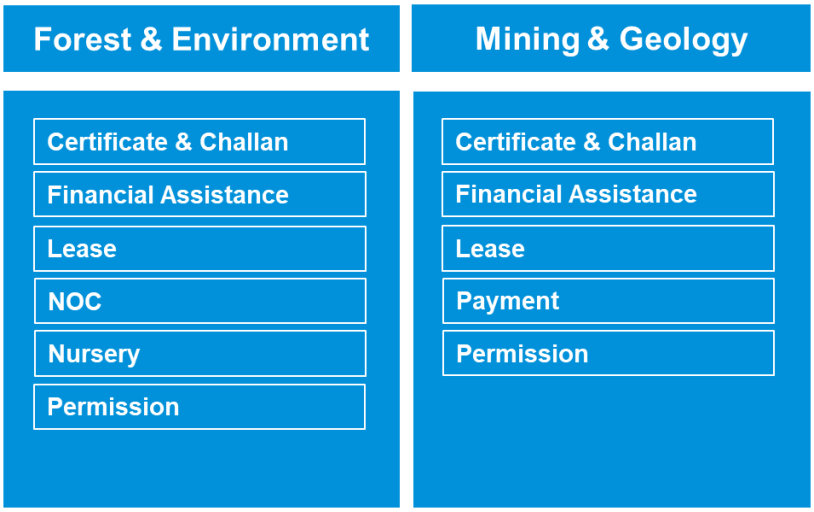


Figure 7: Service Domains of Environment Pillar

- **Lease** – The service domain is about granting land in lease for mining, granting transfer of lease land, renewal of lease and termination of lease land offered by both Forest & Environment department and Mining & Geology department
- **Financial Assistance** – The services in this domain includes the following: i. providing financial support to victims of wildlife depredation by Forest & Environment and ii. Providing scholarship to local students pursuing higher education in Mining & Geology
- **NoC** – This service domain includes NOC services provided by Forest & Environment department like issuing No Objection Certificate to setup timber depot, furniture unit and stone crusher unit.
- **Permission** – This domain includes services like granting permission for felling of trees, transportation of timber, mining plan approval and for exploration of mining projects
- **Nursery** - Social Forestry & Territorial Circle have setup nursery for planting stock to be provided under various schemes.
- **Certificate & Challan** – This service domain deals with providing certificate for land to be classified into forest or non-forest land and issuance of transport challan to carry minerals

- **Payment** - This service deals with the payment of the Royalty by the permit holder, forest royalty payment and other receipts.

3.2.2 Current Service Portfolio

Service discovery stage is to identify and finalize the current list of services offered by Forest & Environment department and Mining & Geology department and corresponding directorates to citizens, businesses and other stakeholders in the ecosystem under preview. Details of all services (G2C, G2G, G2B and G2E), critical to stakeholders offered by any means need to be consolidated along with underlying sub services and processes details at current stage. To help department stakeholders understand the project objectives, service definition and the need for service identification, multiple sessions were organized with each department. With the help of Planning Department, Nodal officer for each department was assigned, who helped in meeting coordination activities and follow-up for data collection. Demonstrations for entering service data and process steps in MeghEA Questionnaire Portal were also given to department officers and nodal officers. The following are the accomplishments from this exercise:

- 29 services (15 by F&E Department and 14 by Mining and Geology Department) were identified along with detailed description of the services.

Below is diagrammatical representation of the qualified services of departments under Environment Pillar:

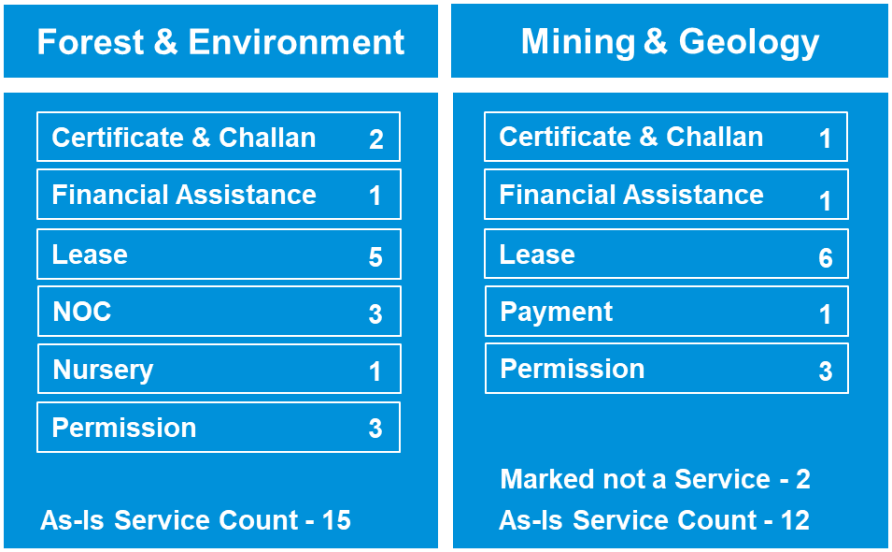


Figure 8: Environment Pillar - Service Domains with As-Is Service Counts

The data entered by the department is available at MeghEA Portal. Further the Service Catalog as on 30th March 2020 is detailed in Annexure 9.2.

3.2.3 Current State Business Interaction Matrix

The departments in Environment Pillar consumes business services from other departments in State Government and provide services to other departments in State Government.

These business interactions have been captured in matrix covering business services with Environment Pillar departments consume and provide to other departments.

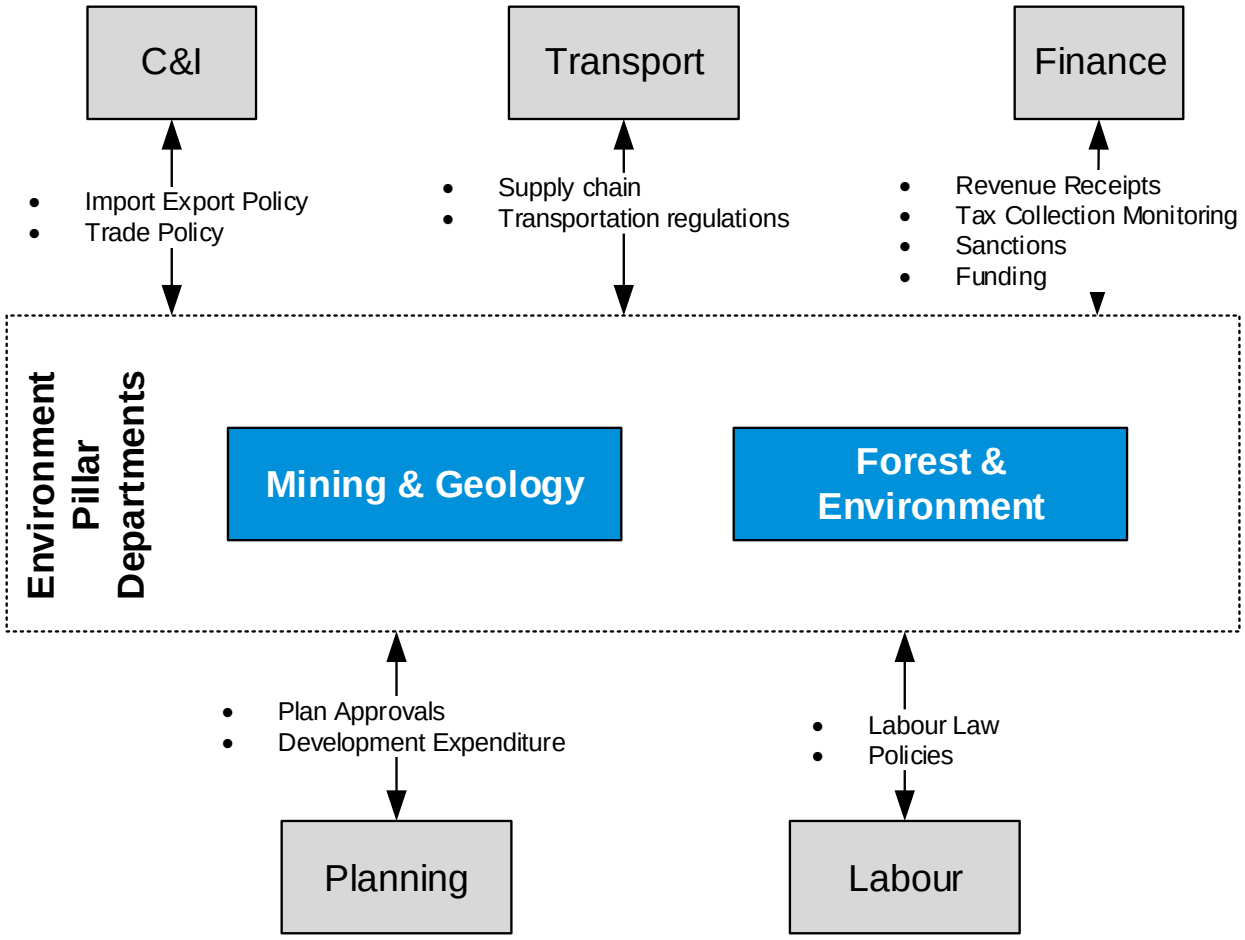


Figure 9: Current State Business Interaction Matrix

The matrices are detailed in Annexure 9.7

3.3 Service Delivery Challenges/ Bottleneck

The departments in Government of Meghalaya has been facing various challenges in delivering their services to the beneficiaries including businesses, citizens and communities. The priority of the departments is to improve the service delivery experience.

The key challenges identified in delivering services related to Environment Pillar and their impact are as below:

Service Domain	Challenge	Impact
Certificate & Challan	Land Status Verification certificate, transport challan are issued in manual mode.	There are chances of faking these certificates without tracking. Also, the authenticity of these documents cannot be assured at checkpoints.
Lease	Government at times do not have a clarity on the lease expiry	Lack of efficient tracking and management system may lead to the government losing revenue.
	Because of the manual process, Miners face a challenge in application	Sub-optimal service delivery and potential revenue loss
NOC	The application process is manual and requires physical submission at Division level.	Delay due to manual processing may lead to delay in setting up of units and hence employment generation may get impacted.
Nursery	The price information is not made available online for easy comparison and decision making by the beneficiaries.	Interested beneficiaries may end up paying higher price than approved rates and government may loose revenue because of manual accounting.
Permission	Application process for various services like permission for Transportation of timber outside Meghalaya is offline.	Manual process leads to delay and inefficiencies.
Financial Assistance	Financial Assistance to beneficiaries is also delivered through cash or cheque without system-based tracking	Officials at District/ Division level and below spend significant time and effort in tracking these services and possibility of corruption in few cases cannot be ruled out.
	Eligibility criteria for benefits are not clearly defined and displayed	Ad-hoc and inconsistent decision making in benefit distribution as a result of human bias cannot be ruled out.
	Identification criteria for Scholarship to local students is not clear.	Some of the eligible students may not get the benefit.

Service Domain	Challenge	Impact
Payment	No system flags for Royalty payment dues	Government may miss out on Royalty collections

Table 1: Service Domains, Challenges and Impacts

3.4 Service Rationalization

As part of service rationalization, services that provides similar output as per service definition, are merged together. Further, those processes part of other services are subsumed in the larger service. The services are further confirmed and validated with the nodal and department and corresponding directorate officers.

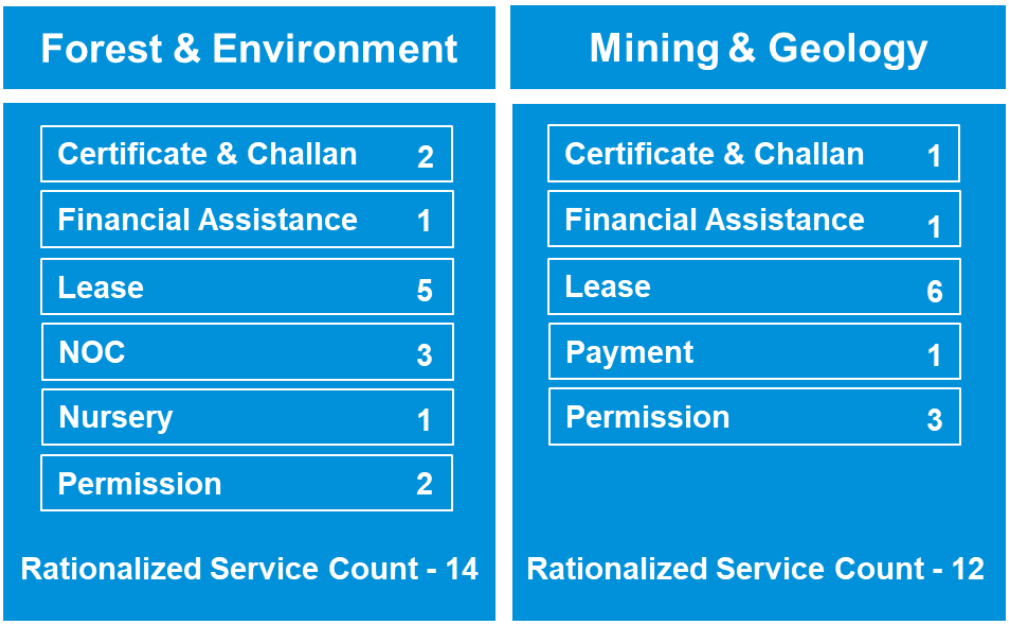


Figure 10: Environment Pillar- Service Rationalization Numbers

Accomplishments:

- 3 services are merged/ rationalized from the existing list of 29 services leaving **26** services as qualified services.

Rationalized Service Catalog can be seen at Annexure 9.3

3.4.1 Service Indicator Mapping

UN has identified **17** sustainable development goals and the targets to be achieved by 2030. These identified targets have been mapped to indicators which are realistic and measurable criteria to monitor the progress of achieving targets.

Meghalaya has adopted **12 out of 38** indicators to measure and monitor the progress of targets linked to Environment. The indicators have been finalized in Vision and Scope of Meghalaya Enterprise Architecture. The services provided by the contributing departments has been mapped to the indicators for achieving targets. The identification of key services mapped with listed indicator under each Strategic Pillar is based on the steps below:

1. Service outcome must have a direct impact to the indicator;
2. Service delivery efficiency can impact the indicator's target achievement milestones;
3. Services that are inter-linked to the service that has been mapped in the above two criteria.

The detailed service to indicator mapping is provided in Annexure 9.4

3.4.2 Current State Assessment and Service Prioritization

The departments contributing to Environment Pillar has many bottlenecks in service delivery. It is imperative that such service delivery challenges impact the service delivery to its citizens. As most of the services delivered by Environment Pillar are in manual mode, Current state DSS assessment for the services is **Low** to **Medium**.

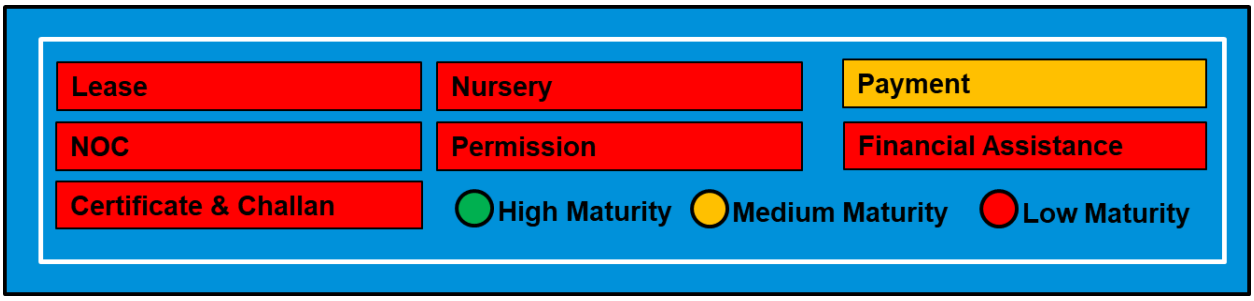


Figure 11: Environment Pillar- Service Assessment

Summary of Current State Assessment:

- Very limited number of services are available in digital channels, this makes the assessment score to be low.
- Service portfolio is not formalized, notified or documented; thus, the services are marked low in several assessment dimensions.
- Service BPR, ease of delivery and service facilities have not been undertaken. Only a few of the department stakeholders are aligned to the service delivery.
- Most of the services are in offline mode except payment through GRAS.

Please refer Annexure 9.5 for detailed assessment result along with the level of complexity in implementation and value to stakeholders. Please note the following pointers related to complexity of implementation.

Complexity of implementation is a function of the following parameters; these parameters are not exclusive.

- External stakeholder involvement in the service delivery process.
- Process-role has variability depending on the service request, the variability may arise due to various factors such as scheme funding from central government.
- No other similar implementation has been observed.

Please note the value to stakeholders have been derived from the strategic indicator mapping.

3.5 Life Cycle

The Environment Pillar service domains are studied and mapped to services in a life cycle. The illustration for the same is as below:

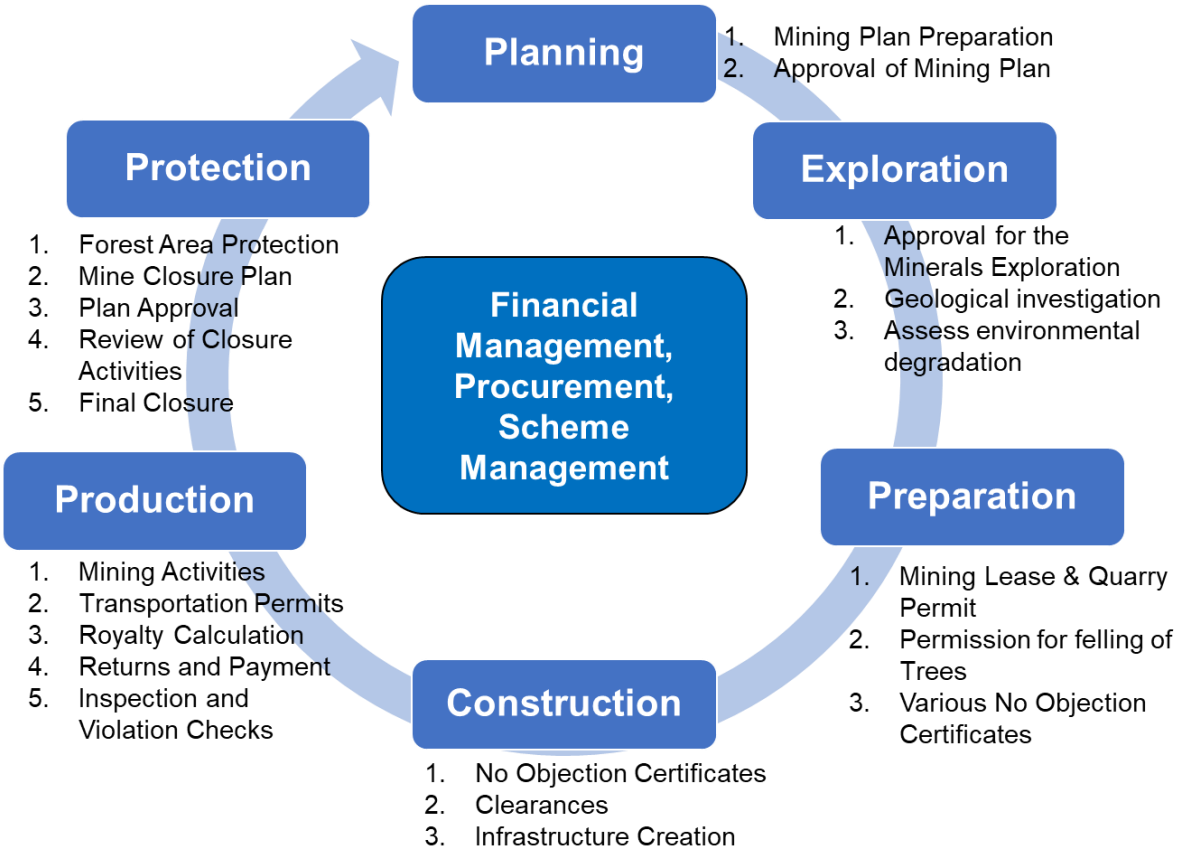


Figure 12: Service Life Cycle

The life cycle has been prepared keeping different stakeholder needs during different stages in Environment Pillar. These stages have been explained as below:

3.5.1 Planning

In this stage, mining plan is prepared for mining minor minerals from mines and forests. The plan is duly reviewed, and approval is accorded to execute the plan. This also includes plan for extraction of timber from forest land.

Aligned Services:

- Mining Plan Preparation
- Approval of Mining Plan for minor minerals

3.5.2 Exploration

In this stage, applications are submitted for exploration of minerals whether by Geological & Geotechnical Survey, Survey, Mapping & Drilling of samples etc., to be conducted by the Directorate.

Aligned Services:

- Approval for the Minerals Exploration
- Access Environment Degradation

- Geological Investigation

3.5.3 Preparation

In this stage, Lease License and Quarry Permits are granted to interested businesses entities on application. Permission for felling trees are granted to businesses and citizens to carry out activities in their land/ land allotted. Also, no objection certificates are issued to businesses for starting certain businesses related to furniture units, stone crushers etc.

Aligned Services:

- Mining Lease & Quarry Permit for Minor Minerals
- Mining Lease & Quarry Permit Registration by Citizen
- Transfer of Mining leases
- Application for permission for felling of Trees
- Renewal of Mining Leases
- Forest clearance Application for projects other than mining stone crushers quarry permit furniture unit and timber depot
- Non-Forest Land Certificate/ NOC

3.5.4 Construction

In this stage, certain permissions are granted for construction and infrastructure creation activities in forests/ mining areas. This include creation of roads in forest land, creation of transportation facilities and mining areas for extraction of minerals and minor minerals. In this regard, departments also issue certain no objection certificates and clearances to the applicants.

Aligned Services:

- NOC to set up timber depot
- NOC for setting up of Stone Crushers
- Application for permission for felling of Trees
- Forest clearance Application for projects other than mining stone crushers

3.5.5 Production

Production is the stage where the output from forest and mining areas is generated by the business entities. Departments issues permits to transport produce/ raw material extracted to different areas. The forest and mining officers keep check on the transportation and possible violations. The businesses declare the extraction in returns and pays the royalty amount to the government.

Aligned Services:

- NOC to set up Furniture unit
- Issuance of Transport Challan for Transportation of Minerals
- Returns Filing by Mining Leasee
- Royalty Payment
- Inspection & Violation Check at Check Points

3.5.6 Protection

In this stage, after the minerals / timber extraction is over in the area allotted or the lease period is

over, the Closure plan is prepared and submitted to department for approval. Department verifies the closure plan and provides consent. The business entity acts upon the closure plan and department monitors the activities.

Aligned Services:

- Forest Area Protection
- Mine Closure Plan
- Mine Closure Plan approval
- Review of Mine Closure activities
- Final Closure of Mine.

3.6 SWOT Analysis of Business Architecture

Analysis Paradigm	Key Pointers	Target State
Strength	Revenue earning potential in the Departments owing to high forest cover and availability of minerals. The services are well structured with minimal overlaps	Would be Strengthened
	Adoption of standardized process in complex service processes such as Mining Lease Issuance.	Would be Retained
Weakness	Redundant process steps involving actors with no value addition to the service delivery process.	Proposed for Elimination
	Paper based Application for Service request.	Proposed for Elimination
Opportunity	Integrated services across departments.	Would be Realized
	Digitization of workflow to enable lean and fast service delivery.in lease issuance	Would be Realized
	Unification and standardization of processes related to transport permits and challans	Would be Realized
Threats	Physical Inspections in Areas with no network.	Would be Addressed Partially

3.7 Future State Service Portfolio

The services prioritized based on current state assessment, implementation complexity and value to stakeholder are considered for conversion to digital services first. New services, which are not currently offered by the departments in Environment Pillar, are proposed to be delivered to beneficiaries by the departments. The services need to be deliberated and eligibility need to be defined by the departments. The rationalized services (Prioritized and Non-Prioritized) along with new services constitutes Future State Service Catalogue (Annexure 9.6). Further, these services are listed department wise according to service domains which can be seen on below links:

Forest & Environment Department

Mining & Geology Department

3.7.1 Service-Stakeholder Matrix

Environment Pillar services involve several stakeholders. Various external entities have a role to play in the service delivery process. Below is a snapshot of the service – stakeholder matrix. This matrix details out a high-level view of the services, to understand, the various key entities involved in the services delivery, please refer Annexure 9.9 for Service-Stakeholder matrix

- **Approval:** The responsible department receives the service request, conducts internal checks and controls and further decides to approve/ reject the service request.
- **Apply for Service:** Businesses/ citizen/ student/ applies for the service to get the benefit/ desired outcome.
- **Audit:** The responsible department has the responsibility to do a systematic and independent examination of the information/ documents provided
- **Transfer of Funds:** The agency processes service request to transfer money.
- **Approval of Proposal:** The agency responsible for providing approval on the proposal of scheme submitted to the department.
- **Issuance of Sanction, LOA and Funds:** Agency responsible to issue sanction as per the approved proposal and issuance of Letter of Approval for withdrawal of Funds for implementation of scheme.

Stakeholders, their Roles & Responsibilities:

Businesses, Citizens and communities apply for various service to Departments of Environment Pillar. F&E and M&G Departments majorly plays the role of approver for these services.

Stakeholder	Brief about roles & responsibilities
Planning Department	• Vetting of Proposals submitted by the departments. • Approval on proposal for implementation of schemes in the state.
Finance Department	• Provide Sanction for the funds required for different services based on budget. • Provide Letter of Approval (LoA) for withdrawal of funds by departments for implementation of schemes.

Stakeholder	Brief about roles & responsibilities
	• Provide funds for State Sponsored Schemes (SSS).
Businesses/ Citizen/ Students	• Apply for Lease License, No objection Certificate, Permissions. • Apply for transport permits. • Apply for benefits such as compensation in Human-Animal conflict.
F&E and M&G Department	• Approves/ Rejects the service application based on eligibility criteria. • Perform Assessment of Returns filed. • Collects payment on behalf of Finance Department.
AG/ CAG	• Audit of the funds provided for implementation of schemes and services. • Management of Audit Paras and ensuring compliance in usage of funds. • Audit of assessments performed by the departments against permits issued and collections.

Table 2: Stakeholder – Role Matrix

3.7.2 Future State Business Interaction Matrix

The departments in Environment Pillar consumes business services from other departments in State Government and provide services to other departments in State Government.

These business interactions have been captured in Section 3.2.3. As the objective is to provide One Government experience to citizens, thus the departments are grouped together based on sectors to form pillars. The interactions in future state between the pillars are captured in below diagram for better illustration:

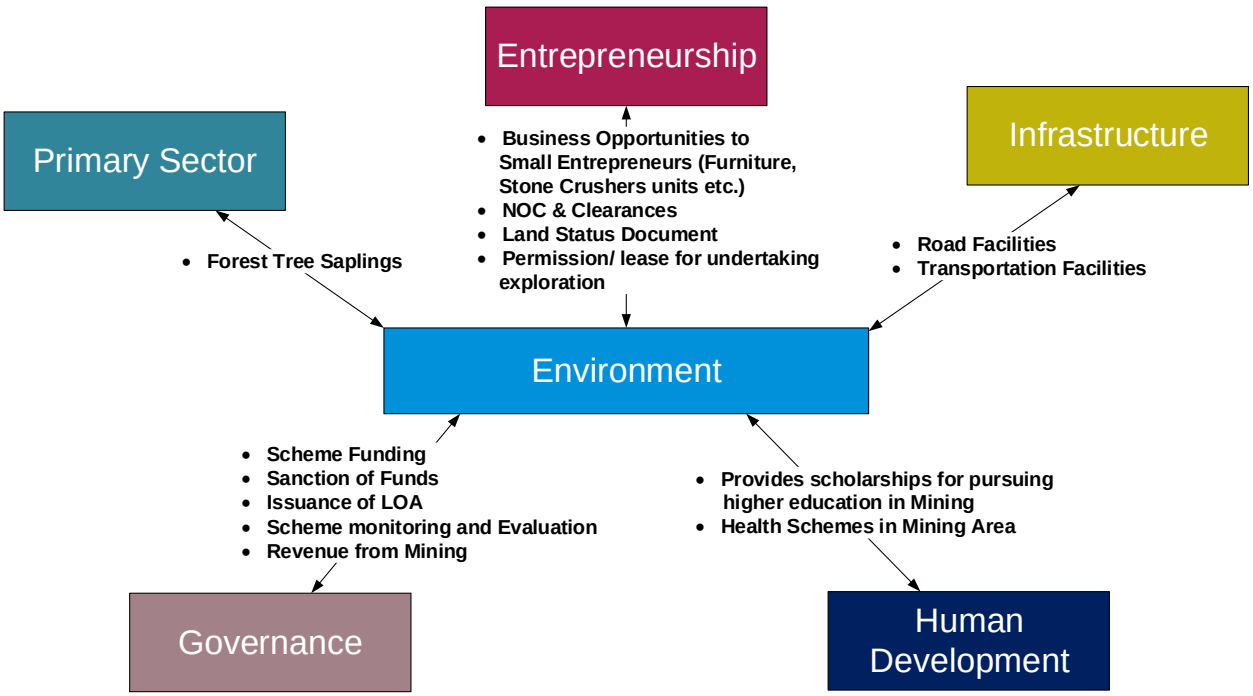


Figure 13: Future State Business Interaction between Pillars

The detailed matrix is placed at Annexure 9.10

3.8 Business Transformation Requirements

The Environment Pillar is a crucial pillar to ensure sustainable growth for the people of Meghalaya. However, the Environment Pillar has challenges in terms of limited existing capabilities to prevent illegal mining and environmental degradation.

Against this background it is necessary to bring about transformational changes in the Environment Pillar to make a significant impact on the population of Meghalaya and improve economy of the state. This transformation should be considered as join responsibility by the state and the development agency by introducing various reforms addressing the challenges discussed above and in Section 3.3. Variety of Game Changers should be introduced along with Process Re-engineering, as described below, but not limited to the same.

3.8.1 Game Changers

Game Changers make a qualitative difference the way services are delivered and/ or introduce new technologies or processes for enhancing the outcomes significantly. The Game Changers proposed for Environment Pillar are as below:

- **Satellite-based Remote Sensing-** Geographical Information System could be used for Forest cover analysis, check deforestation and can help in curbing illegal mining.

  Case Study: Forest Survey of India has done forest survey through application of Satellite Based Remote Sensing for Monitoring and Mapping of India's Forest and Tree Cover.

- **Drone based monitoring/ surveys and cadastral mapping -** Drone based surveys and Monitoring of Forests and Mines can be done to extend the reach in difficult terrain. In addition to helping the government in curbing illegal mining/ deforestation, drone could be used for discovering potentials mines and minerals in the state.

  Case Study: Survey of India (SoI) is September 2019 has decided to deploy 300 drones for mapping country.

- **Social Media out-reach monitoring -** Engaging with the citizens over social media platforms can support disaster management with close to real-time information on calamities and can help ascertain the strength of forest fire etc.

  Case Study: Sentiment Analysis for the Social Media has been done for Turkish General Elections.

- **Ask Megha:** Ask Megha is a chatbot to ease service application through interactive exchange on information with the businesses/ citizen. The chatbot would be further supported by IVRS based system with both machine and human based interaction for service resolution and application.

  Case Study: VANI (Virtual Assistant for NIC) has been successfully implemented for COVID-19 Portal by Meghalaya and iKhedut Portal by Agriculture, Farmers Welfare & Co-operation Department, Government of Gujarat.

