

Section VI.
Schedule of Requirements

Schedule of Requirements

| NOMENCLATURE | AGENCY COMPLETION SCHEDULE | BIDDER'S COMPLIANCE |
|--|---|--------------------------------|
| 1. Final Plan and Design of NDCP International Student Dormitory with amenities & Multi-Level Parking and NDCP Staff/Transient Quarters with amenities | Within fifteen (15) calendar days after the issuance and receipt of Notice to Proceed (NTP) | |
| 2. Construction of NDCP International Student Dormitory with amenities & Multi-Level Parking and NDCP Staff/Transient Quarters with amenities | Three Hundred Thirty (330) calendar days from the approval of the Final Plan and Design | |

I hereby certify to comply with the above requirement.

Name of Compny/Bidder

Signature Over Printed Name of
Authorized Representative

Date

- A Statement of comply or equivalent term will suffice on the work completion the bidder is participating on.

Section VII.
Terms of Reference
**NDCP International Student
Dormitory with Amenities & Multi-
Level Parking**

Terms of Reference

NDCP International Student Dormitory with Amenities & Multi-level Parking Building

1. BACKGROUND

- 1.1 In recognition of the importance of the National Defense College of the Philippines' role and its attribution to defense and security, there is a need to strengthen NDCP's capability to attain its mandate of preparing future defense and security leaders for high positions of responsibility and command, and undertake research and special studies as basis for the formulation of policies to enhance national defense and security.
- 1.2 Pursuant to Acquisition Decision (ADM) Nr. 2018-011, the Office of the Secretary of National Defense has permitted the National Defense College of the Philippines to initiate the implementation of the procurement for the NDCP International Student Dormitory with Amenities and Multi-Level Parking Building within the compound of the NDCP, which covers building structures, amenities, and other details.
- 1.3 The 4-storey NDCP International Student Dormitory and Multi-Level Parking Building is part of the whole scheme to enhance the NDCP's capability to provide accommodation to NDCP foreign students and family and parking space for students, in congruence with the expansion of NDCP into the National Defense University of the Philippines System (NDUPS).

2. OBJECTIVES

The general objectives of the **PROJECT** are:

- 2.1 To design and construct the NDCP International Student Dormitory with Amenities and Multi-Level Parking Building that:
 - (a) Has a timely, socio-culture Architectural design and Structural integrity. Fellowship, harmony and peaceful coexistence among various nationalities are the inspiration behind the building concept that is aim to accommodate the NDCP foreign students and parking space for occupants.
 - (b) Is capable of accommodating an approximate thirty two (32) foreign students and maximum of forty eight (48) parking space for students and staff quarters occupants.
- 2.2 To design and construct the NDCP International Student Dormitory with Amenities and Multi-Level Parking Building that is

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satisfactory to the National Building Code of the Philippines (NBCP), National Structural Code of the Philippines (NSCP 2010), and American Standards for Construction Engineer (ASCE).

- 2.3 To design and construct the NDCP International Student Dormitory with Multi-Level Parking Facility capable to adapt to the dynamics of the environment.

3. PLANNING PARAMETERS

- 3.1 The "Project" will be designed for and constructed at the National Defense College of the Philippines, Camp Gen. Emilio Aguinaldo, Quezon City with an approximate dormitory floor area of 1,828 sqm and parking area of 1,680 square meters with a re-inforced concrete roofdeck. The building must be functional and with complete amenities.
- 3.2 The "Project" shall compose of the following:
 - a. Building Structure
 - b. Furniture, Fixtures and Equipment

4. PROPOSAL STRUCTURE AND EVALUATION

- 4.1 The procurement of services of the Private Construction Firm and the implementation of "The Project", including its processes, requirements for eligibility, bid proposal structure and evaluation by the Bids and Awards Committee of the Department of National Defense (DND) shall be governed by the Implementing Rules and Regulations of RA 9184 or the Government Procurement Reform Act and other existing laws.
- 4.2 Eligible bidders must satisfy the requirements of the Philippine Contractors Accreditation Board (PCAB) with Size Range of at least **Large A** and License Category of **"AA"** in General Building Classification.
- 4.3 Eligible bidders should be a design-construction oriented affiliated group of professionals, who can successfully prepare "The Project". They should have experience and capability in the type of services, and the field under consideration, specifically on the Design and Build of NDCP International Student Dormitory and Multi-Level Parking Facility.
- 4.4 Completed projects of prospective bidders will clearly demonstrate the designer's abilities. The projects experiences need not necessarily be performed for the military; comparable civilian projects to include institutional campuses, new communities,

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- housing and commercial complexes and industrial parks. In evaluating this experience, the design excellence of the completed projects is of critical importance. Site visits to representative projects by the selection board is desirable to best evaluate the skill of the design and construction professionals. Minimally, site plans and photographs of completed projects will be carefully reviewed. The CF must have undertaken similar contract with a minimum value not less than Fifty Per Centum (50%) of the Approved Budget Cost (ABC);
- 4.5 The selection criteria to be used in the procurement of the Construction Firm shall be **Quality Based Evaluation (QBE)**, in accordance to the Revised IRR of RA 9184.
- 4.6 Eligible bidders shall submit their bids through their authorized managing officer or their duly authorized representative (i) in the prescribed Bid Form, including its annexes, as specified in the bidding documents, (ii) in two (2) separate sealed bid envelopes, the first containing the technical component of the bid, and the second containing the financial component of the bid, with the name of the contract to be bid and the name of the bidder in capital letters, addressed to the BAC of the agency concerned. The bidder shall mark the two envelopes: "Do not open before (date and time of opening of bids)." Both envelopes shall then be sealed in an outer envelope which shall be addressed to the BAC and shall be marked as specified in the Instructions to Bidders.
- 4.7 **THE TECHNICAL PROPOSAL** - The first envelope, containing the Technical Proposal, shall be comprised of all the required documents for infrastructure projects under Section 25.2 (b) of the Revised IRR of RA 9184 and the following additional documents:
- (a) Schematic documents
- (i) The schematic documents shall be a take-off from the proposed conceptual design prepared by the CF in consultation and coordination with the NDCP. These documents shall be scaled presentation drawings comprising the perspectives, site development plan, floor plans, elevations, and layouts/diagrams of allied disciplines and other necessary drawings to illustrate the size and character of the project. They shall be submitted on A3 paper using appropriate scale.
- (ii) The schematic documents shall also include an outline of specifications, illustrating the size and character of the project, and showing the kinds of materials intended to be used, the structural concept and type,

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the types of mechanical, electrical, electronics and communications, sanitary and other utility systems and equipment to be installed, including other items of work that are indicated in this Terms of Reference. They shall be submitted, printed and ring-bound on A4-sized sheets.

(b) Design and Construction Methods

- (i) Emphasis shall be made on the construction methods that best benefit the cost and compressed duration of the project. Steel Framing System construction, prefabricated and/or modular systems, with a proven track record and history of past projects, shall be the preference for evaluation.
- (ii) The CF shall carry out all works necessary to attain the objectives stated above and is expected to conduct participatory consultation process with the PMT of "The Project".
- (iii) Specific Planning Parameters - To bring the vision into realization. Several issues needed to be addressed to make "The Project" responsive, cost effective and compliant to present surroundings and to the environment.

(c) List of Design and Construction Personnel, to be assigned to the contract to be bid, with their complete qualifications and experience.

- (i) FOR DESIGN PERSONNEL - The key personnel and the respective qualifications of the DESIGN PERSONNEL shall be as follows:
 - (i.1) DESIGN ARCHITECT- The Design Architect must be duly-licensed with at least five (5) years experience in the design of dormitories or institutional facilities, and shall preferably be knowledgeable in the application of rapid construction technologies;
 - (i.2) STRUCTURAL ENGINEER - The Structural Engineer must be a duly-licensed Civil Engineer with at least five (5) years experience in structural design and shall preferably be knowledgeable in the application of rapid construction technologies;

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- (i.3) ELECTRICAL ENGINEER - The Electrical Engineer must be a registered Professional Electrical Engineer with at least five (5) years experience in the design of lighting, power distribution, and preferably knowledgeable in developments in emergent efficient lighting technologies and energy management;
- (i.4) ELECTRONICS & COMMUNICATIONS ENGINEER - The Electronics & Communications Engineer must be registered Professional Electronics & Communications Engineer with at least five (5) years experience in communication systems (specifically structured and local area network cabling, PABX, cable tv), building management systems
- (i.5) MECHANICAL ENGINEER - The Mechanical Engineer must be a Professional Mechanical Engineer with at least five (5) years experience in Heating Ventilation and Air Conditioning (HVAC) System and Fire Protection Systems and preferably knowledgeable in emergent, alternative energy-efficient HVAC technologies;
- (i.6) SANITARY ENGINEER - The Sanitary Engineer must be duly-licensed with at least five (5) years experience in the design of building water supply and distribution, plumbing, and preferably knowledgeable in waste water management/treatment, and emergent, alternative effluent collection and treatment systems;
- (i.7) GEOTECHNICAL ENGINEER - The Geotechnical Engineer must be a registered Civil Engineer/Geologist with at least five (5) years experience in geotechnical evaluation, preferably with a degree in Geotechnical Engineering;
- (i.8) LANDSCAPE ARCHITECT - The Landscape Architect must be duly-licensed with at least five (5) years experience in landscape design and preferably knowledgeable in the application of concepts, standards and innovations in landscaping that require minimal maintenance costs and procedures for the PROJECT; and

