Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
ZAMBOANGA DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
REGIONAL OFFICE IX
Sta. Isabel, Dipolog City

TERMS OF REFERENCE FOR THE CONSULTANCY SERVICES FOR THE GEOTECHNICAL EXPLORATION OF THE PROPOSED FY 2025 BRIDGE PROJECTS

I. INTRODUCTION

A. PROJECT BACKGROUND

The Government of the Philippines (GOP), through the Department of Public Works and Highways (DPWH), Regional Office IX, Zamboanga del Norte 2nd District Engineering Office has prepared these guidelines to assist the consultancy services in the planning, cost estimating and reporting of geotechnical survey and investigation of four (4) Bridges site, for FY2025 projects. The specific project will require the services of the Consultant that will conduct detailed geotechnical investigation of bridge sites identified by the DPWH.

B. OBJECTIVES

The main objective of the consultancy is to have a comprehensive geotechnical report of the listed projects. The output of this study/investigation will serve as a basis for the preparation of detailed engineering design.

C. PROJECT SCOPE

The proposed projects subject for subsurface exploration work are listed in the table below.

Project Name	Depth of each Borehole (m)	No. of Boreholes		
		Abutment	Pier	Total
1. Manukan Bridge (B00439MN) – Widening of Bridge, Manukan, Z.N.	30 meters	2	0	2
2. Pasanan Bridge (B00450MN) – Widening of Bridge, Sindangan, Z.N.	30 meters	2	0	2
3. Piangon Bridge (B00442MN) – Widening of Bridge, Manukan, Z.N.	30 meters	2	0	2
4. Piao Bridge (B00429MN) – Replacement of Bridge, Roxas, Z.N.	30 meters	2	1	3

II. SCOPE OF SERVICES

A. GENERAL

The scope of consulting services shall involve the conduct of the subsoil investigation and preparation of the Geotechnical Report and is the subject of this TOR.

The Consultant's scope of work shall cover but not necessarily be limited to the items listed hereunder.

The Consultant shall (a) perform field reconnaissance of the study area with regard to existing situation of the project site and relevant site situation under study, (b) coordinate with the DPWH Zamboanga 2nd District Engineering Office – Planning and Design Section (PDS) through the Chief during the conduct of geotechnical and surveys and investigations at the sites, (c) identify areas with geological problems and difficulties, and water bearing stratum causing subsurface discharge, which could affect the stability of the structures, and (d) based on the result of item (a), (b) and (c), provided detailed report of the field activity and recommend technical solutions with appropriate technical justifications, taking into considerations the proposed structure on the site.

The Consulting Service shall be performed in accordance with accepted professional standards utilizing sound engineering evaluation practices and environmental and social requirements. The Consultant shall adopt the guidelines stated in the Design Guidelines, Criteria and Standards manual being used by DPWH. The Consultant's scope of work shall cover, but not necessarily limited to, items listed in the subsequent paragraphs.

B. SERVICES

1. Geotechnical Investigations, consisting of, but not limited to the following:

    a. Auger borehole/test pit/borehole location plan and soil profile relative to the proposed project including reference information such as station, coordinates, reference elevation of hole, MSL, etc.
    b. Discussion on results of Geotechnical Investigation and Laboratory Testing
    c. Duly signed results of the test conducted
    d. Summary of Results from Field and Laboratory Tests
    e. Evaluation of results
    f. Recommendation (foundation type and required geotechnical parameters for design)
    g. Analysis for Liquefaction Potential during earthquake and consolidation due to soft ground
    h. Geotechnical report duly signed by the geotechnical engineer
    i. Geotagged field photographs and sample photographs (related to geologic/ geotechnical investigation such as project location, boring operation/ sampling, samples in core boxes, etc.)
    j. Others (i.e. soil improvement, presence of boulders and other obstructions, etc.)

