Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Manila

097.13 DPWH
01-12-2016

11 JAN 2016

DEPARTMENT ORDER)
)
NO: 07)
Series of 2016) 01.14.16

SUBJECT: GUIDELINES ON THE PLANNING AND IMPLEMENTATION OF DPWH RIVER DREDGING PROJECTS BY ADMINISTRATION

In line with the continuing efforts of the Department to mitigate flooding all over the country through its Flood Control Projects, which includes dredging activities, to effectively manage the implementation of DPWH River Dredging Projects and, to efficiently manage resources therefor, all concerned offices are hereby ordered to adopt the *Policies and Guidelines on the Planning and Implementation of DPWH River Dredging Projects,* herein attached to form part of this Department Order, in the planning and implementation of river dredging projects.

The Policies and Guidelines delineate the responsibilities of various offices and personnel regarding the implementation of By-Administration dredging projects. In addition, the Policies and Guidelines expound the requirements for the application for dredging permit as outlined in DO 139 S2014, Guidelines on River Dredging Operations for Flood Control. Furthermore, these guidelines shall aid the concerned personnel in the preparation of all requirements under the said Department Order, particularly the Dredging Plan. Lastly, the Policies and Guidelines prescribe the constitution of a Dredging Program Management Team which shall oversee the implementation of all dredging projects and make sure that they are conducted in compliance with the provisions of these Policies and Guidelines. The Team and all heads of concerned offices shall see to it that this order is strictly enforced. Failure to do so shall, after due process, make the erring personnel liable to penalties for violation of reasonable office rules and regulations prescribed under Section 52, C(3) of Civil Service Resolution No. 991936 dated August 31, 1999, otherwise known as the Uniform Rules on Administrative Cases in the Civil Service.

This Order is supplementary to **Department Order No 139 Series of 2014** which sets the guidelines on river dredging operations for flood control.

This Order supersedes all issuances or portions thereof which are inconsistent herewith and shall take effect immediately.

ROGELIO L. SINGSON
Secretary

Department of Public Works and Highways
Office of the Secretary
WIN6T01330

Encl. : 1) *Policies and Guidelines on the Planning and Implementation of DPWH River Dredging Projects*
2) *Dredging Plan Template*
3) *BOE-mandated Dredging Reports*

5.6 TNLI

Encl. 1

Republic of the Philippines
Department of Public Works and Highways

POLICIES AND GUIDELINES
ON THE PLANNING AND IMPLEMENTATION OF
DPWH RIVER DREDGING PROJECTS BY ADMINISTRATION

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List of Acronyms

AE	Amphibious Excavator
BOE	Bureau of Equipment
CNC	Certificate of Non-Coverage
DPMT	Dredging Program Management Team
ECC	Environmental Compliance Certificate
EIS	Environmental Impact Statement
EMB	Environmental Management Bureau
EMD	Equipment Management Division
FED	Floating Equipment Division
IEE	Initial Environmental Examination
MPAD	Multi-Purpose Amphibious Dredge
PD	Presidential Decree
PIO	Project Implementing Office
POW	Program of Work
QA	Quality Assurance
QC	Quality Control
QMP	Quality Management Plan
QMT	Quality Management Team

1.0 Background

Every year, billions of pesos are allocated to different Flood Control Projects of the Department of Public Works and Highways (DPWH) under the General Appropriations Act (GAA). These include the construction of flood control structures and dredging works. Dredging accounts for almost 10 percent of the budget allocated to Flood Control Projects.

The Bureau of Equipment (BOE) maintains and manages a fleet of 80[1] dredges and support vessels of different types. These dredges and support vessels are deployed in different dredging projects of the Department across the Philippines. The BOE continues to procure new and state-of-the art dredging equipment to cope up with the increasing demand for dredging works in the country.

The National Water Resources Board (NWRB) identified 1164 rivers in the archipelago in 2014. Some of these rivers join together and form the 18 major river basins. With the Philippines abounding in rivers, and with an average of 20 typhoons visiting the Philippines every year, many places all over the country are prone to flooding, hence the need for an effective policy for the implementation of flood control projects and efficient management of resources therefor.

The proper and complete planning of flood control projects is essential to the success of the project. Targets must be clearly defined in the planning stage and all activities to be conducted must be discussed in details. A good monitoring procedure must be established to make sure that the project is implemented as planned and the target is achieved. Further, monitoring is important to make sure that the equipment is properly maintained so as not to jeopardize or delay the operation.

Involvement and responsibilities of different offices in the implementation of the project must be clearly delineated so as to avoid confusion on the jurisdiction of each office and to foster a cooperative setting among different offices.

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[1] Status Report of DPWH Dredges, Multi-Purpose Amphibious Dredges and Amphibious Excavators as of October 31

2.0 Purpose

The Policies and Guidelines delineate the responsibilities of various offices and personnel regarding the implementation of dredging projects undertaken by the Department. In addition, the Policies and Guidelines expound the requirements for the application for dredging permit as outlined in DO 139 S2014, Guidelines on River Dredging Operations for Flood Control. Furthermore, these guidelines shall aid the concerned personnel in the preparation of all requirements under the said Department Order, particularly the Dredging Plan. Lastly, the Policies and Guidelines prescribe the creation of a Dredging Program Management Team who shall oversee the implementation of all dredging projects.

This document shall serve as the official guidebook for the implementation and monitoring of approved dredging projects.

3.0 Scope

These Policies and Guidelines shall be applicable to all By-Administration dredging projects of the Department EXCEPT for those classified as EMERGENCY projects.

4.0 Definition of Terms

Deepening – the removal of sediments from beneath the water to increase the depth of the channel to increase navigability or water conveyance capacity.

Dewatering – removal of water from solid material or soil by wet classification, centrifugation, filtration, or similar solid-liquid separation processes.

Dike – a long wall or embankment built to prevent flooding from the sea or river.

Disposal – the process of transporting dredged material to designated disposal area.

Dredge – mechanical, hydraulic or electrical plant used for dredging.

Dredging – the removal from beneath water and raising through water of soil, rocks, debris, etc. to deepen or enlarge existing channels, maintain to a specific depth existing bodies of water, create new channels, or remove undesired materials from beneath bodies of water.

Maintenance Dredging – removal of sediments from previously dredged channel bed to maintain navigability of the channel or water carrying capacity

Capital Dredging – for navigation, to enlarge or deepen existing channel and port areas or to create new ones; and for engineering purposes; e.g. trenches for

pipes, cables and immersed tube tunnels, removal of material unsuitable for foundations, removal of overburden for aggregate extraction

Clean-up Dredging – deliberate removal of contaminated material from the marine environment for human health and environmental protection purposes

Environmental Remedial Dredging – activity of removing polluted sediments from rivers, harbor basins, etc.; a type of maintenance dredging

In-situ material – the undisturbed mass in its natural/original position

Sounding – the act or process of measuring the depth of a body of water

Spoil site – a geographic area where spoils/dredged materials can be disposed

Spoils – unconsolidated, randomly mixed sediments composed of rocks, soil, and/or shell materials extracted and deposited during dredging

5.0 Organization and Line of Authority

This section defines the responsibilities of different offices and personnel concerned in the implementation of DPWH dredging projects.

In order to ensure that dredging projects comply with these Policies and Guidelines and all applicable national rules and regulations about dredging and environmental management, a team of knowledgeable and able personnel dedicated to this purpose shall be formed. The team shall be called Dredging Program Management Team. The Team shall be under the BOE and shall be composed of personnel from the Floating Equipment Division and personnel from the Implementing Office.

The figure in the following page shows the composition of the Team and the responsibilities of each officer.

Dredging Program Management Team (By-Administration)		
Office/Unit	Designation	Responsibility
BOE Director	Dredging Program Manager	• Review and evaluate submitted requirements for dredging permit • Recommends the approval of the dredging proposal or the extension of the project • Make sure that all dredging projects comply with the provisions of these Policies and Guidelines • Recommend to the Secretary further actions to be taken
BOE-FED-DOSS	Project Management Team - Luzon Project Management Team - Visayas and Mindanao	• Make sure that all dredging projects comply with the provisions of these Policies and Guidelines • Conduct site evaluation to determine the dredgeability of the site and the appropriate equipment to be deployed • Review, evaluate and provide feedback on submitted dredging reports
Project Implementing Office	Project Management Team	• Has direct supervision over a specific dredging project • Conduct site inspection, prepare dredging plan and secure necessary permits from different government agencies • Shall be liable to the Dredging Program Manager
Implementing Office BOE-FED	Project Inspector Project Manager	• Shall review the dredging reports prepared by the Dredge Crew and conduct on-site survey to validate the reports
BOE-FED	Dredge Crew	• In-charge of the actual dredging operation, equipment maintenance and safety enforcement on-board • Prepare and submit BOE mandated dredging reports • Assist the Project Inspector and Project Manager in conducting surveys and inspections

Figure 1. Structure and Responsibilities of DPMT for By-Administration Dredging

5.1 Dredging Program Management Team

The Dredging Program Management Team (DPMT) shall consist of the Dredging Program Manager who shall oversee the entire dredging program, the Project Management Teams from BOE (one for Luzon Cluster and one for the Visayas and Mindanao Cluster), the Project Management Team from the Implementing Office, the Project Inspector and Project Manager, and the Dredge Personnel.

5.2 Bureau of Equipment

The Bureau of Equipment (BOE), having the technical know-how about dredges and dredging operations, shall be the head of the DPMT for by-administration dredging projects. BOE shall review and evaluate proposals for dredging, determine the suitable type of dredge for the proposed dredging site, and recommend to the Secretary the approval of proposed dredging projects. BOE shall make sure that all dredging projects comply with the provisions of these Policies and Guidelines and all applicable national laws and regulations. The Floating Equipment Division (FED) shall monitor the implementation of dredging projects, review, evaluate and provide feedback to submitted dredging accomplishment reports. The FED shall communicate its evaluation analysis and findings to the Bureau Director.

5.3 Implementing Office

Under Department Order No 94 Series of 2015, Transferring the Flood Control Management Cluster (FCMC) under the Supervision of the Office of the Undersecretary for Regional Operations, DPWH Regional Offices and the District Engineering Offices shall be the Implementing Office for locally-funded flood control projects which include dredging.

The Implementing Office shall directly manage the implementation of dredging projects and shall make sure that they comply with these Policies and Guidelines.

6.0 General Policy

6.1 No dredging works shall be performed without the approval of the Secretary. All requesting offices/personnel shall submit all requirements for dredging permit under Department Order No 139 to the Bureau of Equipment for evaluation. BOE shall, after due process, recommend to the Secretary the approval of dredging proposals that complied with all the requirements.

6.2 As a corollary to 6.1, the dredge and its ancillary equipment shall be used only for the specific project and duration specified in the approved Project Plan. If dredging period extension is needed, the Implementing Office shall seek the approval of the Secretary through the DPMT.

6.3 A Dredging Program Management Team (DPMT) shall be formed and shall have the overall responsibility for the enforcement of these Policies and Guidelines. The DPMT shall make sure that all dredging projects comply with the requirements and provisions of these Policies and Guidelines and applicable environmental and national laws and regulations.

6.3 Consistent with Department Order No 94 S2015, Transferring the Flood Control Management Cluster (FCMC) under the Supervision of the Office of the Undersecretary for Regional Operations, DPWH Regional Offices and the District Engineering Offices shall be the Implementing Office for locally-funded flood control projects which include dredging.

6.4 Monitoring of By-Administration dredging projects shall be conducted by the Implementing Office and BOE. Compliance to DO 74 S2015, SOLAS, DO 139 S2014, preventive maintenance program, environmental regulations, and adherence to the approved dredging plan shall be regularly monitored by both parties.

7.0 Planning

7.1 Plan

The Planning stage starts with the identification of the need for dredging works. This stage is the most important part of the project. During planning stage, targets are defined, objectives are determined, methodology and control measures to be taken are laid down, and monitoring procedures are established. The proponent office shall prepare a Dredging Plan which shall contain, at the minimum, the following:

- Cover Sheet
  The cover sheet shall contain the name of the project, the year the project is to be implemented, the Implementing Office and the approval of the DPWH Secretary.

- Executive Summary

- General Project Information
  This section shall provide a brief description of the proposed dredging project which shall include the location of the project, nature of work to be performed, rationale for the proposed dredging, the methodology to be employed, the type of equipment to be used, the personnel who will be involved in the project, and the projected duration of the project.

- Site Description
  This section shall discuss in detail the specifications of the proposed dredging site which shall include the following:

- Location of the proposed dredging site (i.e. Barangay and Municipality/City)
- Geographical coordinates of the limits/boundaries of the proposed project obtained using GPS. Stationing must be consistent with the existing inventory of flood control structures from the Unified Project Management Office – Flood Control Management Cluster (UPMO – FCMC).
- Area covered by the proposed project
- Total target volume to be dredged
- Slope of the area
- Composition of in-situ materials
- Mean water elevation
- Tributaries to the river to be dredged
- Flooding profile of the area
- Geotagged Photos of the proposed dredging site

Location map and vicinity map of the proposed dredging site shall be provided in this section, together with the results of geotechnical investigations. Based on the dimensions/specifications of the area, the volume of materials to be removed and the time to complete the project can be computed. These will be used in the scheduling of activities for the whole project.

Environmental conditions in the area must also be discussed as these may have direct and indirect effect on the operation and vice versa. The following environmental conditions shall be considered:

- Geographic location and land area
- Biological environment
  Describe the vegetation found in the embankment of the proposed project site, as well as the animals in the project vicinity.
- Water quality
  Show results of water quality analysis. The water characteristics to be tested include pH level, dissolved oxygen, biochemical oxygen demand and suspended solids.
- Air quality
- Meteorology
  The average rainfall, average number of rainy days and the months where the maximum rainfall occur must be considered in the planning and scheduling of activities for the project.