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- (i.9) The key personnel listed are required. The CF may, as needed and at its own expense, add additional professionals and/or support personnel for the optimal performance of all Architectural and Engineering Design Services, as stipulated in this Terms of Reference, for “The Project”. Prospective bidders shall attach each individual’s resume and Professional Regulatory Commission (PRC) license of the (professional) staff.
- (ii) FOR CONSTRUCTION PERSONNEL - The key personnel and the respective qualifications of the construction shall be as follows:
 - (ii.1) PROJECT MANAGER - The Project Manager shall be a licensed architect or engineer with at least (10) years relevant experience on similar and comparable projects in different locations. The Project Manager should have a proven record of managerial capability in directing and managing of major engineering works, including projects of a similar magnitude;
 - (ii.2) PROJECT ENGINEER/ARCHITECT - The Project Engineer/Architect shall be a licensed architect or engineer with at least five (5) years experience in similar and comparable projects and shall preferably be knowledgeable in the application of rapid construction technologies;
 - (ii.3) MATERIALS ENGINEER - The Materials Engineer must be duly accredited with at least five (5) years experience in similar and comparable projects and shall preferably be knowledgeable in the application of rapid construction technologies;
 - (ii.4) ELECTRICAL ENGINEER - The Electrical Engineer must be duly-licensed with at least five (5) years experience in similar and comparable projects in the installation of lighting, power distribution;
 - (ii.5) ELECTRONICS & COMMUNICATIONS ENGINEER-The Electronics & Communications Engineer must be duly-licensed with at least five (5) years experience in communication systems (specifically structured and local area

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- network cabling, PABX), building management systems;
- (ii.6) MECHANICAL ENGINEER - The Mechanical Engineer must be duly-licensed with at least five (5) years experience in similar and comparable projects in the installation of HVAC and fire protection;
 - (ii.7) SANITARY ENGINEER - The Sanitary Engineer must be duly-licensed with at least five (5) years experience in similar and comparable projects in the installation of building water supply and distribution and plumbing;
 - (ii.8) CERTIFIED OCCUPATIONAL SAFETY AND HEALTH OFFICER – The Occupational Safety and Health Officer must be certified with at least three (3) years experience in the field of safety, health and welfare of people at work, in adherence to standard health and safety policies, procedures, rules and regulations.
 - (ii.9) FOREMAN - The Foreman must have at least five (5) years experience in similar and comparable projects and shall preferably be knowledgeable in the application of rapid construction technologies; and,
 - (ii.10) The key personnel listed are required. The CF may, as needed and at its own expense, add additional professionals and/or support personnel for the optimal performance of all Construction Services, as stipulated in these Terms of Reference, for the PROJECT. Prospective bidders shall attach each individual's resume and PRC license of the (professional) staff.
- (d) Value engineering analysis of design and construction method - Prospective bidders shall prepare a value engineering analysis report of their proposed design and construction method to be applied for the PROJECT. Importance shall be made on the following criteria:
- (i) Cost-saving (can be measured by a per square meter average figure) than conventional construction methods; and,

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- (ii) Time-saving in design and construction duration (can be measured by an initial proposed PERT-CPM of “The Project” due to the expertise and past experiences with the proposed method.

- 4.8 THE FINANCIAL PROPOSAL - The second envelope, containing the Financial Proposal, shall be comprised of all the required documents for infrastructure projects under Section 25.2 (b) of the Revised IRR of RA 9184, enumerated as follows:
 - (a) Lump sum bid prices which shall include the detailed engineering cost in the Bill of Quantities in the prescribed Bid Form, not to exceed **PhP85,000,000.00**;

 - (b) Detailed estimates including a summary sheet indicating the unit prices of construction materials, labor rates, testing and equipment rentals in coming up with the bid; and,

 - (c) Cash flow by monthly and payments schedule.
 - (i) The payment shall be phased following Section 16 hereof and in accordance to the guidelines as stated in RA 9184 and its Revised IRR. This shall be phased in the following manner:
 - (i.1) Mobilization Fee: (15% of the Contract Amount less taxes) to be recouped on partial billings;
 - (i.2) Upon submission of the Completed and Approved Design with complete drawing details cost estimate; and,
 - (i.3) Succeeding payments shall be made to the CF through progress billing.

4.9 CRITERIA FOR DESIGN AND BUILD RATING PROCEDURE (**Annex A**).

5. SCOPE OF WORK (WINNING CONSTRUCTION FIRM)

The work consist of the preparation of the design and furnishing plans, equipment, labor, materials, supply of all amenities and performing all operations necessary in the completion of the Construction of the NDCP International Student Dormitory with multi-level parking (DESIGN and BUILD) strictly in accordance with the approved plans, schedules and specifications.

5.1 DESIGN

In consultation and coordination with the Procuring Entity, CF shall provide the conceptual design of the NDCP International

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Student Dormitory with Multi-Level Parking Building, in terms of architectural schematic plans, elevations and sections, as well as a conceptual site development plan in compliance with the conceptual design and of this Bidding Documents:

- (a) The Contractor shall prepare the Final Plan and Design of “The Project” in consultation and coordination with NDCP in relation to the undertaking of its responsibilities. The consultation process should include but not less than two (2) stakeholder consultation activities to be conducted at NDCP prior to the approval of the President, NDCP.
- (b) The Contractor shall prepare from the approved schematic design documents, the complete construction drawings and detailed technical specifications, cost estimates and the bill of quantities, setting forth in detail the work required for the architectural, structural, civil, landscape architecture, electrical, plumbing/sanitary, mechanical and other service-connected equipment, utilities, site planning aspects and related works, electronic and communications and the site development plan of “The Project’s” immediate environs. Only the plans approved by the Procuring Entity shall be signed and sealed by the Contractor and thereafter shall be approved construction documents to form part of the Contract Documents to be used for the construction.
- (c) The Contractor shall conduct Soil Testing at the Project Site as basis for the structural design of the NDCP International Student Dormitory with Multi-Level Parking.
- (d) Prepare layouts, specifications and estimates of all furniture and equipment required for the fill-out of the buildings, specifically items that are owner furnished materials.
- (e) Prepare site surveys, topographical surveys, surveys of existing trees, soil boring tests, geotechnical reports and other needed requirements prior to production of construction drawings.
- (f) Prepare the scope of work for construction based on the prepared bill of quantities and cost estimates that are within the approved budget.
- (g) Provide value engineering analysis on all prepared construction documents.
- (h) Coordinate with all offices and agencies concerned, within and outside NDCP regarding utility connections, national and local permits/clearances and other need requirements at no cost to NDCP.

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- (i) All drawings included in the contract documents should be drawn using CAD software and plotted on 20" x 30" sheets. All other textuals submittals shall be printed and ring-bound on A4-sized sheets with electronic copy.
- (j) Design components must conform and coordinated with the agencies concerned (e.g. coordinate with Power Utility Company for power lines and Water Utility Company for water and sewage lines).

5.2 CONSTRUCTION

The Contractor shall implement the construction of "The Project" as described in the Scope of the Services and Works as per approved Plan and Design of the Procuring Entity.

PRE-CONSTRUCTION PHASE

- (i) The Contractor shall secure all necessary building permits, documents and clearances required by law prior to construction. All incidental fees shall be included in the cost estimate of the building.
- (ii) Submit and brief the PERT-CPM of the construction phase to the PMT.

5.3 CONSTRUCTION PHASE

- (a) Implement all works indicated in the approved construction drawings and documents. All revisions and deviation from the approved plans, especially if it shall impact the overall cost of the project, shall be subject for approval, of the Procuring Entity.
- (b) Provide soil filling, grading and other soil protection measures of the building and other elements of the site, in response to the results of soil testing and materials testing.
- (c) Construct sidewalks and curb cutouts, paving, driveways, rotundas, parking slots, landscaping, walkways and other site treatments within the project site.
- (d) Provide protection or relocation of existing trees indigenous to the area, and proper removal and replacement of all trees and vegetation affected by the construction.
- (e) Layout piping, conduits, manholes, boxes and other lines for utilities including tapping to existing utility lines. Facilitate the connection of all utilities (power, water, sewer,

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structured cabling and telephone) with their corresponding utility companies. All application fees shall be included in the project cost.

- (f) Submission of required shop-drawings.
- (g) Coordinate with NDCP regarding scheduling of delivery and installation of all furniture and equipment.
- (h) Conduct all necessary structural tests from accredited Material Testing Companies and submit reports of results.
- (i) Rectification of punch-listing works to be inspected by the NDCP.
- (j) Provide all other necessary documents that shall be required by the NDCP.

5.4 POST CONSTRUCTION PHASE

- (a) Preparation of as-built plans.
- (b) Turn-over of all manuals, certificates and warranties of installed items.
- (c) Testing and Commissioning.
- (d) Provide all other necessary documents that shall be required by NDCP.
- (e) General Clearing and Cleaning Works.