Few Other interventions worth considering are:

- Forestry resources management system based on big data
- Bar code scanners

- Smart sensors
- Data analytics
- Online Weighing bridges

Existing Government of India applications like the Mining Tenement System could be used effectively for bringing in automation in the mining sector and for covering the entire lifecycle of a mine (from exploration to closure) and real-time information availability leading to transparency and effectiveness.

3.8.2 Game Changers – Strategic Indicator Mapping

The game changes defined above would help Government of Meghalaya in the following ways:

Game Changer	Strategic Indicator What to achieve?	Capability Increment How to achieve?
Satellite-based Remote Sensing	Increase/decrease in imposition of adequate Tax per unit of fossil fuel consumption.	• Forest Area Management • Forest Flora & Fauna Management • Mineral Resource Management • Revenue Collection • Forest Commercial Activity Management
	Number of wild life offences booked	
	Increase in forest / vegetative cover in mountain areas	
	Increase in Moderately Dense Forest	
	Increase in Very Dense Forest cover	
	Percentage of degraded area restored	
	Increase in area under afforestation / tree plantation	
	Percentage increase of Tree Outside Forest (TOF) in total forest cover	
Drone based monitoring/ surveys and cadastral mapping	Increase/decrease in imposition of adequate Tax per unit of fossil fuel consumption.	• Forest Area Management • Forest Flora & Fauna Management • Mineral Resource Management • Revenue Collection • Forest Commercial Activity Management
	Number of wild life offences booked	
	Increase in area under afforestation / tree plantation	
	Percentage increase of Tree Outside Forest (TOF) in total forest cover	
	Percentage of degraded area restored	
	Increase in forest / vegetative cover in mountain areas	
Social Media out-reach monitoring	Number of wild life offences booked	• Promotion • Research & Development

Table 3: Game Changers – Strategic Indicator Mapping

3.8.3 Regulatory Changes:

The changes as per redefined processes for the services need to be carried out in the respective acts and rules of the departments. The identified Acts for regulatory changes are listed below:

Changes in Service delivery channels

- Requirement of new Government order specifying the introduction of new (digital) service delivery channel for delivery of services.
- Government order specifying introduction of new services with associated details about the services.

Changes in Service delivery process

The Meghalaya Minor Mineral Concession Rules, 2016

- The act deals with Grant of Mining Lease & Quarry Permit. Any process related changes as part of business process reengineering has to be carried out in the specific sections.
- Form level changes are also to be carried out as part of Business Process Reengineering exercise.

The Meghalaya Forest (Removal of Timber) (Regulation) Act, 1981

- The act is related to License for Removal of Timber and permission for movement outside state. These services are proposed to be converted to digital services thus any changes as part of business process reengineering, has to be carried out in the specific sections of the act.
- The existing forms needs to be eliminated from the act
-

The Meghalaya Tree (Prevention) Act, 1976.

- The act is related to permission for felling of tree. This service is proposed to be converted to digital services thus any changes as part of business process reengineering has to be carried out in the specific sections of the act.
- The existing forms needs to be eliminated from the act

Mineral Policy 2010

- As part of business process reengineering, the changes related to service of Mineral Exploration has to be carried out in Section 8 of the policy.

New Government Orders

- Post BPR, all service and modified process steps (G2C services only) needs to be notified before implementation.

Changes in Service Delivery Actors

The Meghalaya Minor Mineral Concession Rules, 2016

- There are many approval/ verification levels in Grant of Mining Lease and Quarry Permit issuance. The process steps need to be simplified as part of Business Process Engineering and some of the actors who are not adding much value to the workflow can be removed. Further, as these services will be converted to digital services, some basic validations will be performed by the system itself thus removing need of some assistants.

New Government Orders

Post BPR, all service and actors' roles (G2C services only) needs to be notified before implementation.

All of the above may require approvals from legislation and cabinet

Thus, the capabilities will be enhanced as stated in below diagram:

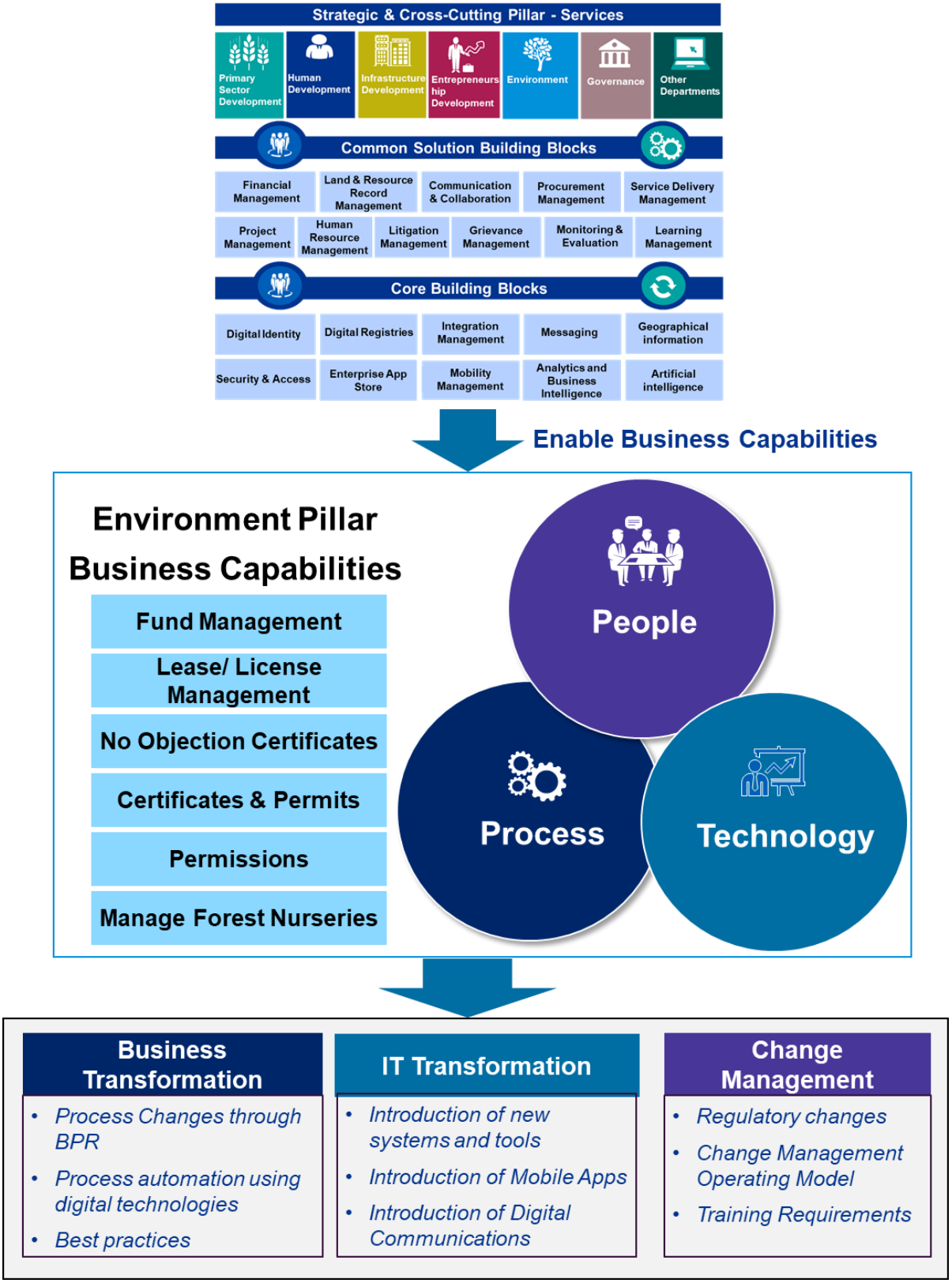


Figure 14: Business Capability to Transformation Linkage

3.8.4 BPR Opportunities Identification

No e-Governance initiative will produce desired impact unless it is accompanied by Business Process Re-engineering. The areas for process reengineering have been identified to simplify and eliminate the processes not adding value to the flow and integrate the service delivery. Process re-engineering and form re-engineering must be carried out at the time of implementation.

- **The service list for BPR:**

  Please follow the list of services that needs process re-engineering in section 9.5

- **The As-Is process steps**

  Please follow annexure on as-is process steps for the services as provided by department stakeholders in MeghEA Portal

- **The Use Cases for Services:**

  The architecture use cases for prioritized service is detailed in section 8.2, these use cases would form the basis of system and process design

- **The System flow illustration**

  The implementation of services would need a specific system flow, this is detailed in section 8.3. Please follow the section for details on how to design the system basis of high-level process flow

How to execute BPR

The areas identified are elaborated as below:

- **System Redesign:** All services under the pillar should be made online through a single portal along with mobile app and presented in user-centric way. The usability should be designed keeping literacy level of the users in view.
- **Form Re-engineering:** The forms should be simplified removing any duplicate and unnecessary fields not required for the purpose of delivering the service. Only the data fields required to check eligibility and deliver effective services should be kept in the application form. The below principles need to be kept in mind for this purpose:
  - The basic details available at the time of issuance of ID should not be asked again in any of the service forms. The data captured first time while registering on State Portal should not be asked in the form and should be pre-populated in online forms.
  - Common forms should be designed for availing similar services from different departments in Environment Pillar like for Forest clearance and Mining.
- **Business Process Reengineering:** The To-Be steps for services defined in Future State Service Catalogue should be defined for implementation. Below principles need to be kept in mind for BPR of the services:
  - Simplified steps to apply for a service.
  - Elimination of process steps not adding much value to the service flow.
  - Common form for multiple services to be availed together.
  - Multiple channels to apply for service.
  - Online Acknowledgement of the service with tracking.
  - Financial assistance to be provided in beneficiary account.

As a result of game changers and business process reengineering implementation, the State-wide Building blocks would be consumed by the departments under Environment Pillar:

- The business capabilities of the departments would be enhanced by various Common Solution Building Blocks.
- The Core Building Blocks would provide technical (IT Capability) to facilitate departments under Environment Pillar to deliver their services.

3.9 Future State Business Architecture

The objective of MeghEA, related to Environment Pillar is to **connect** the service delivery points to the service beneficiaries, ensure **collaboration** within and outside the departments, and **empower** beneficiaries by providing control back to them.

The diagram below describes the future state aspiration of MeghEA for Environment Pillar:

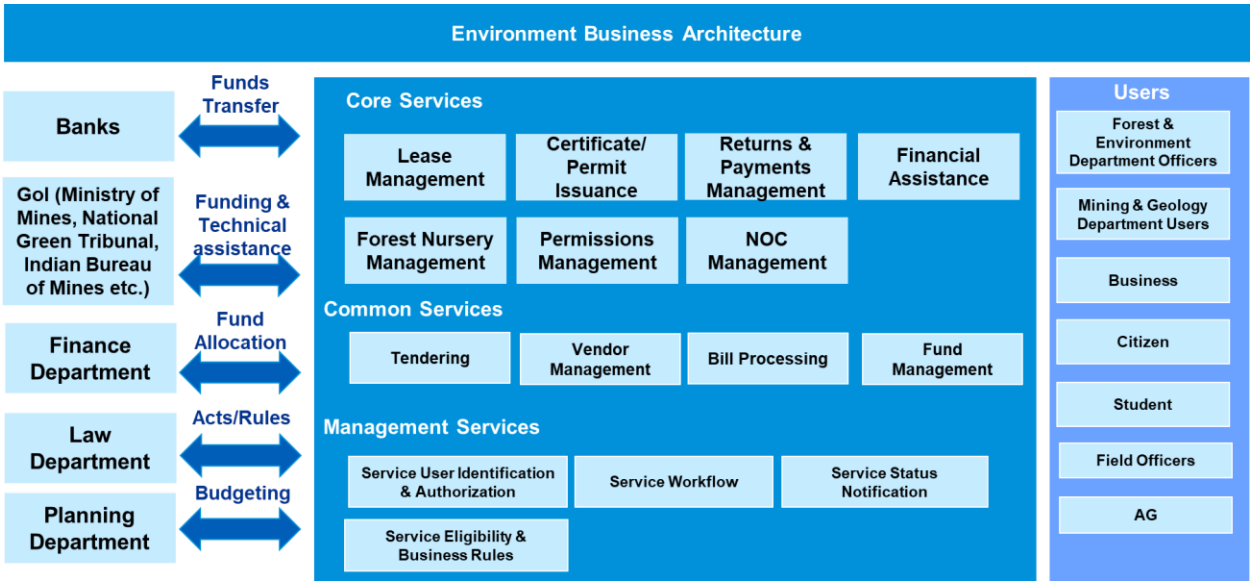


Figure 15: Environment Pillar- Future State Business Architecture

The core services, common services and management services constitute the architecture building blocks. The success of 'MeghEA' vision depends on its holistic approach, communication, and meticulous execution of the above building blocks to ensure the expectations meets the desired objectives.

Subsequent sections would determine the solutions to realize the above building blocks using applications, data, technology and security. It is imperative that each of the above building blocks be delivered through standard architecture methodology. The solution requirements to develop the above building blocks would follow a prioritized roadmap, basis of the government's priority. Hence, the realization of benefits would take a while however, the success measurement must be followed during the execution of the project.

To measure success, a similar approach must be followed to design solutions around the building blocks. As an illustration, digital service developed must adhere to the Digital Service Standard, the assessment framework must be followed to ensure all tenets are well covered for each service such as the service must have business process re-engineering executed before implementation.

Further, the Portal for Environment Pillar would include all services grouped into domains for easier understanding and accessibility of the businesses, Citizen/ Communities. The future state service landscape for Environment Pillar is as below:

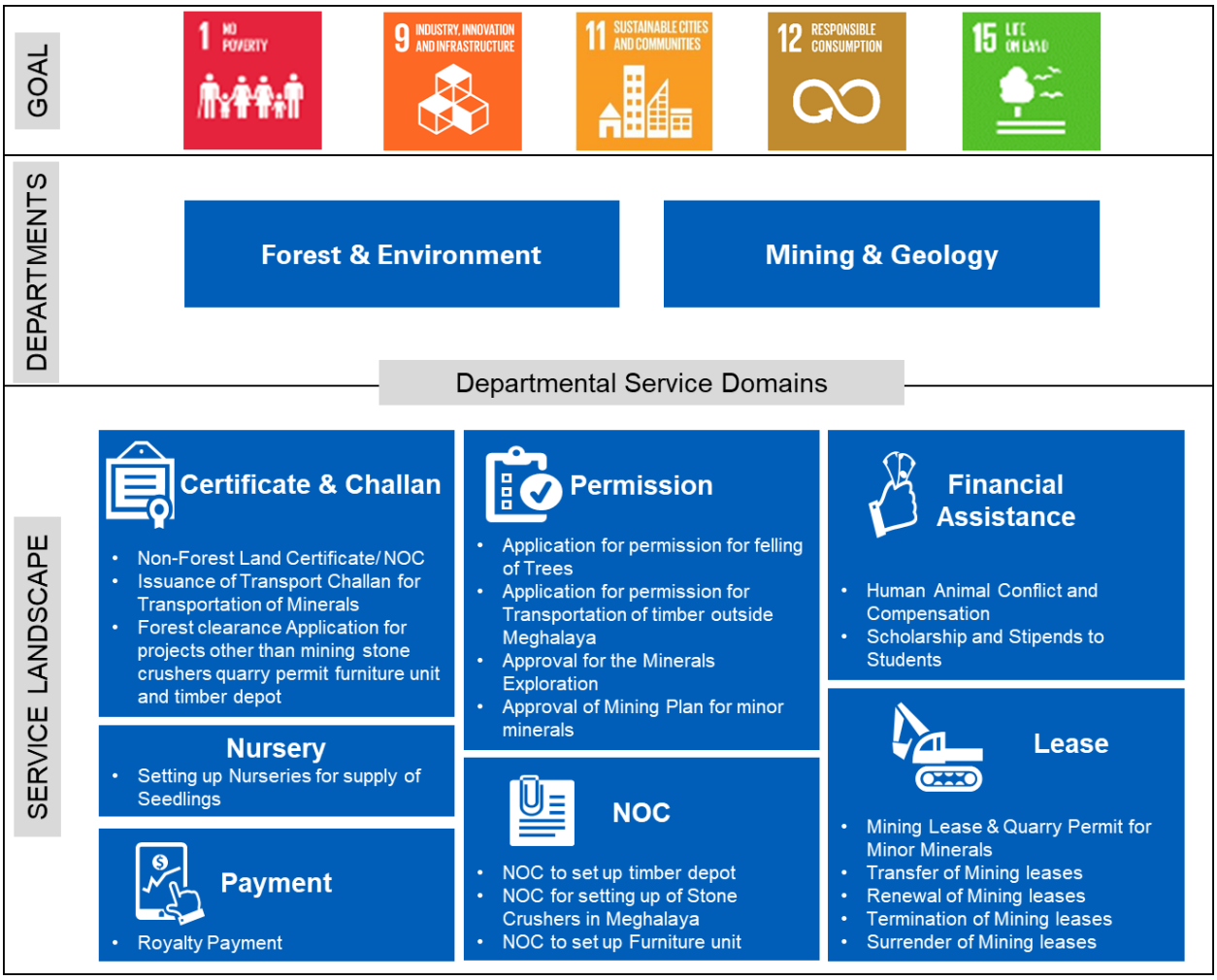


Figure 16: Indicative View of Environment Pillar Portal

3.9.1 Stakeholders' benefits

The representation below describes how achieving various Mission could provide benefits to various stakeholders :

Mission	Government	Citizens/ Businesses
Protect – Protect forest flora and fauna through a sustainable model	Can ensure sustainable development of various resources and their utilization	Empowered to thrive in an environment suitable for healthy life
Preserve – Preserve rich biodiversity, heritage, endangered species and culture	Can ensure sustainability of the communities	Utilize rich biodiversity to earn living using ecotourism as a key growth driver
Prevent – Prevent and	In addition to law and order	Ease of availing Government

Mission	Government	Citizens/ Businesses
eliminate revenue leakages	improvement, the realized revenue can then be used for various development and welfare activities	service through payment from digital channels
Promote - Promote empathy for wildlife and restricted tourism	Can ensure sustainability of tourism and the associated re	Leverage rich cultural heritage, biodiversity and natural beauty to foster growth through tourism and agriculture

Table 4: Connecting Mission to Benefits

In addition to the above, the following are the key benefits to the stakeholders as a result of the proposed digital transformation:

Value to Government

- **Automate** non-value-added processes through technology, non-value-add process such as file approval, service status, data search, lease, royalty calculations, tree clearing permissions and several other would be automated through **digital technologies.** Currently there are no digital technologies in departments in **Environment Pillar**.
- **Prudent revenue collection** by leveraging new digital technologies. As of today, the revenue collections is on check posts in remote areas which poses various risks in collections.

Value to Citizens and Businesses

- **Empowered** to apply for **entitled** services facilitated by digital technologies for Forest Mining and Mineral Mining.
- **Assisted** and **ease of service** application, facilitated by **chatbots**, easy service application forms and **integrated** data, users would need little digital literacy to apply for services to the citizens and businesses dealing in Mining or Forest Produce.
- **Multiple channels** for users to apply for services at their convenience e.g. Mobile App, State Portal, Digital Facilitation Centre and Rainbow Centres thus increasing outreach to the citizens for permissions of felling trees, or other mining activities.
- Improved efficiency of **internal processes** to enhance convenience and transparency to users. This can be achieved by making the transportation of timber and other permits online. Compliance should be checked at check gates.
- **Minimal** need for businesses to undertake physical visits for availing various services through digital platform like Environment Pillar Portal and Mobile App.
- Periodic **alerts** to the communities regarding various potential environmental hazards and the precautions they need to undertake.
- Facility for generation of **Online challan** for transportation of minerals/ timber/ other forest products out of the state.
- Enhanced knowledge on scientific/ improved methods of mining to miners and forest & environment conservation through **self-learning videos**.

4. Application Architecture

The application architecture model describes logical groups of IT Capabilities (logical application modules) that manage the data objects in the data architecture model and support the business services identified in the business architecture model. These components will tend to be static, but the technology portfolio used to implement them will change over time, based on the technologies currently available and changing business needs. The components provide the common, re-usable "Building Blocks" which can then be combined and orchestrated in order to construct business applications. The application architecture is based on the design principles defined in the Application Architecture principles of IndEA and shall ensure maximum value is extracted from IT investment, whilst at the same time minimizing the time, cost and complexity of developing, deploying, maintaining and enhancing the applications going forward.

The Objective of Application Architecture

- The application architecture section tries to capture the future state application landscape in line with the business requirements of the Environment Pillar Strategic Pillar. At Whole-of-Government level, the architecture framework would facilitate a common understanding of application assets and ICT services, identifying opportunities of sharing, reuse and consolidation or re-negotiation of licenses.
- The architecture framework would also assist in defining the data requirements, the design to store the data and how the data would need to be shared.
- The architecture would act as a framework in defining technology requirements.
- This would provide the framework through which Meghalaya Government would digitally **connect** with its stakeholders.
- Enable government to provide effective and integrated services to its stakeholders through integration – **collaborate.**
- This would also provide how processes and information would be executed to facilitate value delivery to citizens, **empower**ing government service delivery stakeholders.

4.1 As-Is State Application Architecture

There are no application systems specific to Mining & Geology and Forest & Environment Departments in the state. The primary gap is related to access to government services for businesses and citizens. This has led to lack of transparency in service delivery and lack of awareness of government services.

The existing systems (including center systems) are described below:

Application Name	Application Description	Application Architecture Description	Modules	No of Users	Application Group
Mining & Geology Department website	Website of department of Mining & Geology	MS.Net 4.0, C# and MS SQL Database 2012	Static Portal	Not Known	Department Specific

Application Name	Application Description	Application Architecture Description	Modules	No of Users	Application Group
Forest & Environment Department wensite	Static website of department of Forest & Environment	MS.Net 4.0, C# and MS SQL Database 2012	Static Portal with Link to Payment Portal	Not Known	Department Specific
Pradhan Mantri Khanij Kshetra Kalyan Yojana Portal (https://mitra.ibm.gov.in/pmkkky/Pages/Index.aspx)	Web Portal by GoI for providing financial assistance for development of Mining affected areas	Center System developed in Asp.Net	Reports	Not Known	Center System
Mining Tenement System	The Mining Tenement System (MTS) is a Digital Repository of entire Life Cycle analysis of each Mining Concession granted for major Minerals excluding Coal, Fuel and minor minerals. This includes automation of all the processes and approvals at various levels of governance thereby mapping all the activities from identification of potential mineral bearing areas to even post closure of mining activity thereby enabling real-time transfer of electronic data and files, with Geographical Information System (GIS) interface.	Not Known	• Registration • Concession Application & Mgmt • Mining Plan Approval • Royalty Payment • Return Filing • Inspections • Final Mine Closure	Not Known	Central System
Parivesh	Web based system with workflow application which has been developed for Online Submission & Monitoring of Environmental, Forest and Wild Life Clearances-A Single Window Clearance System for proposals submitted by the user agencies for seeking prior approval of	No details	• Forest Clearance • Wild Life Clearance • Environmental Clearance	Application agency (business), Forest department officers	Central System

Application Name	Application Description	Application Architecture Description	Modules	No of Users	Application Group
	Environmental, Forest, and Wildlife Clearance. It automates the entire tracking of proposals which includes online submissions of a new proposal, editing/updating the details of proposals and displays status of the proposals at each stage of the workflow.				

Table 5: As-Is Application Architecture

Application Name	Application Number	Type
Mining & Geology Department Portal	ENV.DEP.01	Department
Forest & Environment Department Portal	ENV.DEP.02	Department
Pradhan Mantri Khanij Kshetra Kalyan Yojana Portal	ENV.DEP.03	Department
Mining Tenement System	ENV.DEP.04	Department

Table 6: As-Is Application Encoding

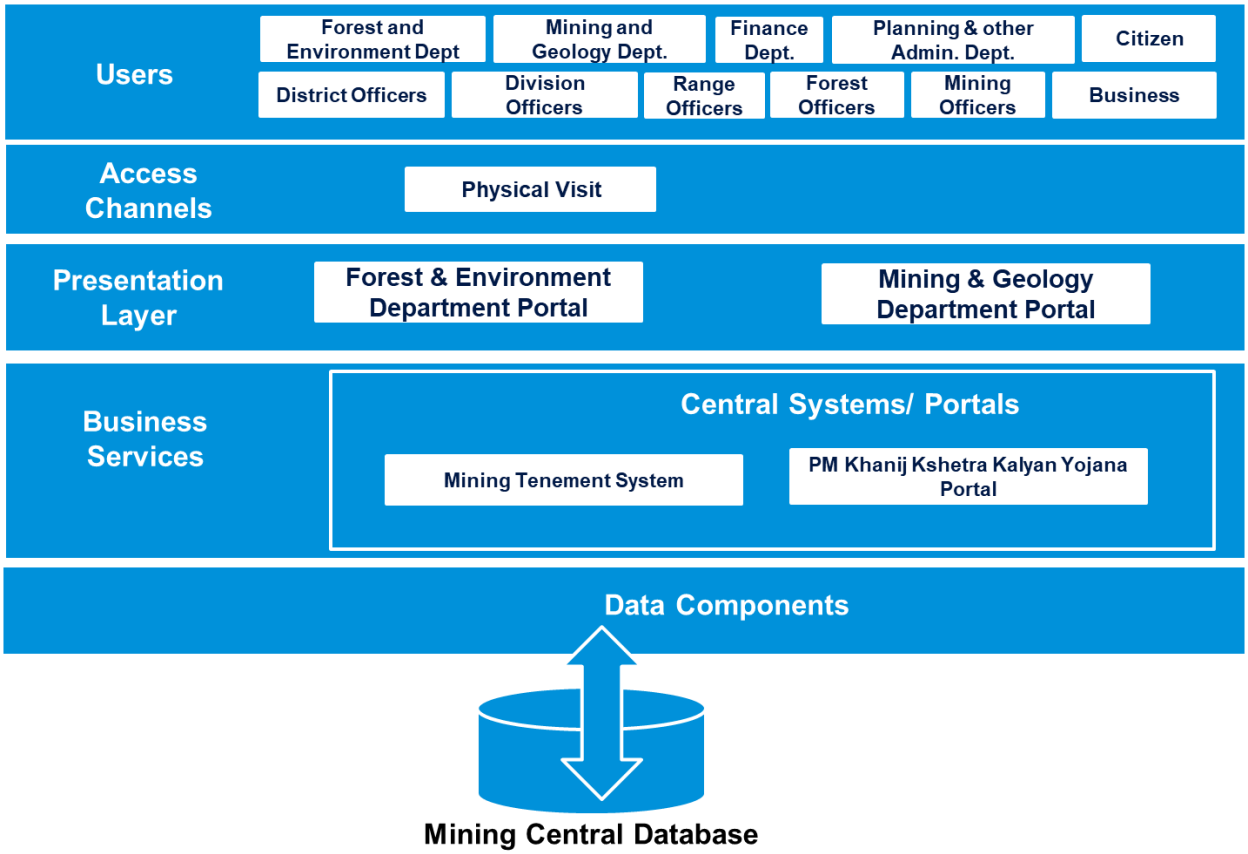


Figure 17: As-Is Application Architecture

4.2 Gap Assessment

Stage	Existing System	Business Functional Gaps
Planning	None	• Mining/ Extraction plans are prepared manually. • Approval files are moved manually from one authority to another which are extremely difficult to track and chances of lost are more.
Exploration	None	• Paper applications lead to physical file movement thus consumes a lot of time. • No timeframes defined for approvals. • Surveys, Mapping & Drilling, Geotechnical Surveys etc. are not captured in any system thus, the outcome of exploration is not shared with larger group.
Preparation	None	• Paper applications for lease and licenses need to be checked manually and may lead to missing verification of some information. • Manual tracking of validity of lease/ license granted to business entities may lead to missing the last date resulting in revenue loss.
Construction	None	• No system tracking of activities, schedules against plan. • Paper applications for felling of trees with no traceability of status.
Production	None	• Manual returns with no system level checks and calculations may sometimes result in wrong calculations of royalty due. • Transported produce can't be checked and reconciled against return declaration; thus, chances of revenue leakages are more.
Completion	None	• Closure plans are prepared manually. • Approval files are moved manually from one authority to another which are extremely difficult to track and chances of lost are more. • No system tracking of activities, schedules against plan.
Protection	No State Systems	• Currently the state does not have any systems for forest department services related to protection of forest area. Additionally, forest land maps are also not available this leads to key challenges in demarking forest area.

Table 7: Gap Assessment

There are several gaps in business functional coverage and service delivery enablement. However, over the course of the years the state along with some focus teams have developed few systems to bridge these gaps. The systems so developed have few lacunae, below is a high-level representation of the gaps.

4.3 SWOT Analysis of Application Architecture

Analysis Paradigm	Key Pointers	Target State
Strength	Availability of officers in forests and mining areas	Would be Retained
	Workflow management system exists (Service Plus).	Would be Retained
Weakness	Unavailability of survey tools	Recommended for implementation
	Monolith architecture with minimal integration capability (Static Portals).	Recommended for Re-architecture
	Lack of service digital maturity.	Would be Partially Eliminated
	Unavailability of Integration platform.	Recommended for State Service Bus and API-Gateway
Opportunity	Adoption of emerging technology to address unthinkable IT capability gaps such as: • Real-time monitoring of service delivery outcome • Integration of data for analysis • Business intelligence from reconciled data	Would be Realized
	Introduction of new services in digital service delivery channels	Would be Realized
	Use of modern portable device to collect data	Would be Realized
Threats	Unavailability of SSO leads to non-uniform security	Would be Addressed
	Resistance towards adoption of systems and inclination towards manual mode of service delivery	Would not be addressed
	Primitive user experience may lead to hinderance in technology adoption	Would not be addressed

4.4 Application Transformation Plan

Based on the current state understanding, it is observed that Mining & Geology Department and Forest & Environment Department are yet to make a state specific application available to various users to facilitate service delivery. There are several reporting systems available online for reporting purpose.

Basis study of business architecture and the derived business transformation plan, it is evident that new system has to be introduced for enabling digital services and enhance user experience. Following are the transformation areas:

- New system for Environment Pillar would be introduced for this purpose.
- Introduction of mobile apps that are accustomed to work in low or no network areas with feature to upload data whenever network is available.
- Introduction of core and common systems to align to state EA.

4.5 Future State

It is critical to note that, MeghEA would follow the **minimum viable architecture** principle. Hence, not all building blocks stated above would be built in a big bang approach. Rather, the roadmap would follow a step-by-step approach to ensure a smooth transition to the future state and a holistic approach that includes dependency assessment and several other considerations such as legal and regulatory assessment before project initiation.

The Prioritization Phase-I, would implement a minimum viable architecture for Environment that includes following principles:

- Implementation of systems that are mandatory for coverage of prioritized business service digital implementation.
- Implementation of common systems that can be used in a plug and play model, however these systems would be aligned to IndEA principles.
- A high-level cost impact assessment would be considered for derivation of the Phase-I architecture plan.