Possible impacts of the operation to physical environment, socio-economic environment and environmental sanitation must be identified to determine the necessary control measures to be implemented.

- Equipment and Operations
  A list of all the equipment to be used for the project with their corresponding specifications must be provided, including photos of the equipment.

- Dredge Position and Dredging Operations
  This section describes all components/stages of the project and the corresponding activities under each component. Details of mobilization and site preparation, sequence of activities during the dredging operation, spoil site and spoil site management, and demobilization and site restoration activities are discussed in this section.

- Supplies and Spare Parts Needed
  This section shall provide the computation for the fuel requirement for the whole project duration. The fuel requirement can be computed based on the volume to be dredged, dredge capacity and rated fuel consumption of dredge, or based on the projected time of dredging and rated fuel consumption of dredge. Likewise, fuel requirement for the support vessel shall be computed.

- Operational Cost
  The operational cost of the project can be obtained from the following:

  - Salaries of Dredge Personnel
    Dredge Master
    Dredgeman Foreman
    Marine Engineman
    Additional Job Order Personnel
  - Cost of Fuel and Lubricants
  - Maintenance Cost
  - Mobilization and Demobilization
  - Cost of Temporary Structures
  - Contingency

- Timeline and Schedule
  This section shall show the list of all activities to be performed and the schedule for the whole dredging project using Gantt chart.

- Daily Operations Reporting
  All activities during each shift shall be logged in the BOE-mandated forms, and shall be submitted to BOE not later than the 15th day of the succeeding reporting month.

- Monitoring
  This section covers the monitoring procedures to be employed during the entire project duration. Monitoring of the project starts from the site preparatory activities and mobilization and ends after demobilization and turnover of project and equipment.

- Personal Protective Equipment Needed
  This section shall list all required PPE for the dredging operation as specified in the On-Board Dredge and Dredge Operations Safety Manual of DO 74 S2015. Additional PPE may be required for different project sites.

- Safety Plan

7.1.1 Dredging Plan Template

To set the standard design of dredging plans for all by-administration dredging projects of the Department, the Bureau of Equipment developed a Dredging Plan Template herein attached to form part of this Department Order, see Encl. 2. Concerned DPWH offices shall prepare and submit the dredging plan in the given format to BOE.

8.0 Application for Approval of Dredging Request

8.1 Requirements under DO 139 S2014

Department Order 139 S2014 sets the guidelines and requirements for the application for dredging permit for DPWH flood control projects. This section elaborates on the requirements of the said DO, to wit:

- Surveys
  The required surveys include bathymetric, topographic and hydrographic surveys. Bathymetric survey shall be conducted to determine the current profile of the river and the amount of material to be removed which will be the basis for the computation of the projected duration of the project.
  Topographic surveys are made to determine the configuration of the earth's surface and to locate natural and cultural features on it to determine horizontal and vertical spatial relations.

- Soil Investigation
  Soil investigation must be conducted in order to establish the representative riverbed material gradation which is necessary for the design of the project. Where public structures such as bridges and river structures are located, dredging may introduce risk for instability of elevation degradation of riverbed and instability of side slopes. The type(s) of equipment to be deployed for the project depends on the characteristics of material found in the riverbed. Soil investigation shall be in accordance with DPWH Design Guidelines Criteria and Standards for Public Works and Highways, Volume I, Part I. Survey and investigation for slope stability shall be undertaken along the riverbed with borings of 3 to 5 meters and at a minimum of 200 m intervals.

- Plan
  The plan for dredging works shall contain the following:
  - Cover Sheet
  - Index of Drawings
  - Location Map and Vicinity Map
  - Plan showing location of dumpsite for dredged materials
  - General notes, legends/abbreviations and symbols and technical specifications
  - Geotechnical investigation
  - Typical drawings
  - Plan and longitudinal profile and
  - Cross sections

  Section 7.1 of these Policies and Guidelines discuss in detail the contents of the dredging plan.

- Design and Related Reports

- Standard Requirements

- Environmental Clearances
  Dredging works are intended to enhance environmental quality, thus they generally fall under Category C "Projects intended to directly enhance environmental quality or address existing environmental problems not falling under Category A or B" of Environmental Impact Statement (EIS) System, PD 1586. Depending on the proposed dredging area, either an Environmental Compliance Certificate (ECC) may be required or a Certificate of Non-Coverage (CNC) may be issued by the Environmental Management Bureau (EMB) as determined in the Revised Procedural Manual for DENR DAO 2003-30.

  During the Planning Stage, the likely impacts of the project on the environment during construction, commissioning, operations and abandonment shall be determined and evaluated through the Environmental Impact Assessment (EIA). EIA includes designing appropriate preventive, mitigating and enhancement measures addressing the impacts of the project to protect the environment and community's welfare. Based on the EIA submitted by the project proponent, an ECC or CNC may be issued by the DENR-EMB to be conformed to by the proponent.

  The guidelines and procedure for the application for ECC can be found in the Revised Procedural Manual for DENR Administrative Order No. 30 Series of 2003, Implementing Rules and Regulations of Presidential Decree No. 1586, Establishing the Philippine Environmental Impact Statement System. The following figure shows the summary flowchart for the EIA process:

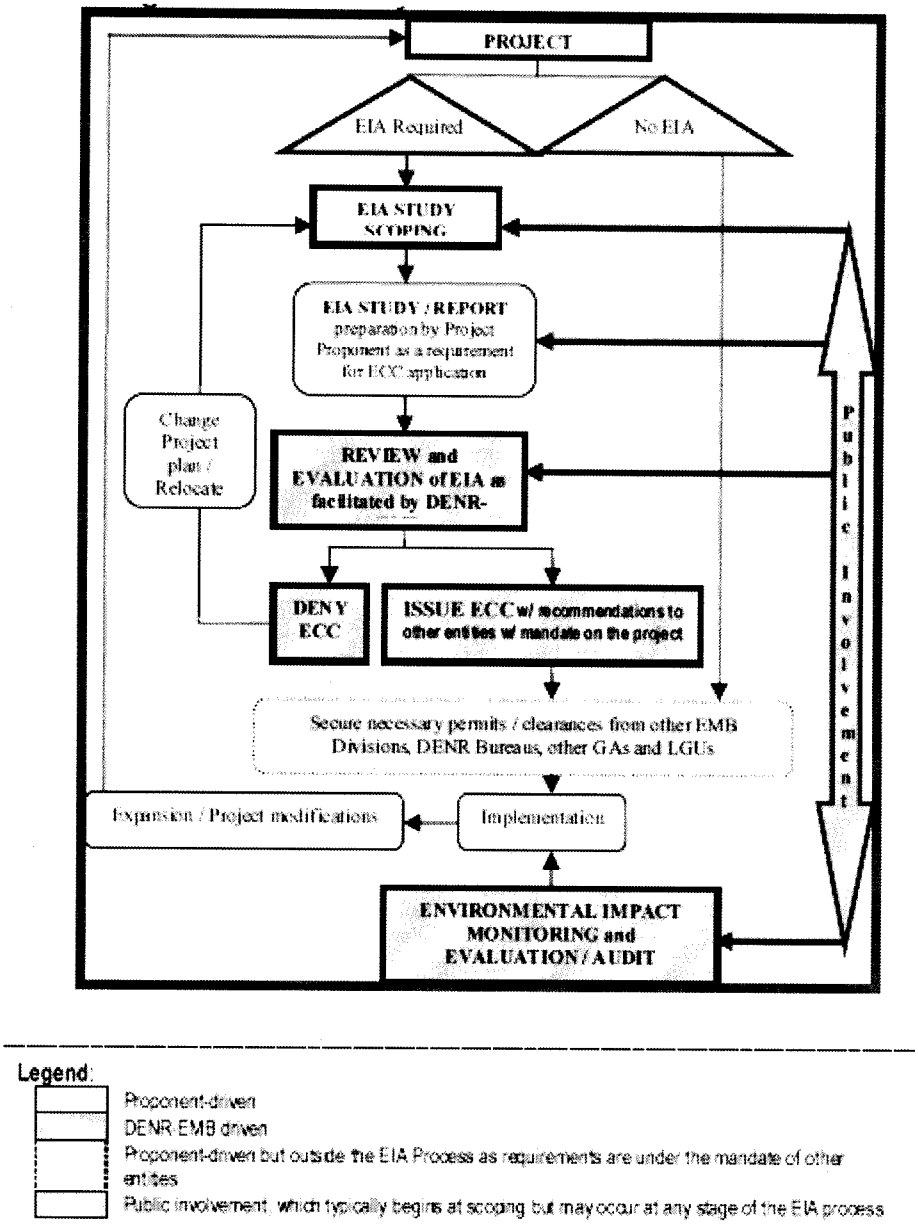


Figure 2. Summary flowchart for EIA Process[2]

Upon completion of the necessary documents as stated in Section 8.1 of these Policies and Guidelines, the proponent office shall submit all the required documents to the Regional Director who shall then forward the request to BOE for processing.

[2] Revised Procedural Manual for DENR Administrative Order No 30 Series of 2003 (DAO 2003-30)