2. Boring Logs

    a. Borehole number with coordinates
    b. Project name, address of project, client name/implementing office
    c. Date of start and completion of boring
    d. Station, coordinates and elevation of borehole
    e. Type of drilling equipment and casing information
    f. Thickness of soil layer

g. Standard penetration test (SPT)
h. Sampling and coring information
i. Description of materials penetrated (i.e. color, shape, etc.)
j. Classification of soil in accordance with AASHTO M145 and USCS
k. Sample recovery and RQD for rock strata
l. Indicated depth to groundwater or seepage zones
m. Elevation of the top and bottom of the hole and the top of rock formation in meters above sea level
n. Special Remarks (i.e Color of wash water, loss of wash returned to the surface corresponding to its depth).

3. Laboratory Soil Test

a. Mechanical Sieve Analysis
b. Hydrometer Test
c. Natural Moisture Content (NMC)
d. Atterberg Limits
e. Specific Gravity
f. Consolidation Test (for soft soils)
g. Direct Shear Test (DST) or Triaxial Compression Test
h. Dry unit weight
i. Soil Strength Test
j. California Bearing Ratio Test

4. Geotechnical Plan

a. North arrow
b. Name of project/location
c. Borehole location plan
d. Borehole designation
e. Borehole Coordinates
f. Borehole log reflected according to ground elevation
g. Type of recommended foundation drawn adjacent to boring logs with SPT graph
h. Idealized Soil Profile Plan
i. Ground water elevation
j. Ground Improvement Techniques
k. Name of waterway and direction of flow
l. Geological/geotechnical waiver duly signed
m. Appropriate signatories in the title block

GEOTECHNICAL REQUIREMENTS FOR DESIGN		
Type of Project	**Spacing**	**Depth**
Bridge Projects	For piers or abutments over 30m wide, provide a minimum of two borings. For piers or abutments less than 30m wide, provide a minimum of one boring per pier or abutment	30.0m minimum in ordinary soil unless rock is encountered at a shallower depth and boring should reach 3m into bedrock.

Disturbed and undisturbed soil and rock samples obtained shall be subjected to physical and mechanical tests and soil mechanics analysis to include shear strength tests for slope stability analysis. Geotechnical investigation maybe carried using

inclinometers and piezometers, if necessary, at rock formations and mountainous sections and at areas where ground movement and/or settlement and subsidence, have been observed.

All geological and geotechnical investigation results and reports shall be subject for review and evaluation for conformity with the DPWH Design Guidelines, Criteria and Standards.

III. IMPLEMENTATION

A. STAFFING

1. Preparation and Submission of Reports

1.1. Draft of Final Report

The Consultant is required to submit a draft of the final report consisting all of the data, results and discussion. Submitted draft of the report will be evaluated by Planning and Design Section Personnels for its completeness before requiring the Consultant to submit final report and electronic copy.

1.2. Final Report

The consultant shall prepare the final report in 1 original bound copy, 2 bound machine copies and an editable electronic and scanned copy (all colored and with signatures) stored in USB flashdrive after the evaluation of the draft of final report done by PDS Personnel. The final report shall include, but not be limited to the following:

i. Field Investigation and Methodology
ii. Borehole Drilling and Sampling
iii. Laboratory Testing
iv. Regional Geology
v. Vicinity Maps in scale of 1:50,000
vi. Final Boring Logs (BL), see below
vii. Final Laboratory Test Results (FLTR), see below
viii. Borehole Location Plan in scale of 1:250
ix. Soil Profile along structures showing boring/drillings logs
x. Recommendations if called for, such as type of proposed countermeasures/structures to address geological/geotechnical problems and foundation type.
xi. Other relevant data, i.e. Geotagged photographs, sample photographs, etc.

1.3. Other data to be submitted:

1.3.1. Final Boring Logs (BL)

i. Project name, Address of Project, Client Name/Implementing Office
ii. Date of start and completion of Boring

iii. Elevation of the Top and Bottom of the Hole and Top of Rock Formation, if encountered
iv. Coordinates of the Hole
v. Job, Boring hole number, date, time, boring/drilling Foreman and supervisor
vi. Weather condition
vii. Depth of water level
viii. Method of penetration and flushing system
ix. Description of soil strata encountered
x. Size, type and depth of samples and sample number
xi. Type and depth of in situ test
xii. Standard Penetration Tests Resistance, "N" values
xiii. Detailed notes on boring/drilling procedure, casing sizes and resistance to driving, description of wash water or spoil from boring/drilling tools
xiv. Depth of Boring
xv. Other relevant information such as RQD, percent core recovery, etc.