Based on above principles, below is a diagrammatic representation of the Phase-I Application Architecture for Environment is derived below:

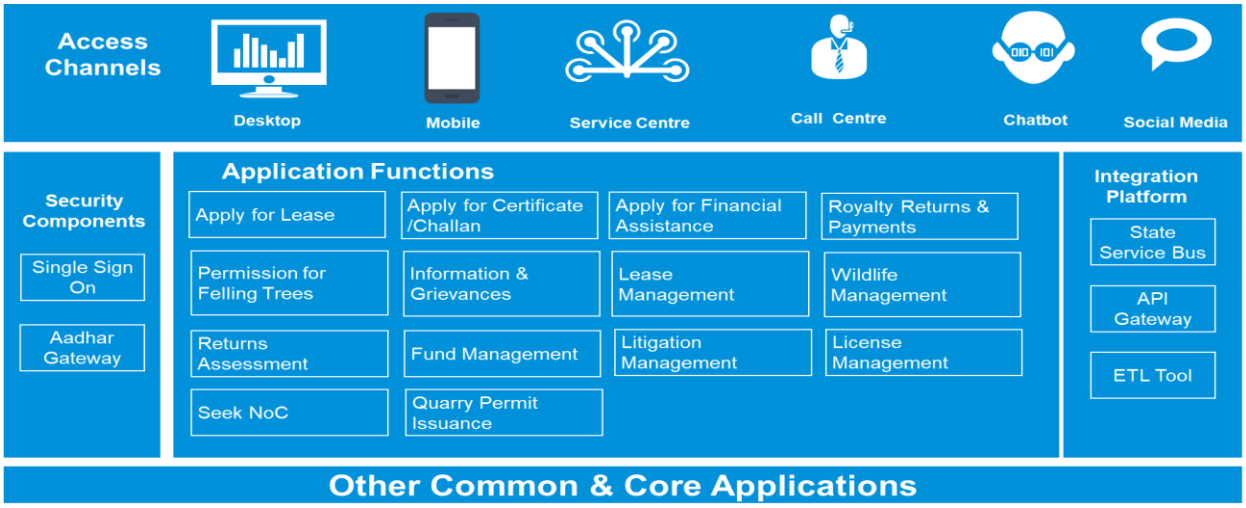


Figure 18: Environment Application Architecture

The above diagram illustrates the Phase -I application portfolio for Environment Pillar. The core and common applications to be included is described in main document.

Below is the system functionality for the Environment Pillar new applications.

Environment (New Applications)	
New Modules	**Sub-Modules and Description**
Financial Assistance	• Scheme Preparation: The module would enable new scheme to be prepared, service eligibility to be set-up and services to be delivered. • Scheme Approval: Module would enable verification and approval of schemes. • Scheme Funding: Set funding for scheme and map to 17-digit scheme code. • Scheme Eligibility: Define scheme eligibility parameters that can be used by system to perform automated checks. This would not be comprised of any descriptive values. The eligibility check may have (as an example) requirement of Citizen ID as a mandatory value. • Application Management: Would enable applications to be managed based on the pre-defined service levels and service delivery timeframes. • Verification and Approvals: The module would enable verification of applications and approvals of the same post verification. • Benefit Disbursement: the module would enable bill generation and sending to treasury for disbursement of benefit to applicant.
Returns & Payments	• Returns Assessment: This module would enable department officials to receive mineral royalty returns only and perform assessment to calculate the royalty due and reconcile the payments against the same. • Fee Payment: The module would enable the businesses/ citizens for payment of different fee levied on applications of different permits/ permissions.

Environment (New Applications)	
	• Royalty Payment: The module would enable mining lease holder to make payments against the dues as per mineral royalty return.
Certificate & Challan	• Land Status Certificate: The module would enable citizens/ businesses for applications for verification of land and get certificate to conduct certain activities like mining, roads, any projects, industrial set up, developmental works, construction works etc. • Transport Challan Issuance: The enable businesses to generate challan for transportation of timber/ minerals. • Transport Challan Verification: The module would enable department official to verify the material in transport vehicle against the challan. This module would help in recording quantity of material transported and returns filed by the lease holder for royalty payments or other fees. • No Objection Certificates: The module would help businesses to apply and avail No objection certificate for setting up timber depot, stone crusher or furniture units. • Permission Letter: The module would be used by citizens, businesses and officials. Citizens would apply for permission for felling of trees, businesses would apply for permission to transport timber outside state and for minerals exploration. The department officials would verify the applications and issue approval through the module.
Lease Management	• Issuance of New Lease: The module would be used for applications and approvals for new lease license. • Renewal of Lease: The module would be used for applications and approvals for renew of lease license. • Transfer of Lease: The module would be used for applications and approvals for transfer of lease license. • Quarry Permit Issuance: The module would be used for applications and approvals for Quarry Permit. • Termination/ Surrender: The module would be used for applications and approvals for surrender of lease license and termination by the department official.
	Technical Architecture
Application Architecture	Application to be built in Service Oriented Architecture/Micro-Service Architecture with complete isolation of business logic. The architecture needs to follow MeghEA architecture principles and adhere to MeghEA application architecture standards. These standards and principles are derived from IndEA
Data Architecture	Please follow data architecture section for data design: • Conceptual Data Model • Logical Data Model

Environment (New Applications)	
	Physical data model must be derived aligned to the Logical Data Model
Technology Architecture	The system would be deployed at State Data Centre and following are required: • Application Server • Web Server • Database Server Please refer Technology architecture section for detailed requirement

Table 8: Environment Pillar New Application Modules

4.5.1 The Service – Application Matrix

The below table is a critical table to explain the flow of information across modules to deliver services in Environment Pillar. Further to the above, the application modules are mapped to service in manner they would be delivered. The detailed service to application module mapping is shown below:

Future state applications in Environment Sector would be as follows:

Application Name	Application Number	Type
Environment Pillar System	ENV.GRP.01	Group
State DBT	MEG.COM.01	Common
Learning Management System	MEG.COR.01	Core
e-Office	MEG.COM.02	Common
Service Plus	MEG.COR.02	Core
TreasuryNet	MEG.COM.03	Common
iOBS	MEG.COM.04	Common
Chatbot	MEG.COR.03	Core
MeghEIS	MEG.COM.05	Common
Email/ SMS Gateway	MEG.COR.04	Core
GRAS	MEG.COM.06	Common
DigiLocker	MEG.COR.05	Core

Table 9: Future State Application Encoding

4.5.2 Future State Application Communication Model

The future state application communication model would not be based on point to point integration rather be enabled by State Integration platform. The integration platform's primary function would be to provide the connections between communicating applications - acting much like a router to control the data. The interaction and communication between components are across the platform, which has a similar function as a physical computer bus to handle data transfer or message exchange between services without writing any actual code.

As per the business architecture interaction matrix (please refer section), the systems need a high degree of integration owing to the varied portfolio and business functional capability. To enable information flow for effective business integration, the integration platform would ensure reliable, cost effective and managed integration across the systems.

Below are the logical integration details between each system:

Consumes Information ---> Provides Information V	Environment Pillar System	State DBT	eOffice	Service Plus	iOBS/ TreasuryNet	Chatbot	MeghEIS	GRAS	Email/ SMS Gateway	DigiLocker
Environment Pillar System		Beneficiary Bank Details	Request Acts/Rules	Invoke Service Request from list Provide Resolution Stakeholder	LOA Amount scheme code wise, Bill Submission	Information Services	Stakeholder Information Request	Service Payment Request	Email/ SMS notification	Certificate, License, Permit
State DBT	Payment update									
eOffice	Acts & Rules, File Movement									
Service Plus	Service Status									
iOBS/ TreasuryNet	Bill Details for Payment	Payment Request								

Consumes Information ---> Provides Information | V	Environment Pillar System	State DBT	eOffice	Service Plus	iOBS/ TreasuryNet	Chatbot	MeghEIS	GRAS	Email/ SMS Gateway	DigiLocker
Chatbot	Service Request No									
GRAS	Service Payment Status									
MeghEIS	Service Resolution Stakeholder Details								Email id of Dept. Stakeholder	
Email/ SMS Gateway	Email/ SMS notification to stakeholders									
DigiLocker	Citizen ID, ID Card									

Table 10: Application Communication Matrix

Basis of the above communication matrix, below diagram is an illustrative representation of application:

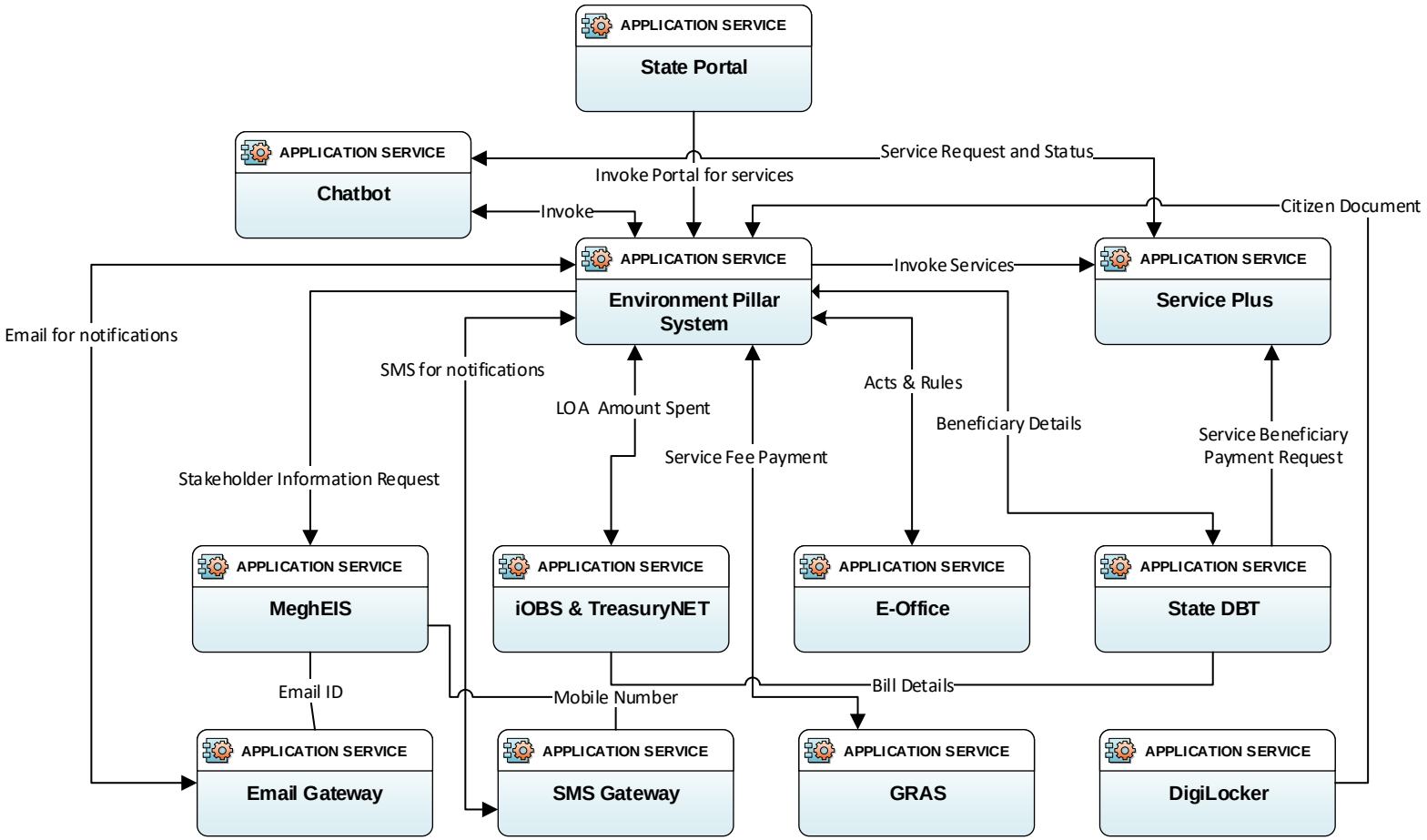


Figure 19: Future State- Application Communication Model

Even though above diagram illustrates the logical model for application communication, the practical implementation would be different.

The future state application communication model would not be based on point to point integration rather be enabled by State Integration platform. The integration platform's primary function would be to provide the connections between communicating applications - acting much like a router to control the data. The interaction and communication between components are across the platform, which has a similar function as a physical computer bus to handle data transfer or message exchange between services without writing any actual code.

Based on above analysis, following APIs (logical level) needs to be made available. Please note the list below is indicative in nature and needs to be further elaborated at the time of implementation.

API/ Application Service	Data Sharing Details	Source Application	Destination Application
Service Request	• Service ID (Number) • Mobile Number (Number)	Chatbot	Service Plus
Service Acknowledgement Status	• Service request ID(Number) • Service application URL	Service Plus	Chatbot
Aadhar Verification	• Aadhar Number • Verification Result	Service Plus	UIDAI
Fetch Name & Demography-Aadhar	• Aadhar Number • Name • Date of Birth • Last Name • First Name • Address • Pin Code • Sex	Service Plus	UIDAI
PAN Verification	• PAN • Verification Result	Service Plus	GST System
Fetch Company Details	• GSTN • PAN • Legal Name • Trade Name • Date of Liability • Date of Validity • Type of Registration • Address	GST System	Service Plus
Financial Assistance	• Application ID • Beneficiary Details • Beneficiary Bank Details • Amount	Environment Pillar System	TreasuryNet
Returns & Payment	• Return ID • Return Details	Service Plus	Environment Pillar System

API/ Application Service	Data Sharing Details	Source Application	Destination Application
	• Payment Due		
Certificate & Challan	• Application ID • Beneficiary Details • Certificate Number • Certificate Details	Environment Pillar System	DigiLocker
Lease Management	• Lease ID • Lessee Details • Lease Validity	Environment Pillar System	DigiLocker
Service Status	• Service Request ID • Service Status • Reason for Delay	Environment Pillar System	Service Plus

Table 11: Logical Application Integration Requirements

4.5.3 Illustrative Use Cases

Based on above analysis, MeghEA Environment Application Architecture would aim to be futuristic and visionary to achieve citizen centric objectives that is not been achieved in many Indian states. Below are the objectives which would be realized.

Accessibility

The services would be available in many delivery channels and enabled by Chatbot with artificial intelligence capability. The IndEA principle of Anywhere, Anytime Service Delivery is at the core of the architecture. The service availability channel includes:

- Chatbot
- State Portal
- Social Media Channels – Facebook Chat and WhatsApp
- Common Service Centers

Service Ease

Data once captured would not be asked again, document storage and application integration would be aimed to minimize service forms data requirement to minimal. For these multiple data repository would be connected to verify citizen's/ business data and pre-populate the descriptive data.

Service Tracking

Enabled by modern systems, service workflow would be enabled by SMS/Email notifications. All services, as per service timeline would be tracked along with escalation mechanism to escalation to appropriate stakeholders in cases of service delivery delay.

Commodity Services

Certificates, License, Approval, NoC and similar such documents would be available for citizens without the need of citizens asking for the document. These documents would be stored in secured citizen locker.

Below is a use case depicting the same for environment pillar. Citizens would be facilitated with

services through simple and easy process steps.

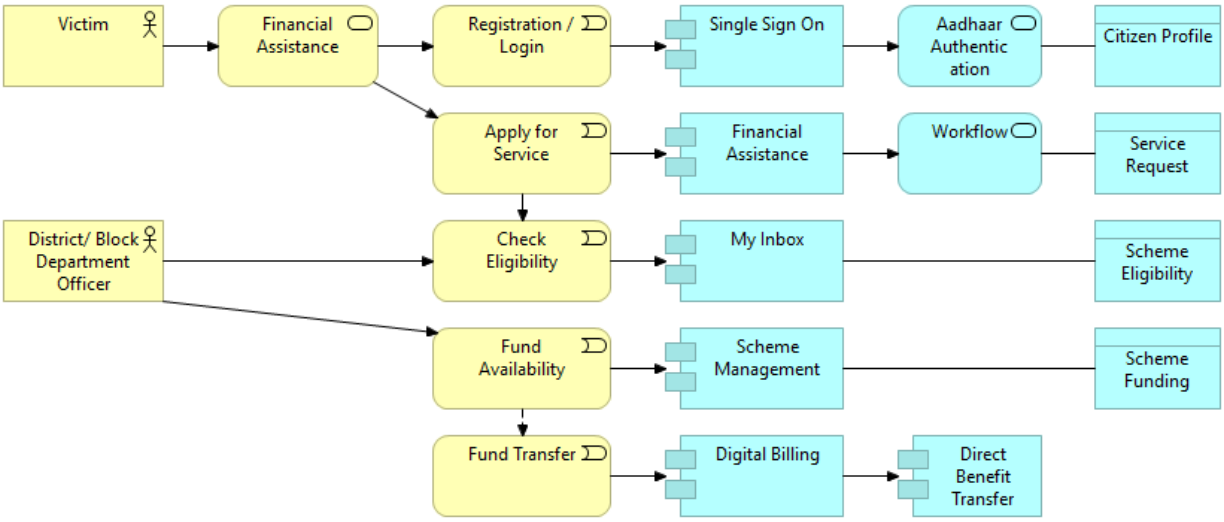


Figure 20: Illustrative Use Case

4.5.4 The Future State Application – Stakeholder Matrix

One of the key objectives of MeghEA – Environment Application Architecture is to enable all stakeholders with digital service delivery and resolution channels. The application so designed is aimed to ensure all stakeholders are taken into consideration to design the application functionality.

Environment has a varied list of stakeholders – Business and Citizens (at the core of it), Department Employees, Forest Officers, Mining Officers and various other department users as well. Uniquely Environment Pillar system would also be accessed by the state Government leadership as well. Below is a table illustrating the planned mapping for Environment Pillar:

Stakeholders	Environment Pillar System				
	Financial Assistance	Returns & Payments	Certificate & Challan	Lease Management	Reports
Principal Secretary	✓				✓
Commissioner & Secretary	✓				✓
Officer on Special Duty	✓				✓
Deputy Secretary	✓				✓
Under Secretary	✓				✓
Director	✓	✓	✓	✓	✓
Joint Director	✓	✓	✓	✓	✓
Deputy Director	✓	✓	✓	✓	✓
Senior Geologist					✓
Senior Drilling Engineer					✓

Stakeholders	Environment Pillar System				
	Financial Assistance	Returns & Payments	Certificate & Challan	Lease Management	Reports
Chief Chemist					✓
Mining Engineer					
Geologist					
Petrologist					
Photogeologist					
Sr. Chemist					✓
Divisional Mining Officer		✓	✓	✓	✓
Asst. Geologist					
Asst. Geophysicist					
Senior Surveyor					
Drilling Engineer					
Chemist					
Mining Officer		✓	✓	✓	
Principal Chief Conservator of Forests & Head of Forestry Force					✓
Principal Chief Conservator of Forests					✓
Addl. Principal Chief Conservator of Forests					✓
Chief Conservator of Forests					✓
Deputy Conservator of Forests	✓	✓	✓		✓
Conservator of Forests				✓	✓
Planning Officer				✓	✓
Forest Officer	✓	✓	✓	✓	
Range Forest Officer	✓	✓	✓	✓	
Director		✓	✓	✓	✓
Divisional Forest Officer	✓	✓	✓	✓	✓
Chief Forest Officer				✓	✓
Managing Director				✓	✓

Table 12: Future State Application – Stakeholder Matrix

5. Data Architecture

Data Architecture provides means for Environment departments to consistently define their data, sharing of information among other departments and external agencies, providing opportunities for improved information flow and efficiency and effective Governance. Further, it facilitates increased **collaboration** among departments/agencies and reduce the number of incompatible systems thereby contributing to Government-wide interoperability. It ensures that special attention is given to security and technical requirements of individual data elements so that they are implemented appropriately.

The Objective of Data Architecture

- Improving the discovery of data entities , access and sharing of data among both internal (departments) as well as external stakeholders (citizens, businesses and developers);
- Minimizing the duplicative efforts by capturing the data only once in the system and **connecting** with other systems and capturing only the incremental data as and when required in the business process. Auto-populating of the existing data with due validations would be required;
- Ensuring the accountability for the quality, consistency and security of data;
- Developing shared vocabularies for ensuring common understanding of data;
- Facilitating **collaboration** among departments at all levels of the Government;
- Reducing cost and impact on citizens and businesses because of redundant collection of citizen and/or business data;
- Identifying the technical and security requirements of different data assets;
- Ensuring that notified standards are adopted so that interoperability among applications is ensured.

5.1 Current State Assessment

5.1.1 Current State Data Entities

There are quite a few systems in Forest & Environment and Mining Department and largely works independently without any data sharing. The Department lacks any data governance processes and is at a risk owing to lack of availability of data retention, data back-up and data sharing policies.

Below is the list of critical data entities along with the system of origin and usage. Please note these data entities are mostly at conceptual level.

Data Entity	Key IT System	Stakeholder Usage
Service details	• Department portals	• Beneficiary (Citizen/Business) at Districts and State HQ
Business Details	• UAM • GSTN System	• Beneficiary (Citizen/Business), DFO at Districts and State HQ
Certificate and NOC	• Department Portal	• Forest & Environment and Mining Department
Payment and returns	• Department Portal	• Forest & Environment and Mining Department

Data Entity	Key IT System	Stakeholder Usage
Finance Details	• Department Portal	• Forest & Environment and Mining Department
Vendor Details	• Department Portal	• Forest & Environment and Mining Department
Lease Details	• Department Portal	• Forest & Environment and Mining Department
Environment reports	• Department Portal	• Forest & Environment and Mining Department

Table 13: Current State Data Entities

Currently, the above data is not integrated and available in excel based files in silo systems. There are no database systems being developed in used in Forest & Environment and Mining Departments. The diagrammatical representation of the same is as below:

5.2 Challenges and Pain Points

The challenges and pain points of data architecture is categorized as below:

5.2.1 Data Design

The Portals of departments are only IT systems owned by environment sector departments. Data design concept is completely missing from the department portals. Additional key points that may provide details around current state of data architecture,

- Department Portals are collection of static information pages, i.e. lack of any mechanism to collect the information or data from stakeholders.
- The forms required to avail any department services are kept on portal, rest process till delivery of service is manual.
- Portals design is lacking any data architecture principle, i.e. there is no backend database to keep the records of the details.
- The data is entered manually by the officer receiving the application form. This would lead to data quality issues because of data entry errors.
- Details and reports are published as static pages after entering the data manually.
- Digitally Information exchange not possible considering silo and static data sheets.

5.2.2 Data Quality Management:

The data quality management involves key aspects of data such as correctness of data, metadata management, data profiling and monitoring quality of data through statistical procedures. Key

issues identified are described below:

- Data validation and verification is missing, SOP to re-check the manual data is not in place.
- Data profiling is missing, this leads to unavailability of knowledge related to what data is stored for which service.
- Unavailability of process related to metadata management, data dictionary documentation, and documentation around data repository has created lacuna in system adoption.
- Data quality dashboard is not built, or no process exists to track quality of data used. This impacts causal analysis and error corrections.

5.2.3 Data Life-cycle Management:

The data life-cycle management is the process of managing business information throughout its lifecycle, from requirements through retirement. The lifecycle for data crosses different application systems, databases and storage media. The cycle is made up of phases of activity including create, use, share, update, archive, store and dispose.

- Data ownership or steward is not defined as the data lies in offline mode in manual registries. There is no state level application database in use.
- Data entities such as Leasee data, Mining data, Forest Data are not mapped to services. Thus, a business justification of data is weak.
- The data attributes, data models, data dictionary and other related documentation does not exist. This has led to issues on management of data.
- Data security requirement is not established, data classification does not exist. The manual registries of Leasee, Mining areas, returns etc. can be assessed by non-authorized person without a record.
- Data archival process is not there for storing manual registries older than specified archival period.

5.3 SWOT Analysis of Data Architecture

Analysis Paradigm	Key Pointers	Target State
Strength	Process to execute the information	Would be Retained
	Although Manual but historical data on mining , lease, emissions, etc. is available	Would be Retained
Weakness	Business registration data along with Land and lease details is captured and available	Proposed for Elimination
	No mapping of tables through Environment and Foreign keys.	Proposed for Elimination
	Unavailability of Master Data Management system	Proposed for Elimination
	Unavailability of data warehouse, business intelligence-based capability	Proposed for Elimination
Opportunity	Introducing Data Architecture concept and principles, Enhancement of data quality, data integration and data management to enhance reporting	Would be Realized
	Introduction of new capabilities – data analytics, data warehouse, data management	Would be Realized
	Introduction of new data entities for digitization of manual processes	Would be Realized
Threats	Manual record Keeping and adopt silo data base system development	Would be Realized
	Reporting may be hampered due to poor data quality	Would be Addressed
	Non availability of utilization of funds data and stock data under different schemes	Would be Addressed

5.4 Environment Sector Metadata

Refer MeghEA: Statewide Detailed Architecture Requirements for Metadata Standard Typology. Addition to the statewide standards, follow standards would be followed in Environment Sector

Content Related Standards

Standard	Mandatory/ Optional	Reference Link	Remarks
ISO 19115	Mandatory	https://www.iso.org/standard/26020.html	ISO 19115:2003 defines the schema required for describing geographic information and services. It provides information about the identification, the extent, the quality, the spatial and temporal schema, spatial reference, and distribution of digital geographic data.

5.5 Data Transformation Plan

5.5.1 Master Data Management and Data Warehouse

Environment Sector Departments would play a significant role in the state master data management. Following are the key data entities that would be included as part of the State Master Data, along with the extraction methodology and frequency. The extracted data would be included in the Data Warehouse.

Data Entity	Data Store (System)	Data Extraction Tool	Master Data	Frequency (Recommended)
Beneficiary	Environment Sector System	ETL	✓	Weekly
Service Request	Service Plus	Not Required		Weekly
Lease Register	Environment Sector System	ETL	✓	Daily
Location	Common System	ETL		Weekly
Returns and Payments	Environment Sector System	ETL	✓	Weekly
NOC and Approvals	Environment Sector System	ETL		Weekly
Challan Register	Environment Sector System	ETL		Weekly
Certificate Register	Environment Sector System	ETL		Weekly
Officer Register	MeghEIS	ETL	✓	Weekly
Minerals Register	Environment Sector System	ETL		Daily
Asset Register	Environment Sector System	ETL	✓	Weekly
Scheme Register	Environment Sector System	ETL	✓	Weekly

Service Register	Environment Sector System	ETL		Daily

Table 14: Master Data Management Requirements Matrix

The data warehouse would follow Enterprise Data Warehouse Model, with ETL used as data extraction tool and Business Intelligence used for visualization of data reports.

5.5.2 Data Governance in Environment Sector

All departments under Environment Sector would have a role to play in each of the stages of the Data Lifecycle for the Scheme (core data entity).

Data, being a key asset of the Government, must be correct, up-to-date, complete and secure (quality data). These requirements are managed by the following roles:

- Data owner
- Data Trustee
- Data Custodian
- Data Steward

For details on the above roles along with data governance responsibilities, please refer Statewide – Detailed Architecture Requirements document.

The Data Steward, Data Custodian and Data Owner for various key data entities are described below:

Data Entity	Data Trustee	Data Steward
Business	F&E and Mining – Deputy Secretary	F&E and Mining – Joint Secretary
Service Request	Respective Departments – District Officer	Respective Departments – Director
Lease Register	Respective Departments – District Officer	Respective Departments – Director
Returns and Payments	F&E and Mining – Deputy Secretary	F&E and Mining – Joint Secretary
Location	Respective Departments – District Officer	Respective Departments – Director
NOC and Approvals	F&E and Mining – Joint Secretary	F&E and Mining –Secretary
Challan Register	F&E and Mining – District Officer	F&E and Mining – Director
Certificate Register	F&E and Mining – District Officer	F&E and Mining – Director
Minerals Register	F&E and Mining – District Officer	F&E and Mining – Director
Officer Register	Finance Department – Joint Secretary	Finance Department – Secretary
Asset Register	Respective Department – District Officer	Respective Department – Director

Data Entity	Data Trustee	Data Steward
Service Register	Respective Department – District Officer	F&E and Mining – Director
Scheme Register	Respective Department – Joint Secretary	Respective Department – Secretary

Table 15: Data Entity Role Matrix

The Steps for data Quality Management is illustrated in Detailed Architecture Requirements: Data Architecture section of Statewide – Detailed Architecture Requirements document.

5.6 Future State

5.6.1 Environment Sector Data Architecture

MeghEA data architecture includes various core data entities. The core data entities are those which contain data elements that are most commonly used in the applications of several departments of the Meghalaya Government. The core data entities are listed below:

- Citizen
- Business
- Student
- Employee
- Minerals
- Wildlife
- GIS
- Schemes & Policies

Environment Sector deals with all the core data entities.

As defined in State-wide Detailed Architecture Requirement document, the data architecture building blocks are defined considering minimalistic approach – to include only those building blocks which are mandatory for the Government of Meghalaya, please refer Statewide – Detailed Architecture Requirements document.

Below diagram illustrates the Digital Registries applicable to Environment Sector (highlighted). Please refer Statewide – Detailed Architecture Requirements document for details of the digital registries.

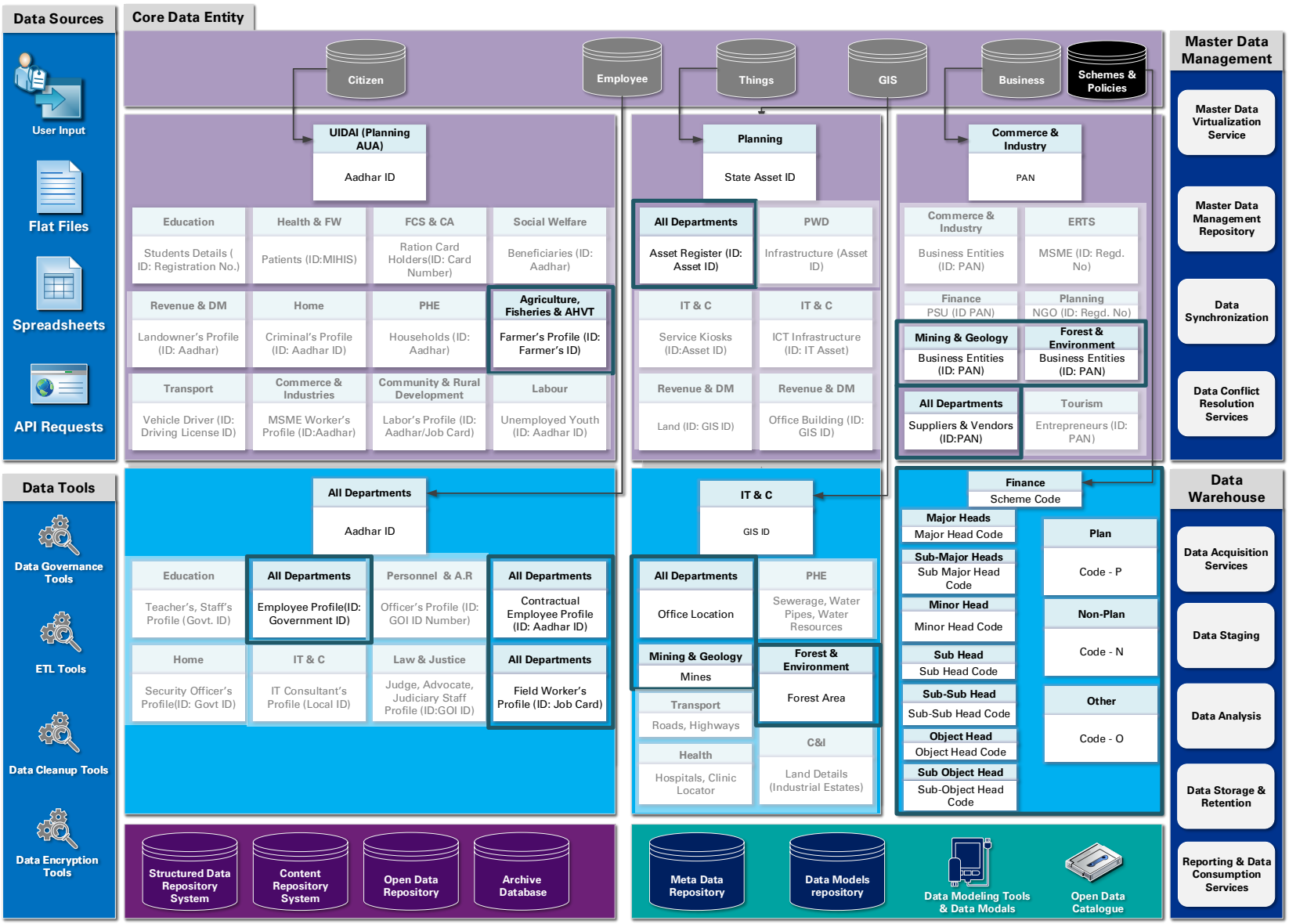


Figure 21: Environment Sector - Digital Registries and Data Tools

5.6.2 Conceptual Data Model

Data Entities: The data entity is the fundamental building block in the data structure design of the department. An Entity is an abstraction for a Business, Citizen, location, object, event, or concept described (or characterized) by common Attributes.