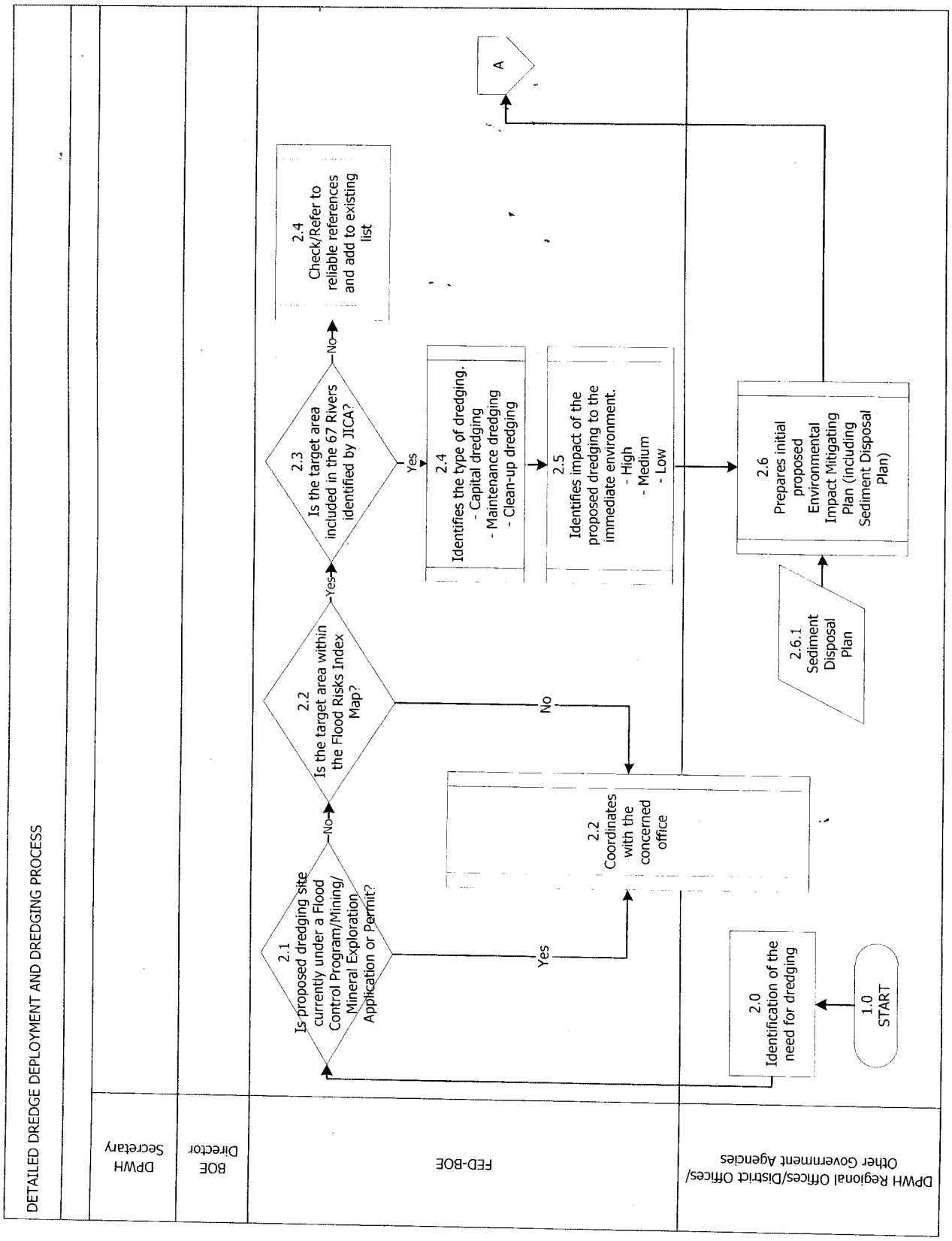
9.0 Implementation of Dredging Project

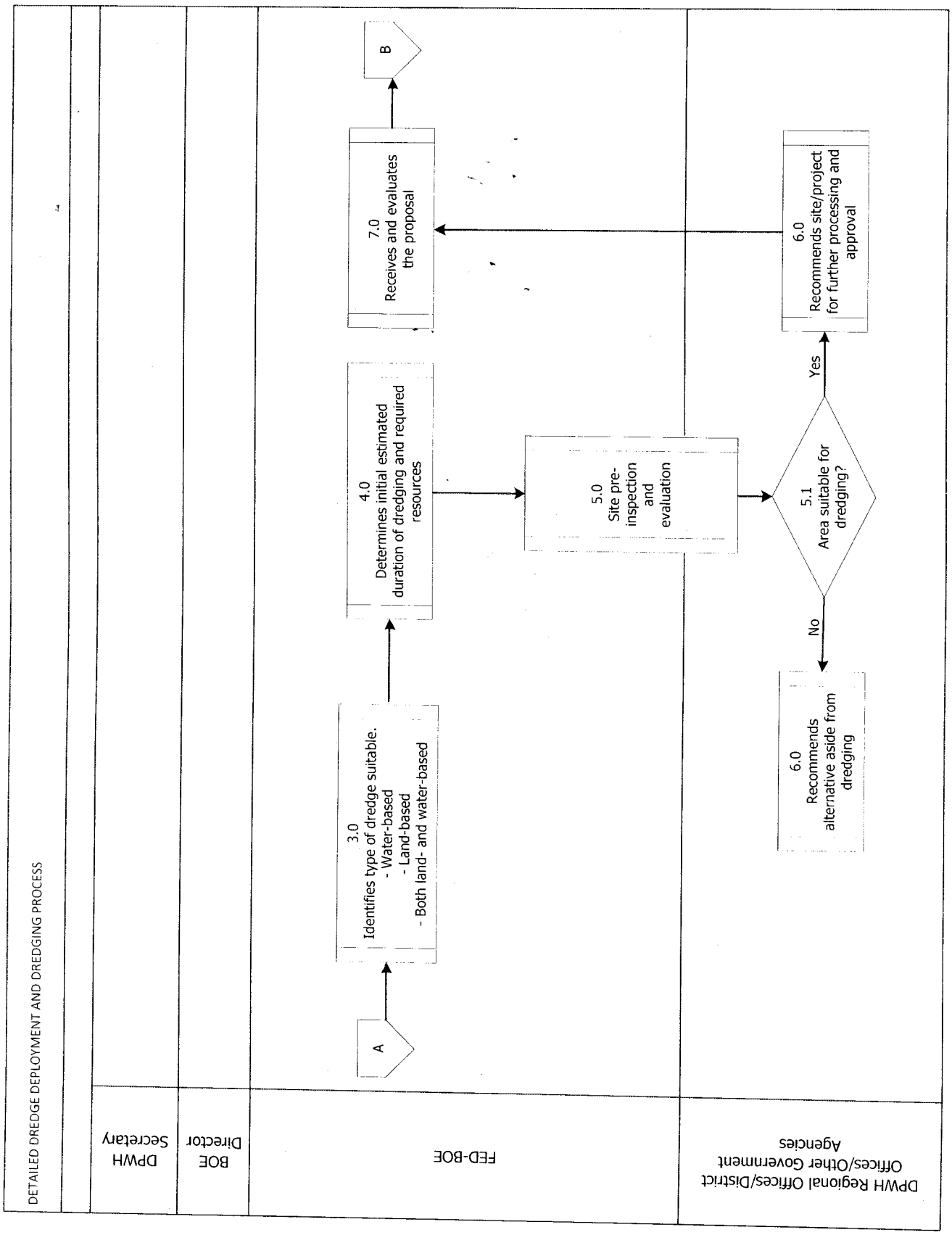
Once the application for dredging permit has been reviewed and approved by the DPMT, the BOE, in coordination with the Project Implementing Office, shall initiate the mobilization of the dredging equipment to the dredging site.

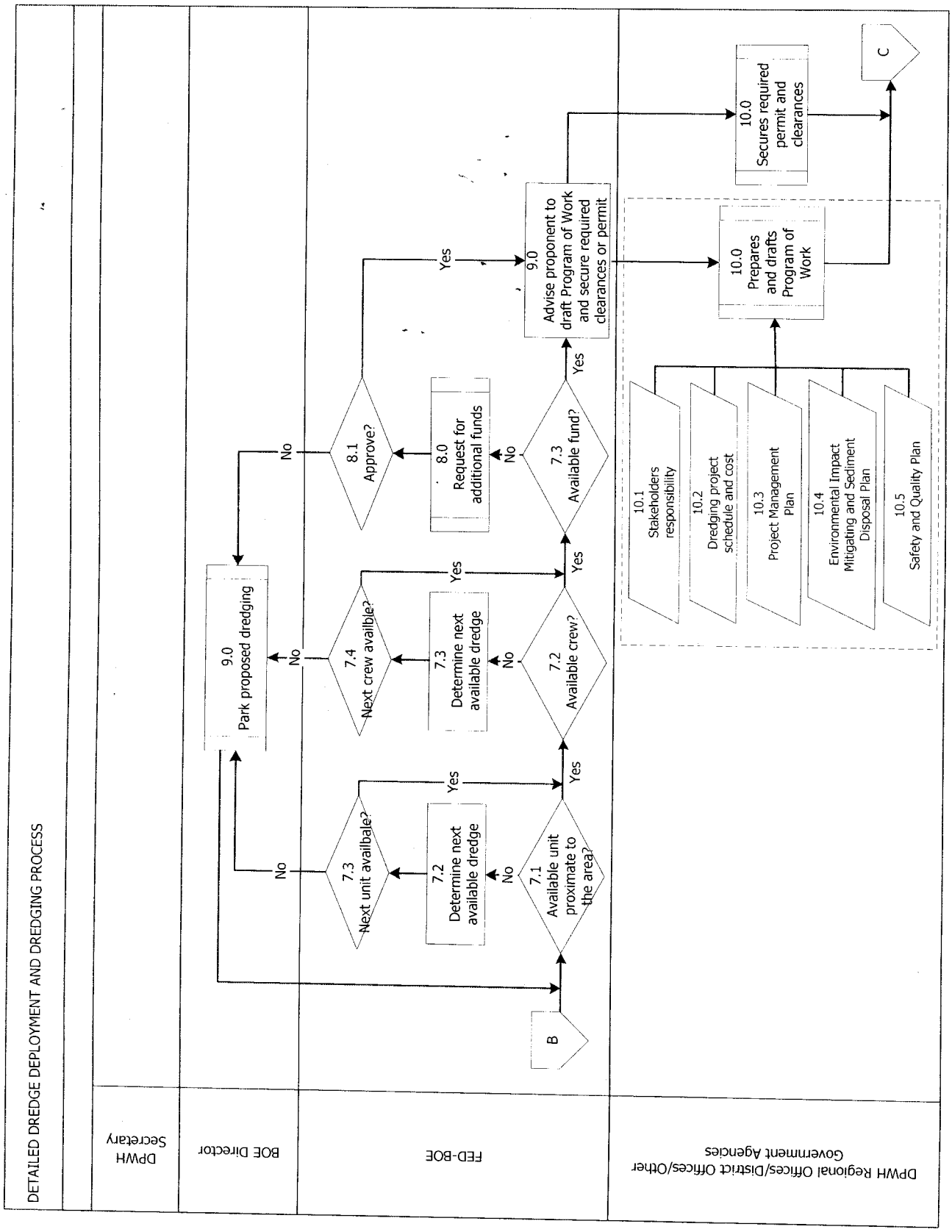
As stated in Section 5, the Implementing Office shall have direct supervision on the implementation of the dredging project. Monitoring of the project shall be conducted by personnel from BOE-FED and from the Implementing Office, and shall start from day 1 of the project to be conducted regularly until the turnover of the project. Section 11 of this Guideline describes the monitoring procedure and lists the required dredging reports to be accomplished and submitted by dredge personnel. The Implementing Office shall make sure that the dredging plan/POW is strictly implemented. Any departure from the plan shall be properly documented and coordinated to the DPMT. Section 12 discusses the quality plan to be employed in order to ensure and monitor adherence to plans and compliance to existing laws and regulations.

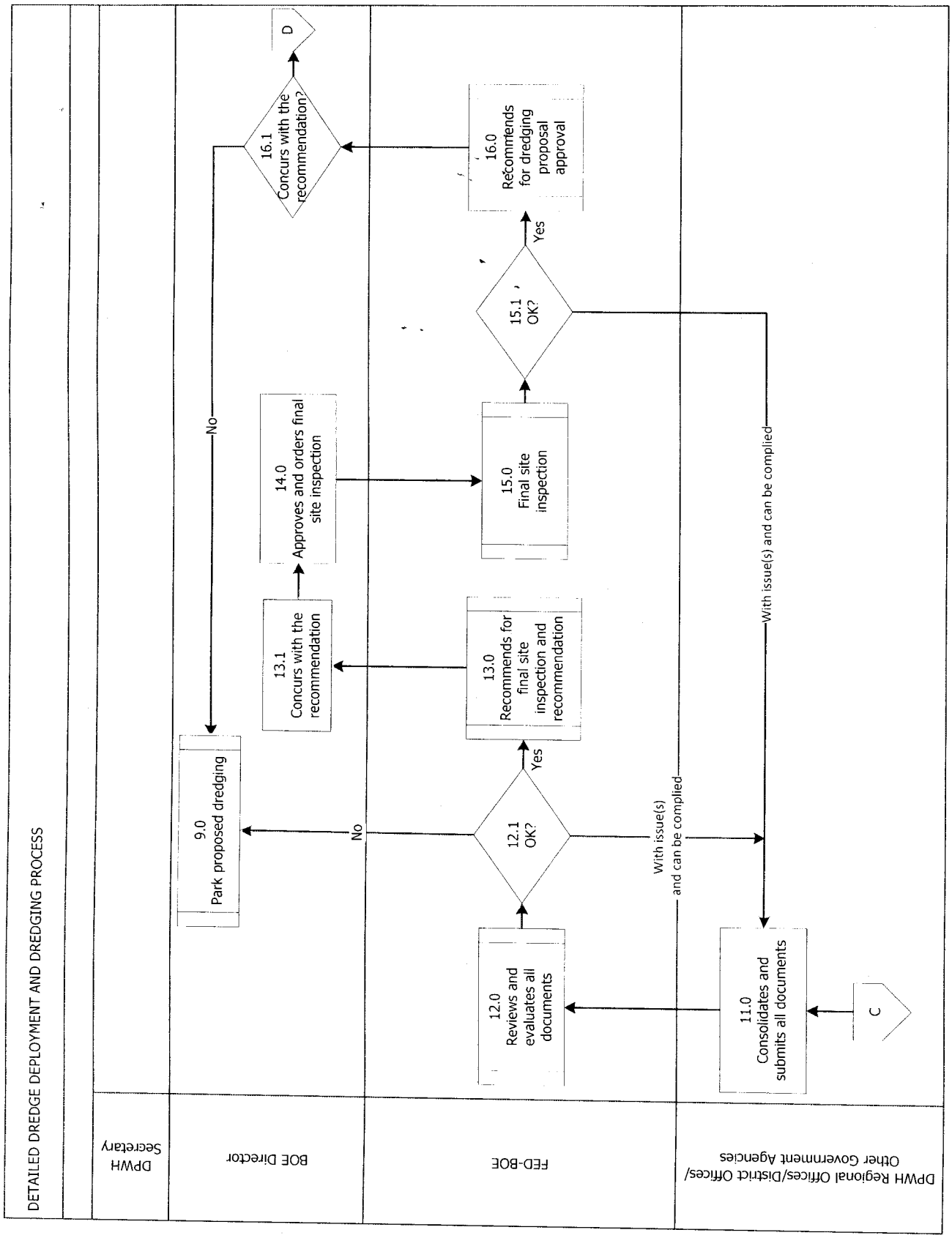
10.0 Process Flow for the Application for Dredging Permit and Implementation of Dredging Program

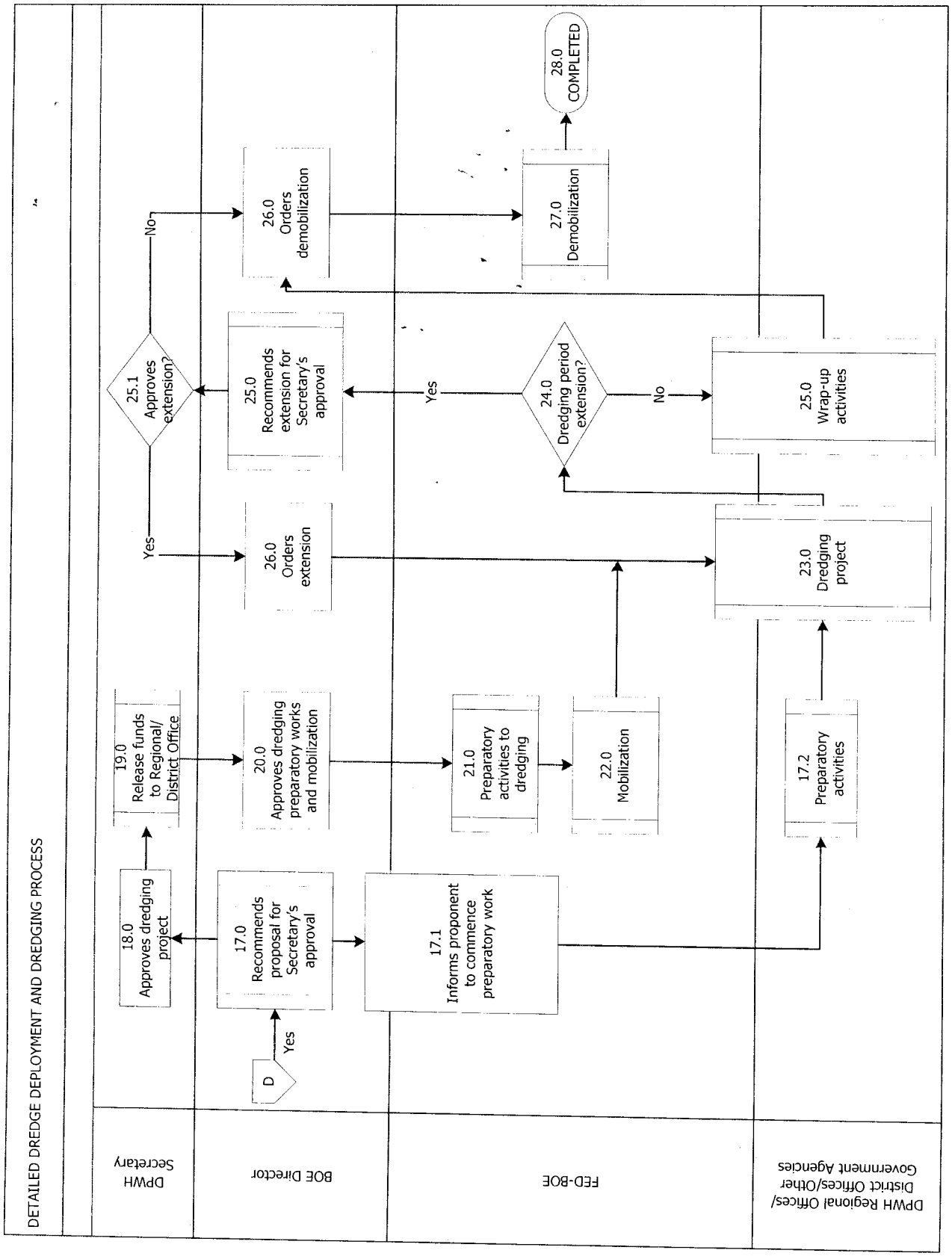
Figure 3. Detailed process flow for the application for dredging permit and implementation of dredging project