1.3.2. Geotagged Photographs

Photographs showing the borehole drilling and sampling at each proposed site shall be taken by the Consultant and form part of the report. The photographs to be taken shall depict the following:

i. Equipment used
ii. Core drilling operations
iii. Water level measurements
iv. Performance of SPT sampling
v. All core and SPT samples placed in core boxes with depth
vi. Markings
vii. Date photographs were taken
viii. Location and/or station
ix. Coordinates

1.3.3. Laboratory Test Results

i. Mechanical Sieve Analysis
ii. Hydrometer Test
iii. Natural Moisture Content (NMC)
iv. Atterberg Limits
v. Specific Gravity
vi. Consolidation Test (for soft soils)
vii. Direct Shear Test (DST) or Triaxial Compression Test
viii. Dry unit weight
ix. Soil Strength Test
x. California Bearing Ratio Test

1.3.4. Geotechnical Plan

xi. North arrow
xii. Name of project/location
xiii. Borehole location plan
xiv. Borehole designation
xv. Borehole Coordinates
xvi. Borehole log reflected according to ground elevation
xvii. Type of recommended foundation drawn adjacent to boring logs with SPT graph
xviii. Idealized Soil Profile Plan
xix. Ground water elevation
xx. Ground Improvement Techniques
xxi. Name of waterway and direction of flow
xxii. Geological/geotechnical waiver duly signed
xxiii. Appropriate signatories in the title block

B. SUB-CONTRACTING

Subcontracting is not allowed.

C. DURATION OF CONSULTANCY SERVICES

The Consultant's contract period for undertaking the Geotechnical Survey shall not be more than 19 calendar days and the Consultant shall commence work within seven (7) days after receipt of Notice to Proceed (NTP).

D. SCHEDULES

Activities	Duration (days)
Drilling	
Testing of Sample (Laboratory)	
Preparation of Reports	

E. KEY EXPERTS' QUALIFICATION AND REQUIREMENTS

The Consultants shall be composed of qualified staff with experience in the conduct of geological and geotechnical investigation.

Designation	Minimum Years of Experience	Qualification Requirements
1. Team Leader (Sr. Geotechnical Engineer - CE)	10	Must be a Licensed Civil Engineer with an advanced degree in the field of Geotechnical Engineering. Must have at least ten (10) years of experience in carrying out geotechnical investigations and surveys. Must be familiar with the interpretations of the laboratory results and appropriate solutions/ interventions.
2. Sr. Soils/ Materials Engineer	5	Must be a Licensed Civil Engineer with an advanced degree in the field of Geotechnical Engineering. Must have at least five (5) years of experience in carrying out geotechnical investigations and surveys. Must be familiar with the interpretations of the laboratory results and appropriate solutions/ interventions.

F. ASSISTANCE TO BE PROVIDED BY THE CLIENT

In connection with the task of the Consultant that require input and assistance from other government agencies as well as local NGO's, members of the Congress and Officials of the regional/provincial branches government agencies, the DPWH shall ensure that the Consultant has access to all relevant information necessary to the performance of the above services. The consultant is expected to provide office space and equipment and all other resources necessary for completing the services.

IV. OWNERSHIP OF THE OUTPUT / REPORTS / DOCUMENTS

All submitted outputs/reports/documents under this contract, including but not limited to, digital information, computer model and data, specifications, investigations and studies completed or partially completed, inspection logs, and photographs, shall be the property of the Department of Public Works and Highways (DPWH).

Further, the use of these data for other purposes not specified in this TOR shall require written consent from the Implementing Office. Copyrights will be governed by existing laws, rules, and regulations.

Submitted by:

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Approved:

CHARITY D. RELLOSA
BAC Chairperson