Attributes: An Attribute is a property or characteristic of an Entity. Different instances of an entity may have different values for an attribute.

Digital Data Source: A Digital Data Resource is a digital container of information. A Digital Data Resource may correspond to three types of data: "Structured Data Resource", "Semi-Structured Data Resource", and "Unstructured Data Resource".

Relationship: Relationship defines the relation with other key entities.

S. No	Entity Name	Description	Attributes	Digital Data Source	Relationship
1	Business	The data entity with information related to Business who wish to OR has been benefited by department through service delivery	• UAM • PAN • Business details • Location • Mineral	UIDAI Database UAM PAN	• Service Request • Location • Business Profile
2	Service Request	The service request entity is the high-level model for service plus	• Request id • Order type • Order details	Service Plus	• Beneficiary • Sales Order • Officer Register
3	Lease Register	The entity stores information related to lease of Mine fields:	• Business ID • Mineral type • Exploration details	UIDAI Database UAM	• Business • Service Request • Location • Business Profile
4	Location	The entity stores information related to location of mine, Green fields: • Immunization Kits • Medicines	• GIS ID • Mine ID • Location • Mineral ID	No Any	• Treatment Register • Location
5	Returns and Payments	The location entity contains the details of income from Mining and return details	• Business ID • Payment details • Village ID	Challan ID	Multiple entities
6	Approvals	The entity stores information related to Challan Approval, status, start end date, rejection reason and Business details	• Business ID • Request ID • Mineral Type • Supportive Status • Mineral Type	No any	• Business • Mineral Register • Officer Register • Environment compliance Register
7	Challan Register	The entity stores information related to Challan details, status, start end date, rejection reason and Business details	• Business ID • Request ID • Mineral Type • Supportive Status • Mineral Type	No any	• Business • Mineral Register • Officer Register

S. No	Entity Name	Description	Attributes	Digital Data Source	Relationship
8	Certificate Register	The entity contains information related to Exploration, Mineral	• Mineral Type • Business ID	No any	• Business ID • Asset ID • Citizen ID
9	Officer Register	The entity contains information related to Department employee, office location and various officials' details	• Employee ID • Location	No any	• Location • Officer ID
10	Minerals Register	The entity contains information related to details of Minerals, Exploration, type and location of land	• Mineral Type • Exploration status • Designation ID • Role ID • Location	No any	• Service Request • Mineral Register • Location
11	Asset Register	The entity contains information related to items / Products.	• Item ID • Scheme ID • Item Quantity • Item Name	No any	• Location • Scheme • Service Request
12	Scheme Register	The entity contains information related to different schemes offered by departments.	• Digital ID (Beneficiary ID) • Location • Address	No any	• Beneficiary • Location
13	Service Register	The entity contains information related to schemes being offered.	• Scheme ID • Service ID • Scheme Funding	No any	• Service Register • Service Request
14	NOC	The entity contains information related to services being offered.	• Request ID • Service Name • Service Eligibility • Document status	No any	• Request Register • Service Request

Table 16: Environment Sector – Conceptual Data Model

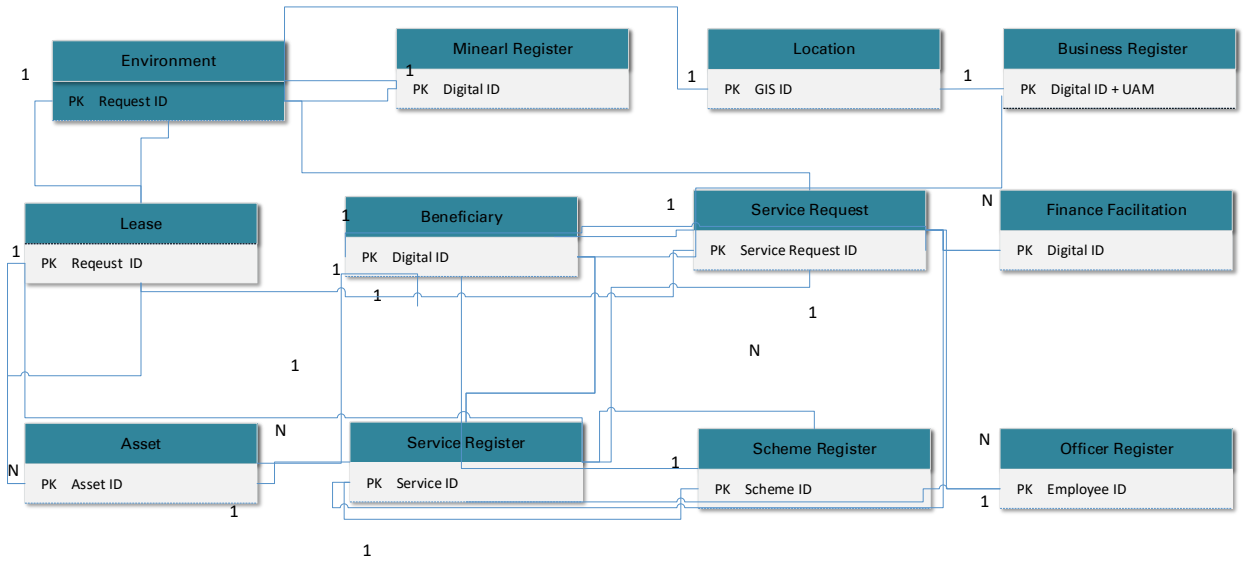


Figure 22: Environment Sector Conceptual Data Model

5.6.3 Logical Data Model

A logical data model is a holistic representation of the 'in scope' of business entities, their relationships, and their attributes. It is used to provide a detailed description of the data requirements and needs in support of the 'in-scope' business activities irrespective of the physical implementation environment or performance considerations.

The new data entities discussed above have been further detailed to include in Logical Data Model. It is also to be noted that the data entity detailing may change upon further analysis of the requirement.

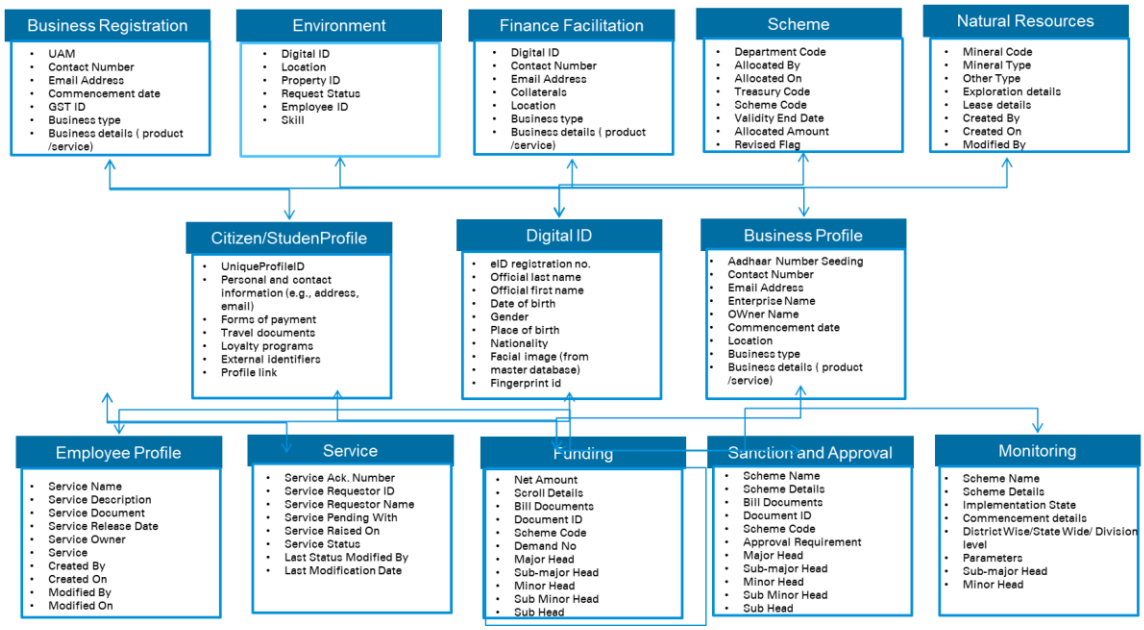


Figure 23: Logical Data Model

5.6.4 Service and Data Mapping

As we had observed in the earlier section, there are not many systems in Environment Sector and hence, minimum data. These data are stored in system specific databases. As a part of the transformation, data entities need to be created and these data entities would be stored in new systems. It is imperative to understand the services that these new data entities would create. This would ensure establishment of a structure for data management and development of new systems.

Data Entity	Data Store (System)	Created By	Modified By	Used By
Beneficiary	Environment Sector System	First service availed by Citizen/ Business	No Modification Allowed	All services related to Business/ Citizen
Lease Register	Environment Sector System	All lease and Quarry request services	No Modification Allowed	Lease approval, renewal, etc. Services
Service Request	Service Plus	All services	Every service delivery step	The applied service and tracking services
Returns and Payments	Environment Sector System , Payment gateway	Revenue returns filing and Payments	Earning from mineral blocks and revenue collection service	Payment and Revenue Services
Location	GIS Database	Administrator based on GIS ID Codes	As per directives	All Services
NOC and Approvals	Environment Sector System	F&E and Mining Officer at District level	F&E and Mining Officer at District level	All F&E and Mining Services
Challan Register	Environment Sector System	All Requests	Every service delivery step	The applied service and tracking services
Certificate Register	Environment Sector System	Land /Exploration Request	On receipt of new stock and consuming stock on providing service	All distribution and sale services
Officer Register	Environment Sector System	Approval Related services	On receipt of new service request, new, renew, suspension	All services related to Mining
Minerals Register	Environment Sector System	On recruitment	Finance Department	All service workflows
Asset Register	Environment Sector System	Procurement Related services	On receipt of new stock and consuming stock on providing service	All distribution and machination services

Data Entity	Data Store (System)	Created By	Modified By	Used By
Scheme Register	Environment Sector System	Department Administrator	On instructions from State Government/ Centre Government	All services under that scheme
Service Register	Environment Sector System	Department Administrator	On instructions from State Government/ Centre Government	All services

Table 17: Environment Sector Service Data Mapping

The above table shows data flow in Environment Sector. A data flow is a path for data to move from one part of the IT system to another. The above is tentative and may be revised at time of implementation.

6. Technology Architecture

Technology Architecture depicts the layout of the technology foundation of ICT-based systems to be designed for delivery of identified business services. Technology Architecture lists all the components of the technology system on an end-to-end basis, including IT Infrastructure, Applications, Access Devices, Communication Systems and Service Delivery modes. It further defines the currently applicable open standards for all the solution building blocks and components and identifies the Open Source Products for each technology component.

6.1 Current State Assessment

Current state assessment is an important aspect to understand the infrastructure components available and can be used. The infrastructure available for Environment Pillar is assessed in further sections.

6.1.1 Environments and Locations

Environment and location components incudes all the IT infrastructure needed for deployment with respect to production environment for as-is and future state.

The following table provide the current technology stack Environment Pillar portals already available:

Application Name	Application Platform	Operating System	Database	Software License Status
Mining & Geology Department Website	MS.Net 4.0 with C#	Windows	SQL Server 2012	SQL Server 2019 released
Forest & Environment Department website	MS.Net 4.0 with C#	Windows	SQL Server 2012	SQL Server 2019 released

Table 18: Environment Pillar Current Technology Stack

6.1.2 IT Infrastructure

Following systems are hosted at Mini Data Centre maintained by NIC Meghalaya:

- Mining & Geology Department Portal
- Forest & Environment Department Portal

The existing infrastructure components and their locations are provided below;

Infrastructure ID	Infrastructure Component Type	Application/ application component	Make, Model	Data Centre	Infrastructure Challenges
-	Web Server	Mining & Geology Department Portal	HP ProLiant BL460C	NIC	End of Life

Infrastructure ID	Infrastructure Component Type	Application/ application component	Make, Model	Data Centre	Infrastructure Challenges
-	Web Server	Forest & Environment Department Portal	HP ProLiant BL460C	NIC	End of Life

Table 19: Existing Infrastructure Components

6.1.3 Network

The primary network for the service delivery centres is NICNET, the secondary network of Meghalaya SWAN is outdated and mostly non-operational. The network details for blocks are not available hence not included in the document.

6.2 Challenges and Pain Points

The critical challenges and points have been captured under the following categories:

- **Unavailability/Outdated IT Infrastructure**: The tools and technologies that are missing and are required considering the reference technology model. The IT infrastructure that have crossed the end of life; and have issues related to support and maintenance.
- **Network**: The availability of uninterrupted primary and secondary network is critical for the working of departments under Environment Pillar. The key challenges with respect to network is discussed under this consideration.

6.2.1 Unavailability/Outdated IT Infrastructure

The infrastructure on which the applications/ portals of departments in Environment Pillar are deployed has been analysed and the gaps has been identified. The details identified are listed below:

Application Name	User Departments/ Function	Gaps
Mining & Geology Department Portal	Mining & Geology Department	Crystal Server infrastructure needs immediate upgrade.
Forest & Environment Department Portal	Forest & Environment Department	Crystal Server infrastructure needs immediate upgrade.

Table 20: Infrastructure Gaps

6.2.2 Network Challenges

Network is a critical area and Meghalaya Government have several issues with respect to the network. Below are the key challenges Meghalaya is facing in terms of network.

Key Issues:

- Unavailability of network (Primary and Secondary) in many blocks.
- Unavailability of secondary network in some districts.
- Network audit is not carried out
- Network devices are not assessed, no inventory exists in the state data centre.

6.2.3 Consolidated Challenges

Below is a list of key challenges as observed in the Technology Architecture assessment phase

S. No	Challenges
1	Few critical hardware/software components have crossed end of life; hence, needs upgrade in near term.
2	Unavailability of primary network in some blocks and secondary network at many places leads to severe impact in normal operations.
3	Department do not have proper back up database, data archival, database clustering, data management and there is no backup policy.
4	State lacks tools for monitoring of application and network. Tools for access rights, performance monitoring, and utilization monitoring are required.

S. No	Challenges
5	State do not have proper IT asset Management, Software licenses management, access management, Asset management etc.

Table 21: Technology Architecture – Key Challenges

6.3 SWOT Analysis of Technology Architecture

Analysis Paradigm	Key Pointers	Target State
Strength	Desktop availability in Divisions	Would be Retained
	Network Availability in Districts and Blocks	Would be Retained
Weakness	Outdated infrastructure	Recommendations for infrastructure modernization
	Availability of uninterrupted network in all offices	Recommendations Provided
Opportunity	Availability of Field officers/ staff can be leveraged to deliver services through tablets/ mobile apps.	Would be Realized
Threats	Unavailability of systems due to network outages	Would be Addressed
	Risk of system outages owing to outdated infrastructure	Would be Addressed
	Security lapses in current architecture.	Would be Addressed

6.4 Future State

6.4.1 New Requirement Specifications

The new technology component listed below along with High-level specifications based on number of users and volume of expected transactions.

Equipment / component /supply/works	Qty. at Primary Site	Qty. at DR Site	Remarks
Environment Pillar System DB Server	1	1	LBS (Load Balancer Switch) & FOS (Fail Over Switch) at SDC (State Data Centre) between SDC & DR (Disaster Recovery), with licenses
Environment Pillar System App Server	1+1	1	LBS & FOS at SDC between SDC & DR, with licenses
IAM / WAM Software (including SSO and associated software components [e.g. application server, web server etc.] if any) with 40 Core perpetual license	1	1	
Directory Service per Instance/Node basis	1	1	High Availability Scalability: High Scalability to store minimum 20 Million user records Support for 64-bit Architecture
IAM/WAM Server	1+1	1	LBS & FOS at SDC between SDC & DR, with licenses
IAM/WAM DB Server	1+1	1	LBS & FOS at SDC between SDC & DR, with licenses
Remote Servers at Checkpoints (each)	1		Router and standalone application along with required licenses for syncing data with data centre with daily end of day (EoD) frequency.

Table 22: New Requirement Specifications

In addition to above, there will be infrastructure requirement based on the roles of the officers in Environment Pillar. Below are the tentative infrastructure requirements for each role:

Department Officers	Desktop	Mobile Device	Barcode Scanner
Principal Secretary	✓		
Commissioner & Secretary	✓		
Officer on Special Duty	✓		
Deputy Secretary	✓		
Under Secretary	✓		
Director	✓		
Joint Director	✓		
Deputy Director	✓		
Senior Geologist	✓	✓	
Senior Drilling Engineer	✓	✓	

Department Officers	Desktop	Mobile Device	Barcode Scanner
Chief Chemist	✓		
Mining Engineer	✓	✓	
Geologist	✓	✓	
Petrologist	✓	✓	
Photogeologist	✓	✓	
Sr. Chemist	✓	✓	
Divisional Mining Officer	✓		
Asst. Geologist	✓	✓	
Asst. Geophysicist	✓	✓	
Senior Surveyor	✓	✓	
Drilling Engineer	✓	✓	
Chemist	✓	✓	
Mining Officer	✓	✓	
Principal Chief Conservator of Forests & Head of Forestry Force	✓		
Principal Chief Conservator of Forests	✓		
Addl. Principal Chief Conservator of Forests	✓		
Chief Conservator of Forests	✓		
Deputy Conservator of Forests	✓		
Conservator of Forests	✓		
Planning Officer	✓	✓	
Forest Officer	✓	✓	✓
Director	✓		
Divisional Forest Officer	✓		
Chief Forest Officer	✓	✓	✓
Managing Director	✓		

Table 23: Infrastructure Requirements

Key Changes

- Deployment of Enterprise Service Bus and API gateway for effective integration. Re-architecture of systems to SOA/ MSA based architecture
- Re-architecture of Department portals to modern architecture. Development of Environment Pillar System accessible through common state portal.
- Implementation of data back-up and disaster recovery mechanism, implementation of DR drills.
- Implementation of analytics software.
- Server virtualization at SDC.
- Implementation of tools for access rights, performance monitoring, and utilization monitoring.
- Implementation of SSO components.

6.4.2 Consolidated Recommendations

Technology standards catalogue is already listed in IndEA. Compliance with respect to the IndEA Technology standards catalogue are captured as below;

S. No	Challenges	Recommendations
1	Unavailability of modern integration methods.	Deployment of Enterprise Service Bus and API gateway for effective integration. Re-architecture of systems to SOA/ MSA based architecture
2	Few critical hardware/software components have crossed end of life; hence, needs upgrade in near term.	Upgrade existing IT infrastructure as per End of Life analysis
3	Unavailability of primary/ secondary network may lead to severe impact in normal operations.	Availability of primary/ secondary network in all district, block and circle offices.
4	Department do not have proper back up database, data archival, database clustering, data management and there is no backup policy.	Implementation of data back-up and disaster recovery mechanism, implementation of DR drills.
5	Department has deployed ICT infrastructure at a fast pace, however, there is a lack of methodology for infrastructure design, procurement and support	Implementation of IT infrastructure guidelines for procurement. Architecture review of new changes for study and analysis.
6	State lacks tools for monitoring of application and network. Tools for access rights, performance monitoring, and utilization monitoring are needed.	Implementation of tools for access rights, performance monitoring, and utilization monitoring.
7	State do not have proper IT asset Management, Software licenses management, access management, Asset management etc.	Implementation of IT Asset management system along with integrated software license management
8	Analytics capability is limited owing to unavailability of data analytics specialized software.	Implementation of analytics software.

Table 24: Technology Standards Catalogue

7. Security Architecture

Meghalaya state government has been planned its services online through web and mobile interfaces. This may open a boulevard for multiple threats to access the information, systems, and assets to be viewed and/or altered unauthorized to harm the services, applications or the departments. This points out the importance of defining and implementing policies, processes, controls for information security.

7.1 Current State Assessment, Challenges and Pain Points

There are no state Government specific applications and the usage of systems developed by Government of India is also very limited. The major challenges have been captured as below:

- There is no backup policy on the servers which are already out of warranty thus there is always threat of data loss in case of server failure.
- No defined anti-virus policy exists. Users laptops and devices are not covered under any anti-virus policy.

7.2 SWOT Analysis of Security Architecture

Analysis Paradigm	Key Pointers	Target State
Strengths	Security audit process exists in Mini Data Centre	Would be Retained
Weakness	System level security and user profiling; lack of availability of SSO	SSO recommended
	State Data Centre is non audit compliant	Recommendations Provided
Opportunity	Single-Sign-On	Recommended
Threats	Vulnerability to security threats	Recommendations Provided

7.3 Future State

7.3.1 Access Requirement

The various modules in Environment Sector would have varied access. The table below highlights the access requirement to various department officials on different modules in the application.

Stakeholders	Environment Pillar System				
	Financial Assistance	Returns & Payments	Certificate & Challan	Lease Management	Reports
Principal Secretary	✓				✓
Commissioner & Secretary	✓				✓
Officer on Special Duty	✓				✓
Deputy Secretary	✓				✓
Under Secretary	✓	✓	✓	✓	✓
Director	✓	✓	✓	✓	✓
Joint Director	✓	✓	✓	✓	✓
Deputy Director	✓	✓	✓	✓	✓
Senior Geologist				✓	✓
Senior Drilling Engineer				✓	✓
Chief Chemist					✓
Mining Engineer					
Geologist					
Petrologist					
Photogeologist					
Sr. Chemist					✓
Divisional Mining Officer		✓	✓	✓	✓
Asst. Geologist					
Asst. Geophysicist					
Senior Surveyor					
Drilling Engineer					
Chemist					
Mining Officer		✓	✓	✓	
Principal Chief Conservator of Forests & Head of Forestry Force					✓
Principal Chief Conservator of Forests					✓
Addl. Principal Chief Conservator of Forests					✓
Chief Conservator of Forests					✓
Deputy Conservator	✓	✓	✓		✓

Stakeholders	Environment Pillar System				
	Financial Assistance	Returns & Payments	Certificate & Challan	Lease Management	Reports
of Forests					
Conservator of Forests				✓	✓
Planning Officer				✓	✓
Forest Officer	✓	✓	✓	✓	
Range Forest Officer	✓	✓	✓	✓	
Director		✓	✓	✓	✓
Divisional Forest Officer	✓	✓	✓	✓	✓
Chief Forest Officer				✓	✓
Managing Director				✓	✓

The access to various modules should be allowed based on the roles of the particular stakeholder. For instance, the Planning Officer do not require any access to returns and payment module but the same is required to the divisional forest officer for assessing the liability.

7.3.2 Data Classification

Please refer Statewide – Detailed Architecture Requirements document, Detailed Architecture Requirements – Security section for details on the data classification categories.

The data related to Environment Sector has been classified as per below:

Data Entity	Data Classification	Securing data at rest	Securing data in transit	Data encryption	Data quality	ETL Security	Data Loss Prevention
Business	Public	✓	✓				✓
Service Request	Official	✓	✓				✓
Lease Register	Official	✓	✓		✓	✓	✓
Location	Public	✓	✓				✓
Returns and Payments	Official	✓	✓	✓	✓	✓	✓
Approvals	Private	✓	✓				✓
Challan Register	Official	✓	✓				✓
Certificate Register	Private	✓	✓	✓	✓	✓	✓

Data Entity	Data Classification	Securing data at rest	Securing data in transit	Data encryption	Data quality	ETL Security	Data Loss Prevention
Officer Register	Public	✓	✓				✓
Minerals Register	Official	✓	✓				✓
Asset Register	Official	✓	✓				✓
Scheme Details	Public	✓	✓				✓
Service Register	Official	✓	✓				✓
NOC	Public	✓	✓				✓

Table 25: Environment Sector Data Classification

8. Architecture Realization

8.1 Mission Realization

As part of realization, it's important that the mission defined is realized. The mission defined for Environment Sector is to achieve 4P i.e. to achieve Protect, Preserve, Prevent and Promote. Effort has been made to realize the mission by clearly defining the eligibility criteria for the services and **Protect** forest (flora/fauna) and mineral resources through a sustainable model. Further, the services are proposed to be made digital to the extent possible to enable state to **Prevent** and eliminate revenue leakages. There are services to **Preserve** rich biodiversity, heritage, endangered species and culture. The motive is to make those services digital to ensure system driven connects and radially available information. The information services are made online to ensure timely to **Promote** preservation of mineral resources and wildlife.

The service realization has been explained further in below sections.

8.2 Service Realization Model

The sections above have described the services, processes within the service and the need for capability increment to enhance service delivery. The current section mainly covers the business use cases needed to support the service delivery, a business use case model is a model that describes the processes of a business and their interactions with external parties like beneficiaries and stakeholders.

Following sub-section describes the business use cases along with the key activities to be undertaken within the service and re-usable architecture building blocks. The prioritized services are explained below:

8.2.1 Mining Lease & Quarry Permit for Minor Minerals

- **Strategic Indicators:**
  - CO2 equivalent emission per unit of manufacturing value added.
- **Use Case Steps**: Application for Mining Lease & Quarry Permit for Minor Minerals.
  - Key Activities: As per need, Beneficiary apply for Mining lease and quarry permit for minor minerals through digital platform by providing various details.
  - Architecture Building Blocks: Workflow
- **Use Case Steps**: Verification and Approval of Application.
  - Key Activities: The authority verifies the application, check proposal for mining and provide approval. Approval details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Workflow, Messaging, DigiLocker
- **Use Case Steps**: Permit issuance.
  - Key Activities: Issue 2D barcodes in State Mobile App.
  - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

All permit verification to be enabled by the 2D barcode issued by state

8.2.2 Transfer of mining lease for minerals

- **Strategic Indicators:**
  - CO2 equivalent emission per unit of manufacturing value added.
- **Use Case Steps**: Application for Mining Lease/ Transfer/ Renewal
  - Key Activities: As per need, Beneficiary apply for Mining Lease Transfer through digital platform by providing various details.
  - Architecture Building Blocks: Lease management, Workflow.
- **Use Case Steps**: Verification and Approval
  - Key Activities: The authority verifies the application and provide approval. Approval details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Workflow, Messaging, DigiLocker
- **Use Case Steps**: Lease issuance transfer.
  - Key Activities: Transfer 2D barcodes from one stakeholder to other in State Mobile App.
  - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.3 Renewal of Mining Lease for minerals

- **Strategic Indicators:**
  - CO2 equivalent emission per unit of manufacturing value added.
- **Use Case Steps**: Application for Mining Lease/ Transfer/ Renewal
  - Key Activities: As per need, Beneficiary apply for Mining Lease Renewal for minerals through digital platform by providing various details.
  - Architecture Building Blocks: Lease management, Workflow.
- **Use Case Steps**: Verification and Approval
  - Key Activities: The authority verifies the application and provide approval. Approval details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Workflow, Messaging, DigiLocker
- **Use Case Steps**: Lease issuance transfer.
  - Key Activities: Issue 2D barcodes in State Mobile App.
  - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.4 Payment and Returns filing for minerals

- **Use Case Steps**: Return Filing and Royalty Payment
  - Key Activities: The lessee logs into the digital platform and provide details for the minerals extracted.
  - Architecture Building Blocks: Workflow
- **Use Case Steps**: System Verification
  - Key Activities: System verifies the entered details and calculates the royalty payment due.
  - Architecture Building Blocks: Workflow
- **Use Case Steps**: Submission and Payment
  - Key Activities: The beneficiary verifies the details of the return and submit. On submission, return details are notified to the applicant through SMS and app

notifications and redirected to payment screen. Beneficiary makes the payment and payment details are notified to the applicant through SMS and app notifications
    - Architecture Building Blocks: Workflow, Payment Gateway, Messaging

8.2.5 Approvals for Minerals Explorations

- **Use Case Steps**: Application for Minerals Exploration.
    - Key Activities: Beneficiary Apply for Approval for the Minerals Exploration through digital platform by providing various details.
    - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification and Approval.
    - Key Activities: Department officials facilitate feasibility and provide approvals basis the outcome. Approval details are notified to the applicant through SMS and app notifications.
    - Architecture Building Blocks: Message, Workflow.
- **Use Case Steps**: Approval issuance.
    - Key Activities: Issue 2D barcodes in State Mobile App.
    - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.6 Issuance of Transport Challan for Transportation of Minerals

- **Strategic Indicators**:
    - Increase/decrease in imposition of adequate Tax per unit of fossil fuel consumption.
- **Use Case Steps**: Request for Transport Challan.
    - Key Activities: The applicant upload details of the minerals to be transported through digital platform.
    - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification and Approval.
    - Key Activities: Department officials verifies details and provide approval. Approval details are notified to the applicant through SMS and app notifications.
    - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: Challan issuance.
    - Key Activities: Issue 2D barcodes in State Mobile App that can be verified in any check posts
    - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.7 Grant of Reconnaissance Permit (RP)

- **Use Case Steps**: Application for Grant of Reconnaissance Permit
    - Key Activities: As per need, Beneficiary apply for Grant of Reconnaissance Permit through digital platform by providing various details.
    - Architecture Building Blocks: Lease management, Workflow.
- **Use Case Steps**: Verification and Approval
    - Key Activities: The authority verifies the application and provide approval. Approval details are notified to the applicant through SMS and app notifications.
    - Architecture Building Blocks: Workflow, Messaging, DigiLocker

- **Use Case Steps**: Permit issuance.
    - Key Activities: Issue 2D barcodes in State Mobile App.
    - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.8 Student Scholarships

- **Use Case Steps**: Students applies for scholarship.
    - Key Activities: Eligible students apply for the financial assistance through digital platform by providing various details.
    - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Checking of Scheme Eligibility for applicant and Funds under the scheme.
    - Key Activities: System/ Authority checks eligibility of student and funds of that particular scheme and provide approval. The details are notified to the applicant through SMS and app notifications.
    - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: Funds transferred to beneficiary account.
    - Key Activities: As per eligibility, bill will be generated, and funds will be transferred to bank account of beneficiary student through TreasuryNet system. Applicants will be notified through SMS and app notifications.
    - Architecture Building Blocks: Messaging, Workflow, Financial Management.