DETAILED DREDGE DEPLOYMENT AND DREDGING PROCESS
DPWH Secretary
BOE Director
FED-BOE
DPWH Regional Offices/District Offices/Other Government Agencies
A
3.0
Identifies type of dredge suitable.
- Water-based
- Land-based
- Both land- and water-based
4.0
Determines initial estimated duration of dredging and required resources
5.0
Site pre-inspection and evaluation
5.1
Area suitable for dredging?
No
6.0
Recommends alternative aside from dredging
Yes
6.0
Recommends site/project for further processing and approval
7.0
Receives and evaluates the proposal
B


DETAILED DREDGE DEPLOYMENT AND DREDGING PROCESS
DPWH Secretary
BOE Director
FED-BOE
DPWH Regional Offices/District Offices/Other Government Agencies
B
7.1 Available unit proximate to the area?
Yes
No
7.2 Determine next available dredge
7.3 Next unit availbale?
Yes
No
9.0 Park proposed dredging
7.2 Available crew?
Yes
No
7.3 Determine next available dredge
7.4 Next crew availble?
Yes
No
9.0 Park proposed dredging
7.3 Available fund?
Yes
No
8.0 Request for additional funds
8.1 Approve?
Yes
No
9.0 Advise proponent to draft Program of Work and secure required clearances or permit
10.0 Prepares and drafts Program of Work
10.1 Stakeholders responsibility
10.2 Dredging project schedule and cost
10.3 Project Management Plan
10.4 Environmental Impact Mitigating and Sediment Disposal Plan
10.5 Safety and Quality Plan
10.0 Secures required permit and clearances
C


DETAILED DREDGE DEPLOYMENT AND DREDGING PROCESS
DPWH Secretary
BOE Director
FED-BOE
DPWH Regional Offices/District Offices/ Other Government Agencies
C
11.0 Consolidates and submits all documents
12.0 Reviews and evaluates all documents
12.1 OK?
With issue(s) and can be complied
No
Yes
9.0 Park proposed dredging
13.0 Recommends for final site inspection and recommendation
13.1 Concurs with the recommendation
14.0 Approves and orders final site inspection
15.0 Final site inspection
15.1 OK?
With issue(s) and can be complied
No
Yes
16.0 Recommends for dredging proposal approval
16.1 Concurs with the recommendation?
D


DETAILED DREDGE DEPLOYMENT AND DREDGING PROCESS
DPWH Secretary
BOE Director
FED-BOE
DPWH Regional Offices/ District Offices/Other Government Agencies
17.2 Preparatory activities
17.1 Informs proponent to commence preparatory work
17.0 Recommends proposal for Secretary's approval
D
Yes
18.0 Approves dredging project
19.0 Release funds to Regional/ District Office
20.0 Approves dredging preparatory works and mobilization
21.0 Preparatory activities to dredging
22.0 Mobilization
23.0 Dredging project
24.0 Dredging period extension?
Yes
No
25.0 Wrap-up activities
25.0 Recommends extension for Secretary's approval
25.1 Approves extension?
No
Yes
26.0 Orders extension
26.0 Orders demobilization
27.0 Demobilization
28.0 COMPLETED

11.0 Reporting and Monitoring of Dredging Operations

11.1 Daily Operations Reporting

All activities during each shift shall be properly logged in the dredge logbook and in the designated forms from BOE, see Encl. 3, and shall be submitted to BOE not later than the 15th day of the succeeding reporting month. The following are the required dredging reports to be submitted to BOE:

- Daily Dredging Operations Log
  A register of activities and accomplishments for each shift. The daily log contains the effective dredging hours, advance, width and depth of cut, total volume dredged, actual fuel consumption, lubricant consumption, preventive maintenance and non-effective dredging hours.

  The volume excavated can be computed from the advance, width and depth of cut. This shall be checked against the volume of materials in the spoil site, and/or the volume based on the effective hours and dredge capacity corresponding to the engine RPM setting used.

- Dredge and Support Vessel Daily Safety and Maintenance Checklist
  Mandated under DO 74 S2015, Safety On Board All DPWH Dredges and Support Vessels. This check covers the daily inspection of equipment and PPEs.

- Fuel Daily Consumption Report
  This shall contain the actual fuel consumed for each shift based on the volume of fuel in the tank before and after operation.

- Summary of Fuel Deliveries and Issuances
  Every delivery of fuel and supplies must be logged in this form. The amounts as received shall be properly logged and each delivery must be signed accordingly.

- Monthly Dredging Output and Operational Status Report
  Contains the summary of the daily operations as well as the equipment status at the end of the reporting month.

Geotagged Photos

Geotagging is the attachment of geographical identification (i.e. geographical "x,y" coordinates) to electronic media such as photographs so that the location at which the photo was taken can be shown on a map.

To provide evidence of progress or work performed, geotagged photos of spoil site and the actual dredging operation shall be submitted by the Project Inspector every last day of the

week. The submittal must consist of a minimum of 15 geotagged photos or at least three (3) photos per day, two (2) photos of the actual dredging operations showing distinct reference points and one (1) photo of the spoil site taken at the same point throughout the week. The photos must be placed in a folder to be named as follows:

<Name of Dredge>_<Name of Project>_<week #>
Ex. Pinatubo IIB_Maintenance Dredging of Pasac Waterways_Week3

and submitted to the designated email found in the following table.

Summary of Dredge Reports and Schedule of Submission				
Report	To be prepared by:	To be submitted by:	To be submitted before:	To be submitted to:
Daily Dredging Operations Log	Dredge Master	Dredge Master	15th day of the following month	BOE-FED
Dredge and Support Vessel Daily Safety and Maintenance Check	Dredge Master	Dredge Master	15th day of the following month	BOE-FED
Fuel Daily Consumption Report	Dredge Master	Dredge Master	15th day of the following month	BOE-FED
Summary of Fuel Deliveries and Issuances	Dredge Master	Dredge Master	15th day of the following month	BOE-FED
Dredge Maintenance Summary and Log	Dredge Master	Dredge Master	15th day of the following month	BOE-FED
Monthly Dredging Output and Operational Status	Dredge Master	Dredge Master	15th day of the following month	BOE-FED
Geotagged Photos of the Dredge in operation		Project Inspector	end of the week	(email)
Geotagged Photos of the Spoilsite		Project Inspector	end of the week	(email)

Figure 4. Summary of dredging reports and schedule of submission

11.2 Monitoring of Dredging Operations

Monitoring of dredging operations shall be jointly conducted by the Implementing Office and BOE to track progress of the project and validate the data in the dredging operations log. The frequency of survey shall depend on the rate of siltation of the river, weekly being the shortest interval, and every two weeks being the longest interval. Bathymetric survey will be conducted using multi-beam eco sounding device capable of producing contour maps of the river bed.

Likewise, compliance to DO 74 S2015, Safety On-Board All DPWH Dredges and Support Vessels, shall be monitored by BOE along with water quality monitoring. Dissolved oxygen, biochemical oxygen demand, pH level and suspended solids shall be monitored regularly to determine control measures for environmental protection.

12. Quality and Continual Improvement, Environmental and Safety Plan

To ensure the protection of property, equipment and personnel, quality and safety plan shall be established based on national and international laws.

12.1 Quality Management Plan

12.1.1 Overview

The Quality Management Plan (QMP) details the quality control (QC) and quality assurance (QA) measures and procedures to be observed during the implementation of dredging projects so that the quality of the project will meet the requirements as specified in the dredging plan.

The Implementing Office is responsible for ensuring that the construction and dredging operations are in accordance with the plans and specifications. The IO is responsible for controlling the quality of its work to meet plans, specifications and related requirements.

12.1.2 Objectives

The QMP aims to:

- Describe and define the quality program and organization to be enforced to verify the project's conformance to specifications and industry standards;
- Set the guidelines for inspection and documentation of activities;
- Establish a process for detecting, documenting and addressing unexpected changes or conditions that could affect the quality of operations.

12.1.3 Responsibilities and Authorities of Organizations

12.1.3.1 Dredging Program Management Team

The DPMT is the lead group responsible for monitoring the implementation and progress of all dredging projects.

12.1.3.2 Bureau of Equipment

BOE, being the head of the DPMT for by-administration dredging, shall be responsible for the overall monitoring of implementation and progress of dredging projects.

12.1.3.3 Implementing Office

The Implementing Office is responsible for the implementation and supervision of dredging activities. The IO shall ensure that all activities are performed in accordance with the dredging plan and industry standards.

12.1.4 Structure of Organization

Figure 5 in the following page shows the structure of the Quality Management Team (QMT).

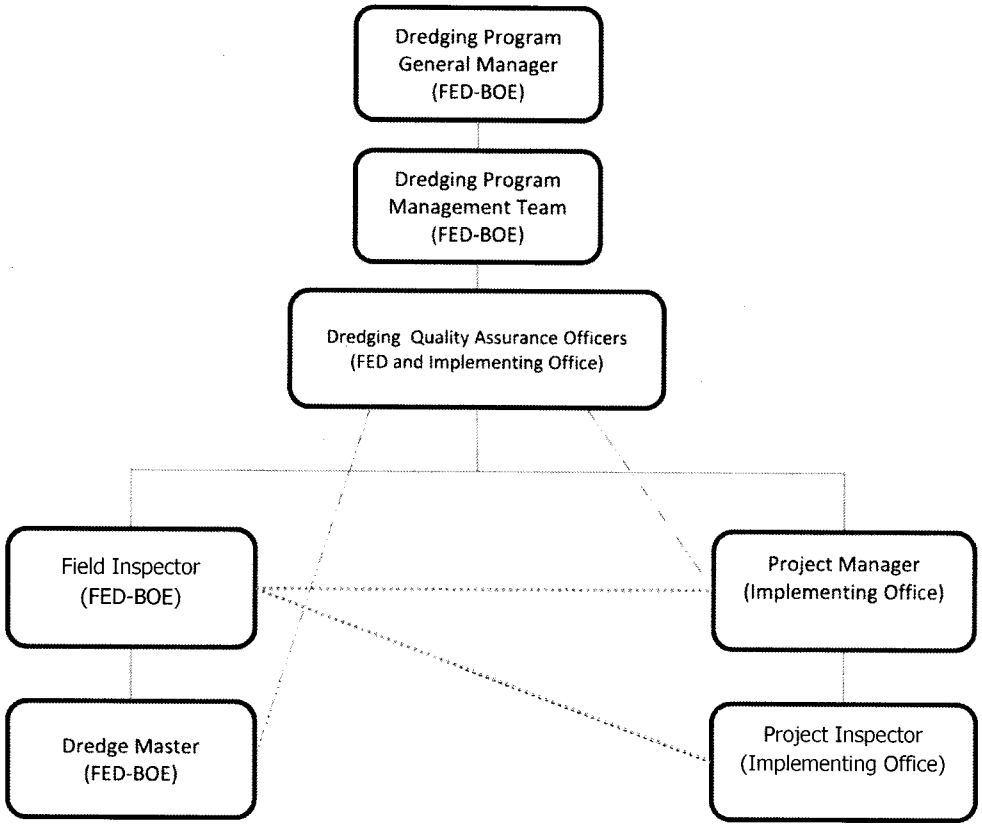
12.1.4.1 Key Personnel Responsibilities

Project Manager (PM)

The PM shall monitor the dredging operations and work with the IO to evaluate and approve quality and progress submittals from the Dredge Master to verify that the project meets the requirements and specifications. The PM shall monitor performance and recommend corrective actions as necessary. The PM shall directly coordinate with the Field Engineer of BOE for recommendations on corrective actions and technical issues during operation

Project Inspector (PI)

The PI shall lead the survey team for the IO and shall conduct on-site surveys to validate the submittals of the dredge crew. The PI shall monitor day-to-day activities of the dredge crew. The PI shall conduct inspections to verify the quality of work, review test and inspection reports, and check that the required documentations are submitted. The PI must be able to detect, record, and report any deviation from the approved dredging plan. The PI shall call the attention of the PM and the FI if any deficiency has been observed. The PI shall maintain accurate and up to date records of the dredge performance and work progress, delivery of materials, and other pertinent matters, including daily inspection and operations report.



