Environmental Management Plan

Environmental Management Plan (EMP)

An EMP is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

How is it related to EIA?

EIA is analysis of issues and recommendations and documented in an EA report.

EMP is an action plan based on the results of EA.

Maybe a standalone report or part of an EA report.

Role of an EMP

- Summarize environmental impacts identified in the EA report
- Identify impacts that must be mitigated
- Describe mitigation measures
- Describe monitoring and reporting arrangements
- Describe assignment of responsibilities and schedules
- Provide costs estimates for mitigation and monitoring measures

Features of an EMP

- An instrument for implementing environmental management commitments, conditions, and requirements of project.
- Promotes self-regulation & integration of environmental issues in planning and operations.
- Addresses relevant environmental management issues,
- Can be drafted in a consultative manner.
- Facilitates environmentally sustainable development and decision-making process. It is:
  - Able to forms the basis for consultation and negotiation of outcomes;
  - Flexible;
  - Comprehensive;
  - Updatable; and
  - A tool for promoting accountability

Environmental Management Strategies

1. Mitigation measures to Reduce or Eliminate Adverse Impacts
   - Adoption of Protective Measures
   - Selection of Alternatives
   - Modification of Activities
   - Changes in Construction Procedure/Materials
   - Adoption of Supplementary program

2. Compensation or Off-set measures for Irreversible and Residual Impacts
   - Resettlement of Affected People
   - Development of Alternative Resources
   - Replacement of Lost Resources
   - Replacement of Lost Production

Environmental Management Strategies

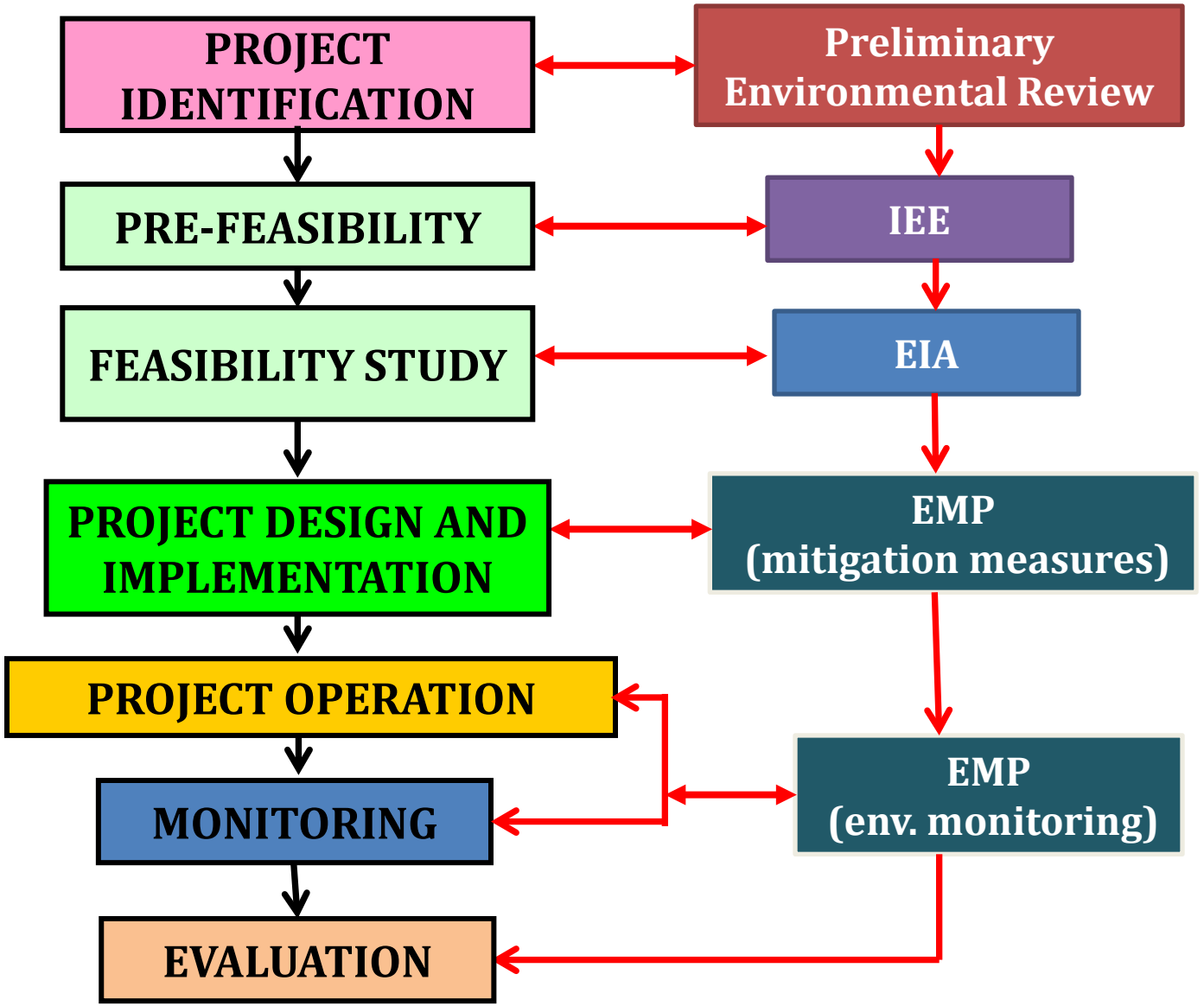
3. Enhancement Measures to Maximize Positive Impacts
   - Specific Environmental Enhancement Measures
   - Replacement or Upgrading of Affected Resources
   - Technical Support to Increase Production
   - Training for Effective Management of Resources
   - Introducing Community Management Practices