8.2.9 Regular Monitoring and Reporting of Air Quality

- **Strategic Indicators**
    - Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
- **Use Case Steps**: Monitoring and Reporting of Air Quality.
    - Key Activities: Recording of Air Quality through equipments on predefined intervals and capturing the same in system to publish dashboards and reports.
    - Architecture Building Blocks: Data Collection, Workflow, Analytics, Integration.

8.2.10 Permission for felling of Trees

- **Strategic Indicators:**
    - CO2 equivalent emission per unit of manufacturing value added.
    - Percentage increase of Tree Outside Forest (TOF) in total forest cover.
    - Increase in area under afforestation / tree plantation.
- **Use Case Steps**: Application for permission for felling of Trees
    - Key Activities: The applicant applies for permission for felling of trees through digital platform by providing certain details.
    - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification and Approval.
    - Key Activities: Department officials verifies details and provide approval. Approval details are notified to the applicant through SMS and app notifications.
    - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: Permission issuance.
    - Key Activities: Issue 2D barcodes in State Mobile App.

- Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.11 NOC to set up Timber depot

- **Strategic Indicators:**
  - CO2 equivalent emission per unit of manufacturing value added.
  - Percentage increase of Tree Outside Forest (TOF) in total forest cover.
- **Use Case Steps**: Application for NOC to setup Timber depot.
  - Key Activities: The applicant applies for NOC to setup Timber depot through digital platform by providing certain details.
  - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification and Approval.
  - Key Activities: Department officials verifies details and provide approval. Approval details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: NOC issuance.
  - Key Activities: Issue 2D barcodes in State Mobile App.
  - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.12 Timber transportation permit outside Meghalaya

- **Strategic Indicators:**
  - Increase/decrease in imposition of adequate Tax per unit of fossil fuel consumption.
- **Use Case Steps**: Application for permission for Transportation of timber outside Meghalaya.
  - Key Activities: Beneficiary apply for Application for permission for Transportation of timber outside Meghalaya through digital platform by providing certain details.
  - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Approval of Transportation of timber outside Meghalaya.
  - Key Activities: Department officials analyze the details and supporting document to provide approvals. Approval details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: Permission issuance.
  - Key Activities: Issue 2D barcodes in State Mobile App.
  - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID
- **Use Case Steps**: Permission document issuance.
  - Key Activities: Issue Permit document from template.
  - Architecture Building Blocks: Document Management

8.2.13 NOC to setup stone crushers in State

- **Strategic Indicators:**
  - CO2 equivalent emission per unit of manufacturing value added.
  - Percentage increase of Tree Outside Forest (TOF) in total forest cover.

- **Use Case Steps**: Application for NOC to setup stone crushers.
  - Key Activities: The applicant applies for NOC to setup stone crushers through digital platform by providing certain details.
  - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification and Approval.
  - Key Activities: Department officials verifies details and provide approval. Approval details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: NOC issuance.
  - Key Activities: Issue 2D barcodes in State Mobile App.
  - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.14 NOC to setup Furniture Unit in State

- **Strategic Indicators:**
  - CO2 equivalent emission per unit of manufacturing value added.
  - Percentage increase of Tree Outside Forest (TOF) in total forest cover.
- **Use Case Steps**: Application for NOC to setup Furniture Unit.
  - Key Activities: The applicant applies for NOC to setup Furniture Unit through digital platform by providing certain details.
  - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification and Approval.
  - Key Activities: Department officials verifies details and provide approval. Approval details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: NOC issuance.
  - Key Activities: Issue 2D barcodes in State Mobile App.
  - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.15 Non forest land certificate NOC

- **Strategic Indicators:**
  - Percentage increase of Tree Outside Forest (TOF) in total forest cover
- **Use Case Steps**: Application for Non-Forest Land Certificate .
  - Key Activities: Beneficiary apply for Non-Forest Land Certificate/ NOC through digital platform by providing certain details.
  - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification of Land
  - Key Activities: Authority appoints site visit/ checks records for verification of the land for which certificate has been applied.
  - Workflow
- **Use Case Steps**: Approval
  - Authority provides approval to the application based on report of verification. Approval details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Workflow, Messaging.

- **Use Case Steps**: NOC issuance.
    - Key Activities: Issue 2D barcodes in State Mobile App.
    - Architecture Building Blocks: Security, Mobile Device Management, State Digital ID

8.2.16 Other Permits

- **Strategic Indicators:**
    - CO2 equivalent emission per unit of manufacturing value added.
- **Use Case Steps**: Application for Grant of Permit
    - Key Activities: As per need, Beneficiary apply for Grant of Permit through digital platform by providing various details.
    - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification and Approval
    - Key Activities: The authority verifies the application and provide approval. Approval details are notified to the applicant through SMS and app notifications.
    - Architecture Building Blocks: Workflow, Messaging, DigiLocker.

8.2.17 Facilitation of raising planting stock – establishment of nurseries

- **Strategic Indicators:**
    - Increase in area under afforestation / tree plantation.
    - Percentage of villages with JFMCs (Joint Forest Management Committee).
- **Use Case Steps**: Application for establishment of nursery.
    - Key Activities: The applicant applies for the establishment of nursery under various schemes through digital platform by providing certain details.
    - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Approval for setting up nursery under various schemes and for public distribution of seedlings.
    - Key Activities: Department officials analyze the details and supporting document to provide approvals. Approval details are notified to the applicant through SMS and app notifications.
    - Architecture Building Blocks: Workflow, Messaging.

8.2.18 Financial Assistance – loss in Human- Animal Conflict

- **Strategic Indicators:**
    - Number of wildlife offences booked.
    - Number of detections of offences and prevention measures for traded wildlife that was poached or illicitly trafficked.
- **Use Case Steps**: Application for Compensation by the effected person/ family.
    - Key Activities: As per loss notified, Beneficiary apply for the compensation against magnitude of loss due to conflict with animal through digital platform by providing certain details.
    - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification.
    - Key Activities: The authority gets the details of conflict and loss verified through field officers.

  - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: Approval of Application.
  - Key Activities: Based on the field report, compensation is approved by the officer. The details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: Funds transferred to beneficiary account.
  - Key Activities: As per eligibility, bill will be generated, and funds are transferred to bank account of beneficiary through TreasuryNet system. Applicants are be notified through SMS and app notifications.
  - Architecture Building Blocks: Messaging, Workflow, Financial Management.

8.2.19 Single Window Clearance service

- **Use Case Steps**: Single window clearance service for environmental clearance, forest clearance, wildlife clearance and renewal of NOCs from Meghalaya Pollution Control Board for all mining business entities.
  - Key Activities: As per need, Beneficiary apply for environmental clearance, forest clearance, wildlife clearance and renewal of NOCs from Meghalaya Pollution Control Board for all mining business entities through digital platform by providing certain details.
  - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Verification and Approval
  - Key Activities: The details are verified by the official and approval is provided. Approval details are notified to the applicant through SMS and app notifications.
  - Architecture Building Blocks: Messaging, Workflow.

8.2.20 Record Environmental Issues under the Environmental Information System (ENVIS) Project

- **Use Case Steps**: Monitoring and Recording of Environmental Issues.
  - Key Activities: Recording of Environmental Issues through equipments on predefined intervals and capturing the same in system to publish dashboards and reports.
  - Architecture Building Blocks: Data Collection, Workflow, Analytics, Integration.

8.2.21 Biodiversity Conversion and Management

- **Strategic Indicators**:
  - Percentage of degraded area restored.
  - Increase in forest / vegetative cover in mountain areas.
- **Use Case Steps**: Monitoring of Biodiversity sites and information exchange.
  - Key Activities: As per need, the count of rare inhabitants and invasive plants is recorded and information with location details with shared with departmental officials to ensure its verification before providing any environment clearance.
  - Architecture Building Blocks: Workflow.

8.2.22 Protection of sacred groves and promotion to premium tourists

- **Use Case Steps**: Conversion of heritage sites to promote as tourism spots .
    - Key Activities: District/ Block level officials to share the regular details heritage sites. Information to tourism department to promote rare heritage site as prime tourism spots
    - Architecture Building Blocks: Workflow, Integration.
- **Use Case Steps**: Arrange awareness about biodiversity sites amongst officials and researchers to promote as heritage site.
    - Key Activities: Support is arranged and required document and details of program is shared with beneficiary for reference. Awareness Notifications and SMS will be sent to tourists.
    - Architecture Building Blocks: Messaging, Workflow.

8.2.23 Managing Zoological and Botanical parks

- **Strategic Indicators:**
    - Protection and conservation of wildlife and rare plants
    - Awareness and promoting state wildlife spots.
- **Use Case Steps**: Online platform to manage and maintain Zoological and botanical parks.
    - Key Activities: As per need, Beneficiary buy tickets of visit to zoological and botanical parks through digital platforms. Booking details would be notified to the purchaser through notification and SMS.
    - Architecture Building Blocks: Messaging, Workflow.

8.2.24 Develop and Manage State declared protected areas

- **Strategic Indicators:**
    - Increase in Moderately Dense Forest.
    - Increase in Very Dense Forest cover
- **Use Case Steps**: Online platform with status on development of protected areas.
    - Key Activities: Department officials at district/block level share near real-time information to ensure the protection of state declared protected areas.
    - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Platform for the citizen and community in managing the protected areas.
    - Key Activities: Department officials can share information to Citizen/community to protect area and reduce man-animal conflicts.
    - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: Arrange awareness to manage protected areas.
    - Key Activities: Regular sessions at village level on awareness on reserving protected areas.
    - Architecture Building Blocks: LMS , Messaging, Workflow.

8.2.25 Protection and census of Elephants and other rare species

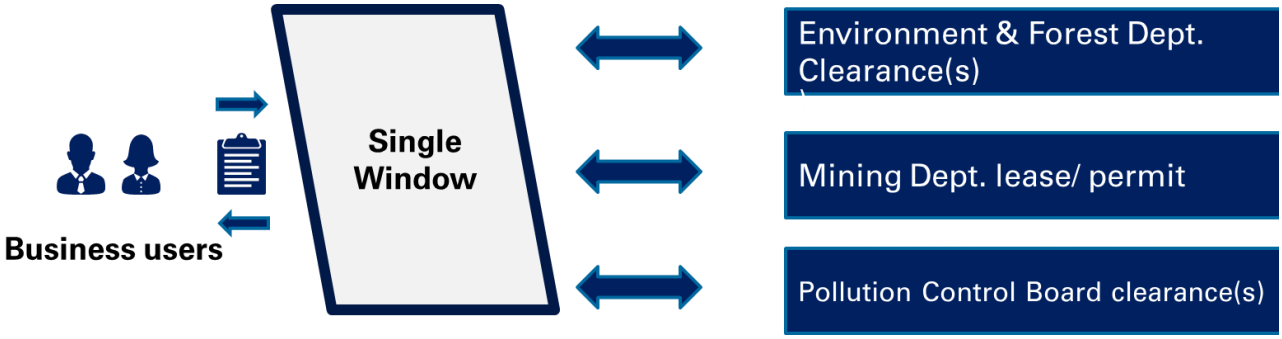
- **Strategic Indicators:**
    - Number of detections of offences and prevention measures for traded wildlife that was poached or illicitly trafficked

- **Use Case Steps**: Census of count of elephants and rare species
  - Key Activities: Department officials at district/block level capture the information of elephants in the area and record for census purpose.
  - Architecture Building Blocks: Workflow.
- **Use Case Steps**: Managing count of elephant and reduced conflict with human.
  - Key Activities: Department officials can share information to Citizen/community on count of elephant and Human-animal conflicts.
  - Architecture Building Blocks: Workflow, Messaging.
- **Use Case Steps**: Arrange awareness to manage census.
  - Key Activities: Regular sessions at village level on awareness on protecting the species and reducing conflicts with them.
  - Architecture Building Blocks: LMS , Messaging, Workflow.

8.3 Illustration of Use Case Realization:

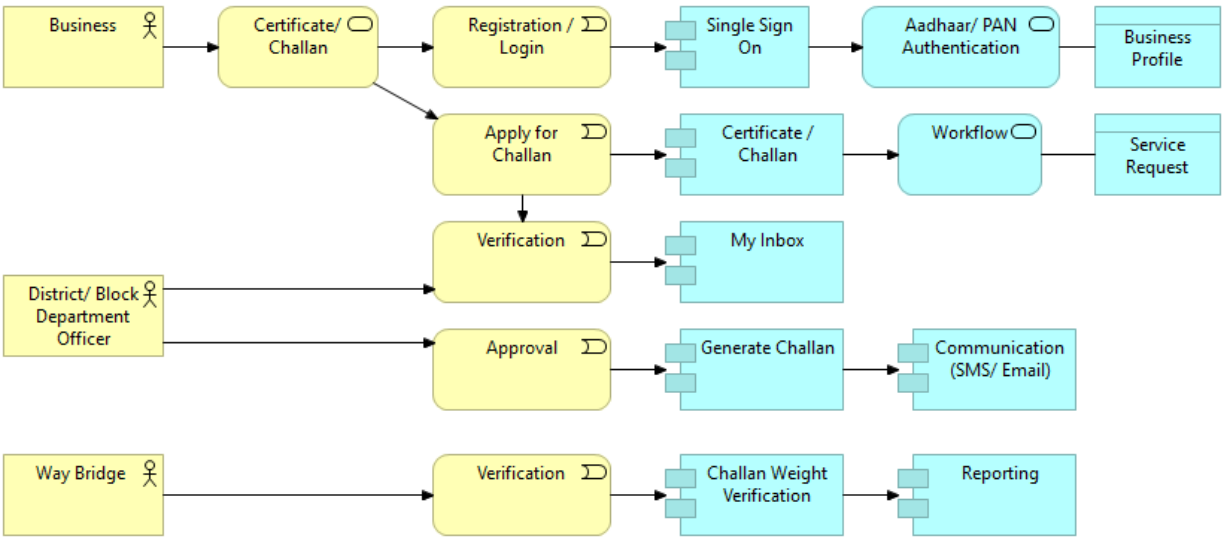
8.3.1 Single Window Clearance

As mentioned in previous section, all mining business entities should be able to Single window clearance service for various environment and forest clearance; renewal of their lease/ license etc. The illustrative use case for the proposed service delivery is as shown below:



8.3.2 Transit Pass Issuance and Challan Vigilance

As mentioned in previous section, approval of Forest & Environment department is required for Transportation of timber outside Meghalaya and similarly challans are required for Transportation of Minerals outside the state. The illustrative use case for the proposed service delivery is as shown below:

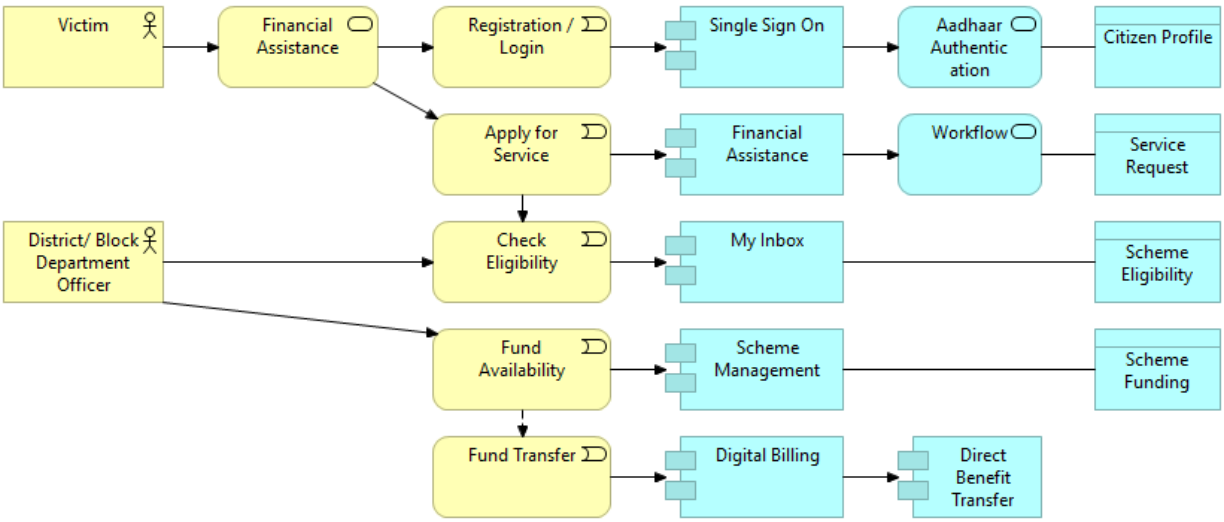


The system is subsequently proposed to be integration with RTO, Treasury etc.

8.3.3 Financial assistance to Wildlife depredation victim

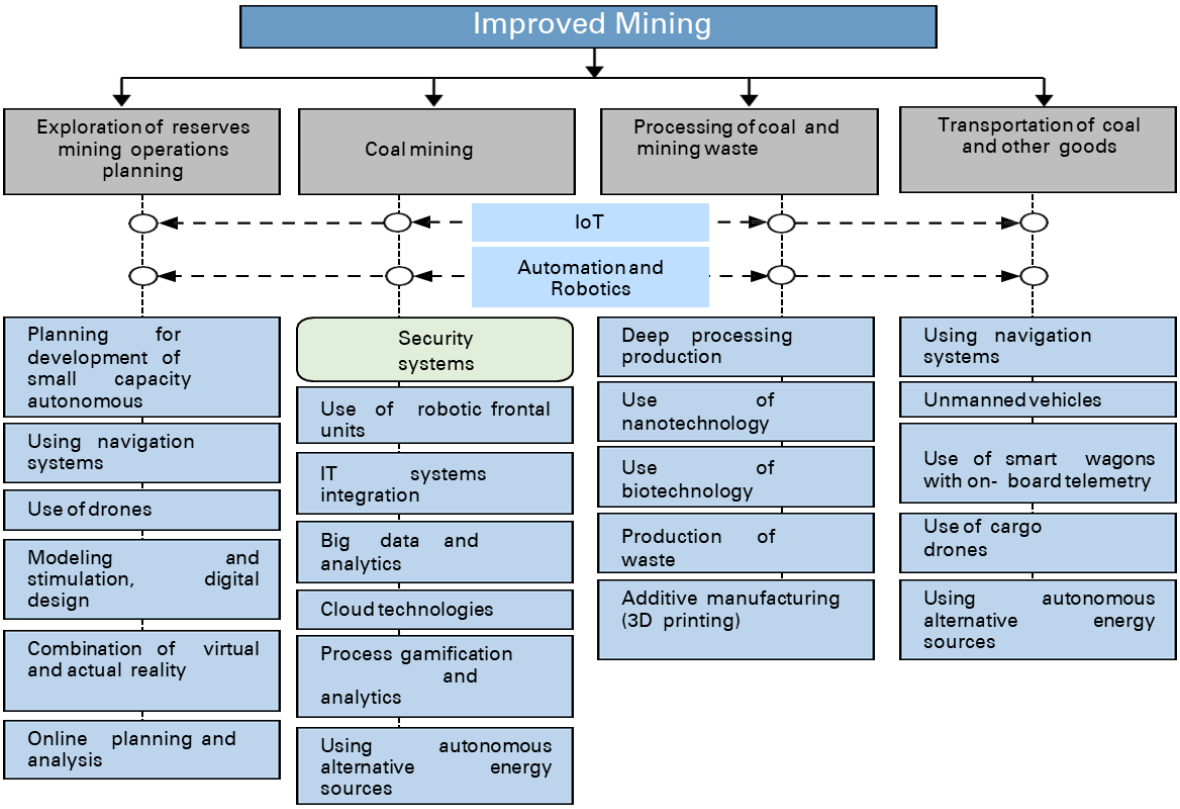
The forest in order to maintain harmony between Human beings and Wildlife, makes ex gratia payment to victims of wildlife depredation for loss of life, loss of limbs or injuries causing permanent

disability and damage/ loss of crops and property including livestock. The applicant is required to apply to Wildlife Beat or Range Office for financial assistance. The request is routed to the concerned Department Official who then undertakes verification along with Beat Officer/ Range Office. Divisional Forest Officer recommends payment based on the merit. On approval, the request will go to bank for transfer of funds to the beneficiary's bank account. The illustrative use case is as shown below:



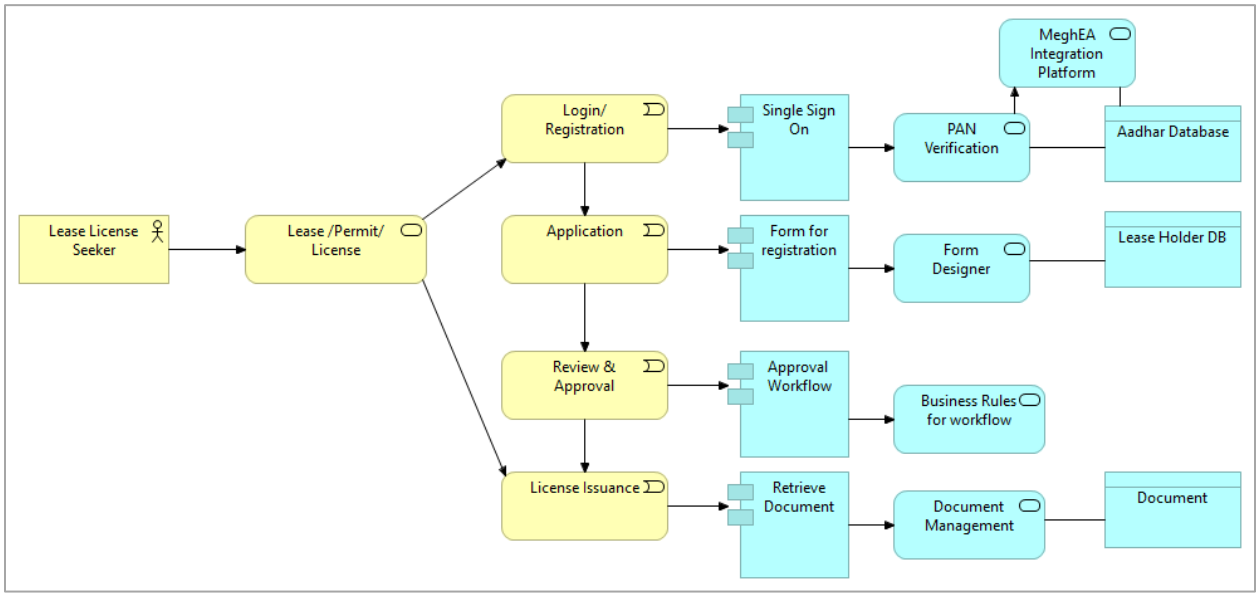
8.3.4 Optimized usage of Minerals and effective mining

As defined in previous section, the mining industry plays an important role in the economic development of state, creating new qualified jobs, developing infrastructure and generating substantial trade income. The illustrative use case is as shown below provide view on use of innovative technologies that have been actively introduced in the mining industry, which can significantly reduce production costs, increase production efficiency and successfully develop mining projects that have recently been economically unprofitable in state.



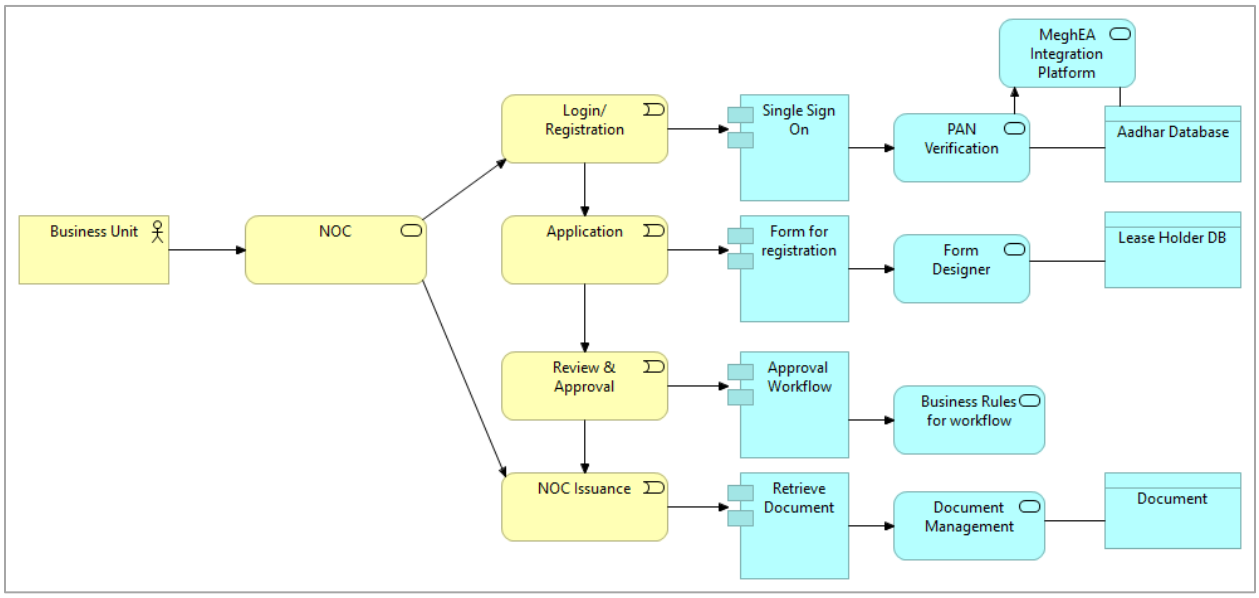
8.3.5 Lease/License/Permit

As described in previous section, approval of Forest & Environment department and /or mining department is required for lease/license/permit issuance. Below is an illustrative use case for the same



8.3.6 NOC Issuance

As described in previous section, approval of Forest & Environment department and /or mining department is required for NOC issuance. Below is an illustrative use case for the same



8.4 Architecture Realization

Based on above analysis on services, a set of building blocks are required to be built to deliver the services in the desired manner. These building blocks can be built though key changes in each of the architecture layers.

8.4.1 Performance Architecture

Environment Sector have been assigned certain strategic goals that are required to be achieved. These goals are planned to be measured through certain indicators. The indicators are further mapped to the services through which they can be achieved. The services have been enabled through architecture initiatives and solutions to enhance delivery experience for the Beneficiaries.

The Strategic Indicators are listed below:

S. No	Strategic Indicators
1	CO2 equivalent emission per unit of manufacturing value added
2	Percentage increase of Tree Outside Forest (TOF) in total forest cover
3	Increase in area under afforestation / tree plantation
4	Increase in Very Dense Forest cover
5	Percentage of villages with JFMCs (Joint Forest Management Committee)
6	Increase in Moderately Dense Forest
7	Percentage of degraded area restored
8	Increase in forest / vegetative cover in mountain areas
9	Number of wildlife offences booked
10	Number of detections of offences and prevention measures for traded wildlife that was poached or illicitly trafficked
11	Increase/decrease in imposition of adequate Tax per unit of fossil fuel consumption.
12	Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)

Table 26: Strategic Indicators of Environment Sector

Please follow Section 2.5 for details.

The indicator to service mapping can be seen at Annexure 9.4. The mapping has been done considering the contribution of service to achieve target of that particular indicator.

The service will be delivered through different applications and application modules the mapping can be seen at 9.11

The budget outlay for the applications and modules would be prepared as part of implementation. The funds will be sanctioned for each identified project/ application and RFP will be floated for deciding the implementation agency.

8.4.2 Business Architecture

The approach towards business architecture is service identification, rationalization of service, current state assessment including mapping to indicators and prioritization of services and business transformation requirements.

- Service Identification – **29** services have been entered as service in the MeghEA portal.

- Service Rationalization – **26** Services have been identified post rationalization.
- Service Prioritization – **19** Services have been prioritized based on detailed assessment.
- New Services – **12** New services have been identified for inclusion in future state service portfolio.

Future Service Portfolio: Environment Sector would have future services enhanced and efficiently delivered. The future service portfolio would comprise of three sets of services:

- The prioritized set of 19 services;
- The non-prioritized set of 7 services;
- The newly introduced set of 12 services.

The key changes that are part of the recommendations in business architecture are listed as Business Transformation changes which includes Game Changes and identification of BPR opportunities.

The business architecture of the future state portfolio of Environment Sector would include key business services grouped according to functional categorizations to suit user needs.

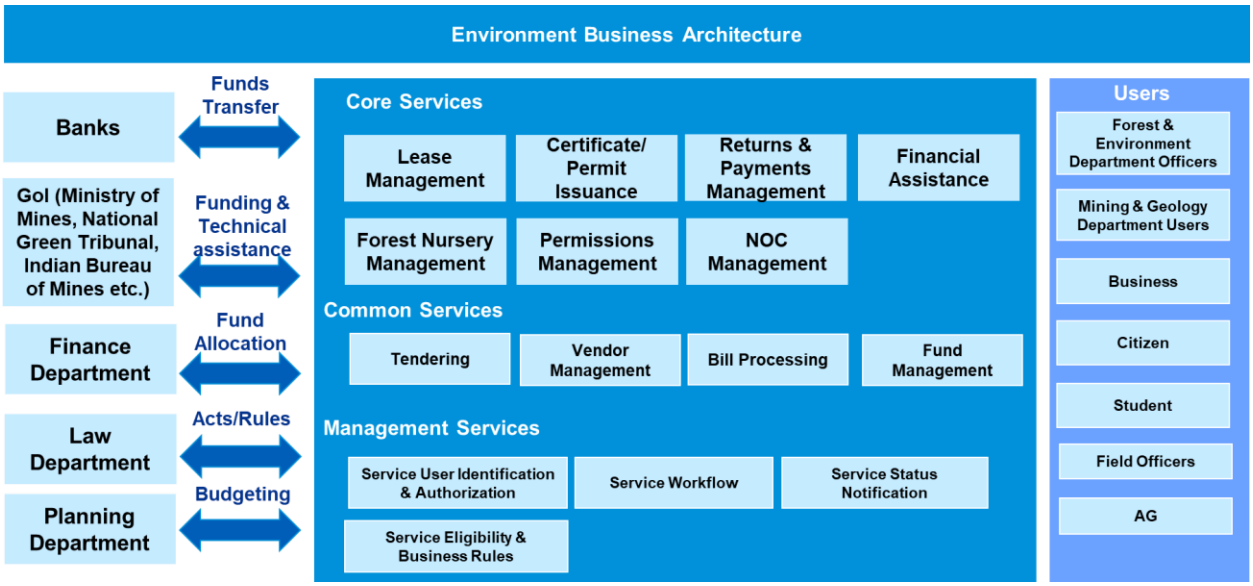


Figure 24: Future State Business Architecture

The services in the future state would be delivered through Environment Sector application whereas there will be three departments i.e. Forest and Environment and Geology and Mining Departments, **collaborating** to deliver the services. The Environment and secondary responsibility have been fixed for each service in the future state portfolio. The responsibility matrix to protect the departmental autonomy is as below:

Service Name	Primary Responsibility	Secondary Responsibility
Mining Lease & Quarry Permit for Minor Minerals	Forest and environment,	Mining and Geology
Transfer of Mining leases (For minerals under Schedule III)	Mining and Geology	Line Department
Application for permission for felling of Trees outside Shillong	Forest and environment,	Line Department
NOC to set up timber depot	Forest and environment	Line Department

Service Name	Primary Responsibility	Secondary Responsibility
Renewal of Mining Leases (For minerals under Schedule III)	Mining and Geology	Forest and environment
Forest clearance Application for projects other than mining stone crushers quarry permit furniture unit and timber depot	Forest and environment	
Human Animal Conflict and Compensation	Forest and environment	
Application for permission for Transportation of timber outside Meghalaya	Forest and environment	Line Department
NOC for setting up of Stone Crushers in Meghalaya	Forest and environment,	Mining and Geology
Non-Forest Land Certificate/ NOC	Forest and environment	Line Department
NOC to set up Furniture unit	Forest and environment	Line Department
Issuance of Transport Challan for Transportation of Minerals	Mining and Geology	Transport Department
Approval for the Minerals Exploration	Mining and Geology	Forest and environment,
Mining Lease and Quarry Permit Registration by Citizen (For minerals under Schedule II)	Forest and environment,	Mining and Geology
Royalty Payment (For minerals under Schedule II)	Mining and Geology	
Mining Leases Renewal (For minerals under Schedule II)	Mining and Geology	Forest and environment,
Returns Filing by Mining Lease Holder (For minerals under Schedule II)	Mining and Geology	Forest and environment,
Grant of Reconnaissance Permit (RP) Issuance process	Forest and environment, Mining and Geology	Line department
Student Scholarships Grant Process	Mining and Geology	Finance Department

8.4.3 Application Architecture

The application architecture is a representation of the business aligned systems, the portfolio of the systems, the technology behind the systems, the information access methodology and the gaps around the systems – both functional and technical.