Legend

—·—·—· Direct communication and coordination related to dredging QMP

····· Direct communication and coordination related to technical issues

Figure 5. Quality Management Team Structure

BOE Field Inspector (FI)

The Field Inspector works with the BOE to evaluate and verify the submittals of the dredge crew. The FI shall directly communicate with the PM and PI of the Implementing Office and shall make sure that the project is conducted in accordance with the dredging plan requirements. The FI shall oversee inspection efforts, provide technical advice and coordinate support from engineering, administration and inspection services.

Dredging Quality Assurance Personnel (DQAP)

The DQAP shall report directly to the DPMT head and shall have full authority delegated by the DPMT to institute actions necessary for the successful implementation of the QMP to realize project targets and objectives. The DQAP, in coordination with the DPMT, shall administer and oversee the implementation of the QMP. The DQAP shall make revisions to QMP as necessary, and implement systematic actions to verify compliance to the QMP.

The DQAP shall track and report non-conformance to the DPMT and all concerned personnel.

12.1.5 Performance Monitoring

The Project Management Team shall oversee the dredging operations to ensure conformity with the dredging plan design and requirements.

12.1.5.1 Inspections

The IO shall establish an effective program for inspection of activities affecting quality and shall cover pertinent on-site and off-site operations. Inspections shall be conducted to verify compliance to instructions, adherence to design drawings, procedures and requirements as defined in the dredging plan.

A four-phase inspection may be adopted by the DPMT. The following are the phases of the inspection:

1. Preparatory Inspection
   The PMT shall conduct preparatory inspections prior to beginning any work on any definable feature of the project. The preparatory inspection shall:

   - Include a review of the plan requirements;
   - Check that all materials and equipment have been tested, inspected and approved;
   - Examine the work area to make sure all preliminary works had been completed;
   - Examine equipment and materials to make sure that they conform to standards and are properly calibrated and in proper working condition;
   - Be documented in the PMT's logbook and documentation system.

2. Initial Inspection
   The PMT shall conduct initial inspection soon as representative portion of the definable feature of work has been accomplished. This inspection shall:

   - Examine the quality of workmanship;
   - Review control testing for compliance with requirements;
   - Review dimensional aspects of the project;
   - Be documented in the PMT's logbook and documentation system.

3. Follow-up Inspection
   Follow-up inspections shall be conducted daily, and shall:

   - Monitor continuing compliance with design requirements;
   - Be documented in the PMT's logbook and documentation system.

4. Wrap-up Inspection
   The wrap up inspection will:

- Determine items that do not conform to the approved plan;
- Determine deficiencies/unaccomplished tasks;

12.1.5.2 Material Handling, Packaging, Storage, and Delivery Requirements

The PI shall inspect dredging activities to monitor compliance in identification, storage, packaging, preservation and delivery of materials, assemblies and parts.

12.2 Environmental Plan

This section discusses possible impacts of the activities during the different phases of the dredging project and the mitigation and enhancement plan to be implemented for the protection of the environment. The following table shows possible impacts of different activities and the recommended mitigation measures to be employed:

Activities	Impact	Significance	Mitigation and Enhancement Plan
1. Pre Dredging Operations/Mobilization			
1.1 Launching of equipment	Cutting down of trees and vegetation to clear up the path for the equipment to pass through	Significant and negative	
1.2 Clearing, grubbing and earth moving activities	Change in the topography and land form of the area	Significant and negative	Properly supervise earth moving activities and keep it at minimal level
1.3 Accidental spillage of fuels, oils and lubricants during transfer and handling of supplies	Contamination of water	Significant and negative	Establish proper storage of fuels, oils and lubricants and safe system for proper handling of fuel and supplies
2. Dredging Operations			
2.1 Clearing, grubbing and earth moving activities	Change in the topography and land form of the area	Significant and negative	Properly supervise earth moving activities and keep it at minimal level
	Aquatic organisms will be sucked in by dredging equipment or displaced by the operation	Minimal significant, negative and permanent	Dredging shall be regulated and shall be in the shallow portions of the river
2.2 Transporting of dredged soils to designated spoil yard	Accidental spills	Temporary and significant	Discharge pipes must be properly maintained
2.3 Settling of spoils	Dredged spoils and silt may be carried by runoff water back into the river system	Temporary and significant	Establish silt traps and settling ponds around the dredge spoil yard areas. Construct efficient drainage system.
2.4 Spillage of diesel fuel and lubricants during refueling or transfer of dreging equipment	Contamination of water	Significant, negative and regularly occurring	Establish proper storage of fuels, oil and lubricants and safe system for proper and careful refueling and maintenance works
2.5 Operating during heavy rains	Extensive erosion	Highly significant, negative and regularly occurring	If possible, dredging must be stopped
2.6 Domestic and human waste from working crew	Contamination of water	Minimal significant, negative and permanent	Practice proper waste management and proper waste disposal system
3. Post Dredging Operations			
3.1 Demobilization			
3.2 Site restoration		Highly significant and permanent	Plant trees and vegetation to replace the ones removed during the launching and mobilization of equipment

Figure 6. Environmental impact and mitigation

12.3 Safety Plan

To ensure the safety of all personnel working in the project and to achieve zero accident in the dredging site, DO 74 S2015, Safety On-Board All DPWH Dredges and Support Vessels, and DO 136 S2015, Guidelines on the Positioning and Movement of Dredges and Floating Equipment during Heavy Weather, shall be strictly enforced.

13.0 Project Completion

After completion of the project, the equipment will be demobilized, removed from the dredging site, and will be transferred to EMD (if MPAD or AE) for safekeeping while waiting for its next assignment or be mobilized to its next assignment.

The Implementing Office shall prepare a turn over memorandum stating that the project has been completed and shall be acknowledged by BOE through signing. BOE, on the other hand shall be responsible for the demobilization of the dredging equipment. Before deploying the dredge and its support vessel to a new assignment, the dredge shall undergo general/overall inspection and repair to make sure they are safe to operate and can reliably perform their intended purpose.

14.0 Sanctions

The Team and all heads of concerned offices shall see to it that this order is strictly enforced. Failure to do so shall, after due process, make the erring personnel liable to penalties for violation of reasonable office rules and regulations prescribed under Section 52, C(3) of Civil Service Resolution No. 991936 dated August 31, 1999, otherwise known as the Uniform Rules on Administrative Cases in the Civil Service.

15.0 Repealing Clause

These Policies and Guidelines repeal all issuances or portions thereof which are inconsistent herewith.

Encl. 2

BUREAU OF EQUIPMENT

Dredging Plan Template

Dredging Plan

For

[Name of Project] [Year]

12/14/2015

(Version 1.1)

Prepared by: [Office] Date: [date]

Approved by: [Office] Date: [date]

Table of Contents

1. EXECUTIVE SUMMARY

[The Department of Public Works and Highways (DPWH), through the different Regional Offices, manages river dredging projects for flood control in various inland waterways throughout the country. DPWH dredging projects play a critical role in flood control and in maintaining the navigability of some rivers as well. At present, more than 60 dredges are deployed in different dredging projects nationwide.]

[In December 2014, the Department issued a new Department Order, D.O. No. 139, "Guidelines on River Dredging Operations for Flood Control", to set the guidelines and requirements for the approval of request for dredging operations. Among the requirements of D.O. 139 are: pre-dredging bathymetric, hydrographic and topographic survey; soil investigation; environmental clearances; design and related reports; plan; and standard requirements.]

[In compliance with requirement 5 of the abovementioned Department Order, this plan was developed to be used as guide for the implementation of the dredging project. This plan provides the objective and scope of work for the project, detailed information about the project and the methodology to be employed. Maps showing the location of the dredging area and the spoil site are presented in this plan. The appropriate dredging methodology is determined from the results of surveys and site investigation. The proper equipment to be used is identified and the duration of the project is estimated based on the scope of the project and the capacity of the equipment.]

[During dredging operations, the natural environment is disturbed, water turbidity and PH level may rise, dissolved oxygen may fall. This dredging plan provides an overview of the environmental impacts of dredging operations and the monitoring procedures to assess the impacts of the operation in order to take the necessary control measures.]

[On the operational side, dredge personnel are exposed to a multitude of risks and hazards. Section 11 of this plan lists the minimum required personnel protective equipment to protect the dredge personnel against hazards and risks associated with the dredging operation. Likewise, Section 12 cites the On-Board Dredge and Dredge Operations Safety Manual as the guidelines for safety enforcement on board and on site during the operation.]

[To effectively schedule the activities related to the dredging operation, a Gantt chart was developed and presented in Section 9 of this plan. Through proper scheduling of activities, the project will be completed on time and losses will be minimized.]

2. GENERAL PROJECT INFORMATION

General Project Description:

The proposed [name of the dredging project] aims to minimize the problem of flooding in the [city or municipality of _____], particularly in the Barangays of [Barangays]. Flooding has been a problem in the said municipality since [year]. It can be associated to [accumulation of garbage and debris from the city/ fast rate of sedimentation which results from the current river profile]. The slope and width of the river cannot accommodate the high volume flow rate of water in the river. This proposed project shall be carried out to achieve the necessary profile of the river to increase its conveyance capacity and hence prevent the overflow of water to the [city or municipality].

Objective of the Plan:

This dredging plan provides the methods and objectives for dredging operations in the [name of the river] to achieve a certain depth and width [to increase the conveyance capacity of the river] and [to maintain the navigability of the channel]. The dredging will be accomplished in the following phases:

[Phase 1: Removal of large debris and garbage using grab or bucket. Large materials which are not suitable for cutter suction dredges and may cause blocking of pipes and pump must be removed prior to using cutter suction.]

[Phase 2: Dredging the river to a design depth of [x meters] and a design slope of [θ degrees] using cutter suction dredge.]

During Phase 1 dredging, the materials removed will be loaded onto dump trucks and will be transported to [designated dumping site].

During Phase 2 dredging, the materials dredged will be pumped and conveyed to the spoil site via discharge pipelines. The design and specifics of the spoil site will be discussed in Section 5.3 and 5.4 of this plan.

During the entire dredging project, progress will be monitored through bathymetric surveys and the environmental impact and water quality will be monitored through water sampling in various locations. The monitoring procedures are described in Section 6 of this plan.

SCOPE OF WORK

This plan was developed to:

- Provide the methods and quality criteria for the [name of project].
- Provide measures to minimize the effect of the dredging project to water quality and the environment.
- Provide survey and monitoring procedures to monitor progress and compliance to regulatory criteria set for the project.

General project information

Particulars	Information/data
Name of Project	
Proponent	
Previous Dredging Project	
Previous Quantity Dredged	
Previous Design Depth	
Type of Dredge Work	
Design Depth	
Dumpsite (Spoil management)	

Organization and Line of Responsibilities

[Office] will be responsible for the dredging operation and the implementation of this dredging plan. The [Bureau of Equipment], through inspections and reports submitted by dredge personnel, will share the responsibility of monitoring and analyzing reports with [Regional Office]. The Bureau of Equipment shall conduct regular inspection of the dredging equipment to monitor compliance with the safety policy, preventive maintenance program and environmental regulations.

The following personnel are responsible for the dredging operation, supervision and monitoring of operation.

Project Inspector:	[Office]
[Name]	[contact number/s]
Dredge Master:	
[Name]	[contact number/s]
Dredgeman Foreman:	
[Name]	[contact number/s]
[other dredge personnel]	[contact number/s]

3.0 SITE DESCRIPTION

This section provides detailed description of the area to be dredged as well as computations for the volume to be dredged and maps of the site.

3.1 Description of the Area

The proposed dredging site is located at [Barangay, Municipality], near [landmark] or [distance] from [famous landmark] or river mouth. Water carrying [kind of materials: e.g. silt, garbage] coming from [tributaries] join the river and leads to [sea or another bigger river]. During rainy days, volume flow rate and water velocity in the river reach [m^3/s] and [m/s], respectfully. Data from [credible source] show that the area experiences floods of up to [height in meters] during the rainy season. [Additional records of flooding].

In compliance to D.O. No. 139 Series of 2014, material sampling was conducted on [date] to determine the composition of the material to be dredged. The table below shows the percentage of each type of material per sample taken from different locations in the area.