6. DESIGN REQUISITES – The prospective Contractor is also enjoined to:

- 6.1 Have verified the topographic survey and other site investigation procedures.
- 6.2 Have studied the layout and site development plans of existing buildings to align the development of the proposed building and its site within its environs.
- 6.3 Identify the architectural features and academic character of the surrounding structures.
- 6.4 Identify the location of critical areas and portions of utility systems within and around existing buildings, including the outflow direction of sanitary lines, septic tanks, building water meter and water supply lines, power supply service entrances, cisterns and other utility lines
- 6.5 Have studied the flow of people, vehicles and activity within and proximate to the project site to allow for the provision of sidewalks, lighting systems, directional signs and traffic signs, to effectively design an efficient vehicular and pedestrian circulation route.
- 6.6 Identify the presence of vegetation that may be disturbed in the development of the site and the proposed building.

7. DESIGN CRITERIA

7.1 BASIS OF DESIGN – ARCHITECTURAL

- (a) The Architectural Design Concept for the proposed NDCP International Student Dormitory with Multi-level Parking presents the concept design development, and design criteria to meet the project goals and objectives. The following criteria shall set the minimum requirements of the project. The Contractor may exceed the requirements specified to suit the proposed schematic design. Any drawings presented subsequently are recommendatory and may further be modified to suit the CF'S construction method.

- (b) DESIGN REFERENCES - The design of the NDCP International Student Dormitory and Multi-Level Parking shall comply with the requirements of locally and internationally accepted standards and best practices enumerated below. In case of discrepancy on the requirements and regulations, the one that gives the safest design shall prevail, unless otherwise mandated by the authority.
 - (i) National Building Code of the Philippines
 - (ii) Fire Code of the Philippines
 - (iii) NFPA 101 Life Safety Code Handbook latest edition
 - (iv) International Plumbing Code
 - (v) Time Saver Standards
 - (vi) Information provided by user
 - (vii) Field investigation

7.2 DESIGN PHILOSOPHY

- (a) The design philosophy of the proposed NDCP International Student Dormitory with Multi-Level Parking Building is anchored on the principle of creating a relaxing, socializing and conducive environment that includes amenities of

modern family living. Fellowship, harmony and peaceful coexistence among various nationalities are the inspirations behind the building concept that is aim to accommodate the growing needs especially of foreign students who will undertake the one-year residence schooling at NDCP. Each foreign student is assigned a single accommodation enough to comfortably fit a minimum family member of two.

- (b) The building design employs green architecture, with an atrium in the middle of the dormitory, which maximizes the use of glass windows, thus employing the use of natural lighting and contributes to the reduction of energy consumption. The structure as a whole exudes lightness and transparency, and suggests a home away from home, where both the body and mind of the students are simultaneously nurtured by the living and recreational facilities inside the dormitory. Thus, the NDCP International Student Dormitory will be the center-piece structure in providing the beehives of learning and socializing activities, especially during weekends. A warm and sociable environment in the dormitory ensures that personnel interact among themselves freely, learn to extend mutual support when required, and develop close friendly relations. Life in the dormitory is the bedrock of the NDCP student academic success.
- (c) The Multi-Level Parking building design must incorporate an efficient functional layout that best utilizes structural systems to reduce costs while providing a pleasant patron experience. Some of the most important design considerations include: internal functional layout, parking space dimensions and number of spaces, entrance/Exit locations, Isometric, operational equipment, and floor slopes. It is critically important to incorporate the highest security features into every aspect of parking planning and design.
- (d) The building design must also be compliant with Batas Pambansa 344 (BP 344) otherwise known as “The Law to Enhance the Mobility of Disabled Persons” and its Implementing Rules and Regulations (IRR).
- (e) Provision for Solar Panels.

7.3 BUILDING DESIGN

- (a) The NDCP International Student Dormitory with Multi-Level Parking Building is a four-storey building with a

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dormitory floor area of approximately 1,828 sqm and parking area of 1,680 square meters building that houses sixteen (16) units at the ground, second, third and fourth floors. The Multi-level Parking can accommodate a maximum twelve (12) parking spaces per floor for a total of 48 parking spaces. All building must be designed with a R.C. roofdeck.

- (b) The rooms are equipped with wireless internet connection for electronic communication and research. The four-storey dormitory is designed to house sixteen (16) units per floor, it is envisioned to be a high-performance, integrated dormitory building. Each unit has a western-styled toilets and bathrooms with hot water facilities.

(c) **AREA REQUIREMENT**

| Particular | Unit | I/Area |
|---|-------------|------------------|
| <i>International Student Dormitory</i> | | |
| <i>Ground Floor</i> | | |
| Hallway | sqm. | 123.5 |
| Officer's Room | sqm. | 168 |
| Comfort Rooms (T& B) | sqm. | 45 |
| Living Room/Kitchen | sqm. | 45 +15.5 |
| Main Lobby | sqm. | 60 |
| <i>Second Floor</i> | | |
| Hallway | | 123.5 |
| Officer's Room | sqm | 168 |
| Comfort Rooms (T& B) | sqm | 45 |
| Living Room/Kitchen | | 45 +15.5 |
| Main Lobby | sqm | 60 |
| <i>Third Floor</i> | | |
| Hallway | sqm. | 123.5 |
| Officer's Room | sqm. | 168 |
| Comfort Rooms (T& B) | sqm. | 45 |
| Living Room/Kitchen | sqm. | 45 +15.5 |
| Main Lobby | | 60 |
| <i>Fourth Floor</i> | | |
| Hallway | sqm. | 123.5 |
| Officer's Room | sqm. | 168 |
| Comfort Rooms (T& B) | sqm. | 45 |
| Living Room/Kitchen | sqm. | 45 +15.5 |
| Main Lobby | Sqm. | 60 |
| Roof Deck | | (397) |
| TOTAL | | 1,828 sqm |
| | | |

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| | | |
|-------------------------------------|-------------|------------------|
| Multi-Level Parking Building | | |
| First Floor Parking | sqm | 420 |
| Second Floor Parking | sqm. | 420 |
| Third Floor Parking | sqm. | 420 |
| Fourth Floor Parking | sqm. | 420 |
| TOTAL | sqm. | 1,680 sqm |

d. DESIGN CONSIDERATIONS

The green building design considerations include efficient building orientation, strategic locations of utilities, space and energy saving design, use of recycled materials, traffic and pedestrian safety and protection, light and air ventilation, ergonomics and functional facilities, paving block walkways and vertical gardens, energy and power saving features, and cost efficient architectural and engineering design. Other design considerations are the following:

- (i) Minimum height of International Student Dormitory and Multi-Level Parking Facility zone shall be 3 meters from bottom of the truss or ceiling fixture whichever the lower is. Refer to reference drawings.
- (ii) Minimum height of International Student Dormitory and Multi-Level Parking (second floor) shall be 3 meters from floor to roof slab.
- (iii) Floor slab elevation should be the same as the existing slab elevation of the existing Student Dormitory.
- (iv) The Contractor shall examine the extent of fill areas around the building.
- (v) For Building finishes refer to finish schedule.
- (vi) Provide panic device for all exit doors.
- (vii) Use tempered glass on aluminum frame for lobby windows and view windows at the south side of the building and aluminum framed glass for the rest of the windows.
- (viii) All water closets shall be flush valve type with water saving features.

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- (ix) All exposed trusses and structural steel members to be painted.
 - (x) All other design considerations which may respectfully applied.
- e. **ARCHITECTURAL SCOPE OF WORK**
The scope of work includes the supply of labor, materials and tools necessary to complete the installation of the following architectural building items:
- (i) Fill-up of the existing ground to a level of the existing elevation of the New Student Dormitory to include the open space at the back of the building.
 - (ii) Concrete hollow block walls including plastering of exterior and interior faces including exterior wall scoring.
 - (iii) Re-inforced concrete roof deck
 - (iv) With waterproofing insulation and wire mesh support to prevent hairline cracks due to thermal expansion.
 - (v) Aluminum doors and windows.
 - (vi) Metal doors and frames.
 - (vii) Metal louvers.
 - (viii) Door hardware.
 - (ix) Plumbing fixtures and gang showers.
 - (x) High pressure, laminate modular toilet partitions.
 - (xi) Aluminum cladding at roof perimeter siding and at locations indicated in the reference drawings.
 - (xii) Linear metal ceiling including framing.
 - (xiii) Downspouts.
 - (xiv) Ceramic floor and wall tiles at toilets.
 - (xv) Gypsum board ceiling including framing.

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- (xvi) All painting works for interior and exterior.
- (xvii) Metal siding and framing.
- (xviii) Exterior stairs and railings.
- (xix) Catwalks and supports.
- (xx) Waterproofing and concrete topping.
- (xxi) All finishes indicated in the finish schedule per attached reference drawings.
- (xxii) Other items not mentioned here but shown in the reference drawings.

7.4 ARCHITECTURAL – OUTLINE SPECIFICATIONS

(a) Exterior Finishes

| | |
|-------------------|---|
| Roofing | - Roof Deck type R. C. |
| Roof Deck | - Polymembrane waterproofing sealed type |
| Insulation | - Aluminum cladding |
| Roof Eaves | - Spandrel metal ceiling pre-painted finish |
| Sidings | - Ledge Type |
| Roof Eaves Soffit | - CHB parapet wall plain cement painted finish |
| Gutter | - 150mm thick CHB with plain cement plater, painted finish |
| Parapet | - Aluminum 4mm thick cladding PVDF coating on main entrance architrave |
| Walls | - Metal siding on steel girts |
| Doors/Frames | - Aluminum with glass panels, anodized |
| | - Clear finish on main entrance. Tempered glass at lobby window and new window at south wall |
| | - Hollow core steel door exits, painted finish |
| Windows/Frames | - Aluminum windows, anodized clear finish |

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| | |
|-----------------|---|
| Louver windows | - Steel louvers, painted finish |
| Exterior Steps | - Homogeneous non-skid floor tiles |
| Column Cladding | - Aluminum Cladding – 4mm thick PVDF coating |
| Drop Off Canopy | - Aluminum Cladding – 4mm thick PVDF coating |
| Canopy | - Concrete canopy painted finish with elastomeric waterproofing |
| | - Aluminum cladding 4mm thick with PVDF coating at entrance canopy |
| Concrete fins | - CHB with aluminum cladding |
| Railings | - Steel handrails and sub-railings painted finish |
| Roof deck | - Elastomeric waterproofing system fluid applied |
| Vapor Retarders | - 6 mils Polyethylene sheet vapor barrier |

(b) Interior Finishes

Main Lobby

| | |
|---------|--|
| Floor | - 600mm x 600mm - Homogeneous floor tiles with accent |
| Wall | - CHB wall with plain cement plaster painted finish |
| Base | - 100 mm, high vinyl cove base |
| Ceiling | - 12mm thick gypsum board painted finish on metal furring, drop type ceiling |
| | - Linear metal ceiling pre-painted finish |

Male and Female Toilet

| | |
|---------|---|
| Floor | - 600mm x 600mm, unglazed ceramic tiles with accent |
| Wall | - 600mm x 600mm glazed ceramic tiles with lattice and accent |
| | - |
| Ceiling | - Moisture resistant gypsum board, painted finish core type |
| Door | - Solid wood core with solid wood frames, painted finish |
| | - |

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| | |
|------------------|---|
| Toilet Partition | - 10 mm thick high pressure solid compact laminate |
| Counter top | - 20mm, thick granite stone with colored aggregates design canal lining |
| Ledge | - 20 mm, thick granite stone ledge at back of water closet |

Fixtures

| | |
|-----------------|----------------------|
| Water Closet | - Flush valve type |
| Lavatory faucet | - Under counter type |

Accessories

| | |
|---------------------|--|
| Mirror glass | - 6mm thick high quality facial mirror with wall light |
| Hand Dryer | - Surface mounted |
| Soap dispenser | - Surface mounted |
| Toilet paper holder | - Active paper holder |
| Comfort Rooms | - Wall tiles (glazed) with accent |
| Bedroom Partition | - 6mm thick ficemboard on metal studs and tracks |
| Ceiling | - Moisture resistant gypsum board, painted finish with cove lights and drop ceiling pin lights |

(c) Interior Rooms – second floor

| | |
|----------------|---|
| Countertop | - 20mm synthetic granite stone with single tab sink, overhead cabinet and rangehood |
| Flooring | - 60cm x 60cm synthetic granite tiles |
| Wall | - CHB wall, plain painted finish |
| Windows/Frames | - Tempered glass on aluminum frames |
| Door | - Solid wood core with solid wood frames, painted finish with peep hole |

7.5 BASIS OF DESIGN – STRUCTURAL

- (a) The following defines the structural engineering requirements which incorporate owner's specific design requirements for the proposed NDCP International Student Dormitory with Multi-Level Parking. Included herein is a list of applicable codes, standards, and specifications used as reference in determining the parametric values, the concept adopted for the proposed foundation and framing systems, the bases upon which the design criteria is

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established, methods/procedures used for the design and analysis of the structures and computer programs pertaining to the project.

(b) **APPLICABLE CODES, STANDARDS AND SPECIFICATIONS** – The design shall be in accordance with all the applicable laws and regulations of the Government of the Philippines and with the applicable Design Codes, Standards and Specification:

(i) National Structural Code of the Philippines, Volume 1- Buildings, Towers and Other Vertical Structures, Sixth Edition 2010 (NSCP 2010)

(ii) 1997 Uniform Building Code, Volume 2, Structural/Engineering Design Provisions (UBC 1997)

(iii) Specifications for Structural Joints using American Standard and Testing Materials (ASTM) A325 or A490 Research Council on Structural Connections.

(iv) Product Standard Agency (PSA) Publications Philippines:

PNS 07 Specifications for Portland Cement

PNS 18 Specifications for Concrete Aggregates

PNS 49 Specifications for Steel Bars for concrete Reinforcement

PNS 16 Specifications for Concrete Hollow Blocks

SAO 181 Industrial Quickline & Hydrated Lime

PNS – Philippine National Standards

(v) American Concrete Institute (ACI) Publications:
ACI 318-08 Building Code Requirements for Structural Concrete & Commentary

ACI 315 Details and Detailing of Concrete Reinforcements

ACI 301 Specifications for Structural Concrete for Buildings

ACI 224 Control of Cracking in Concrete Structures

(vi) American Institute of Steel Construction (AISC) Publications:

Manual of Steel Construction, Allowable stress Design, 13th Edition.

(vii) American Welding Society (AWS) Publications:

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- D1.1 Structural Welding Code – Steel
- D1.3 Structural Welding Code – Sheet Steel
- D1.4 Structural Welding Code – Reinforcing Steel

- (viii) American Society for Testing & Materials (ASTM) Publications

- (ix) American Iron and Steel Institute (AISI)

Specification for the Design of Cold-Formed Steel Structural Members Computer Programs
- (x) STAAD-PRO analysis and Design Software 2007 for General Structural analysis

- (xi) Microsoft Office Excel 2007 for Calculation Spreadsheets

- (xii) Substance Abuse Free environment (SAFE) – Foundation Design

- (c) STRUCTURAL CONCEPTS
 - (i) The NDCP International Student Dormitory and Multi-Level Parking shall be Reinforced Concrete Moment Resisting Frame structure.
 - (ii) The design ground motion shall be assumed to occur along any horizontal direction. The adequacy of the foundation and framing systems shall be demonstrated through construction of a mathematical model and evaluation of this model for the effects of the design ground motions. This shall consist of a linear elastic analysis in which design seismic forces are distributed and applied throughout the height of the structure in accordance with the applicable design code. The corresponding structural deformations and internal forces in all members of the structure shall be determined and evaluated against acceptance criteria.
 - (iii) Individual members shall be provided with adequate strength to resist the shears, axial forces, and moments determined. Connections shall develop the strength of the connected members or the forces indicated above. The deformation of the structure shall not exceed the prescribed limits.
 - (iv) The foundations shall be designed to accommodate

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the forces developed or the movements imparted to the structure by the design ground motions. The foundations will be designed to resist earthquake forces using the National Structural Code of the Philippines Static Lateral Force Procedure.

- (v) **MATERIAL PROPERTIES** - The material specifications and specified design data for structural design and detailing of concrete and steel members shall be in accordance with the following material strengths specified.
 - (vi) **Concrete** - The strengths are in accordance with the test method using cylinder type test pieces as PNS/ASTM C39- 96. The specified compressive strength (f_c) at 28th days age.
 - (vii) **Reinforcing Steel** - Reinforcing steel shall be deformed and shall meet PNS49/ASTM 706 (Weldable).
 - (viii) **Structural Steel** - ASTM A36 or equivalent shall be used for all structural steel shapes. The specified minimum yield strength is 248 MPa (36 ksi). Modulus of Elasticity, E_s is 200,000 MPa.
 - (ix) **Cold Formed Steel/Light Gage Sections** - The minimum quality requirement for light-gage structural framing members is structural steel conforming to ASTM446 or JIS G3101 SS400. The specified yield strength is taken as 245 MPa (35.5 ksi).
 - (x) **High strength Bolts** – Bolts for structural steel member connection shall conform to ASTM A325 unless otherwise specified on plans.
 - (xi) **Anchor Bolts** – anchor bolts shall conform to ASTM A 307 unless otherwise specified on plans.
 - (xii) **Welding Electrodes and Rods** – Welding electrodes and rods for structural members' connections shall conform to AWS A5.5 unless otherwise specified on plans.
- (d) **DESIGN LOADS** - Loads are forces or other actions that result from the weight of all building materials, occupants and their possessions, environmental effects, differential movements, and restrained dimensional changes. Design loads and forces are those resulting from dead loads, live loads and environmental loads acting in the most critical

combinations, using the appropriate load factors recommended by the applicable code. The basic load types and their corresponding magnitudes are as follows:

- (i) Dead Loads – Dead loads are gravity loads which include the weight of all materials and equipment incorporated into the building or other structure. Dead loads are permanent loads in which variations over time are rare or of small magnitude.
- (ii) Live Loads – Live loads are those loads produced by the use and occupancy of the building or other structure and so not include dead load, construction load or environmental load such as wind load, rain load, earthquake load or flood load. Impact forces shall be considered as live loads shall be set as 20% of equipment's weight (in cases where no impact loads are provided to the designer.
- (iii) Wind Load – The structure and every portion thereof shall be designed and constructed to resist the wind effects determined in accordance to the requirements of National Structural Code of the Philippines (NSCP) 2010 Section 207. The design wind pressure shall not be less than 0.5 kPa.
- (iv) Seismic Load – The purpose of the earthquake provisions is primarily to safeguard against major structural failures and loss of life, but not to limit or maintain function.

Structures and portions thereof shall, as a minimum be designed and constructed to resist the effects of seismic ground motions as provided in NSCP 2010 Section 208.

When the code prescribed wind design produces greater effects, the wind design shall govern, but detailing requirements and limitations of the above mentioned section and other pertinent sections shall apply.

The procedures and the limitations for the design of structures shall be determined considering seismic zoning, site characteristics, occupancy, configuration, structural system and height. Structures shall be designed with adequate strength to withstand the lateral displacements induced by the Design Basis Ground Motion, considering the inelastic response of the structure and the inherent redundancy, over-strength and ductility of the lateral-force resisting system.

Lateral force on elements of structures, non-structural components and equipment supported by structures shall be in accordance with NSCP Section 208.7.

The static lateral force procedure shall be used to determine the distribution of lateral loads on the structure due to earthquake load.

(e) **STATIC LATERAL FORCE PROCEDURE -**

Seismic forces are estimated using the equivalent Static Lateral Force Procedure as discussed in NSCP Section 208.5.

Design Base Shear, V ,

$$1. V = \frac{C_v I}{RT} W$$

But need not exceed the following:

$$2. V_{max} = \frac{2.5 C_d I}{R} W$$

The total design base shear shall not be less than the following:

$$3. V_{min} = 0.11 C_d I W$$

$$4. V_{min} = \frac{0.8 Z N_v I}{R} W$$

Seismic Design Parameters - The Project location must be determined in conformity to the nearest known Seismic source.

The following are the parameters for the seismic analysis that corresponds to the seismic source and the occupancy category of the building:

| | | |
|---------------------------|---|--------|
| Seismic Zone | = | Zone 4 |
| Seismic Zone Factor | = | 0.4 |
| Soil Profile Type | = | S_d |
| Near-source Factor, N_a | = | 1.0 |
| Near-source Factor, N_v | = | 1.2 |

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| | | |
|----------------------------------|---|------------|
| Near-source Factor, C_a | = | 0.44 N_a |
| Near-source Factor, C_v | = | 0.64 N_v |
| Seismic Importance Factor, I_p | = | 1.0 |
| I | = | 1.0 |

T = fundamental period of vibration of the structure, in seconds, in the direction under consideration and determined by the following formulas:

$$T = C_t h_n^{3/4}$$

$$T = 2\pi \sqrt{\left(\sum_{i=1}^n w_i \delta_i^2 \right) \div \left(g \sum_{i=1}^n f_i \delta_i \right)} \text{ but not more than } 1.3T_a$$

Where: $C_t = 0.0731$ for reinforced concrete member resisting and eccentrically braced frames:

- h_i = height of the structure above the base level to level i
- w_i = Portion of W which is located at or assigned to level i
- f_i = lateral force applied to level i
- W = total seismic dead load
- δ_i = horizontal displacement at level i

Furthermore, for equipments and tanks other than tanks with supported bottoms; the seismic forces shall not be less than the following:

$$V = \frac{1.6ZN_v I}{R} W$$

$$V = 0.56C_d I W$$

Design Base Shear, V for Non-Building Structure (Tank with Supported Bottom)

$$1. V = \frac{a_p C_d I_p}{R_p} (1 + 3h_x / h_r) W_p$$

Where h_x = the element elevation with respect to grade.

h_r = the structure roof elevation element elevation with respect to grade

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a_p = the in-structure Component Amplification Factor that varies from 1.0 to 2.5
 W_p = weight of tank and content

But need not exceed the following:

$$2. V = 4C_a I_p W_p$$

The total design base shear shall not be less than the following:

$$3. V = 0.7C_a I_p W_p$$

(f) DESIGN METHOD AND LOADING COMBINATION

Structural Reinforced Concrete – The design of reinforced concrete structural members (wall, column, beam, slab, & stairs) shall be based on Ultimate Design Method and shall conform to ACI 318-05. The following load combinations are to be considered according to ACI 318-05:

1.4D

1.2D + 1.6(L+H) + 0.5Lr

1.2D + 1.6Lr + (*f1*) L

1.2D + 1.6Lr + 0.8W

1.2D + 1.6W + (*f1*) L + 0.5Lr

1.2D + 1.0E + (*f1*) L

0.9D + 1.6W + 1.6H

0.9D + 1.0E + 1.6H

Where: D = Dead Load
H = load due to lateral pressure of soil and water in soil
L = Occupancy Live Load
Lr = Roof Live Load
W = wind load
E = earthquake load ($E = \square E_h + E_v$)
E2 = earthquake load ($E = \square E_h - E_v$)
P = Reliability/Redundancy Factor
f1 = 1.0 for floors in places of public assembly, for live loads in excess of 4.80 kPa and for garage live load.
= 0.5 for other live loads

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Alternate Load Combinations - The following load combinations shall be used to determine the sizes of footing used for foundations. When using these alternate basic load combinations, a one-third increase shall be permitted in allowable stresses for all combinations that include W or E.

$$\begin{aligned} &D + 0.75 (L + L_r + W) \\ &D + 0.75 (L + L_r + E/1.4) \\ &0.60D + W + H \\ &0.60D + E/1.4 + H \\ &D + L + L_r \\ &D + L + W \\ &D + L + E/1.4 \end{aligned}$$

Structural Steel – The design of structural steel members (columns, beams, braces, trusses) and its fasteners, welds and anchor bolt shall be based on Allowable Stress Method and shall conform to NSCP 2010 Chapter 5 or AISC Manual of Steel Construction, ASD 13th Edition. The following load combinations are to be considered according to NSCP 2010 section 203.4.

$$\begin{aligned} &D \\ &D + L \\ &D + L_r \\ &D + 0.75(L + L_r) \\ &D + W \\ &D + E/1.4 \end{aligned}$$

| | | | |
|--------|----------------|---|---------------------|
| Where: | D | = | Dead Load |
| | L | = | Occupancy Live Load |
| | W | = | Wind Load |
| | E | = | Earthquake Load |
| | L _r | = | Roof Live Load |

- (g) FOUNDATION AND DEFORMATION LIMITS – Footings shall be designed with allowable soil bearing pressures as recommended in the Geotechnical Investigation Final Report. Appropriate change in footings' sizes and reinforcements shall be made if results of soil profile to be exposed during excavation will give different allowable soil bearing. When designed using the allowable soil bearing

capacity recommended by a geotechnical engineer, the foundation should have maximum long term deformation in the range of 25 mm.

7.6 STRUCTURAL – OUTLINE SPECIFICATIONS

- (a) SITEWORKS – Backfill for Building Construction - Selected fill consists of gravel, crushed gravel, crushed rock, crushed adobe, or combination thereof.
- (b) CAST-IN-PLACE CONCRETE - Minimum 28-day compressive strength,

$f'_c = 28$ MPa for Building Reinforced Concrete elements except footings

$f'_c = 21$ MPa for Building footings, equipment concrete pads/foundations, slab on grade

$f'_c = 8$ MPa for lean concrete

Materials:

Cement: ASTM C150, Type I for general use in construction.

Aggregates: ASTM C33, Class 1N or 2N

Non-shrink Grout: COE CRD-C-621

Reinforcing Bars: ASTM A706, Grade 40 for diameter 10 and below, and Grade 60 for diameter 12 and above

Mechanical reinforcing Bars Connectors: ACI 301

Steelwire: ASTM A82 or ASTM A496

Vapor Barrier: ASTM C171 polyethylene sheeting, 6 mil thickness minimum.

Waterstop: ASTM D 412-80, neoprene hi-tensile rubber waterstop, 150 mm wide x 6 mm thick, dumbbell with center bulb type.

Admixtures:

- a. Retarding: ASTM C494, Type B, D or G
- b. Water Reducing: ASTM C474, Type A or F
- c. Fly Ash and Pozzolan: ASTM C618, Type N, For C

Curing Materials:

- a. Impervious Sheeting: ASTM C171; waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap
- b. Pervious Sheeting: AASHTO M182
- c. Liquid Membrane-Forming Compound: ASTM C309

Expansion/Contraction Joint Filler ASTM D1751 or ASTM D1752, ½ inch thick, unless otherwise indicated.

Epoxy Bonding Compound: ASTM C881

Integral Waterproofing: 3CC system as manufactured by CEMENTAID or approved equal.

(c) **METALS**

Materials:

Structural steel rolled sections: ASTM A36 minimum yield strength, $F_y = 248 \text{ MPa}$ (36 ksi)

Cold formed steel sections: minimum yield strength, $F_y = 245 \text{ MPa}$ (35.5 ksi)

Standard Anchor bolts: ASTM 307, Grade A

High strength connection bolts: ASTM 325 or ASTM 490

Welding electrodes: E70xx; $F_u = 480 \text{ MPa}$

7.6 BASIS OF DESIGN – ELECTRICAL

(a) **GENERAL DESIGN CRITERIA** – In general, the design, specification and installation of all electrical equipment shall comply where applicable with the latest edition of the following Codes and Publications and any supplements thereto:

(i) Philippine Electrical Code 2009 (PEC)

(ii) Illumination Engineering Society of North America (IESNA)

(iii) Revised Fire Code of the Philippines (RA 9514)

(iv) National Fire Alarm Code (NFPA 72)

(v) National Electrical Manufacturer's Association (NEMA) Publications

(vi) American Society for Testing and Materials (ASTM) Publications

(vii) Institute of Electrical and Electronics Engineers (IEEE)

(viii) International Electro-technical Commission (IEC) Standards

(ix) Underwriters Laboratory (UL)

(x) Factory Mutual (FM)

(b) **LIGHTING SYSTEM** – The lighting design shall be practical, energy-efficient, easy to maintain and appropriate for the intended function of the space. At general areas, lighting fixtures with fluorescent linear tubes and compact fluorescents equipped with electronic ballast are preferred. The use of incandescent lamps shall not be allowed. At the sporting event area, high bay luminaires or floodlights with

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metal halide lamps shall be used. Whenever possible, fluorescent luminaires shall be recessed-mounted.

- (i) Provide a complete self-contained emergency lighting units with batteries, battery charger, 2 lamp heads with LED lamps, under-voltage relay, indicator lights, on/off switch and test switch. The unit should be capable of operation for 3 hours minimum. Provide and install emergency units in accordance with the code.
- (ii) Provide exit lighting fixtures at egresses and corridors leading to exit doors. The units shall include sheet metal enclosures with frames, battery charger, batteries, red light emitting diodes (LEDs) and mounting brackets. Fixtures shall be single or double faced depending on the location. Standard fixture features shall include continuous charging, automatic switching to standby batteries upon loss of power, overload protection, short circuit protection, test switch, low voltage disconnect, switch controlled left and right LED directional arrows, and shall be field connectable to operate from 230 volts. Minimum operating time of the battery system shall be three (3) hours for double faced fixtures and seven (7) hours for single faced fixtures.
- (iii) Light switches at general areas shall be totally enclosed with bodies of thermoplastic or thermosetting plastic complete with mounting strap and grounding screw. Switches shall be modern-looking with illuminating light at the handle.
- (iv) General lighting and sports lighting shall be designed based on the following recommended illumination levels:

| Room/Area Designation | Illumination Levels in LUX |
|----------------------------------|----------------------------|
| Main Lobby | 1 00 – 200 |
| Storage Rooms | 1 00 – 200 |
| Lockers, Toilets and Shower Area | 1 00 – 200 |
| Corridors | 1 00 – 200 |
| Genset/Electrical Room | 1 50 |

(c) **POWER SYSTEM**

- (i) **EXTERIOR POWER DISTRIBUTION SYSTEM** - Presently, there is a 1-unit owned 25kVA, three-phase, 23-0.23kV, double-primary bushing, pole type transformer, supplying some in the existing structures.

Contractor together with the owner's representative shall coordinate with Meralco to: a) extend the overhead primary line up to the area near the Genset/Electrical Room; b) provide new three pole type transformers bank together for the project's three-phase power supply; and c) decommission the existing 25kVA transformer later.

- (ii) **INTERIOR POWER DISTRIBUTION SYSTEM** - Low voltage operating system for the project shall be three-phase 230 volts. A main distribution board, lighting and power panel boards shall be provided. All feeders, sub-feeders and branch circuit cables shall be concealed in a conduit installed in a neat and orderly manner and in accordance with the code.

(ii.1) Electrical boards shall be equipped with UL 489, bolt-on, thermal-magnetic molded case circuit breakers of not less than 10 kAIC interrupting capacities. Circuit breakers shall have dual-rated terminal lugs. Busbars shall be 100% copper with 0.005 mm minimum silver-plating. Minimum thickness of enclosure including the dead-front cover shall be 1.51mm uncoated. Interior and exterior finish shall be ANSI 61 light gray. For the MDP and other boards supplying computers and other electronic devices shall be equipped with surge protective device (TVSS) complying with UL 1449. Provide also a digital power meter for the MDP while indicating light shall be provided in the other boards. Lighting contactor panel/s for sports lighting complete with contactors, on/off push-buttons, indicating lights, cable managers and other accessories shall be provided.

(ii.2) All conduits and fittings shall be metallic (complying with UL 1242), except for the incoming from the transformer up to the MDP where non-metallic conduit (complying with

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- PNS 14:1983) can be used. Connection to motors or pumps or outdoor connection to mechanical equipment shall be liquid-tight flexible metallic conduit (complying with UL 1).
- (ii.3) All wires and cables shall be copper with insulation rated at 600V. Cables shall have operating temperature of 90°C at dry and wet location.
 - (ii.4) Convenience receptacle outlets shall be duplex, heavy-duty grounding type with modern look. Where installed at exterior walls or expose to splash of water, provide the outlet with weather-proof cover.
 - (ii.5) A standby diesel-engine generator set shall be provided for the project to provide 100% back-up emergency power. Provide diesel engine-generator sets consisting of a water-cooled diesel engine direct connected to an ac generator with a brushless excitation system and accessories. Diesel engines shall be four-cycle naturally aspirated, or turbocharged, or turbocharged and intercooled; vertical in-line or vertical Vee type; designed for stationary service. The brushless excitation system shall consist of an exciter and rotating rectifier assembly and permanent magnet generator integral with the generator and a voltage regulator. Insulation class for parts integral with the generator shall be Class F. A residential class silencer shall be provided for each engine to reduce the exhaust sound spectrum. To further reduce the noise, provide also the unit with a canopy or enclosure. The following shall also be furnished: a) batteries and battery charger; b) skid-mounted generator molded-case circuit breaker, and 24-hour capacity sub-base fuel day tank.
 - (ii.6) A solenoid type, closed-transition with bypass automatic transfer switch (ATS) shall be provided for the automatic transfer of power source from normal to emergency and vice-versa.

Recommended demand factors (DF) are as follows:

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| Load Description | Demand Factor |
|-----------------------------|---------------|
| Lightings / FACP / MDF | 100 % |
| Receptacle Outlets / Spares | 50 % |
| Motors/Pumps/HVAC Equipment | 80 |

- (d) **GROUNDING AND BONDING SYSTEM** - Grounding and bonding shall comply with the requirements of PEC 2009. All underground connections shall be by means of exothermic welding. All exposed non-current carrying parts of electrical equipment shall be properly grounded. Ground rods shall be 20 mm diameter by 3 meters long copper clad steel.
- (e) **FIRE DETECTION AND ALARM SYSTEM** - Fire detection and alarm system shall be a complete, addressable, and supervised fire alarm reporting system configured in accordance with NFPA 72 and RA 9514. Furnish equipment that are UL listed, FM approved, or approved or listed by a nationally recognized testing laboratory in accordance with NFPA standards. The control panel shall comply with UL 864 and locate it at the Main Lobby. Addressable manual fire alarm stations shall conform to UL 38 and shall be provided in accordance with the code's spacing requirement. Furnish UL complying fire detecting devices as follows:

| Area | Device |
|---------------|-------------------------------------|
| General Areas | Addressable smoke detectors, UL 521 |
| Genset Room | Addressable heat detectors, UL 268 |

Provide UL complying notification appliances as follows:

| Area | Device |
|----------------|---|
| General Areas | Alarm bells, UL 464 / Strobe light, UL 1971 |
| Generator Room | Combination audio and visual. |

- (f) **TELECOMMUNICATION AND DATA SYSTEM** - Category 6 structured cabling systems shall be utilized for the telecommunication and data system of the project. A main

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distribution frame (MDF) to support voice and data system shall be provided at the main lobby. The MDF shall accommodate the fiber optic and copper backbone cables as well as horizontal cables to each voice and data outlets. The MDF shall be comprised of a free-standing or wall-mounted modular type cabinet, 110 terminal blocks, voice and data patch panels, copper and fiber optic patch cords, cable managers, ground bus and receptacle outlets.

- (i) Workstation outlets shall be single for 1 voice port only, single for 1 data port only, or duplex for a combination of 1 voice and 1 data port. Horizontal cabling shall utilize 250 MHz, Category 6, 23 AWG, UTP cables.
 - (ii) Provide patch panel ports for the number of horizontal and backbone cables terminated on the panel plus 25 percent spare. Provide pre-connectorized optical fiber and Cat 6 copper patch cords for Cat 6 patch panels. Furnish patch cords, as complete assemblies, with matching connectors. Patch cords shall meet minimum performance requirements specified in TIA-568-C.1, TIA/EIA-568-B.2 and TIA-568-C.3 for cables, cable length and hardware specified.
 - (ii) Perform telecommunications cabling inspection, verification, and performance tests in accordance with TIA-568-C.1, TIA/EIA-568-B.2, TIA-568-C.3.
- (g) **CCTV SYSTEM** - Surveillance cameras shall be provided at ingress/egress, court sides and building exteriors. Cameras shall be IP based with 2.10 MP pixel density and 32 fps frame rate. The camera housing shall be equipped with tamper proof latches, and shall be supplied with the proper mounting brackets for the specified camera and lens. The housing and appurtenances shall be a color that does not conflict with the building interior color scheme.
- (i) The network video recorder shall be designed and provided with internal storage recording capacity of 30-days real-time, synchronized audio/video recording and playback, support video compression formats of IP cameras (H.264, MPEG-4 and MJPEG) and support NTSC/PAL video standard.
 - (iii) Video monitors shall be high resolution, 19 inch in size. It should have an S-Video, BNC and VGS input

connector. The monitor shall have a 1000:1 contrast ratio, 100 - 240 Vac, 60 Hz power input with PAL/NTSC auto-detect.