4. Environmental Monitoring
5. Disaster Management
6. Institutional Strengthening

Typical Contents of an EMP Report

- Brief introduction of project design
- Major findings of EIA/screening
- Environmental impacts overview
- Regulatory/statutory requirements
- Environmental management proposed
- Implementation arrangements
- Institutional arrangements
- Monitoring mechanism
- Reporting system
- Environmental training and management budget

EMP and the Project Cycle



One EMP or Multiple EMPs?

Some projects require several EMPs:

- Site-specific EMPs
  - Typical for projects with several components or subprojects on different sites
- Impact-specific EMPs, when particular impacts require special attention, e.g.:
  - EMP for hazardous waste management
  - EMP for oil spill prevention and response
- Recipient-specific EMPs targeted to particular ecosystems or their elements, e.g.:
  - EMP for protecting fish population from impact of hydro power development

To guide preparation of multiple EMPs, Generic or "Framework" EMP is developed first

Who prepares EMPs?

EMP is part of the EA done by the project implementing agency

The project implementation agency hires consultants to prepare EMPs

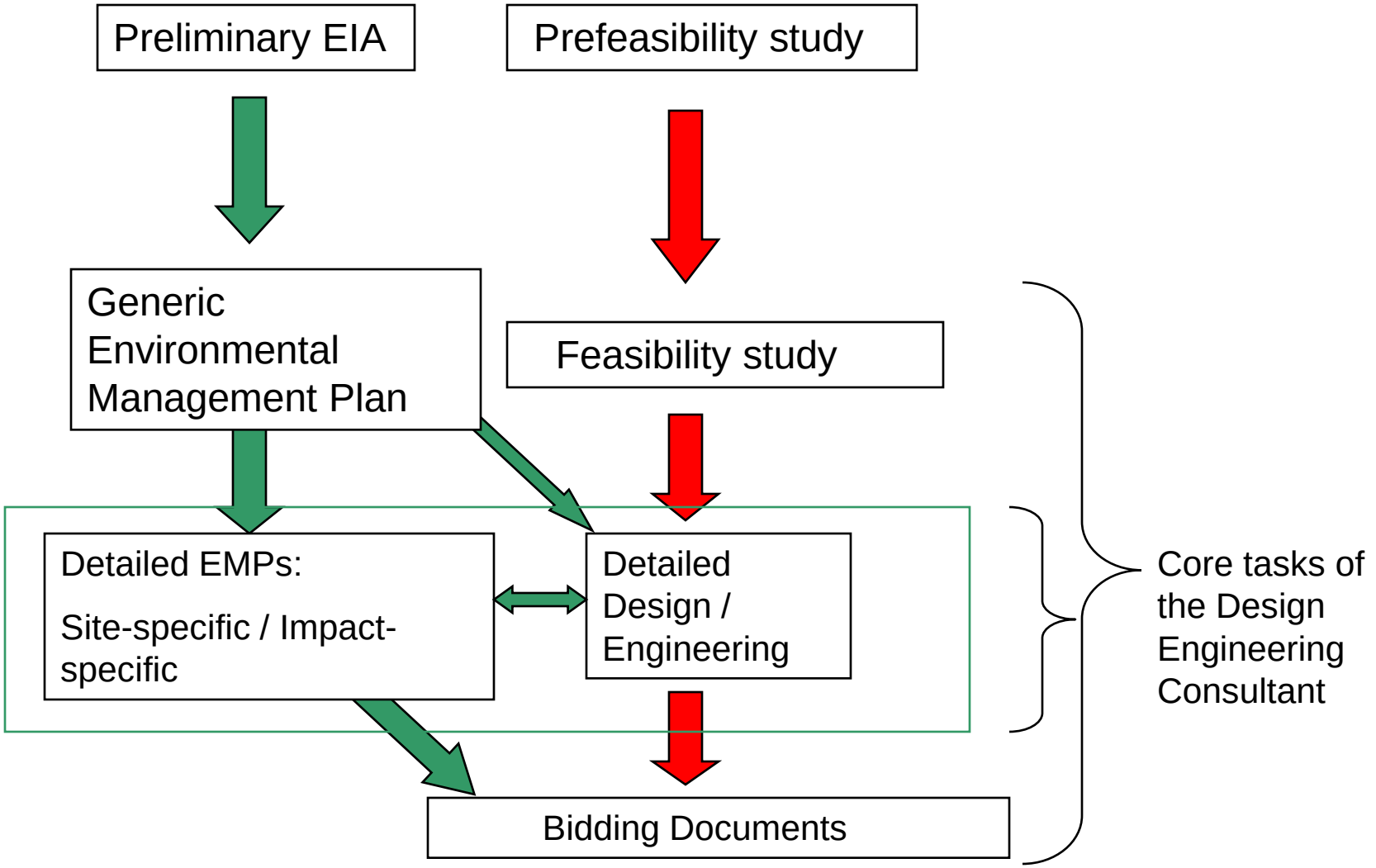
For construction projects, EMP may be developed by:

- Design engineering consultant
- Construction or EPC contractor

Who oversees implementation of EMPs?

The construction supervising engineer oversees the compliance of contractors with the EMPs.

Integration of EMP into project design?



Typical EMP format : Mitigation measures

	Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures(s) (incl. Legislation & regulations)	Institutional Responsibilities (incl. Enforcement and coordination)	Cost Estimates