	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8
Hard Pan								
Shell								
Mud								
Clay								
Silt								
Gravel								
Sand								
Rock								
Stone								
Others								

Table 1 Characteristics of Material at Different Sampling Points

Project Location	Barangay(s) of _____, Municipality of _____
Geographical Coordinates (**aaa° bb' cc.cc"**)	Start: **N aaa° bb' cc.cc"; E aaa° bb' cc.cc"; W; S** End: **N aaa° bb' cc.cc"; E aaa° bb' cc.cc"; W; S**
Station limits *	Start: Sta. __ +___ End: Sta. __ + ____
Area Covered	_____ m^2
Slope of the area	

Table 2 Project Location and Area

* Station limits based on the established inventory of existing flood control structures made by the UPMO-FCMC

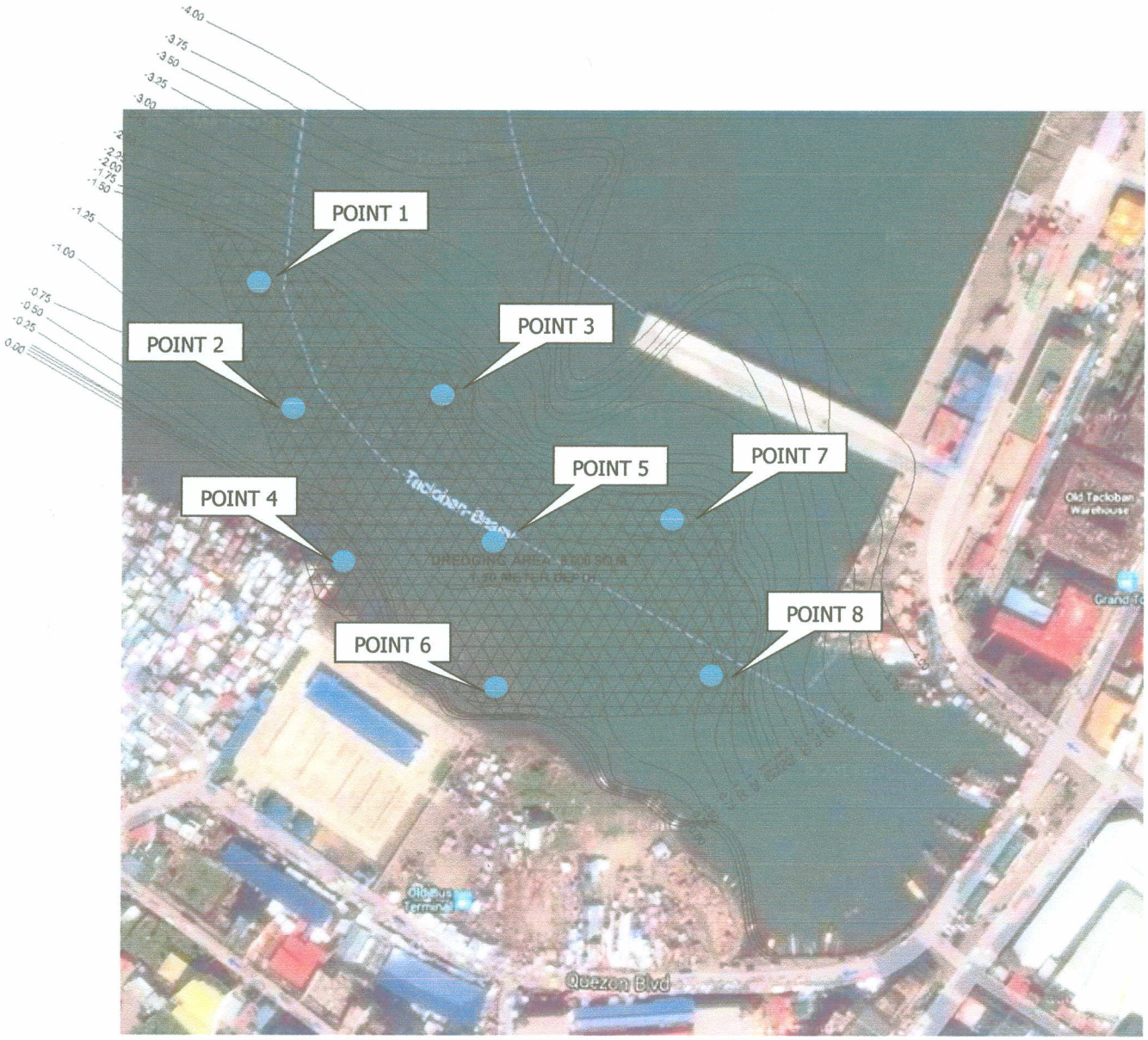


Figure 1 Sampling Locations

Figure 1 shows the location of material sampling points. Sampling points must be at least 200 m apart.

[Sample maps: Tacloban City Fish Port Dredging Project]

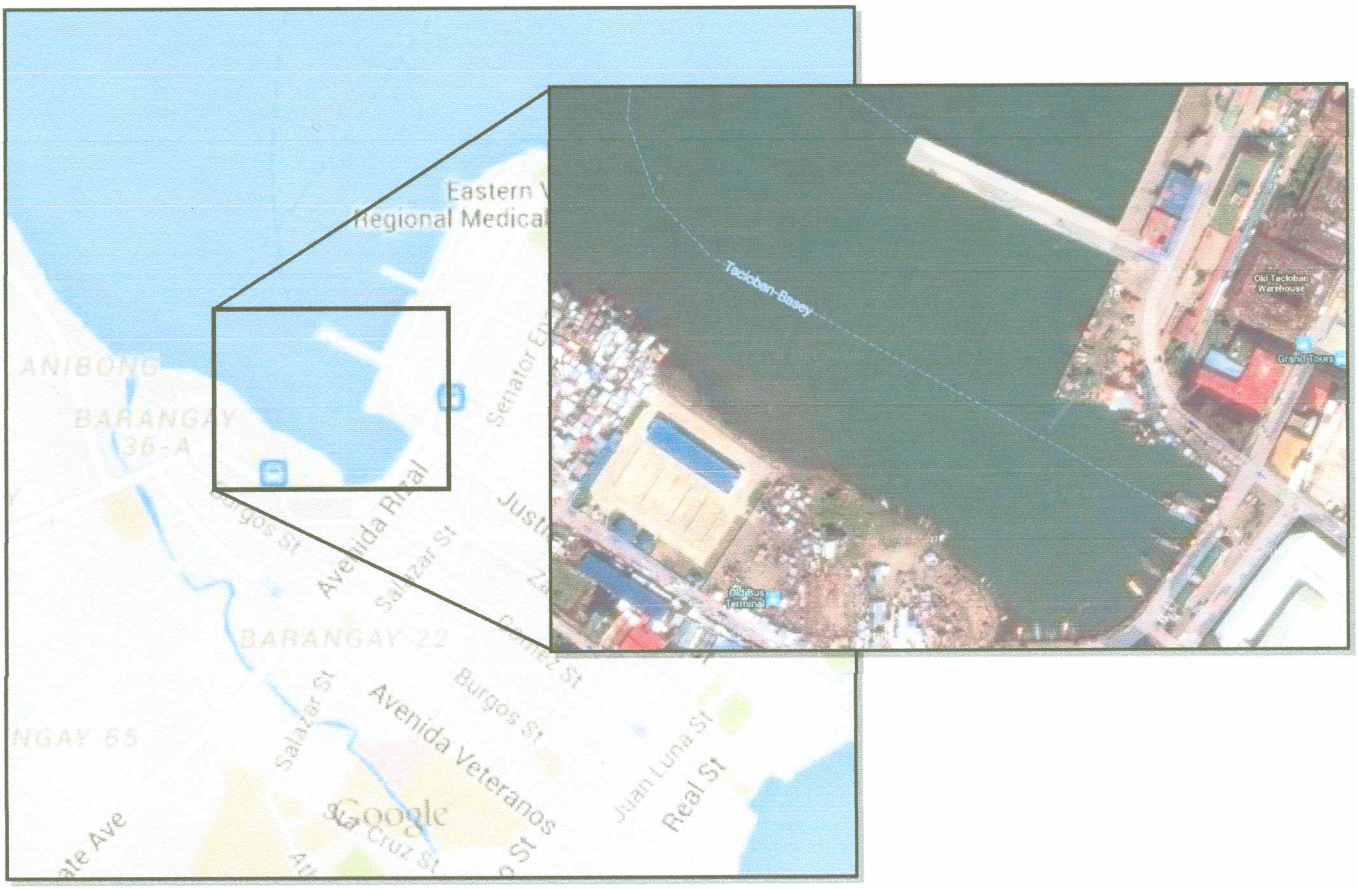


Figure 2 Site Location Map

Figure 2 shows the location of the proposed dredging site in the vicinity of [Barangays]. [Describe the structures located on the sides of the river].

Figure 3 Dredging Area

Figure 3 shows the contour map of the dredging area. At present the deepest part of the river is [depth in meters]. The figure also shows the slope of the river which is [θ degrees].

Figure 4 Navigation Channel

Figure 5 Proposed Segments for Dredging Sequence

Figure 5 shows the dredging area divided into segments. The segments are numbered 1 to n which shall be the sequence for the dredging operation.

Based on the contour map (Figure 2) and (Figure 4) and the design depth, the total volume to be dredged can be computed as follows:

$$Volume_{total} = V_{segment\,1} + V_{segment\,2} + \cdots + V_{segment\,n-1} + V_{segment\,n}$$

Where,

$$Volume_{segment\,x} = Length_{segment\,x} * Width_{segment\,x} * (Depth_{design} - Depth_{present})$$

Further, based on the computed volume to be dredged and the dredge capacity, the estimated time to complete the project can be computed as follows:

$$Time_{total} = T_{segment\,1} + T_{segment\,2} + \cdots + T_{segment\,n-1} + T_{segment\,n}$$

Where,

$$Time_{segment} = \frac{V_{segment}}{dredge\ capacity * e} = \left(\frac{m^3}{\frac{m^3}{h}}\right) = h\ or\ \frac{h}{5.5h/_d} = number\ of\ days$$

Where,

$e = efficiency$
$5.5h/d = average\ effective\ dredging\ hours\ per\ day$

[Geotechnical Investigation: discuss results here]
[Other important information about the dredging area]

3.2 Environmental Conditions

[Describe the environmental conditions here]

3.2.1 Land

[Provide a brief description of the area]

3.2.1.1 Geographic Location and Land Area

[Provide details about the geographical location and area of the proposed dredging site]

3.2.1.2 Biological Environment

[Describe the flora and fauna in the area]

3.2.2 Water

3.2.2.1 Water Quality

Parameters	Station1	Station 2	Station 3	Station 4	Station 5	DENR Standards
pH						
DO (mg/L)						
BOD5 (mg/L)						
Total Dissolved Solids (mg/L)						

Table 3 Results of Water Quality Analysis

3.2.3 Air

3.2.3.1 Air Quality

[Insert details/description here]

3.2.4 Meteorology

[Insert details/description here]

3.3 Impact Assessment

[Insert details/description here]

3.3.1 Physical Environment

[Insert details/description here]

3.3.2 Socio-economic Environment

[Insert details/description here]

3.3.3 Environmental Sanitation

[Insert details/description here]

4. EQUIPMENT AND OPERATIONS

Sample

Main Equipment to be Used	Support Equipment
Dredge PDDP-IV Specifications: Capacity: 430 m^3/h Displacement: 369.5 tons Overall length: 34 meters Width: 10.7 meters Draft: 1.4 meters Maximum dredging depth: 10.7 meters Crew size: 5 Engine specifications: Dredge Pump engine: Make and model: Yanmar T-260L-ST Power: 1400 PS Fuel consumption: 120 L/hr Main Generator Engine: Make and Model: 4608 FJE Model 6N165L-SN Power: 660 PS Fuel consumption: 60 L/hr Auxiliary Engine: Make and Model: 6HAL Power: 180 PS Fuel consumption:	PDDP-IV Work Boat Specifications: Displacement: Overall length: Width: Draft: Fuel consumption: Power: 230 PS Speed: 6.5 mph Motorized Boat Specifications: Speed: Capacity: Fuel consumption:

*include photos

*include map showing the current location of the equipment relative to the proposed dredging site and how the equipment can be transported to the site

5. DREDGE POSITION and DREDGING OPERATIONS

The [name of project] is composed of four major components along with monitoring component. These components include:

- Preparatory activities
- Dredging
- Dredged material dewatering and handling
- Demobilization and site restoration

The position of the dredge at any given time shall be monitored by the Bureau of Equipment through Geo tagging, a process of adding geographical information to various media in the form of metadata which usually consist of coordinates, bearing, altitude, distance and names of places.

The objective of this dredging project is to remove [silts/ garbage/ debris] from [name of river] and achieve the design depth of [n meters]. This will be accomplished using [type of dredge]. The details of the equipment to be used are given in Section 4 of this plan. The boundaries/limits of the dredging project are delineated in Figure 3, Section 3.

5.1 MOBILIZATION AND SITE PREPARATION

The Bureau of Equipment, in coordination with [Regional Office No.], will initiate the mobilization of the dredging equipment to the dredging site. Based on Section 4, the dredge is located [n km] from the site and has to be transported [n km] through [hauling/ towing/ other means]. The mobilization of the dredge together with support equipment will take [n days] via the route shown in Section 4.

Site preparatory activities include the following:

- Clearing of the staging area
- Construction of temporary structures (e.g. bunk house, storage for spare parts and supplies)
- Delivery of supplies and spare parts
- Construction of containment for the dredge materials
- Construction of temporary docking facility for the dredge
- Launch of the dredge into the project site

The plan showing the spoil site and staging area relative to the dredging site is shown in Figure 6, Section 5.

Dredged material will be conveyed through High Density Polyethylene (HDPE) pipes from the dredge [n meters] to the spoil site. Pontoons pipes shall be used to keep the discharge pipes afloat in the water and caution markers shall be deployed to warn other marine vehicles of the ongoing operation. The design of the spoil site is shown in Section 5.4 of this plan.

All activities performed and equipment must comply with environmental rules and regulations and policies set by Maritime Industry Authority (MARINA) and this Department.

5.2 DREDGING OPERATION

The dredging area is divided into segments and dredging will be executed in a sequence in such a way that the downstream migration of dislodged material and debris will be minimized and erosion of the river banks can be prevented. The project shall be accomplished as follows:

- Segment 1 – [n meters] long by [n meters] wide. Segment 1 is currently [y meters] deep and will be dredged to a design depth of [d meters].
- Segment 2 – [n meters] long by [n meters] wide. Segment 2 is currently [y meters] deep and will be dredged to a design depth of [d meters]. [Cite control measures specific to each segment].
- Segment 3 – [n meters] long by [n meters] wide. Segment 3 is currently [y meters] deep and will be dredged to a design depth of [d meters]. [Cite control measures specific to each segment].
- Segment 4 – [n meters] long by [n meters] wide. Segment 4 is currently [y meters] deep and will be dredged to a design depth of [d meters]. [Cite control measures specific to each segment].
- Segment n – [n meters] long by [n meters] wide. Segment n is currently [y meters] deep and will be dredged to a design depth of [d meters]. [Cite control measures specific to each segment].

*a separate sub-section may be dedicated to the discussion of the activities for each segment.