The application architecture approach consists of current state assessment. The current portfolio consists of Government of Meghalaya systems and external systems that are frequently used:

- Internal State Government Systems:
  - Mining & Geology Department website
  - Forest & Environment Department website
- External Systems
  - Pradhan Mantri Khanij Kshetra Kalyan Yojana Portal
  - Mining Tenement System
  - Parivesh

As a part of the analysis, a thorough analysis on existing business functions, IT maturity in each

function, key gaps in the applications existing, data and technology standardization level, reliability and scalability aspects etc. has been conducted and a suitable EA model for Meghalaya has been developed, which could be a sustainable model to cater the requirements. Please refer section for details.

The future state application architecture to support the business transformation plan would can be represented through the following figure:

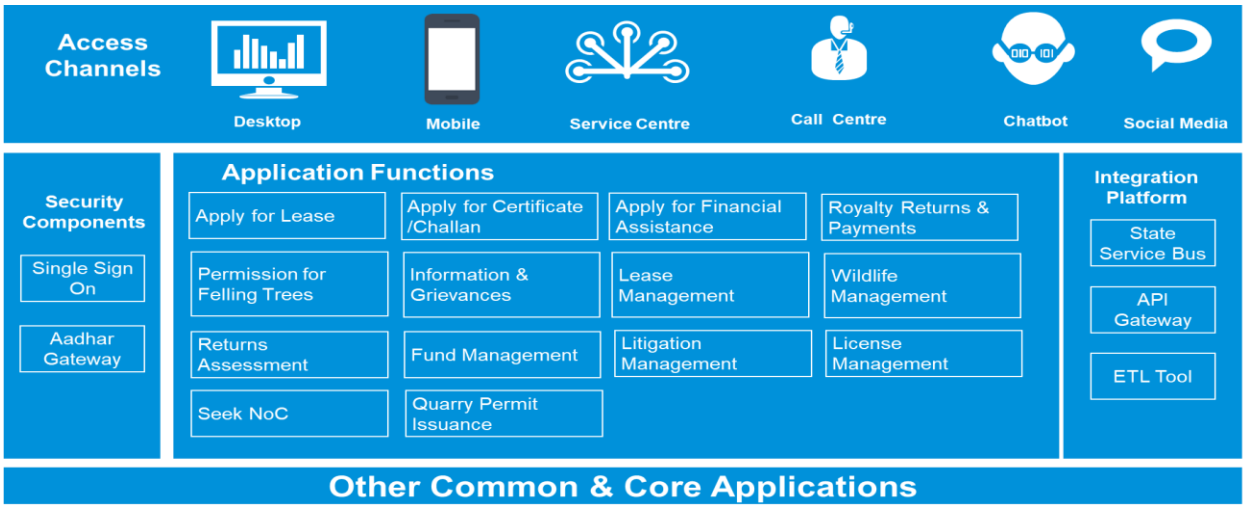


Figure 25: Future State Application Architecture

8.4.4 Data Architecture

Data architecture identifies the key aspects of information management – the key data that resides in the enterprise, how government can deliver services using the data, which are the stakeholders that accesses the data, how the data is managed through secured storage, access and the various forms in which the data is needed.

The **key** data entities (at conceptual level) are defined below:

- Data entities:
- Beneficiary
- Service Request
- Lease Register
- Location
- Returns and Payments
- NOC and Approvals
- Challan Register
- Certificate Register
- Officer Register
- Minerals Register
- Asset Register
- Scheme Register
- Service Register

The key interventions required in data architecture to align the data to support the business

transformation plan is categorized as below:

- **Data Design**: The data design needs to be revamped to align the data architecture adhering to the data principles.
- **Data Governance**: Departments in Environment Sector would have a role to play in each of the stages of the Data Lifecycle for the Scheme (core data entity). Data Trustee and data steward role has been defined for each data life-cycle management phases.
- **Data Tools**: To enable business transformation, the data portfolio requires few tools and technologies to support the plan.

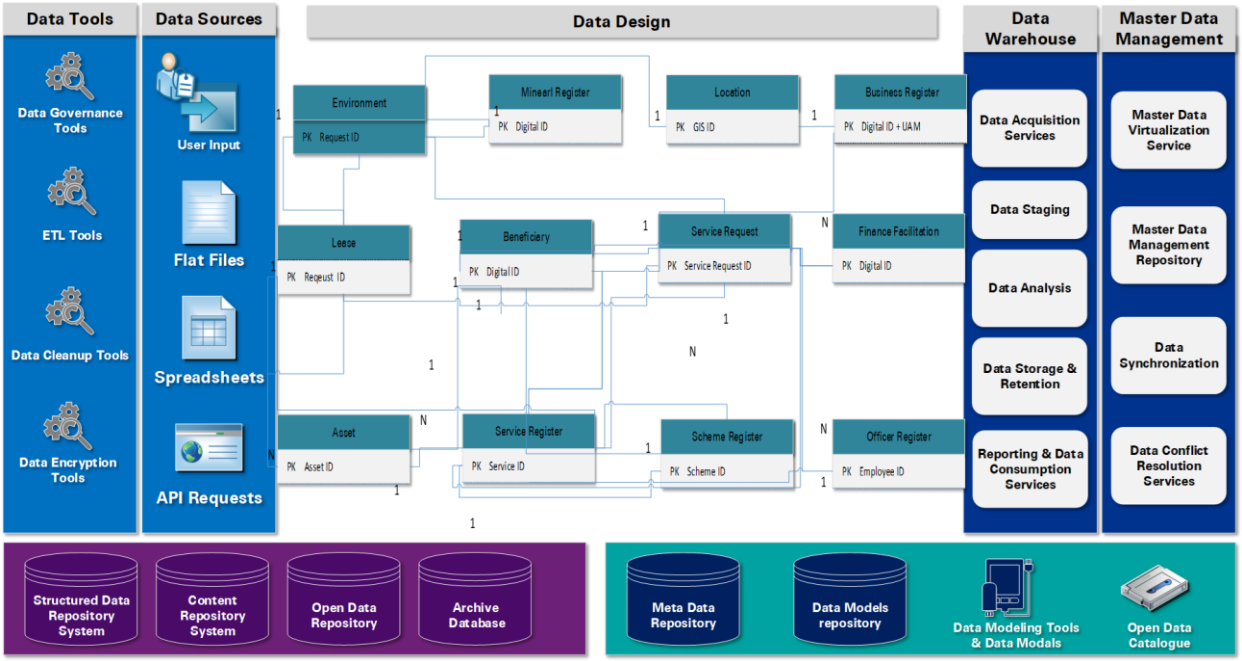


Figure 26: Future State Data Architecture

8.4.5 Technology Architecture

The technology architecture defines the infrastructure (IT) and their respective technical standards to enable better system integration and interoperability and align the application and data to deliver the required results to realize the business transformation objective.

Technology architecture section of the document illustrates the current state of the technology architecture for Environment Sector, the gaps identified in the technology architecture and the future (proposed) requirements.

Current State Assessment: This includes the key infrastructure, system technology, devices and tools portfolio:

- **Environment & Locations**: The key infrastructure for different environments (development, production and testing) is illustrated in the section.
- **Network**: The section illustrates the primary and secondary network availability in the State of Meghalaya.
- **System-Technology List**: The list of systems along with the supporting technology is illustrated in this section.

Aligned to the transformation plan, a gap analysis was carried out to derive the future state of the technology architecture. The future state transformation plan is categorized under following:

- **State Data Centre Modernization**: Upgrade of infrastructure (systems) in the data center to modernize system technology landscape.
- **Network Availability:** Requirement for uninterrupted primary and secondary network to facilitate the planned business transformation.

The diagram below illustrates the future state deployment model for Environment Sector:

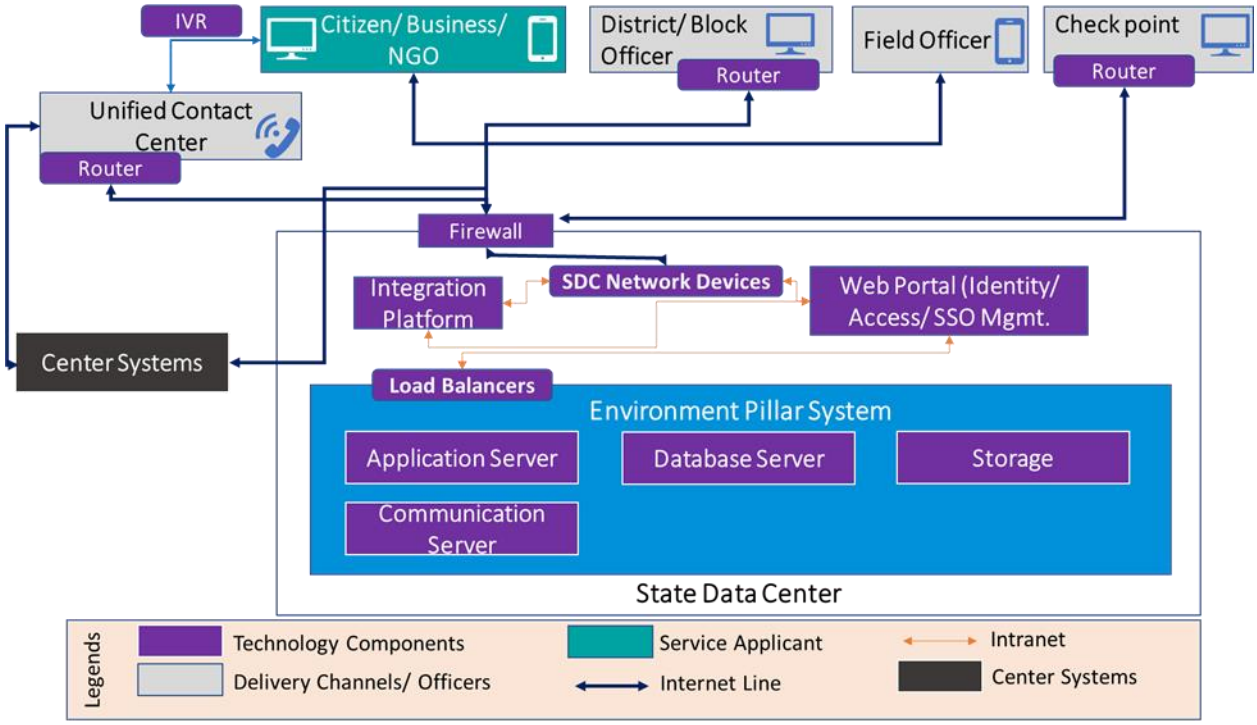


Figure 27: Future State Technology Architecture

8.4.6 Security Architecture

Security architecture illustrates the security details of the information storage, access and management. The security architecture has key transformation requirement to facilitate the realization of the business objectives:

- **Single Sign-On**: Harmonized identification and authentication for all systems to enable realization of the business objective of ease of use, secured data transmission and access of information.
- **Data Classification and Management**: The security architecture also illustrates the need for classification of data and rules governing each classified set of data.

The proposed business transformation framework is illustrated below:

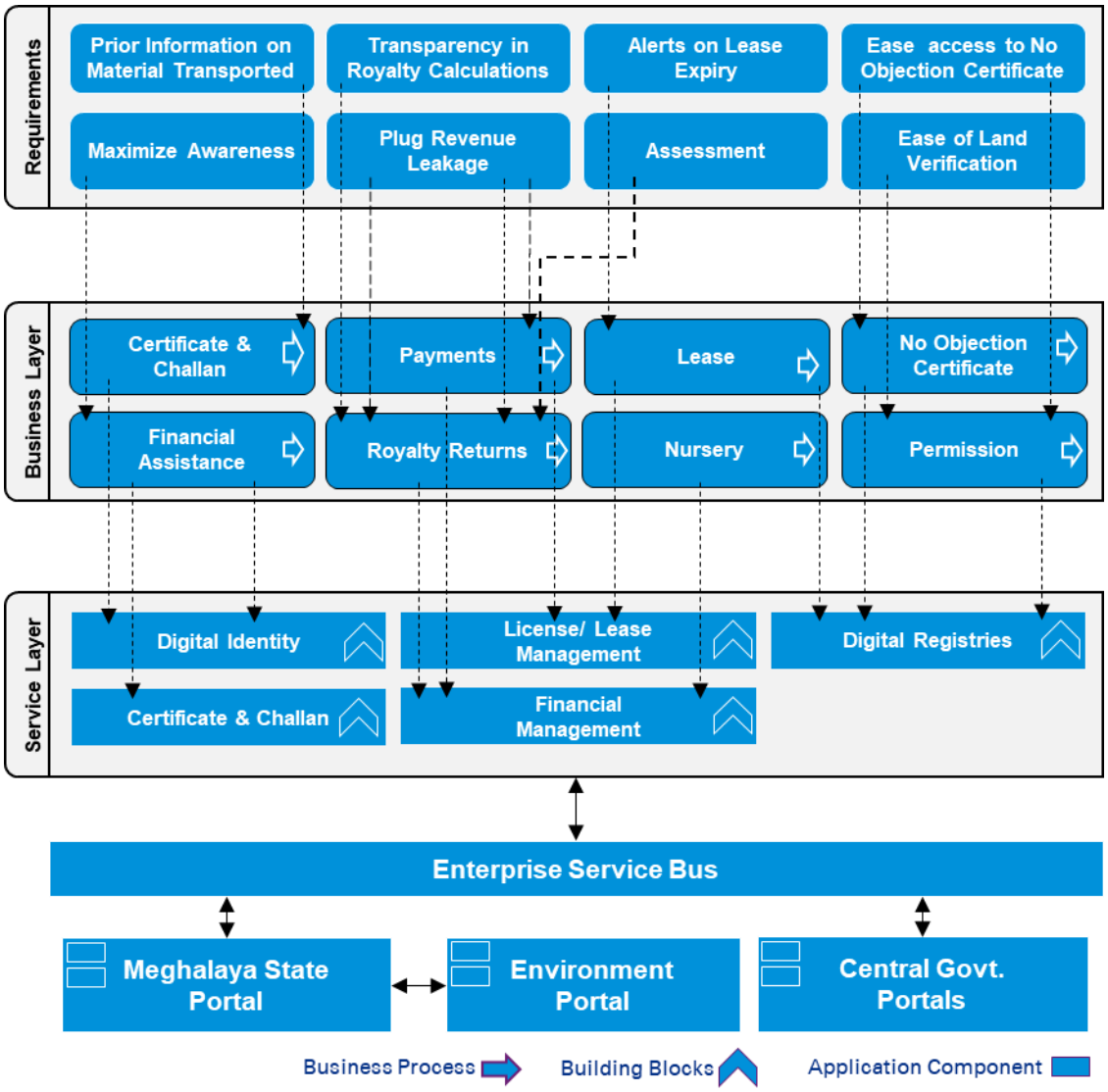


Figure 28: Business Transformation framework

The Architecture realization model comprises of key changes in each of the above layers. Below is the diagrammatic representation for the same.

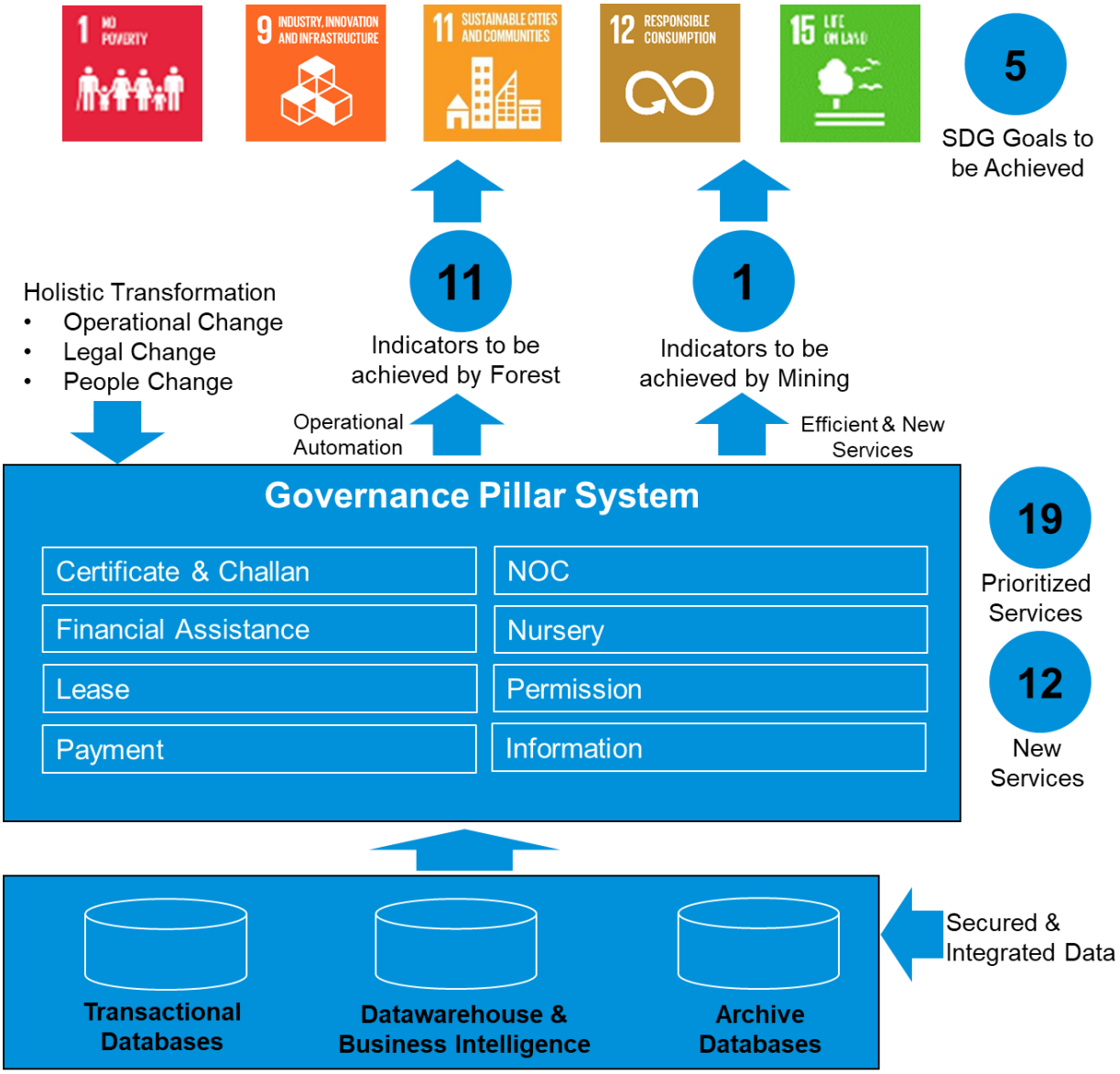


Figure 29: Environment Sector Architecture Realization Model

8.5 Architecture Initiatives

8.5.1 Connect

The section focuses on the initiatives to connect citizens, business and communities to the governance ecosystem through convenient channels leveraging modern technologies. Connect would also interlink the service providers with service beneficiaries in an open but secured manner. Various components for connecting are as mentioned below:

IT System	Description	Dependency/ Risk
Service Plus	Service Plus, a unified platform with multitenant architecture to deliver digital service to citizens has already been deployed in Meghalaya. The service plus instance shall include following new services: • Improvised and flexible process flow for the scheme • Actionable flagging at different stages, scheme or program application approval/sanction of funds • Issuance of license or permits/ License • Financial assistance • Create or update department and/or agencies	• Service plus needs to have the capability to support reengineered service delivery as well as new transactions. • Enablement of cloud infrastructure needs to be explored.
Scheme Management	Central funded and state-run schemes and program can be managed through technology solutions: • Scheme Awareness • Process to avail benefit • Approval and sanctions • Implementation monitoring • Analytics • Business Intelligence	State has to use closely woven scheme and program management platform with some customised features as per the program requirement supported by Analytics and Dashboard
Permission & NOC	Provide innovative solution to apply and verify permissions and NOC granted	Availability of network in remote locations that would enable verification of 2D barcodes in check gates
Lease Management	Provide an online system for management of different types of lease processing: • Issuance of New Lease • Online Renewal of Lease • Transfer of Lease • Quarry Permit Issuance • Surrender/ Termination of Lease	Integration, monitoring and regulatory changes and training especially for small and medium businesses must be considered

IT System	Description	Dependency/ Risk
Certificate and Challan	Provide a gateway between external digital applications and internal application, and a platform for internal applications to effectively integrate thereby ensuring interoperability • Online clearances • Finance Facilitation • Exhibition facilitation	Integration, monitoring and regulatory changes must be considered
Returns & Payments	Provide an online system for management to file returns and make payments: • Returns Assessment • Fee Payment • Royalty Payment	Integration with finance and payment gateway.
Financial Assistance	Provide an online system for Financial Assistance includes : • Scheme Preparation • Scheme Approval • Scheme Funding • Scheme Eligibility • Application Management • Verification and Approvals • Benefit Disbursement	Integration with finance system
Chatbot	A Chatbot with business name "Ask Megha" would be implemented, the chatbot would have the artificial intelligence capability to facilitate citizens and businesses to avail service through simple text request.	Awareness and Capacity building of the stakeholders

8.5.2 Collaborate

Making government units cohesively work towards delivering value ensuring a single government experience to the stakeholders of the government. Collaborate would also orchestrate the activities of the government to enhance efficiency in functioning and citizen centric service delivery. The different APIs required to make this happen are described below:

API	Data Sharing Details	Source Application	Destination Application
Service Request	• Service ID (Number) • Mobile Number (Number)	Chatbot	Service Plus
Service Acknowledgement Status	• Service request ID(Number) • Service application URL	Service Plus	Chatbot

API	Data Sharing Details	Source Application	Destination Application
Aadhar Verification	• Aadhar Number • Verification Result	Service Plus	UIDAI
Fetch Name & Demography-Aadhar	• Aadhar Number • Name • Date of Birth • Last Name • First Name • Address • Pin Code • Sex	Service Plus	UIDAI
PAN Verification	• PAN • Verification Result	Service Plus	PAN System
Fetch Company Details	• GSTN • PAN • Legal Name • Trade Name • Date of Liability • Date of Validity • Type of Registration • Address	GST System/ PAN System	Service Plus
Financial Assistance	• Application ID • Beneficiary Details • Beneficiary Bank Details • Amount	Environment Pillar System	TreasuryNet
Returns & Payment	• Return ID • Return Details • Payment Due	Service Plus	Environment Pillar System
Certificate & Challan	• Application ID • Beneficiary Details • Certificate Number • Certificate Details	Environment Pillar System	DigiLocker
Lease Management	• Lease ID • Lessee Details • Lease Validity	Environment Pillar System	DigiLocker
Service Status	• Service Request ID • Service Status • Reason for Delay	Environment Pillar System	Service Plus

8.5.3 Empower

Creating opportunities and accessibility provided to citizens, to develop capabilities that are valuable to actively participate in the development and decision making of a community. It can be viewed in

terms of knowledge and other aspects (such as digital inclusion) and affecting their everyday quality of life.

Program	Description
Digitization of Data	Following data needs to be digitized: • Digital ID of beneficiary • Central master data of citizens and employees • Data of existing approved schemes and programs. • Data of existing vendors and business • Data of existing Licenses and permits • Location of community complexes • Data of institutes and organizations • All latest reports and publications • New financial year funding details • Template for development expenditure proposals • All survey and data collection forms
Digital Service Awareness	For the services to be digitized, the need for training and capacity building is at following levels: • Officers on Service Plus • Department Officers on Data Collection and Survey System • Monitoring and Evaluation dashboard • How to add new projects, KPIs and various other features of BI in dashboard
Learning Management System	The MeghEA learning Management System would enable to deliver learning lessons online to stakeholders. There is a training requirement of department officers on the processes and usages of the system.

9. Annexure

9.1 Goals, Indicators and Baseline data for Environment Pillar

Out of the 235 indicators identified by the state, a total of 38 indicators pertain to the Environment pillar. Details of various indicators and the baseline data could be found in following subsections:

9.1.1 Indicators Assigned to Environment Pillar

SDG Goal	Indicator	Primary Responsible Department
Goal 1. End poverty in all its forms everywhere	Percentage of population benefitted under NSAP (National Social Assistance Programme)	Community & Rural Development
	Percentage of rural and urban households benefitted under PMAY-G (Pradhan Mantri Awaas Yojana-Gramin).	Community & Rural Development
	Percentage of eligible households to have access to food security through National Food Security Act (NFSA) and the enhanced PDS system	Food Civil Supplies & Consumer Affairs
	Percentage of Priority Sector Advances to Total credit/Advance	Planning
	Number of deaths, missing persons and persons affected by disaster per 10,000 population	Revenue & Disaster Management
	Percentage of towns and Cities covered under the Disaster Reduction Risk Strategy	Revenue & Disaster Management
	Number of deaths, missing persons and directly affected persons attributed to disasters per 10,000 population	Revenue & Disaster Management
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	CO2 equivalent emission per unit of manufacturing value added	Forests & Environment
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable	Percentage of houses completed under Pradhan Mantri Awas Yojana (PMAY) to net demand assessed for houses	Community & Rural Development
	Number of HH benefited from the PMAY-G houses constructed.	Community & Rural Development
	Percentage of Urban poor household covered under housing schemes	Housing

SDG Goal	Indicator	Primary Responsible Department
	Number of urban Homeless under Shelter Homes	Housing
	Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	Meghalaya State Pollution Control Board
	Percentage of waste processed	Public Health Engineering
	Number of urban poor having access to basic services	Urban Affairs
	Percentage of urban households living in slums	Urban Affairs
	Net Density (total urban population by total habitable land area)	Urban Affairs
	Percentage of collection and safe disposal of solid waste	Urban Affairs
	Percentage of wards with 100% door to door waste collection	Urban Affairs
Goal 12. Ensure sustainable consumption and production patterns	Number of companies publishing sustainability reports	Commerce & Industries
	Increase/decrease in imposition of adequate Tax per unit of fossil fuel consumption.	Mining & Geology
	Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment	Public Health Engineering
	Number of Community Mini Compost plants established	Public Health Engineering
	Percentage of organic waste converted into compost	Public Health Engineering
	Percentage of urban waste that has been segregated	Public Health Engineering
	Number of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools	Tourism
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification,	Percentage increase of Tree Outside Forest (TOF) in total forest cover	Forests & Environment
	Increase in area under afforestation / tree plantation	Forests & Environment
	Increase in Very Dense Forest cover	Forests & Environment
	Percentage of villages with JFMCs (Joint Forest	Forests &

SDG Goal	Indicator	Primary Responsible Department
and halt and reverse land degradation and halt biodiversity loss	Management Committee)	Environment
	Increase in Moderately Dense Forest	Forests & Environment
	Percentage of degraded area restored	Forests & Environment
	Increase in forest/ vegetative cover in mountain areas	Forests & Environment
	Number of wildlife offences booked	Forests & Environment
	Number of detections of offences and prevention measures for traded wildlife that was poached or illicitly trafficked	Forests & Environment
	Percentage of conservation expenditure of government to total expenditure (annually)	Planning
	Number of impaired/ dead springs rejuvenated	Water Resources
	Percentage of increase in restoration of water bodies / stream in mountain areas	Water Resources

9.1.2 Indicators under Environment and Assigned to Departments under Environment

S. No	Key indicators	Baseline Data	Target	Primary Responsible Department
1	CO2 equivalent emission per unit of manufacturing value added	*Data not available*	*To be defined*	Forests & Environment
2	Percentage increase of Tree Outside Forest (TOF) in total forest cover	*Data not available*	*To be defined*	Forests & Environment
3	Increase in area under afforestation / tree plantation	*76.32 Ha*	*To be defined*	Forests & Environment
4	Increase in Very Dense Forest cover	*2.6%*	*5%*	Forests & Environment
5	Percentage of villages with JFMCs (Joint Forest Management Committee)	*366*	*To be defined*	Forests & Environment
6	Increase in Moderately Dense Forest	*54.74%*	*70%*	Forests & Environment
7	Percentage of degraded area restored	*Data not available*	*To be defined*	Forests & Environment
8	Increase in forest / vegetative cover in mountain areas	*Data not available*	*To be defined*	Forests & Environment
9	Number of wildlife offences booked	*Data not available*	*100%*	Forests & Environment
10	Number of detections of offences and prevention measures for traded	*Data not available*	*To be defined*	Forests & Environment

S. No	Key indicators	Baseline Data	Target	Primary Responsible Department
	wildlife that was poached or illicitly trafficked			
11	Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	*Data not available*	*To be defined*	State Pollution Control Board
12	Increase/decrease in imposition of adequate Tax per unit of fossil fuel consumption.	*Data not available*	*To be defined*	Mining & Geology

9.1.3 Indicators under Environment but marked to departments out of scope

S. No	Key indicators	Primary Responsible Department
1	Percentage of Urban poor household covered under housing schemes	Housing
2	Number of urban Homeless under Shelter Homes	Housing
3	Number of deaths, missing persons and persons affected by disaster per 10,000 population	Revenue & Disaster Management
4	Percentage of towns and Cities covered under the Disaster Reduction Risk Strategy	Revenue & Disaster Management
5	Number of deaths, missing persons and directly affected persons attributed to disasters per 10,000 population	Revenue & Disaster Management
6	Number of urban poor having access to basic services	Urban Affairs
7	Percentage of urban households living in slums	Urban Affairs
8	Net Density (total urban population by total habitable land area)	Urban Affairs
9	Percentage of collection and safe disposal of solid waste	Urban Affairs
10	Percentage of wards with 100% door to door waste collection	Urban Affairs
11	Number of impaired/ dead springs rejuvenated	Water Resources
12	Percentage of increase in restoration of water bodies / stream in mountain areas	Water Resources

9.1.4 Indicators under Environment departments but marked to departments in Other Pillars

S. No	Key indicators	Primary Responsible Department
1.	Number of companies publishing sustainability reports	Commerce & Industries
2.	Percentage of population benefitted under NSAP (National Social Assistance Programme)	Community & Rural Development
3.	Percentage of rural and urban households benefitted under PMAY-G(Pradhan Mantri Awaas Yojana-Gramin).	Community & Rural Development

S. No	Key indicators	Primary Responsible Department
4.	Percentage of houses completed under Pradhan Mantri Awas Yojana (PMAY) to net demand assessed for houses	Community & Rural Development
5.	Number of HH benefited from the PMAY-G houses constructed.	Community & Rural Development
6.	Percentage of eligible households to have access to food security through National Food Security Act (NFSA) and the enhanced PDS system	Food Civil Supplies & Consumer Affairs
7.	Percentage of Priority Sector Advances to Total credit/Advance	Planning
8.	Percentage of conservation expenditure of government to total expenditure (annually)	Planning
9.	Percentage of waste processed	Public Health Engineering
10.	Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment	Public Health Engineering
11.	Number of Community Mini Compost plants established	Public Health Engineering
12.	Percentage of organic waste converted into compost	Public Health Engineering
13.	Percentage of urban waste that has been segregated	Public Health Engineering
14.	Number of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools	Tourism

9.1.5 Indicators Assigned to Other Pillars with Responsibility Marked to Departments under Environment Pillar

S. No	Key indicators	Primary Responsible Department	Pillar
1	No. of State officials trained in climate adaptation planning	Forests & Environment	Human Development

9.2 As-Is Service Catalogue

Service Code	Service Name	Service Description	Service Delivery Channels	Service Classification	Locations at which this service is being offered	How frequently does the applicant need to avail this service
F&E01	Mining Lease & Quarry Permit for Minor Minerals	As per Rule 5 of the Meghalaya Minor Mineral Concession Rules, 2016, the PCCF & HoFF (for area of more than 5 hectares) or DFO Territorial Division (up to 5 hectares area) shall grant Mining lease, Quarry permit in respect of minor minerals for use other than in industries as specified in Schedule III	Offline	G2B	1. State HQ 2. District HQ	Once in a lifetime
F&E02	Transfer of Mining leases (For minerals under Schedule III)	The lessee may, with the prior approval of the State Government and subject to conditions as the State Government may specify, transfer his lease or any right, title or interest therein to any person on payment of fee	Offline	G2B	1. State HQ 2. District HQ	Once in a lifetime
F&E03	Application for permission for felling of Trees outside Shillong	Permission need to be obtained by the applicant prior to felling of trees as per prescribed application form	Hard copy of the form needs to be submitted at the office of DFO - Territorial Division / Chief Forest Officer - Autonomous District Council, -	G2C	1. District HQ	As and when required
F&E04	NOC to set up timber depot	No person shall set up Timber Depot without	Offline	G2B	1. State HQ	Once in a lifetime

Service Code	Service Name	Service Description	Service Delivery Channels	Service Classification	Locations at which this service is being offered	How frequently does the applicant need to avail this service
		obtaining NOC from Forest Department. An application shall be submitted to DFO (Territorial) in Form II along with land documents etc. and undertaking to supply sawn timber from licensed sawmills			2. District HQ	
F&E05	Renewal of Mining Leases (For minerals under Schedule III)	Renewal only once for a period not exceeding twenty years	Offline	G2B	1. State HQ 2. District HQ	Once in a lifetime
F&E06	Termination of Mining Leases (For minerals under Schedule III)	The lease shall be liable for termination under provisions under Rule 34	Offline	G2G	1. State HQ 2. District HQ	Once in a lifetime
F&E07	Surrender of Mining Leases (For minerals under Schedule III)	The lessee may surrender a part or whole of the leased area after giving notice in writing of not less than 60 days to the competent authority under Rule 33 of MMMCR 2016	Offline	G2B	1. State HQ 2. District HQ	Once in a lifetime
F&E08	Forest clearance Application for projects other than mining stone crushers quarry permit furniture unit and timber depot	Application of forest clearance to verify status of the land as forest or non-forest land	Offline	G2C	1. State HQ 2. District HQ	Once in a lifetime
F&E09	Human Animal Conflict and Compensation	Ex gratia payment made by the Department to victims of wildlife depredation for loss of life, loss of limbs or injuries causing permanent disability and	Offline	G2C	1. District HQ	As and when required

Service Code	Service Name	Service Description	Service Delivery Channels	Service Classification	Locations at which this service is being offered	How frequently does the applicant need to avail this service
		damage, loss of crops and property including livestock				
F&E10	Application for permission for Transportation of timber outside Meghalaya	Application for permission for Transportation of timber outside Meghalaya	Offline	G2C	1. State HQ 2. District HQ	As and when required
F&E11	Application for permission for felling of Trees in and around Shillong	Applicant may apply for Permission before felling of trees in or around Shillong by entering all the necessary fields in the Application form and as per the MTPA 1976	Offline	G2C	1. State HQ 2. District HQ	As and when required
F&E12	NOC for setting up of Stone Crushers in Meghalaya	The applicant shall be required to obtain NOC (Non-Forest land certificate) from the Forest and Environment Department for setting up of Stone Crushers in the State. The application along with land documents and source of raw material shall be submitted to concern DFO Territorial Division.	Offline	G2B	1. State HQ 2. District HQ	Once in a lifetime
F&E13	Non-Forest Land Certificate/ NOC	The applicant, project proponent is required to obtain Non-Forest land certificate (NOC) from Forest and Environment Department for the purposes of any activities, viz. mining, Roads, any projects,	Offline	G2C	1. District HQ	Once in a lifetime

Service Code	Service Name	Service Description	Service Delivery Channels	Service Classification	Locations at which this service is being offered	How frequently does the applicant need to avail this service
		industrial set up, developmental works, construction works etc.				
F&E14	NOC to set up Furniture unit	No person shall set up Furniture unit without obtaining NOC from Forest Department. An application shall be submitted to DFO (Territorial) along with land documents and undertaking to supply sawn timber from licensed sawmills	Offline	G2B	1. State HQ 2. District HQ	Once in a lifetime
F&E15	Forest Nurseries	In order to facilitate raising of planting stock required under various schemes and for public distribution of seedlings, over the years most of Divisions, especially those in the Social Forestry & Territorial Circle have established permanent nurseries at various locations	Offline	G2C	1. District HQ	Annually
M&G 01	Approval of Mining Plan for minor minerals	-	-	-	-	As and when required
M&G 02	Issuance of Transport Challan for Transportation of Minerals	-	Online	G2C	-	As and when required
M&G 03	Transfer of Mining Lease (For minerals under Schedule II)	The lessee may transfer his lease or any rights, title or interest therein to any person on payment of fee with prior	Online	G2B	-	Once in a lifetime

Service Code	Service Name	Service Description	Service Delivery Channels	Service Classification	Locations at which this service is being offered	How frequently does the applicant need to avail this service
		approval by the State Government and subject to condition as the State Government may specify.				
M&G 04	Surrender of Mining Lease (For minerals under Schedule II)	This service relates to the surrendering a part or whole of the Leased area	Online	G2B	-	Once in a lifetime
M&G 05	Approval for the Minerals Exploration	To grant approval for the exploration of mineral whether by Geological & Geotechnical Survey, Survey, Mapping & Drilling of samples etc., to be conducted by the Directorate.	Offline	G2G	1. State HQ 2. District HQ	As and when required
M&G 06	Mining Lease and Quarry Permit Registration by Citizen (For minerals under Schedule II)	This service relates to the Application that a citizen may apply for Mining Lease by entering all the necessary fields in the Application form.	Online	G2B	-	Once in a lifetime
M&G 07	Royalty Payment (For minerals under Schedule II)	This service deals with the payment of the Royalty by the Lessee or Permit holder in respect of each Minor mineral removed from the mining Lease or Quarry permit area	Online	G2B	-	Once in a lifetime
M&G 08	Mining Leases Renewal (For minerals under Schedule II)	This service enables the Lessee to apply the Renewal of Mining lease for a period not exceeding twenty years	Online	G2B	-	Once in a lifetime

Service Code	Service Name	Service Description	Service Delivery Channels	Service Classification	Locations at which this service is being offered	How frequently does the applicant need to avail this service
M&G 09	Mining Lease Termination (For minerals under Schedule II)	This service enables deals with the termination of the Lease	Online	G2B	-	Once in a lifetime
M&G 10	Returns Filing by Mining Leasee (For minerals under Schedule II)	The lessee shall submit monthly and annual returns to the authority of the department.	Online	G2B	-	Once in a lifetime
M&G 11	Grant of Reconnaissance Permit (RP) Issuance process	To grant Reconnaissance Permit (RP) for carrying mining activities in the far particular area having mineral prospects.	Online	G2B	-	Once in a lifetime
M&G 12	Student Scholarships Grant Process	To grant Scholarships to local student if any for promoting higher studies in Mining Geology Sector.	Online	G2C	-	Once in a lifetime
M&G 13	Reviewing the Plans/ Schemes and issuing Sanctions/approval	To review the Plans, Schemes and issuing sanctions, approval to the Directorate for conducting Geological investigation, exploration of minerals, strengthening of mineral administration, assess environmental degradation etc.	Online	G2G	-	Once in a lifetime
M&G 14	Plans/ Proposal/ Expenditures Budget	Budget allocation for all Plans, Proposal, Expenditures and Reports of disbursement are being implemented in	Online	G2G	-	Once in a lifetime

Service Code	Service Name	Service Description	Service Delivery Channels	Service Classification	Locations at which this service is being offered	How frequently does the applicant need to avail this service
		the Directorate level.				

9.3 Rationalized Service Catalogue

Service Code	Service Name	Service Description	Service Classification	Group	Subgroup	Rationalized
F&E01	Mining Lease & Quarry Permit for Minor Minerals	As per Rule 5 of the Meghalaya Minor Mineral Concession Rules, 2016, the PCCF & HoFF (for area of more than 5 hectares) or DFO Territorial Division (up to 5 hectares area) shall grant Mining lease, Quarry permit in respect of minor minerals for use other than in industries as specified in Schedule III	G2B	Lease	Permit	No
F&E02	Transfer of Mining leases (For minerals under Schedule III)	The lessee may, with the prior approval of the State Government and subject to conditions as the State Government may specify, transfer his lease or any right, title or interest therein to any person on payment of fee	G2B	Lease	Transfer	No
F&E03	Application for permission for felling of Trees outside Shillong	Permission need to be obtained by the applicant prior to felling of trees as per prescribed application form	G2C	Permission	Permission	No
F&E04	NOC to set up timber depot	No person shall set up Timber Depot without obtaining NOC from Forest Department. An application shall be submitted to DFO (Territorial) in Form II along with land documents etc. and undertaking to supply sawn timber from licensed sawmills	G2B	NOC	NOC	No
F&E05	Renewal of Mining Leases (For minerals under Schedule III)	Renewal only once for a period not exceeding twenty years	G2B	Lease	Renewal	No

Service Code	Service Name	Service Description	Service Classification	Group	Subgroup	Rationalized
F&E06	Termination of Mining Leases (For minerals under Schedule III)	The lease shall be liable for termination under provisions under Rule 34	G2G	Lease	Termination	No
F&E07	Surrender of Mining Leases (For minerals under Schedule III)	The lessee may surrender a part or whole of the leased area after giving notice in writing of not less than 60 days to the competent authority under Rule 33 of MMMCR 2016	G2B	Lease	Surrender	No
F&E08	Forest clearance Application for projects other than mining stone crushers quarry permit furniture unit and timber depot	Application of forest clearance to verify status of the land as forest or non-forest land	G2C	Certificate & Challan	Permission	No
F&E09	Human Animal Conflict and Compensation	Ex gratia payment made by the Department to victims of wildlife depredation for loss of life, loss of limbs or injuries causing permanent disability and damage, loss of crops and property including livestock	G2C	Financial Assistance	Compensation	No
F&E10	Application for permission for Transportation of timber outside Meghalaya	Application for permission for Transportation of timber outside Meghalaya	G2C	Permission	Permission	No
F&E11	Application for permission for felling of Trees in and around Shillong	Applicant may apply for Permission before felling of trees in or around Shillong by entering all the necessary fields in the Application form and as per the MTPA 1976	G2C	Permission	Permission	Yes

Service Code	Service Name	Service Description	Service Classification	Group	Subgroup	Rationalized
F&E12	NOC for setting up of Stone Crushers in Meghalaya	The applicant shall be required to obtain NOC (Non-Forest land certificate) from the Forest and Environment Department for setting up of Stone Crushers in the State. The application along with land documents and source of raw material shall be submitted to concern DFO Territorial Division.	G2B	NOC	NOC	No
F&E13	Non-Forest Land Certificate/ NOC	The applicant, project proponent is required to obtain Non-Forest land certificate (NOC) from Forest and Environment Department for the purposes of any activities, viz. mining, Roads, any projects, industrial set up, developmental works, construction works etc.	G2C	Certificate & Challan	NOC	No
F&E14	NOC to set up Furniture unit	No person shall set up Furniture unit without obtaining NOC from Forest Department. An application shall be submitted to DFO (Territorial) along with land documents and undertaking to supply sawn timber from licensed sawmills	G2B	NOC	NOC	No
F&E15	Forest Nurseries	In order to facilitate raising of planting stock required under various schemes and for public distribution of seedlings, over the years most of Divisions, especially those in the Social Forestry & Territorial Circle have established permanent nurseries at various locations	G2C	Nursery	Supply of seedlings	No

Service Code	Service Name	Service Description	Service Classification	Group	Subgroup	Rationalized
M&G 01	Approval of Mining Plan for minor minerals	-	-	Permission	Plan approval	No
M&G 02	Issuance of Transport Challan for Transportation of Minerals	-	G2C	Certificate & Challan	Challan issuance	No
M&G 03	Transfer of Mining Lease (For minerals under Schedule II)	The lessee may transfer his lease or any rights, title or interest therein to any person on payment of fee with prior approval by the State Government and subject to condition as the State Government may specify.	G2B	Lease	Transfer	No
M&G 04	Surrender of Mining Lease (For minerals under Schedule II)	This service relates to the surrendering a part or whole of the Leased area	G2B	Lease	Surrender	No
M&G 05	Approval for the Minerals Exploration	To grant approval for the exploration of mineral whether by Geological & Geotechnical Survey, Survey, Mapping & Drilling of samples etc., to be conducted by the Directorate.	G2G	Permission	*Internal process*	No
M&G 06	Mining Lease and Quarry Permit Registration by Citizen (For minerals under Schedule II)	This service relates to the Application that a citizen may apply for Mining Lease by entering all the necessary fields in the Application form.	G2B	Lease	Permission	No
M&G 07	Royalty Payment (For minerals under Schedule II)	This service deals with the payment of the Royalty by the Lessee or Permit holder in respect of each Minor mineral removed from the mining Lease or Quarry permit area	G2B	Payment	Permission	No

Service Code	Service Name	Service Description	Service Classification	Group	Subgroup	Rationalized
M&G 08	Mining Leases Renewal (For minerals under Schedule II)	This service enables the Lessee to apply the Renewal of Mining lease for a period not exceeding twenty years	G2B	Lease	Renewal	No
M&G 09	Mining Lease Termination (For minerals under Schedule II)	This service enables deals with the termination of the Lease	G2B	Lease	Termination	No
M&G 10	Returns Filing by Mining Leasee (For minerals under Schedule II)	The lessee shall submit monthly and annual returns to the authority of the department.	G2B	Lease	Return scrutiny	No
M&G 11	Grant of Reconnaissance Permit (RP) Issuance process	To grant Reconnaissance Permit (RP) for carrying mining activities in the far particular area having mineral prospects.	G2B	Permission	Permission	No
M&G 12	Student Scholarships Grant Process	To grant Scholarships to local student if any for promoting higher studies in Mining Geology Sector	G2C	Financial Assistance	Scholarship	No
M&G 13	Reviewing the Plans/ Schemes and issuing Sanctions/approval	To review the Plans, Schemes and issuing sanctions, approval to the Directorate for conducting Geological investigation, exploration of minerals, strengthening of mineral administration, assess environmental degradation etc.	G2G	*Not a Service*	*Internal process*	Yes
M&G 14	Plans/ Proposal/ Expenditures Budget	Budget allocation for all Plans, Proposal, Expenditures and Reports of disbursement are being implemented in the Directorate level.	G2G	*Not a Service*	*Internal process*	Yes

9.4 Service Indicator Mapping

S.No	Key indicators	Primary Responsible Department	Service No	Service Name
1	Number of companies publishing sustainability reports	Commerce & Industries		Not covered in this pillar
2	Percentage of population benefitted under NSAP (National Social Assistance Programme)	Community & Rural Development		Not covered in this pillar
3	Percentage of rural and urban households benefitted under PMAY-G(Pradhan Mantri Awaas Yojana-Gramin).	Community & Rural Development		Not covered in this pillar
4	Percentage of houses completed under Pradhan Mantri Awas Yojana (PMAY) to net demand assessed for houses	Community & Rural Development		Not covered in this pillar
5	Number of HH benefited from the PMAY-G houses constructed.	Community & Rural Development		Not covered in this pillar
6	Percentage of eligible households to have access to food security through National Food Security Act (NFSA) and the enhanced PDS system	Food Civil Supplies & Consumer Affairs		Not covered in this pillar
7	CO2 equivalent emission per unit of manufacturing value added	Forests & Environment	F&E01	Mining Lease & Quarry Permit for Minor Minerals
			F&E03	Application for permission for felling of Trees
			F&E04	NOC to set up timber depot
			F&E14	NOC to set up Furniture unit
8	Percentage increase of Tree Outside Forest (TOF) in total forest cover	Forests & Environment	F&E03	Application for permission for felling of Trees outside Shillong
			F&E13	Non-Forest Land Certificate/ NOC
9	Increase in area under afforestation / tree plantation	Forests & Environment	F&E03	Application for permission for felling of Trees
			F&E15	Forest Nurseries

S.No	Key indicators	Primary Responsible Department	Service No	Service Name
10	Increase in Very Dense Forest cover	Forests & Environment	F&E16	Management of Reserved Forest & Protected Forest as part of the working plan
11	Percentage of villages with JFMCs (Joint Forest Management Committee)	Forests & Environment	F&E15	Forest Nurseries
12	Increase in Moderately Dense Forest	Forests & Environment	F&E16	Management of Reserved Forest & Protected Forest as part of the working plan
			F&E19	Development of Protected Areas(PAs)
13	Percentage of degraded area restored	Forests & Environment	F&E22	Biodiversity Management
14	Increase in forest / vegetative cover in mountain areas	Forests & Environment	F&E22	Biodiversity Management
15	Number of wildlife offences booked	Forests & Environment	F&E09	Human Animal Conflict and Compensation
16	Number of detections of offences and prevention measures for traded wildlife that was poached or illicitly trafficked	Forests & Environment	F&E09	Human Animal Conflict and Compensation
			F&E20	Protection and census of elephants
17	Percentage of Urban poor household covered under housing schemes	Housing		Out of Scope Department
18	Number of urban Homeless under Shelter Homes	Housing		Out of Scope Department
19	Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	Meghalaya State Pollution Control Board		No Service Provided
20	Increase/decrease in imposition of adequate Tax per unit of fossil fuel consumption.	Mining	M&G 02	Issuance of Transport Challan for Transportation of Minerals
			F&E10	Application for permission for Transportation of timber outside Meghalaya
21	Percentage of Priority Sector Advances to Total credit/Advance	Planning		Not covered in this pillar

S.No	Key indicators	Primary Responsible Department	Service No	Service Name
22	Percentage of conservation expenditure of government to total expenditure (annually)	Planning		Not covered in this pillar
23	Percentage of waste processed	Public Health Engineering		Not covered in this pillar
24	Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment	Public Health Engineering		Not covered in this pillar
25	Number of Community Mini Compost plants established	Public Health Engineering		Not covered in this pillar
26	Percentage of organic waste converted into compost	Public Health Engineering		Not covered in this pillar
27	Percentage of urban waste that has been segregated	Public Health Engineering		Not covered in this pillar
28	Number of deaths, missing persons and persons affected by disaster per 10,000 population	Revenue & Disaster Management		Out of Scope Department
29	Percentage of towns and Cities covered under the Disaster Reduction Risk Strategy	Revenue & Disaster Management		Not covered in this pillar
30	Number of deaths, missing persons and directly affected persons attributed to disasters per 10,000 population	Revenue & Disaster Management		Out of Scope Department
31	Number of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools	Tourism		Not covered in this pillar
32	Number of urban poor having access to basic services	Urban Affairs		Out of Scope Department
33	Percentage of urban households living in slums	Urban Affairs		Out of Scope Department

S.No	Key indicators	Primary Responsible Department	Service No	Service Name
34	Net Density (total urban population by total habitable land area)	Urban Affairs		Out of Scope Department
35	Percentage of collection and safe disposal of solid waste	Urban Affairs		Out of Scope Department
36	Percentage of wards with 100% door to door waste collection	Urban Affairs		Out of Scope Department
37	Number of impaired/ dead springs rejuvenated	Water Resources		Out of Scope Department
38	Percentage of increase in restoration of water bodies / stream in mountain areas	Water Resources		Out of Scope Department

9.5 Prioritized Services Catalogue

Service Code	Service Name	Service Description	Service Assessment	Complexity of Implementation	Value to Stakeholders	Prioritization
F&E01	Mining Lease & Quarry Permit for Minor Minerals	As per Rule 5 of the Meghalaya Minor Mineral Concession Rules, 2016, the PCCF & HoFF (for area of more than 5 hectares) or DFO Territorial Division (up to 5 hectares area) shall grant Mining lease, Quarry permit in respect of minor minerals for use other than in industries as specified in Schedule III	Low	Low	High	Prioritized
F&E02	Transfer of Mining leases (For minerals under Schedule III)	The lessee may, with the prior approval of the State Government and subject to conditions as the State Government may specify, transfer his lease or any right, title or interest therein to any person on payment of fee	Low	Low	High	Prioritized
F&E03	Application for permission for felling of Trees outside Shillong	Permission need to be obtained by the applicant prior to felling of trees as per prescribed application form	Low	Low	High	Prioritized
F&E04	NOC to set up timber depot	No person shall set up Timber Depot without obtaining NOC from Forest Department. An application shall be submitted to DFO (Territorial) in Form II along with land documents etc. and undertaking to supply sawn timber from licensed sawmills	Low	Low	High	Prioritized
F&E05	Renewal of Mining Leases (For minerals under Schedule III)	Renewal only once for a period not exceeding twenty years	Low	Low	High	Prioritized
F&E06	Termination of Mining Leases (For minerals under Schedule III)	The lease shall be liable for termination under provisions under Rule 34	Low	Medium	Low	Not Prioritized
F&E07	Surrender of Mining Leases (For minerals under Schedule III)	The lessee may surrender a part or whole of the leased area after giving notice in writing of not less than 60 days to the competent authority	Low	Medium	Low	Not Prioritized

Service Code	Service Name	Service Description	Service Assessment	Complexity of Implementation	Value to Stakeholders	Prioritization
		under Rule 33 of MMMCR 2016				
F&E08	Forest clearance Application for projects other than mining stone crushers quarry permit furniture unit and timber depot	Application of forest clearance to verify status of the land as forest or non-forest land	Low	Low	High	Prioritized
F&E09	Human Animal Conflict and Compensation	Ex gratia payment made by the Department to victims of wildlife depredation for loss of life, loss of limbs or injuries causing permanent disability and damage, loss of crops and property including livestock	Low	Low	High	Prioritized
F&E10	Application for permission for Transportation of timber outside Meghalaya	Application for permission for Transportation of timber outside Meghalaya	Low	Low	High	Prioritized
F&E12	NOC for setting up of Stone Crushers in Meghalaya	The applicant shall be required to obtain NOC (Non-Forest land certificate) from the Forest and Environment Department for setting up of Stone Crushers in the State. The application along with land documents and source of raw material shall be submitted to concern DFO Territorial Division.	Low	Low	High	Prioritized
F&E13	Non-Forest Land Certificate/ NOC	The applicant, project proponent is required to obtain Non-Forest land certificate (NOC) from Forest and Environment Department for the purposes of any activities, viz. mining, Roads, any projects, industrial set up, developmental works, construction works etc.	Low	Low	High	Prioritized
F&E14	NOC to set up Furniture unit	No person shall set up Furniture unit without obtaining NOC from Forest Department. An application shall be	Low	Low	High	Prioritized

Service Code	Service Name	Service Description	Service Assessment	Complexity of Implementation	Value to Stakeholders	Prioritization
		submitted to DFO (Territorial) along with land documents and undertaking to supply sawn timber from licensed sawmills				
F&E15	Forest Nurseries	In order to facilitate raising of planting stock required under various schemes and for public distribution of seedlings, over the years most of Divisions, especially those in the Social Forestry & Territorial Circle have established permanent nurseries at various locations	Low	High	Medium	Not Prioritized
M&G 01	Approval of Mining Plan for minor minerals	-	Low	Low	High	Not Prioritized
M&G 02	Issuance of Transport Challan for Transportation of Minerals	-	Low	Low	High	Prioritized
M&G 03	Transfer of Mining Lease (For minerals under Schedule II)	The lessee may transfer his lease or any rights, title or interest therein to any person on payment of fee with prior approval by the State Government and subject to condition as the State Government may specify.	Low	Medium	Medium	Not Prioritized
M&G 04	Surrender of Mining Lease (For minerals under Schedule II)	This service relates to the surrendering a part or whole of the Leased area	Low	Medium	Low	Not Prioritized
M&G 05	Approval for the Minerals Exploration	To grant approval for the exploration of mineral whether by Geological & Geotechnical Survey, Survey, Mapping & Drilling of samples etc., to be conducted by the Directorate.	Low	Low	High	Prioritized
M&G 06	Mining Lease and Quarry Permit Registration by Citizen (For minerals under Schedule II)	This service relates to the Application that a citizen may apply for Mining Lease by entering all the necessary fields in the Application form.	Low	Low	High	Prioritized
M&G 07	Royalty Payment (For minerals under Schedule II)	This service deals with the payment of the Royalty by the Lessee or Permit holder in	Medium	Low	High	Prioritized

Service Code	Service Name	Service Description	Service Assessment	Complexity of Implementation	Value to Stakeholders	Prioritization
		respect of each Minor mineral removed from the mining Lease or Quarry permit area				
M&G 08	Mining Leases Renewal (For minerals under Schedule II)	This service enables the Lessee to apply the Renewal of Mining lease for a period not exceeding twenty years	Low	Low	High	Prioritized
M&G 09	Mining Lease Termination (For minerals under Schedule II)	This service enables deals with the termination of the Lease	Low	Medium	Low	Not Prioritized
M&G 10	Returns Filing by Mining Leasee (For minerals under Schedule II)	The lessee shall submit monthly and annual returns to the authority of the department.	Low	Low	High	Prioritized
M&G 11	Grant of Reconnaissance Permit (RP) Issuance process	To grant Reconnaissance Permit (RP) for carrying mining activities in the far particular area having mineral prospects.	Low	Low	High	Prioritized
M&G 12	Student Scholarships Grant Process	To grant Scholarships to local student if any for promoting higher studies in Mining Geology Sector	Low	Low	High	Prioritized

9.6 Department Wise - Future State Service Catalogue

Service Code	Service Name	Service Classification	Group	Service Frequency	Service Delivery Channel	Service Level (Days)	Status
F&E 01	Mining Lease & Quarry Permit for Minor Minerals	G2B	Lease	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 02	Transfer of Mining leases (For minerals under Schedule III)	G2B	Lease	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 03	Application for permission for felling of Trees outside Shillong	G2C	Permission	As and when required	Digital	Service will be delivered in **7 days**	Prioritized
F&E 04	NOC to set up timber depot	G2B	NOC	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 05	Renewal of Mining Leases (For minerals under Schedule III)	G2B	Lease	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 06	Termination of Mining Leases (For minerals under Schedule III)	G2G	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized
F&E 07	Surrender of Mining Leases (For minerals under Schedule III)	G2B	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized
F&E 08	Forest clearance Application for projects other than mining stone crushers quarry permit furniture unit and timber depot	G2C	Certificate & Challan	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 09	Human Animal Conflict and Compensation	G2C	Financial Assistance	As and when required	Digital	Service will be delivered in **7 days**	Prioritized
F&E 10	Application for permission for Transportation of timber outside Meghalaya	G2C	Permission	As and when required	Digital	Real Time	Prioritized
F&E 12	NOC for setting up of Stone Crushers in Meghalaya	G2B	NOC	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 13	Non-Forest Land Certificate/ NOC	G2C	Certificate & Challan	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized

Service Code	Service Name	Service Classification	Group	Service Frequency	Service Delivery Channel	Service Level (Days)	Status
F&E 14	NOC to set up Furniture unit	G2B	NOC	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 15	Forest Nurseries	G2C	Nursery	Annually	Physical	To be defined in second phase of Implementation	Not Prioritized
F&E 16	Management of Reserved Forest & Protected Forest as part of the working plan	G2G	Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New
F&E 17	Protection of sacred groves and promotion to premium tourists		Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New
F&E 18	Protection and Management of National Parks, Wildlife Sanctuaries and Community Reserves of the State		Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New
F&E 19	Development of Protected Areas(PAs)		Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New
F&E 20	Protection and census of elephants		Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New
F&E 21	Maintain and manage mini Zoos & parks		Awareness & Research	As and when required	Physical	Not Applicable	New
F&E 22	Biodiversity Management		Awareness & Research	As and when required	Physical	Not Applicable	New
F&E 23	Record Environmental Issues under the Environmental Information System (ENVIS) Project		Informational	As and when required	Physical	Not Applicable	New
F&E 24	Transit Pass Issuance for Forest Produce and Minor minerals		Payment	As and when required	Digital	Real Time	New
F&E 25	Monitoring and Reporting of Air Quality	G2G	Informational	Daily	Digital	Real Time Monitoring with Daily Reporting	New
M&G 01	Approval of Mining Plan for minor minerals	-	Permission	As and when required	Digital	To be defined in second phase of Implementation	Not Prioritized
M&G 02	Issuance of Transport Challan for Transportation of Minerals	G2C	Certificate & Challan	As and when required	Digital	Real Time	Prioritized
M&G 03	Transfer of Mining Lease (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized

Service Code	Service Name	Service Classification	Group	Service Frequency	Service Delivery Channel	Service Level (Days)	Status
M&G 04	Surrender of Mining Lease (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized
M&G 05	Approval for the Minerals Exploration	G2G	Permission	As and when required	Digital	Service will be delivered in **7 days**	Prioritized
M&G 06	Mining Lease and Quarry Permit Registration by Citizen (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
M&G 07	Royalty Payment (For minerals under Schedule II)	G2B	Payment	Once in a lifetime	Digital	To be done by lessee	Prioritized
M&G 08	Mining Leases Renewal (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
M&G 09	Mining Lease Termination (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized
M&G 10	Returns Filing by Mining Leasee (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	To be done by lessee	Prioritized
M&G 11	Grant of Reconnaissance Permit (RP) Issuance process	G2B	Permission	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
M&G 12	Student Scholarships Grant Process	G2C	Financial Assistance	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
M&G15	Single window clearance service		Permission	As and when required	Digital	Real Time	New
M&G16	Permit & Challan Vigilance		Permission	As and when required	Digital	Real Time	New

9.6.1 Future state service catalogue – Forest & Environment Department

Service Code	Service Name	Service Classification	Group	Service Frequency	Service Delivery Channel	Service Level (Days)	Status
F&E 01	Mining Lease & Quarry Permit for Minor Minerals	G2B	Lease	As and when required	Digital	Service will be delivered in **7 days**	Prioritized

Service Code	Service Name	Service Classification	Group	Service Frequency	Service Delivery Channel	Service Level (Days)	Status
F&E 02	Transfer of Mining leases (For minerals under Schedule III)	G2B	Lease	As and when required	Digital	Service will be delivered in **7 days**	Prioritized
F&E 03	Application for permission for felling of Trees outside Shillong	G2C	Permission	As and when required	Digital	Service will be delivered in **7 days**	Prioritized
F&E 04	NOC to set up timber depot	G2B	NOC	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 05	Renewal of Mining Leases (For minerals under Schedule III)	G2B	Lease	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 06	Termination of Mining Leases (For minerals under Schedule III)	G2G	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized
F&E 07	Surrender of Mining Leases (For minerals under Schedule III)	G2B	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized
F&E 08	Forest clearance Application for projects other than mining stone crushers quarry permit furniture unit and timber depot	G2C	Certificate & Challan	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 09	Human Animal Conflict and Compensation	G2C	Financial Assistance	As and when required	Digital	Service will be delivered in **7 days**	Prioritized
F&E 10	Application for permission for Transportation of timber outside Meghalaya	G2C	Permission	As and when required	Digital	Real Time	Prioritized
F&E 12	NOC for setting up of Stone Crushers in Meghalaya	G2B	NOC	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 13	Non-Forest Land Certificate/ NOC	G2C	Certificate & Challan	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 14	NOC to set up Furniture unit	G2B	NOC	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
F&E 15	Forest Nurseries	G2C	Nursery	Annually	Physical	To be defined in second phase of Implementation	Not Prioritized
F&E 16	Management of Reserved Forest & Protected Forest as part of the working plan	G2G	Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New

Service Code	Service Name	Service Classification	Group	Service Frequency	Service Delivery Channel	Service Level (Days)	Status
F&E 17	Protection of sacred groves and promotion to premium tourists		Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New
F&E 18	Protection and Management of National Parks, Wildlife Sanctuaries and Community Reserves of the State		Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New
F&E 19	Development of Protected Areas(PAs)		Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New
F&E 20	Protection and census of elephants		Protection of Forest - Flora & Fauna	As and when required	Physical	Not Applicable	New
F&E 21	Maintain and manage mini Zoos & parks		Awareness & Research	As and when required	Physical	Not Applicable	New
F&E 22	Biodiversity Management		Awareness & Research	As and when required	Physical	Not Applicable	New
F&E 23	Record Environmental Issues under the Environmental Information System (ENVIS) Project		Informational	As and when required	Physical	Not Applicable	New
F&E 24	Transit Pass Issuance for Forest Produce and Minor minerals		Payment	As and when required	Digital	Real Time	New
F&E 25	Monitoring and Reporting of Air Quality	G2G	Informational	Daily	Digital	Real Time Monitoring with Daily Reporting	New

9.6.2 Future state service catalogue – Mining & Geology Department

Service Code	Service Name	Service Classification	Group	Service Frequency	Service Delivery Channel	Service Level (Days)	Status
M&G 01	Approval of Mining Plan for minor minerals	-	Permission	As and when required	Digital	To be defined in second phase of Implementation	Not Prioritized
M&G 02	Issuance of Transport Challan for Transportation of Minerals	G2C	Certificate & Challan	As and when required	Digital	Real Time	Prioritized
M&G 03	Transfer of Mining Lease (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized

Service Code	Service Name	Service Classification	Group	Service Frequency	Service Delivery Channel	Service Level (Days)	Status
M&G 04	Surrender of Mining Lease (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized
M&G 05	Approval for the Minerals Exploration	G2G	Permission	As and when required	Digital	Service will be delivered in **7 days**	Prioritized
M&G 06	Mining Lease and Quarry Permit Registration by Citizen (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
M&G 07	Royalty Payment (For minerals under Schedule II)	G2B	Payment	Once in a lifetime	Digital	To be done by lessee	Prioritized
M&G 08	Mining Leases Renewal (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
M&G 09	Mining Lease Termination (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	To be defined in second phase of Implementation	Not Prioritized
M&G 10	Returns Filing by Mining Leasee (For minerals under Schedule II)	G2B	Lease	Once in a lifetime	Digital	To be done by lessee	Prioritized
M&G 11	Grant of Reconnaissance Permit (RP) Issuance process	G2B	Permission	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
M&G 12	Student Scholarships Grant Process	G2C	Financial Assistance	Once in a lifetime	Digital	Service will be delivered in **7 days**	Prioritized
M&G15	Single window clearance service		Permission	As and when required	Digital	Real Time	New
M&G16	Permit & Challan Vigilance		Permission	As and when required	Digital	Real Time	New

9.7 Current State Business Interaction Matrix (Consuming & Providing)

In Scope Departments	Environment Pillar Departments	
	Forest and Environment	Mining and Geology
Agriculture & Farmers' Welfare	Forest Trees Saplings	-
Animal Husbandry & Veterinary	-	-
Fisheries	-	-
Commerce and Industry	1. NOC and clearances for setting up of units in the F&E Department jurisdiction 2. Land Status document 3. Business Opportunities to Small Entrepreneurs (Furniture, Stone Crushers units etc.)	Permission/ lease for undertaking, exploration, Mining and challans for transfer of minerals
Community and Rural Development	-	-
Education	-	Provides scholarships for pursuing higher education in Mining
Excise Registration Taxation and Stamps	-	-
Finance	1. Scheme Funding 2. Sanction of Funds 3. Issuance of LOA 4. Funds from Timber/ Nurseries	1. Scheme Funding 2. Sanction of Funds 3. Issuance of LOA 4. Funds from Mining Activities
Food Civil Supplies and Consumers Affairs	-	-
Forest and Environment		-
Health and Family Welfare	-	Health Schemes for Mining Area.
Labour	-	Employment generation in the area.
Mining and Geology	Clearances for mining units under the jurisdiction of F&E Department	
Planning	1. Approval on Scheme Annual Action Plan 2. Scheme monitoring and Evaluation 3. Policy Support.	1. Approval on Scheme Annual Action Plan 2. Scheme monitoring and Evaluation 3. Policy Support.
Public Health Engineering	-	-
Social Welfare	-	-
Tourism	National Parks and Centuries in Forest Area	Opportunities for Mining Tourism
Transport	Transportation Facilities	Transportation Facilities
Textiles	-	-

9.8 MeghEA Meta Model

The MeghEA Meta Model describes the types of entities described in various architecture domains and the relationships between them. Entities are key subject areas that every reference model in IndEA framework focuses on (example: Business architecture focuses on Business services entities). The model illustrates the different types of entities, which are described by the MeghEA architecture domain such as entity types (the types of information described by the architecture domain example – Application), Relationships (connection between entity types within and across layers).

What to achieve: The **Goals** of the State-Sustainable Development Goals and its **indicator**, defined in the State SDG has been used to measure success of the service delivery in terms of measurable, smart and actionable goals. As a part of the **transformation** plan, it is important to measure success through real-time data measurement using a state-level **Monitoring & Evaluation** (M&E) dashboard.

How to achieve: The goals of the department would be realized by delivery of enhanced **services**. The services are grouped into types of output, termed as **service domains**. These services comprise of **process** steps which are executed by **stakeholders**. As a part of the **transformation** plan, it is imperative to transform the service through efficient and lean service processes, this change is termed as Business Process Re-engineering. As a critical impact, a **change management** needs to be carried out to ensure the planned transformation is smooth.

The Enablers: The above business services would be enabled by **application service** to deliver services, **department applications** and **common applications** facilitated by core platform would enable service delivery. As a part of the transformation plan, it is required to develop new **System** or **Modify** to enable the service delivery.

Where to store and how to retrieve Information: The applications facilitate processing of data, these data is designed as per the **Metadata**, that defines the **data entity type**. The State **Digital Registry** would enable identification of service beneficiary. The transformation plan includes a three-fold approach – enhancement of existing **data quality**, efficient **data life-cycle** management and planned **storage** along with efficient **retrieval**

The infrastructure: The applications and data would necessarily reside in the **IT infrastructure** in the state data center or cloud. To enable the above business transformation, it is necessary that infrastructure is modernized or **revamped,** and **network** is made available till the last mile

Building Block: An **architecture building block** is a package of functionality defined to meet business needs, in simple terms it is the transformation requirement. A **solution building block** is a component within the architecture building that represents a part or complete solution to the requirement

The diagram below illustrated the above explanation in a graphical manner:

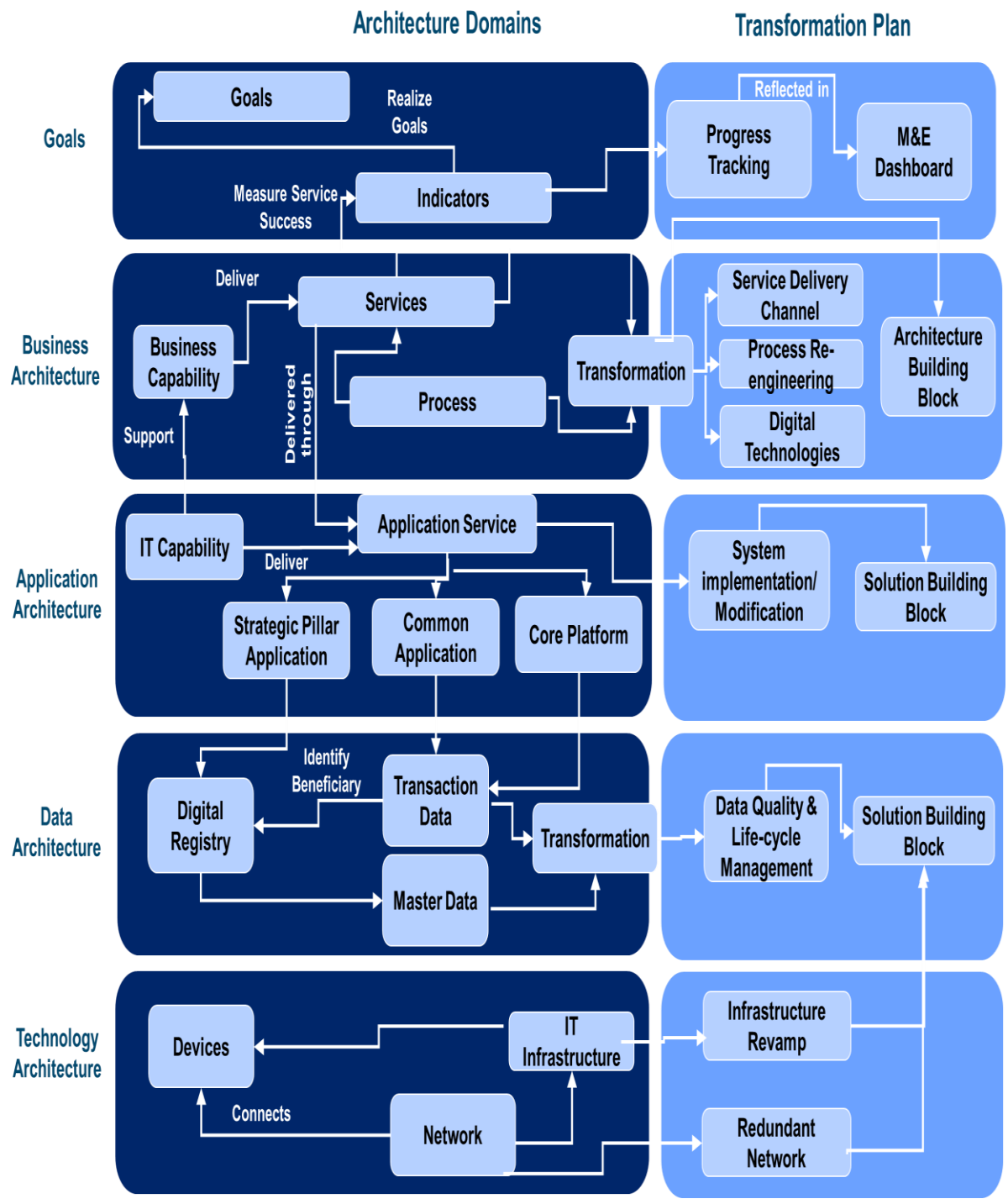


Figure 30: MeghEA Metamodel

The above business content meta model has been explained in below example for Environment Pillar:

Goal:

- **Goal 9.** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

- **Goal 15.** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Indicator:

- CO2 equivalent emission per unit of manufacturing value added.
- Percentage increase of Tree Outside Forest (TOF) in total forest cover.
- Increase in area under afforestation / tree plantation.

Business Capability:
Flora & Fauna Management, Permit & NOC Issuance.

Service:
Permission for felling of Trees.

Service Description:
Permission need to be obtained by the applicant prior to felling of trees as per prescribed application form.

Service Process:
Beneficiary apply for permission for felling of Trees. Department verifies the application, analyze the age of tree, purpose of felling and other requirements. Approval is provided to the applicant on satisfaction. On approval NOC certificate would be delivered in applicants DigiLocker Account and on Portal.

IT Capability:
Digital modes for Service Application, Workflow Based System, Digital Certificate in DigiLocker.

Application Service:
Apply NOC -> Forest & Environment Department -> Permission for Felling of Trees.

Core, Common, Pillar Application:
State Portal, Environment Pillar Portal, DigiLocker, Service Plus.

Digital Registry:
Citizen ID/ Business ID, Land ID.

Master Data:
Citizen Database, Local Government Directory Master, Business Database

Devices:
Mobile Phones, Desktops.

IT Infrastructure:
In premise/ Cloud Deployment Server.

Network:
Uninterupted Primary and Secondary network connectivity for officials and Internet for Citizens.

9.9 Service Stakeholder Matrix

Service Code	Service Name	Service Type	Finance	Planning	Business/ Citizen/ Student	F&E	M&G	AG/ CAG
F&E01	Mining Lease & Quarry Permit for Minor Minerals	G2B			Apply for Service	Approval		Audit
F&E02	Transfer of Mining leases (For minerals under Schedule III)	G2B			Apply for Service	Approval		Audit
F&E03	Application for permission for felling of Trees outside Shillong	G2C			Apply for Service	Approval		Audit
F&E04	NOC to set up timber depot	G2B			Apply for Service	Approval		Audit
F&E05	Renewal of Mining Leases (For minerals under Schedule III)	G2B			Apply for Service	Approval		Audit
F&E06	Termination of Mining Leases (For minerals under Schedule III)	G2G				Termination		Audit
F&E07	Surrender of Mining Leases (For minerals under Schedule III)	G2B			Apply for Service	Approval		Audit
F&E08	Forest clearance Application for projects other than mining stone crushers quarry permit furniture unit and timber depot	G2B			Apply for Service	Approval		Audit
F&E09	Human Animal Conflict and Compensation	G2C			Apply for Service	Approval		Audit
F&E10	Application for permission for Transportation of timber outside Meghalaya	G2C			Apply for Service	Approval		Audit
F&E12	NOC for setting up of Stone Crushers in Meghalaya	G2B			Apply for Service	Approval		Audit
F&E13	Non-Forest Land Certificate/ NOC	G2C			Apply for Service	Approval		Audit
F&E14	NOC to set up Furniture unit	G2B			Apply for Service	Approval		Audit
F&E15	Forest Nurseries	G2C			Apply for Service	Approval		Audit
M&G 01	Approval of Mining Plan for minor minerals	-			Apply for Service		Approval	Audit
M&G 02	Issuance of Transport Challan for Transportation of Minerals	G2C			Apply for Service		Approval	Audit

Service Code	Service Name	Service Type	Finance	Planning	Business/ Citizen/ Student	F&E	M&G	AG/ CAG
M&G 03	Transfer of Mining Lease (For minerals under Schedule II)	G2B			Apply for Service		Approval	Audit
M&G 04	Surrender of Mining Lease (For minerals under Schedule II)	G2B			Apply for Service		Approval	Audit
M&G 05	Approval for the Minerals Exploration	G2G			Apply for Service		Approval	Audit
M&G 06	Mining Lease and Quarry Permit Registration by Citizen (For minerals under Schedule II)	G2B			Apply for Service		Approval	Audit
M&G 07	Royalty Payment (For minerals under Schedule II)	G2B	Receives Funds				Approval	Audit
M&G 08	Mining Leases Renewal (For minerals under Schedule II)	G2B			Apply for Service		Approval	Audit
M&G 09	Mining Lease Termination (For minerals under Schedule II)	G2B					Termination	Audit
M&G 10	Returns Filing by Mining Leese (For minerals under Schedule II)	G2B			Files Return		Assessment & Scrutiny	Audit
M&G 11	Grant of Reconnaissance Permit (RP) Issuance process	G2B			Apply for Service		Approval	Audit
M&G 12	Student Scholarships Grant Process	G2C	Issuance of Sanction, LOA and Funds, Transfer of Funds	Approval of Proposal	Apply for Service		Approval	Audit

9.10 Future State Business Interaction Matrix

Providing Business Services	Consuming Business Services					
	Primary Sector	Human Development	Infrastructure Development	Environment	Entrepreneurship	Governance
Primary				1. Forest Trees Saplings		
Human Development				1. Manpower Educated in Mining Sector 2. Health Schemes		
Infrastructure Development				1. Road Facilities 2. Transportation Facilities		
Environment	NA	NA	NA		1. Business Opportunities to Small Entrepreneurs (Furniture, Stone Crushers units etc.) 2. NOC & Clearances 3. Land Status Document 4. Permission/ Lease for undertaking exploration	Revenue from Mining
Entrepreneurship				NA		
Governance				1. Scheme Funding 2. Sanction of Funds 3. Approval on Scheme Annual Action Plan 4. Issuance of LOA 5. Scheme monitoring and Evaluation		

9.11 Service Application Module Mapping

Services	Application	Primary Module	Sub Module
Mining Lease & Quarry Permit for Minor Minerals	Environment Pillar System	Lease Management	Quarry Permit Issuance
Transfer of Mining leases (For minerals under Schedule III)	Environment Pillar System	Lease Management	Transfer of Lease
Application for permission for felling of Trees outside Shillong	Environment Pillar System	Certificate & Challan	Permission Letter
NOC to set up timber depot	Environment Pillar System	Certificate & Challan	No Objection Certificates
Renewal of Mining Leases (For minerals under Schedule III)	Environment Pillar System	Lease Management	Renewal of Lease
Forest clearance Application for projects other than mining stone crushers quarry permit furniture unit and timber depot	Environment Pillar System	Certificate & Challan	Land Status Certificate
Human Animal Conflict and Compensation	Environment Pillar System	Financial Assistance	• Verification and Approvals • Benefit Disbursement
Application for permission for Transportation of timber outside Meghalaya	Environment Pillar System	Certificate & Challan	Permission Letter
NOC for setting up of Stone Crushers in Meghalaya	Environment Pillar System	Certificate & Challan	No Objection Certificates
Non-Forest Land Certificate/ NOC	Environment Pillar System	Certificate & Challan	Land Status Certificate
NOC to set up Furniture unit	Environment Pillar System	Certificate & Challan	No Objection Certificates
Issuance of Transport Challan for Transportation of Minerals	Environment Pillar System	Certificate & Challan	Transport Challan Issuance
Approval for the Minerals Exploration	Environment Pillar System	Certificate & Challan	Permission Letter
Mining Lease and Quarry Permit Registration by Citizen (For minerals under Schedule II)	Environment Pillar System	Lease Management	Quarry Permit Issuance
Royalty Payment (For minerals under Schedule II)	Environment Pillar System	Returns & Payments	Royalty Payment
Mining Leases Renewal (For minerals under Schedule II)	Environment Pillar System	Lease Management	Renewal of License
Returns Filing by Mining Lease Holder (For minerals under Schedule II)	Environment Pillar System	Returns & Payments	Returns Assessment
Grant of Reconnaissance Permit (RP) Issuance process	Environment Pillar System	Lease Management	Quarry Permit Issuance
Student Scholarships Grant Process	Environment Pillar System	Financial Assistance	• Verification and Approvals • Benefit Disbursement

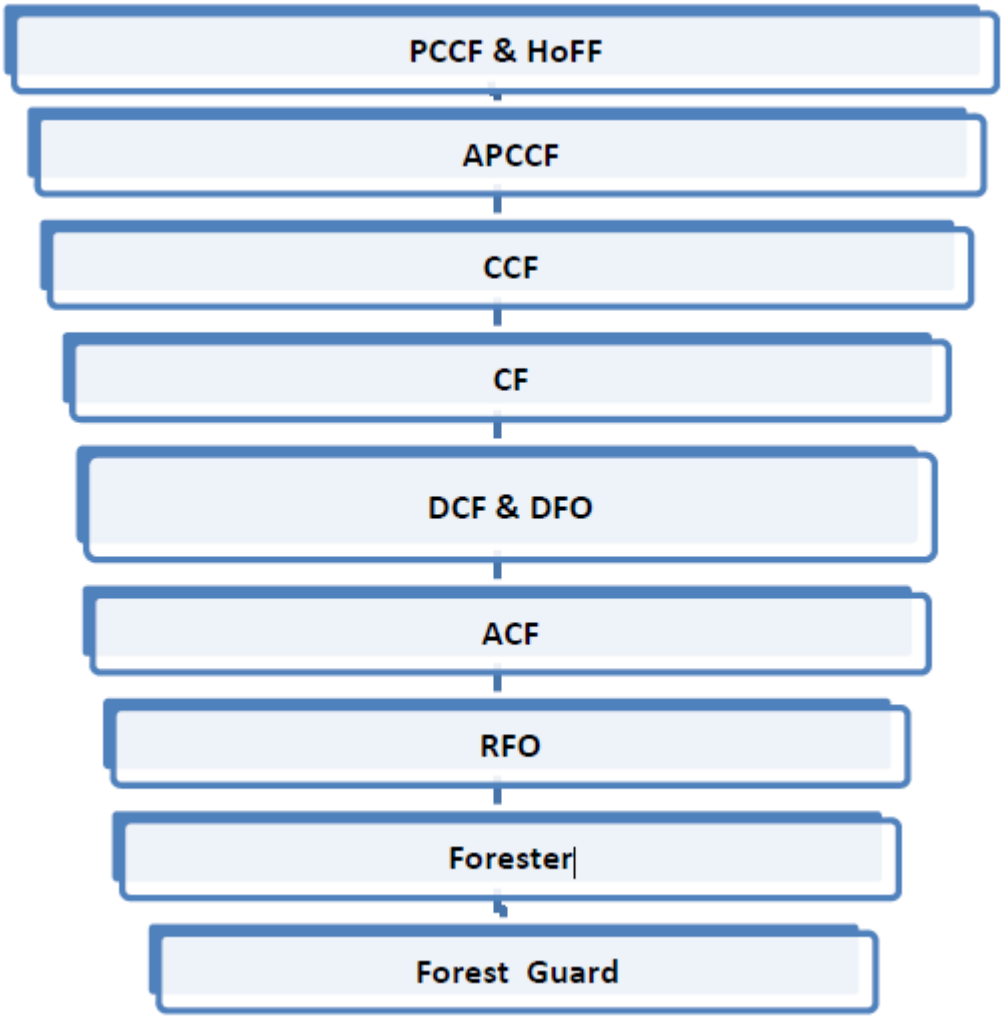
9.12 Functions of Department Agencies

Agency/ Directorate	Function
Mining and Geology Department	The Mining and Geology Department, Meghalaya is entrusted with management and regulatory tasks for mining and mineral

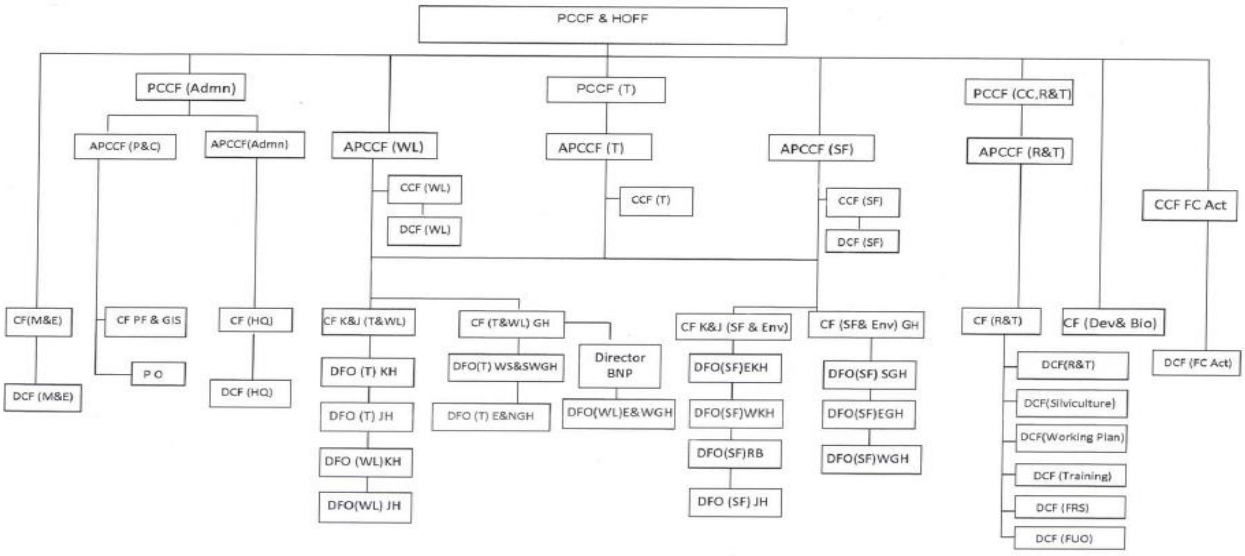
Agency/ Directorate	Function
	development in the State, conservation of resources and environment, safety and health of workers, restoration of mine degraded areas and rehabilitation of affected people
Directorate of Mineral Resources	Broad functions include • Geological investigation/exploration of minerals • Administration of mines and minerals
Forest and Environment Department	The main functions and objectives of the Department which are executed through its various wings are:- • To ensure conservation of forests, wildlife and environment maintain soil and water regime by simple and natural means through forest conservation and improvement. • To maintain multiple and stable ecosystems. • Rehabilitation of all abandoned jhum lands, degraded area, fallow government land and catchment areas of major rivers to restore ecological and hydrological balance. • To control the export of timber outside the State and to encourage wood-based industries where the value-added component is maximum. • To manage the forest in a careful and sustained way which would produce goods • and render services on the same site on the same time. • To assist in extending scientific management to forest areas under the control of • the Autonomous District Councils. • Development and expansion of wildlife protected areas for protection and conservation of rare and endangered species of flora and fauna. • To check illegal poaching and killing of wild animals and plants, both inside and outside the protected areas • Development of recreational centers and tourist spots based on natural ecosystems. • To encourage and assist in setting up forest nurseries. • Strengthening of Forestry Research with a view to improve the over-all health of the forests. • Organizing training forest personnel for imparting knowledge and skills, provide for training of unemployed youths in traditional handicrafts such as canes and bamboo-

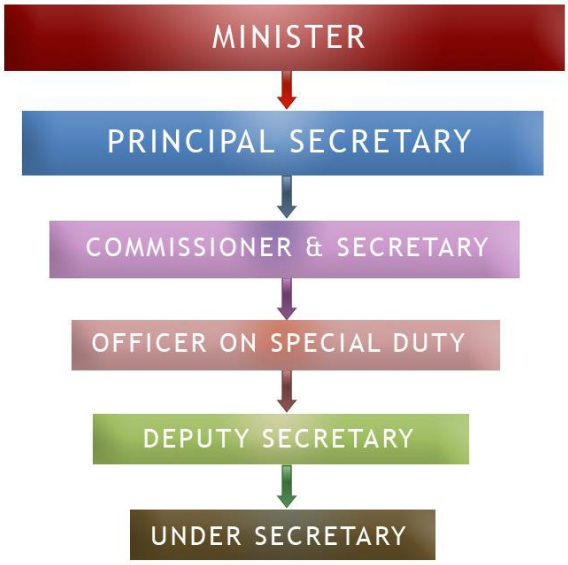
Agency/ Directorate	Function
	based utility items and furniture making. • To set up a monitoring system to monitor stocking and health of forests in terms of their ability to generate by using Remote Sensing Techniques. • To effectively implement the applicable Acts & Rules
Meghalaya State Medicinal Plants Board	The Government of Meghalaya constituted the Meghalaya State Medicinal Plants Board to handle all matters related to policy formulation, co- ordination of various agencies dealing with medicinal plants, local health traditions, sustained availability of medicinal plants, validation and certification issues and conservation and preservation of medicinal plants in the State.
Forest Development Corporation of Meghalaya	Present Function and Activities of the FDCM Ltd. • Timber Trading Business • Supervisory works for the operation of pine and non-sal trees under approved working scheme • Sawmill Project • Bamboo Treatment Plant Project • Raising of Plantations
Meghalaya State Pollution Control Board	• To prevent, control and abate air and water pollution • To maintain and restore the wholesomeness of water • To protect and improve the environment • To prevent hazards to human beings, other living creatures, plants and property
Eco-Development Society	• School Building Construction • Drinking Water Supply • Afforestation • Communication • Environmental Awareness Campaign • Bamboo Plantation • Rehabilitation
Meghalaya State Biodiversity Board	The board looks after the biodiversity of Meghalaya in the areas of: • Birds • Protected Areas • Sacred Groves • Living Root Bridges • Faunal Diversity • Floral Diversity
State Environmental Impact Assessment	• Conservation and survey of flora, fauna, forests and wildlife

Agency/ Directorate	Function
Agency	• Prevention and control of pollution • Afforestation and regeneration of degraded areas • Protection of the environment and • Ensuring the welfare of animals

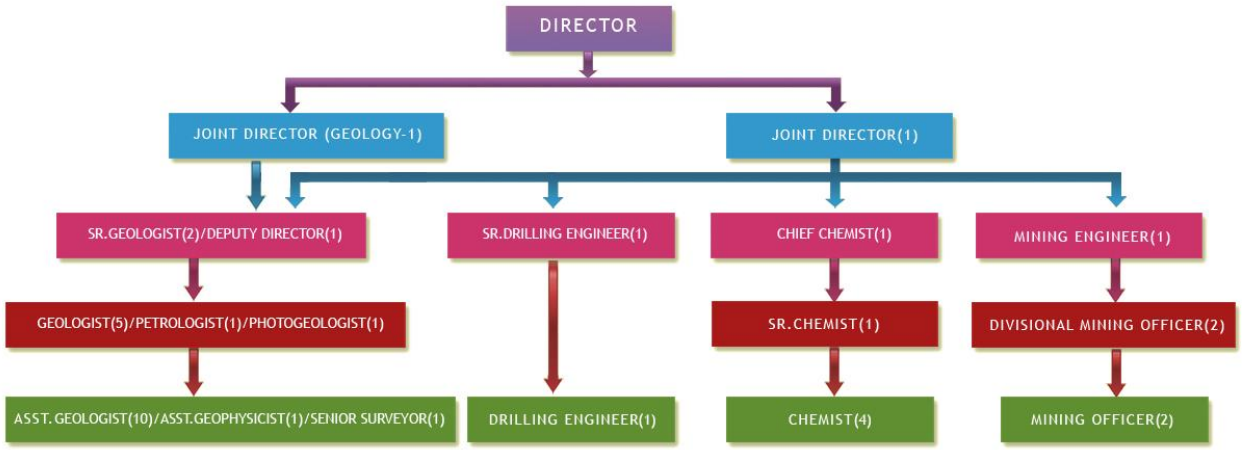


Organization structure of Forest and Environment Department





Organization structure of the Department of Mineral Resources



Organization structure of the Directorate of Mineral Resources