Pre-Construction Phase	1) 2) 3) …				
Construction Phase	1) 2) 3) …				
Operation and Maintenance Phase	1) 2) 3) …				

Example of EMP: Impact Mitigation (Construction)

Activity/Issues	Potentially Significant Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Influx of workers	• Generation of sewage and solid waste	• Construction of sanitary latrine and septic tank system (one latrine for 20 persons) • Erecting "no litter" sign, provision of waste bins/cans, where appropriate • Waste minimization, recycle and reuse • Proper disposal of solid waste (in designated waste bins)	Contractor (Monitoring by EGCB)
	• Possible spread of disease from workers	• Clean bill of health a condition for employment • Regular medical monitoring of workers	

Source: EIA of World Bank funded 335MW Combined Cycle Power Plant at Siddhirganj, Narayanganj
Full report available at:
http://www.egcb.com.bd/Publications/Final%20report_Siddhirganj335MW_EIA.pdf

Example of EMP: Impact Mitigation (Operation)

Activity/ Issues	Potentially Significant Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Power Generation	• Emission from the power plant	• Using stack as specified in the bid document • Using low nitrogen oxide burners, as specified in the bid document • Installation of stack emission monitoring equipment for major pollutants (monitoring requiring and cost estimate provided) • Planting of trees around the project site, especially along the northern boundary of the school and residential areas located close to the project site (number and cost estimate provided) • Restrictions may also be imposed on installation of industries in the area that emit significant amount of particulate matter.	EGCB