5.3 DESIGN PROCESS/PARAMETERS FOR THE SPECIFIC DREDGING PROJECT

Upon examination of the composition of the in-situ material and considering the dimensions of the river, the [type of dredge/ name of dredge] was chosen to be the primary equipment for the [name of the project]. [State how many units will be

deployed for the project]. The [name of dredge] will be transported from [present location] to the dredging site via [means of transportation] for [n days].
*If the dredge is of Multi-Purpose Amphibious Dredge or Amphibious Excavator type, and to be transported by trailer truck, add another paragraph to discuss how the dredge will be launched to the water.

*The dredge will use [cutter suction head] with a rated capacity of [m^3/h] mounted on a [n meter] ladder capable of reaching depth of up to [n meters] and sweeping an area of [x meters] by [z meters] per swing from opposite sides. The dredge discharge will be conveyed through High Density Polyethylene pipes through a distance of [n meters] to the spoil site. The depth of cut will be measured using the depth gauge mounted on the ladder.

Where floating discharge pipelines may impair navigability of the channel, the pipes may be submerged and at no time will the depth and width of the channel be reduced. Where possibility exists for small boats or skiffs to cross over the submerged pipeline, the area should be marked with orange buoys and sign stating "DANGER, SUBMERGED PIPELINE" every 30 meters through the length of the submerged pipeline.

Likewise, floating pipelines will be properly marked and lighted at night and in periods of low visibility.

The dredge will be staffed and operated [d days] per week, [h hours] per shift at single shift per day. Based on the computations in Section 3.1, the actual dredging will take [n days]. Section 9 of this plan shows the timeline and schedule of activities for the entire dredging project.

When the dredge encounters materials that are too big or too hard to be dredged hydraulically, the location will be marked and recorded and the material will be removed by mechanical dredge using bucket or clamshell. After the large material has been removed mechanically, the area will be dredged with the assigned dredge to obtain the design depth.

Daily operations will be recorded and reported to the Bureau of Equipment (BOE) through the BOE mandated reports to be prepared and duly signed by the Dredge Master. The submitted reports shall be subjected to evaluation and review of the Floating Equipment Division, BOE. The required reports are listed in Section 10 as well as the procedures for the proper filling out of the said reports.

Regular monitoring activities and procedures are discussed in Section 6, while PPE requirements and Health and Safety Plan are described in Section 11 and Section 12, respectively.

Routine and scheduled preventive maintenance will be implemented on the dredge so as not to jeopardize the dredging operations.

5.4 SPOILSITE AND SPOILSITE MANAGEMENT

Figure 6 Spoil Site

The proposed spoil site for the [name of project] has a total area of [area in m^2] and can hold up to [volume in m^3] of dredge materials. The proposed spoil site is located [distance in meters] from the dredging area and is bounded on the North by [structures]; South by [structures]; East by [structures] and in the West by [structures].

[a map showing route for trucks must be added if spoils will be transported to another spoil site]

[discuss here the spoils management strategy to be employed and all the resources needed for spoil management]

5.5 DEMOBILIZATION AND SITE RESTORATION

Upon completion of the operations, the project will be turned over to the Regional Office and all equipment will be demobilized. The equipment will be removed from the area and will be transferred to the [Equipment Management Division] or mobilized to its next assignment. However, before taking another assignment, the equipment must be inspected by personnel from the BOE to determine if the equipment is in good condition and must be certified safe to operate before deploying to another project.

Any temporary structures constructed for the operation will be removed upon demobilization. All debris, trashes and garbage brought about by the operation will be cleaned and disturbed areas shall be restored.

6. MONITORING

This section deals with the monitoring activities for the dredging project.

6.1 BATHYMETRIC SURVEY

As a requirement for the approval of dredging operations under D.O. No. 139, pre-dredging bathymetric survey will be conducted to determine the amount of material to be dredged. Bathymetric survey will be done using multi-beam eco sounding device capable of producing contour maps of the river bed.

During the actual dredging operation, regular bathymetric survey will be conducted weekly to monitor progress of the project and verify the accomplishment reports prepared by the dredge crew. The bathymetric survey during operation shall be conducted by the Dredge Master and a representative from the FED-BOE and must be properly recorded and be submitted to BOE.

6.2 WATER QUALITY MONITORING

During dredging, in-situ material from beneath water surface is dislodged before it is raised into the surface either mechanically by bucket or hydraulically by suction pumps.

However, not all dislodged material is captured by the bucket or the pump. Some of the disturbed sediments become re-suspended in the water, hence water turbidity increases.

A monitoring system should be established to minimize the re-suspension of sediments and release of contaminants. Water quality may be damaged due to the re-suspension of sediments both in the immediate vicinity as well as downstream as it travels with the water current. Effective monitoring of re-suspended sediments for the duration of dredging operations is crucial to maintaining acceptable water quality levels for both wildlife and humans. The most commonly used turbidity monitoring systems uses a submersible sensor to monitor for sediment re-suspension. These turbidity sensors can use nephelometry or backscatter technology to measure the amount of light scattered by particles in the water.

In addition to water turbidity, dissolved oxygen (DO) should also be regularly monitored throughout the dredging operation. DO level in the water must be maintained to a certain level in order to sustain marine/aquatic life in the area. If the DO level gets lower than the threshold level, the organisms in the area may migrate to another area or eventually die. To monitor the amount of dissolved oxygen in the water during the dredging operation, DO sensors will be used. Dissolved oxygen monitoring systems typically use a submerged rapid-pulsing or optical sensor to measure DO. These sensors can continually monitor dissolved oxygen levels, providing instantaneous water quality data. Timely control measures can then be initiated based on operation's impacts on the ecosystem.

7. SUPPLIES AND SPARE PARTS NEEDED

Estimated fuel requirement for the project:

Dredge

$$fuel_{dredge} = Volume\ to\ be\ dredged\ x\ \frac{1}{dredge\ capacity}\ x\ rated\ fuel\ consumption$$

$$fuel_{dredge} = m^3\ x\ \frac{hr}{m^3}\ x\ \frac{L}{hr}$$

Or based on the projected period,

$$fuel_{dredge} = Time_{total}\ x\ rated\ fuel\ consumption$$

Support Vessel

$$fuel_{SV} = rated\ fuel\ consumption\ x\ effective\ hours\ per\ day\ x\ days$$

Maintenance spare parts needed

Spare parts needed to conduct preventive maintenance on the dredge for the whole project duration is determined using the preventive maintenance manual developed by the Bureau of Equipment. The cost of materials and labor is also computed based on the manual.

Discharge pipes and Accessories

The accessories and discharge pipes needed for the project can be determined from Sections 5.3 and 5.4. The length of discharge pipe to be used depends on the distance of the dredging site to the spoil site plus allowance for the easy advance and movement of the dredge.

8. OPERATIONAL COST

I. Salaries of Dredge Personnel
   [Dredge Master II]
   [Dredgeman Foreman]
   [Marine Engineman]
   [Additional Job Order Personnel]

II. Cost of Fuel and Lubricants
III. Maintenance Spare Parts
IV. Mobilization and Demobilization
V. Cost of Temporary Structures (e.g. Bunk House and Storage)
VI. Contingency

9. TIMELINE AND SCHEDULE

This section shows the list of activities to be performed and the schedule for the whole dredging project.

In general, the dredging operation is composed of four stages, as discussed in Section 5, namely:

- Preparatory activities
- Dredging
- Dredged material dewatering and handling
- Demobilization and site restoration

Site preparatory activities include the following:

- Clearing of the staging area
- Construction of temporary structures (e.g. bunk house, storage for spare parts and supplies)
- Delivery of supplies and spare parts
- Construction of containment for the dredge materials
- Construction of temporary docking facility for the dredge
- Launch of the dredge into the project site

Daily dredging operations follow the sequence of activities listed below:

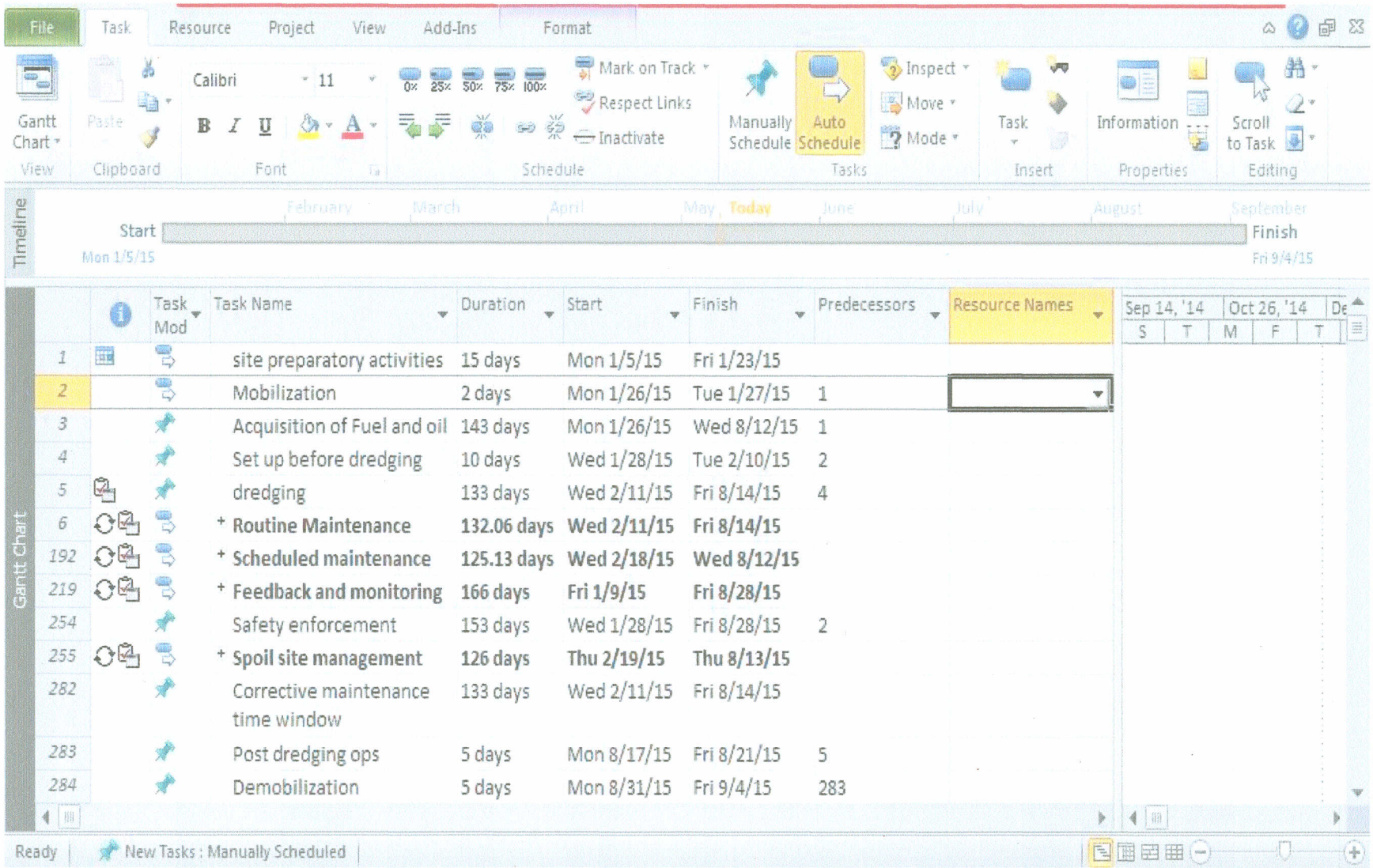
- Review of the activities performed in the preceding day
- Safety briefing, which includes review of the Activity Hazard Analysis
- Walk around inspection of the dredging equipment
- Warming up of the equipment
- Start of the dredging operation

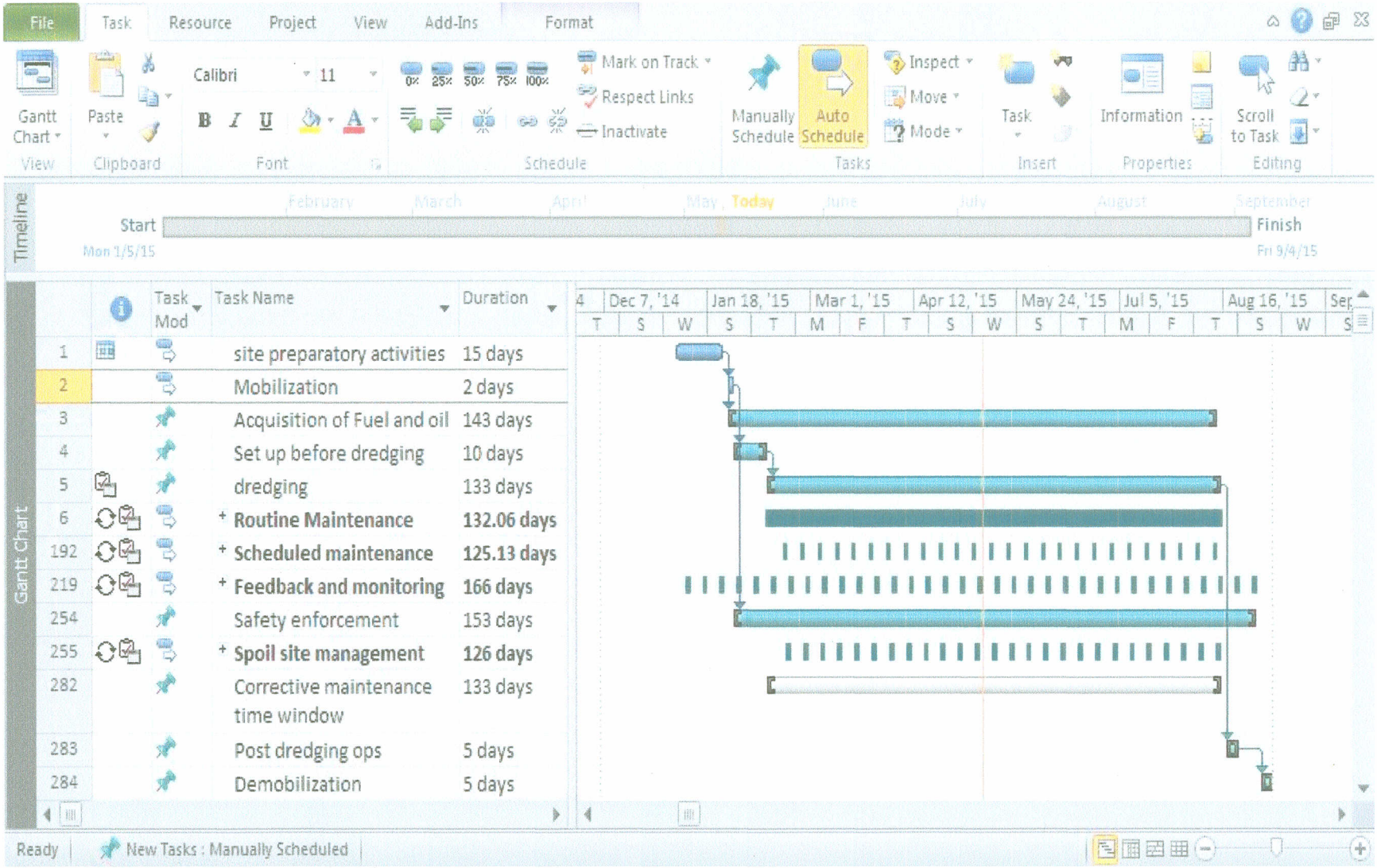
Should any accident/incident occur during the shift, the dredge personnel shall adhere to the policies and guidelines set by the safety manual provided developed by the BOE for dredge and dredge operations. In the event of downtime due to breakdown of equipment (e.g. blocked pipes or pump), the personnel on board shall, by all means available, take the necessary actions to correct the problem and resume operation. At the end of the shift, the Dredge Master will inspect the equipment and make sure that the equipment is clean and in good condition and ready for use in the following day. All activities conducted during the shift must be logged in the dredge logbook and in the proper forms mandated by the BOE.