- (iv) Cables shall be 100Ω, 4-pair, Unshielded Twisted Pair (UTP) 0.51mm (24 AWG), plain copper conductor, data grade polyethylene insulated, PVC jacketed, CMR flame rated data cable meeting or exceeding Category 5E standards up to 160 MHz.

(h) DESIGN NORMS

(i) LIGHTING SYSTEM

Illumination Calculations - Compute illumination calculation using lighting softwares such as Dialux 4.10 or Luxicon 2. Calculation results shall be submitted for review and evaluation.

(v) POWER SYSTEM

Load Calculations - Load calculations, circuit breaker sizing and conductor sizing shall be done in accordance with PEC 2009. Calculation results shall be submitted for review and evaluation.

Load Balancing - All shall be coordinated to come up with a balance loading in a way that maximum phase imbalances per panel should not exceed 5%. Calculation results shall be submitted for review and evaluation.

Voltage Drop Calculation - Maximum of 5% drop shall be considered for the combined branch and feeder circuits. Calculation results shall be submitted for review and evaluation.

7.8 ELECTRICAL – OUTLINE SPECIFICATIONS

(a) POWER AND LIGHTING SYSTEM:

- (i) Standby diesel engine-generator unit shall be provided for emergency power back-up. The unit shall consist of a diesel engine directly connected to an alternating current generator with brushless revolving field solid state excitation system and all necessary accessories and auxiliary equipment resulting in complete self contained unit. The engine shall be 4-cycle, turbo-charged, after cooled or air-

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to-air charge air-cooled, in-line or vee type. The unit shall be provided with canopy to reduce the noise level. Engine-generator shall be Cummins, Caterpillar, Mitsubishi or MTU in brand.

- (ii) Automatic Transfer Switch (ATS) shall be for use in emergency systems described in NFPA 70 and shall conform to applicable requirements of IEEE 472. ATS shall be the double-throw type, closed-transition type, and be incapable of stops in intermediate positions during normal functioning of the ATS. The ATS shall be electrically operated but mechanically held in both positions, with the operator momentarily receiving power from the source to which the load is to be transferred. ATS shall be “Asco”, “GE” or approved equivalent.
- (iii) Panel boards shall be sized in accordance to the rating of the main and branch circuit breakers calculated. All breakers shall be UL 489/IEC 60947, bolt-on, and thermal magnetic type with dual-rated terminal lugs. Circuit breaker shall have a minimum interrupting capacity of 10,000 amperes. Circuit breakers shall be Schneider, ABB, Cutler Hammer, Siemens or approved equivalent. Panel boards shall be fabricated by the circuit breaker distributor’s authorized panel builders.
- (iv) Transient Voltage Surge Suppressor (TVSS) shall be designed in accordance with UL 1449 and manufactured by Asco, GE, Cutler Hammer or approved equivalent.
- (v) Digital power meter shall be GE Multilin EPM Series, Square D Series 800 or approved equivalent.
- (vi) Low voltage cables for lightings, power and controls shall be copper and rated 600V with 90°C operating temperature at dry and wet locations. Cables shall be manufactured by Phelps Dodge or approved equivalent.
- (vii) Conduits: Metallic conduits shall comply with UL 1242. Brand shall be Panasonic or approved equivalent. LTFMC shall be UL 360. Brand shall be Panasonic or approved equivalent. PVC shall be thick wall and PNS 14:1983 certified. Brand shall be Neltex or approved equivalent.

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- (viii) Wiring Devices: Receptacle outlets shall be duplex type grounding type, 16A, 2P, 3W, 240V. Light switches shall be rated 15A, 240V and 1P. Wiring devices shall be Panasonic or approved equivalent.
 - (ix) Lighting Fixtures: General lighting shall be fluorescent lighting fixtures with T8 tri-phosphor lamp; electronic ballast; and housing & diffuser blending with the ceiling finishes or construction. Exit signs with LED lamp, batteries and battery charger, and can provide at least 3-hr back-up time. Emergency lights with LED head lamps, batteries and battery charger, and can provide at least 3-hr back-up time. Fluorescent lamps shall be GE or Philips in brand. Electronic ballast shall be manufactured by Tridonic Atco, Philips or GE. Interior lighting fixtures shall be fabricated by Maxitech, Jax Lighting or approved equivalent.
- (b) GROUNDING SYSTEM:
- (i) Ground rod shall be UL listed, copper clad steel, 20mm diameter by 3 meters long.
 - (ii) Grounding connections shall be by means of exothermic welding. Connecting materials, molds and devices shall be by Erico.
- (c) FIRE ALARM SYSTEM:
- (i) Fire Alarm Control Panel (FACP), shall be UL listed, microprocessor based addressable type with full capability for sensing smoke detectors, heat detectors, and manual stations.
 - (ii) Detectors and manual pull stations shall be of the addressable type and UL listed.
 - (iii) Alarm horn with strobe shall be capable of providing 105dB sound level at 3 meters.
 - (vi) Fire alarm panel, detectors and signaling devices shall be Edwards, Simplex, Notifier or approved equivalent.
- (d) STRUCTURED CABLING SYSTEM:

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- (i) Horizontal cabling shall be 100Ω, 4 pairs, category 6, Unshielded Twisted Pair (UTP), 0.57mm (AWG 23), solid bare copper wire, polyethylene insulated, PVC jacketed.
- (ii) Work station outlets shall be category 6, UTP, 568A, RJ45. The outlets shall be constructed from a high impact, flame retardant thermoplastic with color coded snap-in identification.
- (iii) The distribution frame (MDF) shall link the horizontal cabling system & the backbone system. It shall be composed of passive components such as the floor mounted free standing rack, voice and data patch panels, S110 terminal blocks, patch cords, fiber tray, connectors, and cable management system.
- (iv) All proposed category 5e field testing shall be performed with an approved level III UTP field test device.
- (v) Structured cabling system components shall be Siemon, Panduit, Krone, Amp or approved equivalent.
- (e) CCTV SYSTEM:
 - (i) IP based megapixels cameras shall be indoor fixed dome type or bullet type.
 - (iii) All cameras shall be day and night 0 lux IR sensitive, fast video frame rates, H.264 MPEG4 and Motion JPEG compression, multi-streaming, 100 kbps to 10 Mbps data rate, and powered over Ethernet (PoE).
 - (iv) Storage server shall have a storage capacity based on 30 days recording.
 - (iv) Hub switch shall be PoE type, 24-ports.
 - (v) Cable from cameras to the hub switch shall be 100Ω, 4 pairs, category 5e, Unshielded Twisted Pair (UTP), 0.51mm (AWG 24), solid bare copper wire, polyethylene insulated, PVC jacketed.
 - (vi) Monitor shall be 19 inches LCD flat screen.
 - (vii) CCTV cameras shall be Arecont Vision, Axis or approved equivalent.

7.9 SANITARY/PLUMBING SCOPE OF WORK

- (a) The Contractor is required to refer to all architectural, structural, mechanical, fire protection, electrical and interior designs plus landscape plans and investigate all possible interference and conditions affecting his work.
- (b) All design and installation works shall comply with the pertinent provisions of the Plumbing Code of the concerned city, the Code on Sanitation of the Philippines, the National Plumbing Code of the Philippines and other agencies having jurisdiction.
- (c) Tapping from an existing water main line within the compound and include supply & installation of main water meter.
- (d) Water supply and distribution system for the library building including supply and installation of water cistern tank, booster pump, valves, pipings and other accessories for complete and operable system.
- (e) Hot water distribution and supply lines to include supply and installation of water heaters.
- (f) All building sanitary drains, waste and venting systems including floor drains, and other required accessories to make the systems complete and operable.
- (g) Sewage collection and disposal system including ground cleanouts, sewer service connections, septic tank and other required appurtenances which are essential to the proper function of the system.
- (h) Building storm drainage system including deck and roof drains, canopy drains, and planter's drains.
- (j) Building storm under-drains (if required), area drains, junction boxes and collection system including peripheral collector line into nearest existing storm drain line within the vicinity.
- (k) Installation of all plumbing fixtures, fittings, trims and accessories.

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- (k) Testing for leakage of all water supply and distribution system, drains, waste, sewer and venting system plus pressure testing and disinfection of the water supply and distribution system.
- (l) Testing for leakage and disinfection of the water tanks.
- (m) Test run and start-up of equipment, booster pumping system and other equipment under Plumbing Works.
- (n) Securing of all permits and licenses as required.
- (o) Excavation and back lifting in connection with the work shall be included
- (p) Furnishing of written one (1) year warranty on the plumbing system.

7.10 MECHANICAL SCOPE OF WORK

- (a) The Mechanical contractor shall supply, furnish, install & test the mechanical system of the project in accordance with the prevailing & latest edition of the Philippines Mechanical Codes, Fire Code of the Philippines, Philippines Building Codes and all applicable standards including the requirements of the NDCP Student Dormitory.
- (b) Such applicable standards shall include NFPA 10 for Fire Extinguisher sizes & quantities, ASHRAE Standard 62.1 for Mechanical Ventilation system capacities sizing.
- (c) The mechanical installation of the project shall be as follows:
 - (i) Supply & install portable fire extinguishers of multi-purpose ABC type in all areas concerned in accordance with the latest edition of NFPA10 with a maximum travel distance of 22 meters.
 - (ii) Supply, install & test ceiling cassette exhaust fan complete with back draft damper, vent cap, PVC exhaust round duct, fan/duct hanger, electrical wiring to make the equipment operational. The fan shall be sized based on 70 cfm/water closet or urinal.

8. REVISIONS AND ADDITIONAL WORKS

- 8.1 Revisions and Additional Works necessary due to errors or fault of NDCP or those which are necessary to complete the requirements of this Terms of Reference shall be performed by the CF at no additional cost to NDCP.

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- 8.2 Delay, Extension of Time and Fortuitous Event shall be covered by the following:
- (a) In the event of delay in “The Project”, there shall be an extension that will be agreed upon by NDCP and the CF provided that: 1) the delay was not the Private Structural Consultant's fault; 2) NDCP will not incur additional cost; and 3) the extension shall not be more than thirty (30) calendar days from the deadline of the project.
 - (b) If the delay in the “The Project” is due to a fortuitous event, an extension time will be granted by NDCP provided that the CF was able to make a written notification within ten (10) calendar days from the date of the fortuitous event.
 - (c) Fortuitous Event shall mean strikes, lockouts or other industrial disturbances, acts of public enemy, war, blockades, insurrections, riots, landslides, earthquakes, storms, floods, washouts, civil disturbances, explosions, and other similar events, which are beyond the control of either party and which, with exercise of due diligence, neither party is able to overcome or which cannot be avoided by the CF or NDCP despite the exercise of due diligence.

9. OWNERSHIP AND CONFIDENTIALITY OF PLANS AND DOCUMENTS

- 9.1 All reports, drawings, documents and materials compiled or prepared in the course of the performance of “The Project” by the CF shall be absolute properties of the NDCP and shall not be used by the CF without the prior written consent of the NDCP.
- 9.2 The CF shall, at all times, keep in strict confidence and shall not disclose to any party any information, materials or documents provided by NDCP or any part of any report, drawings, documents and materials as well including all confidential information which the CF may acquire by reason of its engagement, except those which are generally known or available to the public.
- 9.3 The CF shall indemnify NDCP or any third person in the amount of no less than Fifty Per Centum (50%) of the contract cost as liquidated damages resulting from: (1) the disclosure or consequent unauthorized use of any of the confidential information: (2) any breach of the terms and conditions of this Terms of Reference or (3) provisions in the final contract to be executed between the CF and NDCP.

10. OVERALL PROJECT TIME SCHEDULE

The Private Structural Firm shall propose the most reasonable time schedule for the completion of the assessment. Please refer to Schedule of Requirements.

11. CF GENERAL RESPONSIBILITY

- 11.1 The CF shall provide the NDCP with complete plans, engineering reports such as technical analysis, maps and details regarding the existing conditions and proposed improvements within the site.
- 11.2 The CF shall be professionally liable for the design and must submit all signed & sealed plans and documents; same shall also produce a copy of the approved plans and documents to form part of the Assessment Report.

12. THE IMPLEMENTING AGENCY'S GENERAL RESPONSIBILITY

The implementing agency is the NDCP with final approval for all decisions and actions from the Bids and Awards Committee of the same.

The NDCP shall:

- (a) Prepare the pertinent documents in accordance with provided codes and standards and the conditions enumerated in these Terms of Reference.
- (b) Coordinate with the CF with regard to the procedures and completion of the scope of services.
- (c) Facilitate the proper conduct of assessment, in compliance with the stipulations in the Terms of Reference.

13. SUBMITTALS OF THE CF DURING THE PROJECT

The following submittals and accomplished documents shall be duly completed and turned-over by the CF:

13.1 DESIGN PHASE

- (a) Construction plans (signed and sealed) that include Architectural, Civil, Landscape Architecture, Structural, Electrical, Structured Cabling, Mechanical, Fire Protection and Plumbing plans (12 sets hardcopy and softcopy) Technical specifications (7 sets hardcopy and softcopy).
- (c) Detailed cost estimate (3 sets hardcopy and softcopy).

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- (d) Bill of quantities (3 sets hardcopy and softcopy).
- (e) Site survey, topographic survey, survey of existing trees, geotechnical report and all other pertinent data related to the conditions of the project site.
- (f) Documents required for securing the Building Permit
- (g) Drawings and reports that NDCP may require for the periodic update concerning the status of the design phase.

13.2 CONSTRUCTION PHASE

- (a) As-built plans (hardcopy and softcopy)
- (b) All necessary permits (Fees shall be included in the contract.)
- (c) Shop drawings (hardcopy and softcopy)
- (d) PERT-CPM
- (e) Test results
- (f) Guarantees, warrantees and other certificates
- (h) Fire and Life Safety Assessment Report 2 & 3 (FALAR 2 & 3)
- (i) Certificate of Occupancy
- (j) All other necessary documents to be required by National Defense College of the Philippines.

14. CODES AND STANDARDS

The project shall be designed, engineered, installed, tested, commissioned and handed over in conformity with the general policies of the NDCP and with the latest editions of the National Building Code of the Philippines, the National Structural Code of the Philippines, the Philippine Electrical Code, the National Plumbing Code of the Philippines, National Fire Code of the Philippines and other relevant codes and standards.

15. INSTALLATION AND WORKMANSHIP

Any errors, omissions, inconsistencies, inadequacies or failure submitted by the CF that do not comply with the requirements shall be rectified, resubmitted and reviewed at the CF cost. If the CF wishes to modify any design or document which has been previously submitted,

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reviewed and approved, the CF shall notify the procuring entity within a reasonable period of time and shall shoulder the cost of such changes.

16. MATERIALS

16.1 All materials and equipment shall be standard products of manufacturers engaged in the production of such materials and equipment and shall be the manufacturer's latest standard design. Refer to Section 7 - Design Criteria for the detailed specifications of the materials to be used.

16.2 The materials and workmanship supplied shall be of the best grade and constructed and / or installed in a practical and first class manner. It will be complete in operation, nothing being omitted in the way of labor and materials required and it will be delivered and turned over in good condition, complete and perfect in every respect.

17. CONTRACT PRICE AND TERMS OF PAYMENT

17.1 The NDCP shall pay CF the total amount of **EIGHTY FIVE MILLION PESOS (P85,000,000.00)**, inclusive of all taxes and incidental expenses.

17.2 Payments to the winning CF will be progress payments based on billings for actual works, as certified by the NDCP. In no case shall progress billing be made more than once every thirty (30) calendar days. Materials or equipment delivered on the site but not completely put in place or used in the project shall not be included for payment.

17.3 All progress payment shall be subject to retention of ten percent (10%) based on the amount due to the winning CF prior to any deduction. The total retention money shall be released only upon Final Acceptance of the Project. The winning CF may, however, request for its release prior to Final Acceptance subject to the guidelines set forth in R.A. 9184 and its Revised Implementing Rules and Regulations.

17.4 The CF may request in writing which must be submitted to form part of the Contract Documents, for an advanced payment equivalent to fifteen percent (15%) of the total Contract Price. The advance payment shall be made once the CF issues its irrevocable standby letter of credit from a reputable bank acceptable to NDCP, or GSIS Surety Bond of equivalent value, within fifteen (15) days from the signing of the Contract Agreement to cover said advanced payment.

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17.5 First Payment/Billing shall have an accomplishment of at least 20%.

17.6 The following documents must be submitted to NDCP before processing of payments to the CF can be made:

Progress Billing

- (i) Request for payment by the CF
- (ii) Pictures/photographs of original site conditions (for First Billing only)
- (iii) Pictures/photographs of work accomplished
- (iv) Payment of utilities (power and water consumption)
- (v) CF's affidavit (if accomplishment is more than 60%)

Note: The CF can bill NDCP of up to a maximum of 90% accomplishment.

18. DATA AND OTHER ASSISTANCE TO BE PROVIDED BY NDCP, AS AVAILABLE

18.1 NDCP shall provide data assistance to the CF inclusive of any available pertinent documents and other relevant technical information necessary for the execution and performance of the Consultant's duties; and

18.2 NDCP shall provide the venue free of charge, including the cost incurred by the participants from NDCP side and other data as available.

19. INDEPENDENT CONTRACTOR

No employer-employee relationship is created or shall arise between NDCP and the CF. As such, NDCP shall not be held liable for any damage, injury or death caused to the CF's employees and agents or third persons.