Source: EIA of World Bank funded 335MW Combined Cycle Power Plant at Siddhirganj, Narayanganj
Full report available at:
http://www.egcb.com.bd/Publications/Final%20report_Siddhirganj335MW_EIA.pdf

Typical EMP format: Monitoring

Proposed Mitigation Measure	Parameters to be Monitored	Location	Measurements (incl. Methods & equipment)	Frequency of Measurement	Responsibilities (incl. review and reporting)	Cost (equipment & individuals)
Pre-Construction Phase						
Construction Phase						
Operation and Maintenance Phase						
Total Cost for all Phases						

Example of EMP: Monitoring during construction

Potential Environmental Impacts	What *parameter is to be monitored?*	Where *is the parameter to be monitored?*	How *is the parameter to be monitored?*	When *is the parameter to be monitored?*
Damage to vegetation	Clearing techniques and relocation procedures utilized; record of fees to environmental fund	Power plant site, pipeline and transmission line routes	Visual and by comparison with pre-construction photo survey	Monthly throughout construction period
Loss of fertile topsoil and soil erosion	Soil storage procedures and location	Soil storage sites	Visual	Weekly during site preparation and construction period
Air pollution by dust	Dust level	All active construction sites	Visual	During construction
Noise from construction works	Noise level, dB[A]	All active construction sites	Measurements by a licensed organization using certified measurement devices	During construction

Example of EMP: Monitoring during operation

Potential Environmental Impacts	**What** *parameter is to be monitored?*	**Where** *is the parameter to be monitored?*	**How** *is the parameter to be monitored?*	**When** *is the parameter to be monitored?*
Air emissions of NOx, SO2, CO, and particulate matter (PM)	Emissions of air pollutants: (1) NOx calculated as NO2; (2) SO2; (3) CO; (4) PM. The applicable standards are: (1) NO2 ≤ 400 mg/m3; (2) SO2 ≤ 850 mg/m3; (3) CO ≤ 150 mg/m3; (4) PM ≤ 100 mg/m3	At the stack of the power plant	By continuous monitoring equipment supplied with the power plant	Initial test at commissioning and annual subsequently. Continuous for NOx and CO.
Air emissions of NOx, SO2, CO, and particulate matter (PM)	Ground level concentrations: (1) NOx; (2) SO2; (3) PM. The applicable environmental standards are: (1) NOx: Annual average ≤ 40 μg/m3; Max 24-hour average ≤ 150 μg/m3; Max 30-min average ≤ 500 μg/m3 (2) SO2 Annual average ≤ 40 μg/m3; Max 24-hour average ≤ 150 μg/m3; Max 30-min average ≤ 500 μg/m3 (3) PM Annual average ≤ 50 μg/m3; Max 24-hour average ≤ 125 μg/m3; Max 30-min average ≤ 280 μg/m3	In adjacent residential areas and/or nearest air quality monitoring stations	By buying data from the local air quality monitoring station	Once before commissioning of the plant and annually when the plant is in operation
Noise from construction works	Noise level, dB[A]. Applicable limits are 80 dB[A] on-site and 65 dB[A] off-site.	At 1 meter from operating turbines and in nearest residential areas	Measurements by a licensed organization using certified measurement devices	Once before commissioning of the plant and annually when the plant is in operation

EMP needs follow-up and supervision

EMPs should be periodically reviewed, especially when:

- Environmental impacts are associated with the operational rather than construction phase (Example: power plant or mining operations);

Revisions to EMP may be necessary when:

- Final EIA produced after project appraisal renders the original EMP obsolete or irrelevant;

Site-specific EMPs produced after project appraisal need to be checked during project supervision

Final Words..

EMPs provide a critical link between the EA report and environmental compliance during project implementation or operation

EMP requirements are legally binding on the construction contractors…, but only when they are in their contract.

EMP is already incorporated in the national EIA guidelines of Bangladesh. (Ref: DoE 1997. EIA Guidelines for Industries)