At the end of the project, it will be turned over to the Regional Office and all equipment will be demobilized. The equipment will be removed from the area and will be transferred to the [Equipment Management Division] or mobilized to its next assignment. Any temporary structures constructed for the operation will be removed upon demobilization. All debris, trashes and garbage brought about by the operation will be cleaned and disturbed areas shall be restored.

A sample Gantt chart is presented in the following page. In scheduling activities for the operation, holidays, allowance for breakdowns and allowance for operation halt due to weather conditions shall be considered.

Sample Gantt chart for a 6-month dredging operation




File
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11
Mark on Track
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Auto Schedule
Inspect
Move
Mode
Task
Information
Scroll to Task
View
Clipboard
Font
Schedule
Tasks
Insert
Properties
Editing
Timeline
Start
Mon 1/5/15
February
March
April
May
Today
June
July
August
September
Finish
Fri 9/4/15
Gantt Chart
Task Mod
Task Name
Duration
1 site preparatory activities 15 days
2 Mobilization 2 days
3 Acquisition of Fuel and oil 143 days
4 Set up before dredging 10 days
5 dredging 133 days
6 Routine Maintenance 132.06 days
192 Scheduled maintenance 125.13 days
219 Feedback and monitoring 166 days
254 Safety enforcement 153 days
255 Spoil site management 126 days
282 Corrective maintenance time window 133 days
283 Post dredging ops 5 days
284 Demobilization 5 days
Dec 7, '14
Jan 18, '15
Mar 1, '15
Apr 12, '15
May 24, '15
Jul 5, '15
Aug 16, '15
Ready
New Tasks : Manually Scheduled

10. DAILY OPERATIONS REPORTING

All activities performed during the shift shall be properly logged in the dredge logbook and in the designated forms from the BOE. Listed below are the forms to be accomplished and the information needed in each form. The accomplished forms will be submitted to BOE every 15th day of the succeeding month.

- Daily Dredging Operations Log – it contains the total advance for the shift, total effective dredging hours, actual fuel consumption, non-effective dredging hours as well as lubricant consumption and preventive maintenance.
- Dredge and Support Vessel Daily Safety and Maintenance Checklist– this inspection is mandated by the On-Board Dredge and Dredge Operations Safety Manual and covers the inspection of equipment and the PPEs.
- Fuel Daily Consumption Report – the actual fuel consumption based on the volume of fuel in the tanks before and after operation must be recorded accordingly in the given form.
- Summary of Fuel Deliveries and Issuances – every delivery of fuel must be logged in the given form. The amount as received must be entered into the form and must be signed by the deliverer and the receiver at the same time.
- Dredge Maintenance Summary and Log – all maintenance activities performed in the dredge must be logged in the maintenance log.
- Monthly dredging output and operational status report – contains the summary of the daily operations as well as the equipment status at the end of the reporting month.

11. PPE NEEDED

The required PPE for dredging operations as specified in Section 9.0 of On-Board Dredge and Dredge Operations Safety Manual issued by this Department under Department Order No 74 S2015 are listed as follows:

- Head Protection
- Eye and Face Protection
- Short or Long Sleeved Shirt (Uniform)
- Safety Shoes
- Hearing Protection
- Hair Protection (as needed)
- Respiratory Protection
- Hand and Arm Protection
- Class III High Visibility Work Vest
- Fall Protection

12. HEALTH AND SAFETY PLAN

The On-Board Dredge and Dredge Operations Safety Manual shall be used as the safety guide in all dredging operations undertaken by the DPWH.

DO No. 136 Series of 2015 provides the procedure and guidelines for the movement and positioning of DPWH dredges and other floating equipment during heavy weather, and shall be strictly observed to prevent loss of lives and property.

Encl. 3

BOE-Mandated Dredging Reports

1. Monthly Dredging Output and Operational Status Report
2. Daily Dredging Operations Log
3. Daily Safety and Maintenance Checklist
4. Dredge Fuel Delivery and Consumption
5. Fuel and Other Supplies Delivery Log

Republic of the Philippines
Department of Public Works and Highways
Regional Office No. ___
EQUIPMENT MANAGEMENT DIVISION

MONTHLY DREDGING OUTPUT AND OPERATIONAL STATUS REPORT

Project: _____ Date Started: _____
Location: _____
Character of Work: _____
Target Volume to be Dredged: _____ Period Covered: _____
Name of Dredge: _____ Date: _____
Dredge Master: _____

MATERIALS CHARACTERISTIC & PERCENTAGE

Hard Pan	_____ %	Clay	_____ %	Sand	_____ %	Stone	_____ %
Shell	_____ %	Silt	_____ %	Rock	_____ %	Others	_____ %
Mud	_____ %	Gravel	_____ %				

Dredging Days

Total dredging days (current period)
Total dredging days (up to date) _____

Dredging Hours

Total dredging hours (current period) _____ hrs
Total dredging hours (previous period) _____ hrs
Total dredging hours (up to date) _____ hrs

Volume Dredged

Total volume dredged (current period) _____ cu.m
Total volume dredged (previous period) _____ cu.m
Total volume dredged (up to date) _____ cu.m

Advance

Total advance (current period) _____ m
Total advance (previous period) _____ m
Total advance (up to date) _____ m

Average Depth

Before Dredging _____ m
After Dredging _____ m

Accomplishment

Actual percentage of accomplishment _____ %

Fuel and Supplies

Dredge

Diesel	_____ L
Gasoline	_____ L
Lube Oil No. 30	_____ L
Lube Oil No. 40	_____ L
Grease	_____ lbs
Gear Oil	_____ L

Support Vessel

Diesel	_____ L
Grease	_____ lbs
Gear Oil	_____ L

Equipment Status at the End of the Reporting Month

		Days
○ A	Operational. No assignment	_____
○ B	Operational. With dredging operation	_____
○ C	Under repair	_____
○ D	Awaiting repair	_____

PREPARED BY:

_____

SUBMITTED BY:

_____

BOE-15426-01-Rev00

Republic of the Philippines
Department of Public Works and Highways
Regional Office No. ___
EQUIPMENT MANAGEMENT DIVISION
DAILY DREDGING OPERATIONS LOG

Name of Dredge:______________________________ Month of ______________________
Name and Location of Project: ____

Note: 1. For the Multi-Purpose Dredges indicate the attachment used
2. For the non-effective working time, oil and lube consumption and fuel delivery summary, please accomplish back page

Date	Dredging hours (hh:mm)	Cut (m)			Volume Dredged (cu.m)	Fuel in Tank (L)		Fuel Consumed Dredge (L)	Fuel Consumed Workboat (L)	Engine RPM (ave)	PM Group Performed	No. of Crew Present	Activities Performed
		Depth	Advance	Width		Before	After						
1													

Date	Dredging hours (hh:mm)	Cut (m)			Volume Dredged (cu.m)	Fuel in Tank (L)		Fuel Consumed Dredge (L)	Fuel Consumed Workboat (L)	Engine RPM (ave)	PM Group Performed	No. of Crew Present	Activities Performed
		Depth	Advance	Width		Before	After						
31													

I hereby certify on my honor that the information herein are valid and verified correct.

Prepared By:

Submitted by:

_____

_____

Dredge Master

Republic of the Philippines
Department of Public Works and Highways
Regional Office No. ___
EQUIPMENT MANAGEMENT DIVISION

DAILY SAFETY AND MAINTENANCE CHECK

Month of _____		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Checkpoints		**Rating**																														
1	Electrical system																															
2	Hull																															
3	Cutter head																															
4	Suction pipe																															
5	Dredge pump																															
6	Discharge pipeline																															
7	Spuds																															
8	Winches																															
9	Cables																															
10	Swing line																															
11	Anchors																															
12	Dredging attachments																															
13	Fuel line																															
14	Fuel meter																															
15	Pressure gauges																															
16	Hour meter																															
17	Ammeter																															
18	Voltmeter																															
19	General deck condition																															
20	General engine room condition																															
21	Personal Protective Equipment																															
22	First-aid kit																															
23	Fire fighting equipment																															
24	Visual distress signals																															
25	Warning devices																															
26	Safety signage																															

Legend

1	***OK – in good condition***	*Component has no signs of wear and satisfactorily serves its intended purpose.*
2	***Operational. with signs of wear***	*Component is functional but with minor signs of wear or deterioration.*
3	***Needs cleaning***	*Too much dirt, grease/ oil build up on the component that may affect the normal functioning of the component and hasten its deterioration.*
4	***Needs adjustment***	*The component is functional but because of prolonged use adjustment is necessary to bring back to its best state*
5	***Critical – Must be repaired***	*The component may still be serviceable but the probability of failure is high due to deterioration, thus repair is necessary to prevent delay in the operation.*
		The component may be unserviceable but can be repaired/ restored and the cost of repair is less than the cost of replacing the component. The component is critical in the operation of the dredge.
6	***Critical – Must be replaced***	*The component is unserviceable and critical to the operation and replacing is more economical and practical than repair.*

Prepared by:

_____

Submitted by:

_____

Republic of the Philippines
Department of Public Works and Highways
Bureau of Equipment

DREDGE FUEL DELIVERY AND CONSUMPTION

for the month of: _____

DREDGE INFORMATION	**FUEL TANK SPECIFICATIONS**		
	for Dredge Pump Engine (DPE)	for Main Generator Engine (MGE)	for Auxillary Engine (AE)
Dredge Name :	Length (m) :	Length (m) :	Length (m) :
Dredge Master :	Width (m) :	Width (m) :	Width (m) :
Area of Operation :	Height (m) :	Height (m) :	Height (m) :
Powered by : ☐ Gas ☐ Diesel	Capacity (liters) :	Capacity (liters) :	Capacity (liters) :

Days	Fuel Delivery (Liters)	Received by: Name & Signature	Before Operation							After Operation							Daily Fuel Consumption (Liters)	Actual Dredging Operation Time (hours)
			Level of Fuel (mm) for:			Fuel Volume (liters)				Level of Fuel (mm) for:			Fuel Volume (Liters)					
			DPE	MGE	AE	DPE	MGE	AE	Total	DPE	MGE	AE	DPE	MGE	AE	Total		
1																		
2																		
3																		
4																		
5																		
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27																		
28																		
29																		
30																		
31																		
TOTAL																		

FORMULAS:

FUEL TANK CAPACITY = (length of tank) x (width of tank) x (height of tank)

FUEL VOLUME = (length of tank) x (width of tank) x (level of fuel inside the tank)

TOTAL FUEL VOLUME = (volume at DPE fuel tank) + (volume at MGE fuel tank) + (volume at AE fuel tank)

DAILY FUEL CONSUMPTION = (total fuel volume after operation) - (total fuel volume before operation)

CONVERSIONS:

1 meter (m) = 100 centimeters = 1,000 millimeters (mm)

1 meter^3 (m^3) = 1,000 Liter (L)

Prepared by :

_____

Signature over Printed Name

_____

Designation

Republic of the Philippines
Department of Public Works and Highways
Regional Office No. ____
EQUIPMENT MANAGEMENT DIVISION

DIESEL DELIVERY LOG

Date	Time	Amount Delivered (L)	Balance from previous delivery	Total Stock available (L)	Received By: (signature over printed name)	Received From: (signature over printed name)

GASOLINE DELIVERY LOG

Date	Time	Amount Delivered (L)	Balance from previous delivery	Total Stock available (L)	Received By: (signature over printed name)	Received From: (signature over printed name)

OIL and OTHER SUPPLIES DELIVERY LOG

Date	Supplies	Amount Delivered	Total Stock available	Received By: (signature over printed name)	Received From: (signature over printed name)

Prepared by:

Submitted by: