

## **SECTION 00630 DESIGN PARAMETERS**

PROJECT : DESIGN AND BUILD OF THE NATIONAL INSTITUTES OF HEALTH BUILDING

LOCATION : UP Manila, 625 Pedro Gil, Ermita, Manila

OWNER : UNIVERSITY OF THE PHILIPPINES MANILA

TO : \_\_\_\_\_ DATE : \_\_\_\_\_

### **ARCHITECTURAL DESIGN PARAMETERS**

#### **A. CODES AND STANDARDS**

The Architectural Works shall be in accordance with the following Laws, Codes and Standards.

##### **1.00 LAWS AND CODES**

- 1.1 PD 1096 or National Building Code of the Philippines and its Latest and Amended IRR
- 1.2 RA 9266 or The Architecture Act of 2004 and its Latest and Amended IRR
- 1.3 BP 344 or Accessibility Law and its Latest and Amended IRR
- 1.4 RA 9514 or Fire Code of the Philippines and its Latest and Amended IRR
- 1.5 Existing Local Codes and Ordinances

##### **2.00 STANDARDS**

- 2.1 Bureau of Product Standards
- 2.2 Underwriters Laboratory (UL)
- 2.3 Biosafety in Microbiological and Biomedical Laboratories, 5<sup>th</sup> Edition, United States Centers for Disease Control and the National Institutes of Health, Bethesda, MD.
- 2.4 Room ventilation testing as described in the US National Institutes of Health Certification Checklists for biosafety level 3 (BSL-3), animal biosafety levels 2 and 3 (ABSL-2 and ABSL-3).
- 2.5 Vivarium to seek accreditation by Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International)
- 2.6 International Standards Organization ISO 9001:2008 – Quality Management
- 2.7 United States Green Building Council LEED Sustainable Design certification
- 2.8 Integrated Resilient Design Program sponsored by the Science and Technology Directorate of the US Department of Homeland Security.

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## **B. GENERAL DRAWING GUIDELINES**

### **1.00 GENERAL**

- All drawings shall be computer drafted. Drawings shall be submitted both in printed and electronic copies.
- Keep the same orientation for all plans. The north orientation shall be indicated in all architectural plans. The orientation of the architectural plans shall be consistent with all the engineering plans.
- Existing buildings and new works shall be clearly indicated and labeled in site plans.
- Detailed plans shall have a scale not smaller than 1:50 meters.
- Spot detailed plans, elevations and sections shall have a scale not smaller than 1:20 meters.
- Avoid notes such as “see architectural detail” or “see structural”. Always refer with a callout to the specific detail drawing and sheet number.

### **2.00 SITE PLANS**

- The site plans shall have a scale not smaller than 1:200 meters.

### **3.00 FLOOR PLANS**

- All plans shall be 1:100 meters. The same scale shall be used for the rest of the architectural, structural, sanitary, plumbing, electrical and mechanical plans, except for each trade’s site plan, detailed plans and spot details.
- Elevation callouts shall be indicated on the floor plans and shall be consistent with the elevation drawing.
- Section line callouts on the floor plans shall be consistent with the section drawing.
- Floor plans shall be indicated with boxed room callout numbers, including the callout for floor finishes and wall finishes.
- Floor elevations shall be indicated in the floor plans. This shall be in reference to the natural grade line or the established finished floor lines of the adjoining existing buildings.
- The location of mechanical equipment, e.g. air conditioning shall be indicated in the floor plans. This shall be consistent with the mechanical and electrical plans.
- Door callouts shall be circles with proper numbering, e.g. D-01.
- Window callouts shall be hexagons with the proper numbering, e.g. W-01.

### **4.00 ELEVATIONS AND SECTIONS**

- Finish floor lines and top of truss lines shall be consistent in all the elevations, sections and structural plans and details.
- Floor-to-floor heights shall consider beam depths, mechanical ducting, cable trays and plumbing space above the ceiling, and optimum ceiling heights. Floor-to-floor heights shall not be less than the values indicated on the Schematic Plans.

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## **5.00 REFLECTED CEILING PLANS**

- Reflected ceiling plans shall be indicated with boxed room callout numbers, including the callout for ceiling finishes and lighting fixtures.
- Ceiling height relative and in reference to the finish floor line shall be indicated in the reflected ceiling plans in each rooms with boxed dimensions. This is to ensure that the ceiling heights of all rooms are established whether or not reflected in the sections.
- The description and location of the fixtures, e.g. lighting, smoke detectors, air condition vents, exhaust fans, in the reflected ceiling plans shall be consistent with the electrical and mechanical plans.

## **6.00 ROOF PLANS**

- Location of all downspouts shall be indicated in the roof plans.

## **7.00 DOORS AND WINDOWS**

- Door and window schedules shall indicate the type of door or window, the number of doors and windows, the location/s of the door or window, the materials and accessories included and other special specifications, e.g. color or finish.

## **8.00 DETAILS**

- Provide a minimum of one (1) section of a scale not smaller than 1:50 meters for each area preferably cut along the area with special construction design.
- Provide spot detail plans, elevations and sections of a scale not smaller than 1:10 meters for special designs with aesthetic treatment and ornamentation.
- Provide detail plan of a scale not smaller than 1:50 meters for all areas needing tile pattern, e.g. dwelling units, toilets, corridors, stairs, lobby, common areas, entrance walk, showing the position and pattern of tiles.
- Centerline location of plumbing fixtures shall be indicated in detail plan with lines of reference and its corresponding dimensions. This is to indicate the exact locations of the plumbing/sanitary roughing-ins.

## **9.00 COORDINATION DRAWINGS**

- During design development only, provide colored coordination floor plans and reflected ceiling plans that show the overlays of all relevant disciplines. The scale should not be less than 1:100 meters, with each professional assigned a unique color. A legend identifying the discipline and line or object colors shall be contained in each sheet.
- Responses to reviewer comments shall be noted in the forms supplied by the Construction Manager. Approval to proceed with Construction Documents (For Construction) shall be confirmed after designer's responses to reviewer comments on the coordination drawings have been accepted.
- Responses to reviewers comments on Design Development documents shall be back-checked in the Construction Documents prior to implementation.

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## **10.00 DRAWING QUALITY CONTROL**

- All drawings and specifications shall be signed and sealed by the licensed professional who performs quality control prior to submission of Design Development and For Construction deliverables.

## **C. SITE WORKS**

The Master Site Development Plan shall include the following:

1. Contour and survey of the lot, including bearing and dimensions of the property lines
  2. Road network, curbs and gutters, and sidewalks
  3. Parking spaces
  4. Reference location of existing trees, swales and waterways
  5. Reference location and footprint of proposed and existing buildings, with the corresponding building names and dimensions, including distances between adjacent buildings, and distances between buildings and the nearest property lines
  6. Reference location of utilities, e.g., water reservoirs, septic tanks, water treatment plant, powerhouse, transformers, waste storage area, security outposts.
- A porte-cochere shall be provided at the main entrance of the building. Where required, covered walkways shall be provided for access and connection to other buildings.
  - Ramps shall be provided in all main entrances of the buildings and other access opening to walkways leading to other buildings.

## **D. BUILDING ARCHITECTURAL WORKS**

### **1.00 FLOOR PLANS**

- The structural, sanitary, plumbing, electrical and mechanical designs are required to refer to the architectural plans and specifications in case of discrepancies. If an engineering design will have any possible conflict or interference on the architectural design, the latter may be adjusted provided that the aesthetic value will not be compromised.
- The architectural and engineering plans shall be consistent all throughout in terms of dimensions and locations of columns, beams, walls, roof line, conduits, ducts, pipes and fixtures, among others. Column and beam grid lines shall be consistent in all the architectural and engineering plans.
- Verify and coordinate floor plans with the mechanical, electrical and sanitary design with regard to the requirements for mechanical rooms, AHU rooms, pipe chase, and other engineering requirements.
- Public toilets shall have provisions and fixtures for persons with disability as required by BP 344. If enough space allows, toilets specially made and designed for persons with disability is preferable.

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## **2.00 WALLS**

- Exterior concrete walls shall be 200mm thick, while interior concrete walls shall be 150mm thick. This is indicative of the finished wall thickness including the plastering and tile works.
- Toilet wall tiles shall be at least 600mm x 600mm, unless otherwise specified. Toilet wall dimensions shall be based on the modular sizing of tiles to avoid tile serujo and or excessive tile wastage.
- Layout and work on wall and floor tiles must be aligned, plumb, level and square.
- All edges, corners and intersections of toilet tiles, including the top most tiles not reaching the ceiling shall be provided with polyvinyl chloride tile trims.
- Tile color and design shall be approved first before installation.

## **3.00 FLOORS**

- If floor tiles in two adjacent areas with different material, color or design meet at the door opening, the cut shall be located middle of the door thickness when in a closed position. Provide details in the floor pattern designs. Provide aluminum threshold, when required.
- Floors at the openings of toilets for persons with disability shall be sloping. Indicate in the plans and sections.
- Toilet floor tiles shall be at least 600mm x 600mm, unless otherwise specified. Toilet dimensions shall be based on the modular sizing of tiles to avoid tile serujo and or excessive tile wastage.
- Pantry and kitchen floor tiles shall be at least 600mm x 600mm, unless otherwise specified. Kitchen dimensions shall be based on the modular sizing of tiles to avoid tile serujo and or excessive tile wastage.
- Lobby and corridor floor tiles shall be 600mm x 600mm, unless otherwise specified.
- Layout and work on wall and floor tiles must be aligned, plumb, level and square.
- All edges, corners and intersections of toilet tiles, shall be provided with polyvinyl chloride tile trims.
- Tile color and design shall be approved first before installation.
- Laboratory flooring shall be anti-static, anti-microbial, seamless vinyl flooring or epoxy flooring.

## **4.00 CEILING WORKS**

- Ceiling height in corridors and laboratories should be planned to avoid conflicts between ductwork for exhaust, cable trays and plumbing. Determination of slab to slab height should consider beam depth which would limit the locations where room air supply and exhaust may run across.
- Soffit of exterior beams and slabs shall have drip moulds to prevent damage due to water seeping into the eaves or ceiling. Section details shall be required to show the drip mould.
- The direction of lighting fixtures shall be consistent in all building rooms with exterior windows.

## **5.00 DOORS AND WINDOWS**

- All entrance doors to offices and laboratories shall be frameless glass doors.
- Major entry ways that require security shall be installed with security access systems as required.
- Wall partitions facing or along the corridors shall be frameless glass partitions.
- Toilets and other wet areas shall have steel doors on steel frames.

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- Fire escape doors should be provided with panic hardware and door closers and shall conform to the requirements of the Fire Code of the Philippines.
- Aluminum frames of glass doors shall be powder-coated.
- Door finish and color shall be approved first before application.
- Window sills shall be slightly sloped outwards to prevent damage to windows and paint due to water seepage. Section details shall be required to show this slope.
- Door jambs with no moulding/casing installed on concrete walls shall have construction grooves all around. Provide details.
- All doors and windows shall have reinforced concrete lintel beams. Provide details.
- Laboratory doors and windows in high containment and barrier areas shall have stainless steel frames and sealable openings. Seals and room integrity will be subjected to testing
- All joints and openings in containment and barrier rooms shall be filled with the appropriate anti-microbial, food-grade, sterilizable joint sealant. Provide specifications for sealants to be used.

#### **6.00 STAIRS, RAMPS AND CORRIDORS**

- Ramps for persons with disability shall have a slope not higher than 1:12. Handrails and clearances shall conform with the requirements of BP 344.
- Regular stairs shall have risers at 150mm high and treads at 300mm wide. Handrails shall be at least 900mm high. Clearances shall conform to the requirements of the Fire Code of the Philippines.
- Corridors shall have a minimum unobstructed width of 1500mm. This shall be measured clear from the surface of the finished wall and not on-center of the rough CHB wall.
- Corridors and exit doors shall conform to the requirements of the Fire Code of the Philippines.

#### **7.00 FIXTURES AND ACCESSORIES**

- Electrical light switches shall be located by the knob side of the door.
- Electrical light switches and outlets shall be installed plumb and level.
- The backboxes of receptacles and switches shall be packed with expanding sealant prior to installation. The outside edges and screws on face plates or trims shall be sealed and wiped clean of excess sealant.

#### **8.00 ROOFING WORKS**

- The section of the concrete roof gutters shall be designed, in case of a clogged downspout, so that the overflow of water will be directed outside of the building and not towards the eaves or interior ceiling to prevent any damage. Provide membrane-type and integral-type waterproofing. Provide details.
- Avoid valley or inside gutters in roof design. But in cases required in aesthetic design, valley or inside gutters shall be in stainless steel or concrete gutters with membrane-type waterproofing, and the section shall be designed with a capacity for big volume to prevent any damage due to overflow. Provide details.
- Parapets, designed as a roof protection from the winds, must be designed to satisfy the preceding parameters. Provide details.

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- Concrete roofs shall be provided with membrane-type and integral-type waterproofing. Where roof space is to be developed into a roof deck garden, the proper drainage, insulation, waterproofing, vapor/thermal barriers and irrigation system shall be put in place. Provide details and mock-ups for approval prior to installation.
- The slope of a hipped roof shall not be less than 14 degrees.

## **9.00 PAINTING**

- Painted ceiling shall be in flat latex finish, while cornices and mouldings shall be in gloss enamel finish unless otherwise noted.
- Painted interior wall shall be at least in semi-gloss latex finish for rooms, unless specified to a higher type of paint.
- Paint in special rooms for containment or barrier areas shall be epoxy system.
- Painted exterior wall shall be at least in moisture-resistant/water-repellant solvent-based paint finish, textured or smooth, unless otherwise specified.
- Paint color and shade shall be approved first before application.

## **E. SPECIFIC REQUIREMENTS**

Provide spot detail plan and sections of the following:

1. Laboratory Bench Design and Construction
  2. Roof Garden Construction
  3. Gutter, eaves, and parapet
  4. Ceiling – cove light (if provided), special connections and design, moldings, valances
  5. Stairs – handrail and baluster design
  6. Ramps – handrail design and floor pattern
  7. Doors, windows, and gates – grille works
  8. Special Architectural Treatment and Design, e.g. façade design, special windows and doors
  9. Special Carpentry Works, e.g. partitions, cabinetry
  10. Other details as may be required
- Provide Room Data Sheets, including detail floor plan, ceiling plan and sections in coordination with the requirements of the electrical, sanitary and mechanical designs

## **F. SUMMARY OF MATERIALS**

- Materials to be used shall be fire-resistant, non-toxic, moisture-resistant and termite-resistant, e.g. fiber cement board, light-gauge steel frame, polyvinyl chloride ceiling panels.
- Wet areas, e.g. toilets, and kitchen shall use non-skid/non-slip granite or vitrified ceramic floor tiles.
- Heavy traffic areas, e.g. lobby, and corridor shall use heavy-duty seamless granite floor tiles or a higher type of floor material.
- Vinyl floor tiles (if considered) shall be homogenous and not less than 2mm thick.
- Ramps and stairs shall use non-skid/non-slip floor tiles, materials as specified.
- Aluminum T-runners shall be powder coated.

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- Metal rod hangers with adjustable clips, and not galvanized iron wires, shall be used to support and suspend the aluminum T-runners and light gauge metal furrings.
- Roofing sheets shall be Ga. # 24 aluminum-coated, pre-painted, pre-formed and long-span.

## **G. DRAWING REQUIREMENTS**

See Annex for Checklist.

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## **CIVIL/STRUCTURAL DESIGN PARAMETERS**

### **A. CODES AND STANDARDS**

The Civil/Structural Design shall be in accordance with the following Laws, Codes and Standards.

#### **1.00 LAWS AND CODES**

- 1.1 National Structural Code of the Philippines (NSCP) 2010
- 1.2 PD 1096 or National Building Code of the Philippines and its Latest and Amended IRR
- 1.3 BP 344 or Accessibility Law and its Latest and Amended IRR
- 1.4 Existing Local Codes and Ordinances

#### **2.00 STANDARDS**

- 2.1 Bureau of Product Standards (BPS)
- 2.2 Philippine National Standards (PNS)
- 2.3 DPWH Blue Book
- 2.4 American Concrete Institute (ACI)
- 2.5 American Society for Testing Materials (ASTM)
- 2.6 American Welding Society (AWS)

### **B. SITE WORKS**

#### **1.00 GENERAL**

Based on the Master Site Development Plan, provide where applicable complete design and details of road (concrete with curb gutter, including drainage) network, walkways parking areas and fencing.

1. The main driveway leading to the main entrance of the building shall be capable of two-lane traffic (at least 6.00 meters wide) with a minimum thickness of 150mm (8 inches). The perimeter road shall be capable of one way traffic. Concrete strength should be at least 3000psi. Roads shall be so designed to accommodate delivery vehicles.
2. Walkway should be at least 100mm thick with concrete strength of 2500psi. Ramps should be provided, instead of steps, for any change in elevations.
3. Parking area slabs should be at least 150mm thick with concrete strength of 3000psi.

### **C. BUILDINGS**

- The buildings should be designed using seismic importance factor of 1.25 for immediate occupancy category. Buildings should be designed in accordance with NSCP requirements up to magnitude 7 for those near seismic source Type A. Seismic gaps between buildings (old and new) should be properly observed.
- The buildings should be designed also using wind importance factor of 1.15 (especially for design of trusses/roofing system). Concrete gutters and parapet walls should be provided as additional protection to the roofing system during strong typhoons.

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- The structural designer should verify with Philippine Volcanology and Seismology (PHIVOLCS) the distance of the proposed building to the nearest active fault lines and with the DENR for geo-hazard mapping.
- The structural designer shall confirm the required fire ratings for building components based on the laboratory occupancy and design structural elements accordingly. Materials that have low or no volatile organic compounds should be used.
- The structural designer is encouraged to use fire-resistive and non-toxic materials.
- Geotechnical investigation or soil tests have been conducted on site to determine soil bearing capacity and recommended foundation design. The structural designer shall study the results and recommendations of these tests and take such into consideration in designing the appropriate foundation system for the building.

#### **D. SPECIFIC REQUIREMENTS**

The following shall be provided:

1. Connection details of beam and columns following the requirements of NSCP on confined areas.
2. Connection of trusses to beams and columns.
3. Splicing details of reinforcing bars on columns and beams and the required bar cut-off points.

#### **E. SUMMARY OF MATERIALS**

- Concrete shall be Portland cement and conforming to ASTM Specification C150, Type I to Type II.
- Coarse Aggregates shall consist of washed gravel, crushed stone or rock or a combination thereof conforming to ASTM C33.
- Concrete hollow blocks shall be a standard product of recognized manufacturer conforming to PNS 16 with at least 350psi strength.
- Reinforcing bars shall conform with PNS Grade 60 for 16mm diameter and above and PNS Grade 40 for 12mm diameter and below.
- Structural steel shall conform with ASTM A36.
- Bolts and studs shall conform with ASTM A325.
- Welding electrodes shall be E60 or E70 and conform with AWS D.1.1.

#### **F. DRAWING REQUIREMENTS**

See Annex for Checklist.

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## **SANITARY/PLUMBING DESIGN PARAMETERS**

### **A. CODES AND STANDARDS**

The Sanitary/Plumbing Design shall be in accordance with the following Laws, Codes and Standards.

#### **1.00 LAWS AND CODES**

- 1.1 National Plumbing Code of the Philippines (NPCP)
- 1.2 Sanitation Code of the Philippines
- 1.3 PD 1096 or National Building Code of the Philippines and its Latest and Amended IRR
- 1.4 RA 9514 or Fire Code of the Philippines and its Latest and Amended IRR
- 1.5 Existing Local Codes and Ordinances

#### **2.00 STANDARDS**

- 2.1 Bureau of Product Standards (BPS)
- 2.2 Philippine National Standards for Drinking Water
- 2.3 Underwriters Laboratory (UL)
- 2.4 National Water Resources Board (NWRB)
- 2.5 National Plumbers Association of the Philippines (NAMPAP)
- 2.6 Philippines Society of Sanitary Engineers, Inc. (PSSE)
- 2.7 Biosafety in Microbiological and Biomedical Laboratories, 5<sup>th</sup> Edition, United States Centers for Disease Control and the National Institutes of Health, Bethesda, MD.
- 2.8 Vivarium to seek accreditation by Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International)

### **B. SITE WORKS**

#### **1.00 GENERAL**

Based on the Master Site Development Plan, the Site Works shall provide complete layout of the following:

1. Storm Drainage Network, indicating Drainage Manholes and Pipe Culverts;
  2. Sewerage Pipe Network, indicating Sewage Manholes, Sewage Pipes and the location of the proposed Sewage Treatment Plant;
  3. Water Supply Network, indicating the location of Water Service entrance, Cisterns, Elevated Water Tank and proposed Pump House.
- The Storm Drainage Network shall accommodate the magnitude of peak rates of surface run-off including drainage coming from the buildings. The system shall be capable of handling the design flows routing to the designated outfall. For rainfall calculation and sizing of drainage pipes, refer to Table-D2, Appendix-D, National Plumbing Code of the Philippines and current rainfall record from PAG-ASA (250mm/hr).

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- The Sewerage Pipe Network design shall accommodate all sewage coming from all the facilities, conveyed by gravitational flow leading to the proposed or existing Sewage Treatment Plant.
- The Water Supply Network shall include the provision of Fire Hydrants, accessible Drinking Fountain that will serve as testing point for safe and potable water supply.

## **C. BUILDING FACILITIES SANITARY/PLUMBING SYSTEM**

### **1.00 SEWER LINE AND VENT SYSTEM**

- Provide complete Sewer Line and Vent System from all plumbing fixtures and floor drains, laid by gravity flow leading to the Sewage Treatment Plant (STP). For Demand Weight of Fixtures in Fixture Units, refer to Appendix-A, Table A-2, NPCP.

### **2.00 WASTEWATER LINE AND VENT SYSTEM**

- For all wash areas dealing and generating with oil/grease, provide separate Waste Line and Vent System and solely tap to the proposed Grease Trap and then connect its effluent to the Sewage Treatment Plant. For Estimated Demand Weight of Fixtures in Fixture Units, refer to Appendix A, Table A-2, NPCP.
- Laboratory effluent when hazardous should be treated prior to entry into the public sewer.

### **3.00 WATER LINE SYSTEM**

- Provide complete cold water supply pipes to all plumbing fixtures. Form the main water source, the water shall be pumped to the Elevated Water Tank (EWT) and conveyed to the fixtures by gravity system and or distributed to fixtures by transfer pumped with constant pressure through a Pneumatic Storage Tank, whichever is feasible.
- Provide complete hot water system with portable water heaters for selected areas as required and or specified by the Owner.

### **4.00 STORM DRAINAGE SYSTEM**

- Provide complete storm drainage system for all roofs, canopies, concrete ledges and balconies including condensate drains laid for gravity flow connected to a leader/pipe line leading to the natural ground level storm drainage network.
- Provide option to harvest stormwater for landscape irrigation or use in toilet through a grey water system.

### **5.00 FLOOR DRAINS**

- Provide floor drains in laboratories that have deep traps that can be filled less frequently to avoid odors for backing up into the laboratories.
- Provide floor drains as needed to conveniently capture condensate from equipment such as ice makers, controlled environment rooms, steam sterilizers, glassware washers.

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## D. SPECIFIC REQUIREMENTS

Provide details of the following:

1. Grease Trap
2. Cistern Tanks and Elevated Water Tanks (c/o Mechanical Engr)
3. Plumbing for laboratory sink located under counter with drains not penetrating the floor of the sink cabinet.
4. Details for plumbing lines at key equipment such as steam sterilizers, glassware washers, and mass spec equipment.
5. Details of plumbing for wall mounted emergency shower.
6. Pump locations and vibration and noise controls.
7. Effluent treatment method
8. Equipment for decontamination of rooms

## E. SUMMARY OF MATERIALS

- *Sewer and vent pipes*: unplasticized Polyvinyl Chloride (uPVC) extra series 1000 conforming to ISO 3633 ASTM D2729 including trims and fittings
- *Storm drainage pipes*: downspouts, unplasticized Polyvinyl Chloride (uPVC) extra series 1000 conforming to ISO 3633 ASTM D2729 including trims and fittings (BPS Certified)
- *Drainage pipes*: 250mm dia. and below, Non-Reinforced Concrete Pipe (NRCDP)  
300mm dia. and above, Reinforced Concrete Pipe (RCDP)
- *Drainage manholes*: Street inlet/curb inlet, Traffic Type Reinforced Concrete  
Area drain/catch basin, Reinforced Load Bearing CHB
- *Sewage manholes*: Traffic Type Reinforced Concrete with Standard Steel Brass Cover
- *Wastewater pipeline*: Extra Heavy (XH) Single Hub, Hubless Cast Iron Pipes and Fittings (CIP) conforming to ASTM Standard 888
- *Cleanouts*: Cast Iron Brass with counter sunk plug (BPS Certified)
- *Floor drains/Deck drains*: Cast Iron Brass (BPS Certified)
- *Gutter drains*: Cast Iron Dome Type Brass (BPS Certified)
- *Cold Waterline pipes*: for buildings, Polypropylene Pn20 Fusion Weld Pipes including Trims and Fittings (BPS Certified)
- *Hot Waterline pipes*: for buildings, Polypropylene Pn20 Fusion Weld Pipes including Trim and Fittings (BPS Certified)
- *Trench grating*: Galvanized/Stainless Steel Iron grates
- *Plumbing Fixtures including Trims, Fittings and accessories* (BPS Certified):
  - a) Water Closet – Tankless type, DFV
  - b) Lavatory – Pedestal/Counter type with C-sprout spray faucet
  - c) Laboratory Sink – Acid-resistant plastic laminates
  - d) Pantry/Kitchen Sink – Ga. # 16 Stainless steel seamless bowl with gooseneck faucet
  - e) Urinal – Wall hung flush valve type

## F. DRAWING REQUIREMENTS

See Annex for Checklist.

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## **MECHANICAL DESIGN PARAMETERS**

### **A. CODES AND STANDARDS**

The Mechanical Design shall be in accordance with the following Laws, Codes and Standards.

#### **1.00 LAWS AND CODES**

- 1.1 Mechanical Engineering Code of the Philippines
- 1.2 Sanitation Code of the Philippines
- 1.3 PD 1096 or National Building Code of the Philippines and its Latest and Amended IRR
- 1.4 RA 9514 or Fire Code of the Philippines and its Latest and Amended IRR
- 1.5 Existing Local Codes and Ordinances

#### **2.00 STANDARDS**

- 2.1 Bureau of Product Standards (BPS)
- 2.2 Philippine National Standards (PNS)
- 2.3 Underwriters Laboratory (UL) and Factory Mutual (FM)
- 2.4 International Electrotechnical Commission (IEC) 1988
- 2.5 National Fire Protection Association (NFPA)
- 2.6 Biosafety in Microbiological and Biomedical Laboratories, 5th Edition, United States Centers for Disease Control and the National Institutes of Health, Bethesda, MD.
- 2.7 Vivarium to seek accreditation by Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International)

### **B. BUILDING VENTILATION**

- Non-Laboratory Air Supply and Exhaust can recirculate and shall be separated from laboratory and vivarium ventilation systems.
- Laboratory and vivarium ventilation shall be on two different systems. Each type of space shall have a ventilation system shall provide the optimal number of air changes to meet or exceed biosafety guidelines, and realized energy savings based on benchmarks established among research facilities.
- Air that is exhausted from BSL-3, ABSL-2 and ABSL-3 spaces shall be HEPA filtered and non-recirculating to other areas of the building.
- Exhaust fans in BSL-3, ABSL-2 and ABSL-3 areas, as well as Fume hoods and similar fume or aerosol extraction devices shall avoid reversal of airflows through emergency power and room location.

### **C. SPECIFIC REQUIREMENTS**

Provide details of the following:

1. Air handlers, cistern tanks and elevated water tanks at mechanical penthouse.
2. Penetrations of ductwork and piping through containment and barrier walls.

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3. Section of wall partition at double door autoclave and canopy hood.
4. Section of wall partition at door of rack and cage wash equipment.
5. Relative room pressurization design for BSL-3, ABSL-2 and ABSL-3 spaces.
6. Laboratory exhaust and supply controls and balancing.
7. Laboratory ventilation access points for testing and balancing.
8. Laboratory fume hood and fume extraction locations.
9. HEPA filter locations and accessibility.
10. Auditorium ventilation system and silencers.
11. Vibration control methods for HVAC equipment and ducts.
12. Schedule of air handling equipment and electrical requirements for coordination.
13. Energy saving measures designed to decrease relative energy consumption.
14. Passive measures for providing indoor air comfort and monitoring indoor air quality.

## **D. DRAWING REQUIREMENTS**

See Annex for Checklist.

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## **ELECTRICAL DESIGN PARAMETERS**

### **A. CODES AND STANDARDS**

The Electrical Design shall be in accordance with the following Laws, Codes and Standards.

#### **1.00 LAWS AND CODES**

- 1.1 Philippine Electrical Code
- 1.2 National Electrical Code
- 1.3 PD 1096 or National Building Code of the Philippines and its Latest and Amended IRR
- 1.4 RA 9514 or Fire Code of the Philippines and its Latest and Amended IRR
- 1.5 Existing Local Codes and Ordinances

#### **2.00 STANDARDS**

- 2.1 Bureau of Product Standards (BPS)
- 2.2 Underwriters Laboratory (UL)
- 2.3 National Fire Protection Association (NFPA)
- 2.4 International Electrotechnical Commission (IEC)
- 2.5 Illumination Engineering Society (IES)
- 2.6 National Electrical Manufacturer's Association (NEMA)
- 2.7 Biosafety in Microbiological and Biomedical Laboratories, 5th Edition, United States Centers for Disease Control and the National Institutes of Health, Bethesda, MD.
- 2.8 Vivarium to seek accreditation by Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International)
- 2.9 United States Green Building Council LEED Sustainable Design certification
- 2.10 Integrated Resilient Design Program sponsored by the Science and Technology Directorate of the US Department of Homeland Security.

### **B. SITE WORKS**

Based on the Master Site Development, the Site Works shall provide complete Electrical layout of the following:

- 1. KVA rating and other specifications of Transformer
- 2. Switchgear requirements
- 3. Panelboard Layout
- 4. Electrical Metering Devices
- 5. Service Conductors and Conduit Layout
- 6. Grounding System
- 7. Emergency Standby Generators
- 8. Street and Perimeter Lighting System
- 9. Laboratory electrical panels and circuit breakers for laboratory equipment
- 10. Life safety features of electrical system in laboratories and auditorium
- 11. Lighting calculations for offices, laboratories, meeting rooms and auditorium
- 12. Energy saving measures to decrease relative energy consumption

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## **C. BUILDING FACILITIES ELECTRICAL SYSTEM**

### **1.00 LIGHTING SYSTEM**

- Provide and install adequate normal branch circuits for Lighting Systems to all areas using the standard Lighting Design Analysis. Utilize the standard illumination requirements per area of concern using the preferred particular type of luminaires.
- Provide LED lights for all areas, unless otherwise specified.

### **2.00 POWER SYSTEM**

- Provide and install adequate normal branch circuits for the Power System.

### **3.00 STANDBY/EMERGENCY SYSTEM**

- Provide and install adequate life safety and critical emergency branch circuits for lighting or utilization equipment connected to the alternate power source.

### **4.00 AUXILIARY SYSTEM**

- Provide and install provisions for the following Auxiliary System:
  - a) Communication System
    - Telephone System
    - Internet with Wi-Fi System
    - Public Address Paging System
    - Private Branch Exchange (PABX)
    - Closed Circuit Television System
    - Master or Cable Antenna Television
    - Fiber Optic Cable System
  - b) Fire Alarm System
  - c) Security System

### **5.00 LIGHTNING PROTECTION SYSTEM**

- The building lightning protection system shall include roof-mounted air terminals grounding conductors, ground rods, conduits, clamps, and auxiliary equipment as required for a complete and operational lightning protection system.

### **6.00 EARTHGROUNDING**

- The building electrical system should provide laboratories with earth-grounded connections. Laboratory equipment manufacturers may require earth-grounding and reliable power for special connections and services at the laboratory benches.

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## **D. SPECIFIC REQUIREMENTS**

Provide details of the following:

1. Lighting Fixtures/Luminaries
2. Panel board and Circuit Breakers
3. Switchgear and other Metering Devices
4. Electrical Equipment and other Special Equipment
5. Installation and Termination of Auxiliary and other Special Devices and Equipment
6. Power and Telephone Hand holes (as may be required)
7. Pedestal and Service Entrance to building
8. Grounding System Layout
9. Others as may be required

## **E. SUMMARY OF MATERIALS**

### **1.00 GENERAL LIGHTING LUMINAIRES**

Fixtures type shall be as indicated on the Lighting Layout Plan:

- LED lights shall be wall or ceiling mounted or recessed luminaires.
- LED fixture housing shall be copper-free aluminum with epoxy powder coat paint finish and the lens material shall be heat and impact-resistant glass or polycarbonate.
- Other special lighting requirements shall be as approved by the University.
- Adjust lighting design so that laboratory benches are provided with more light than office desks. Confirm that the LED lights used for calculations are the same as specified and approved for installation.
- Day lighting and indoor lighting should provide a consistent (high) level of light at laboratory benches without shadows.

### **2.00 WIRING DEVICES**

Wiring devices shall be non-automatic control devices, the contact is guaranteed by the pressure of the special spiral springs.

- Switches shall be of 15A, 250V or 300V except as otherwise noted and approved. Terminals shall be screw-type or quick-connected type.
- General use receptacle shall be 15A, 240V grounding type unless otherwise indicated on the drawings.
- Special purpose receptacles shall be as called for on the drawings or required by laboratory equipment. Matching plugs shall be supplied. The End user's equipment list shall determine locations of special purpose receptacles.

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### **3.00 PANELBOARDS AND CIRCUIT BREAKERS**

The Panel Board and Circuit Breakers shall be equipped with molded-case circuit breakers and shall be the type as indicated in the panel board schedule and details.

- Provide molded-case circuit breakers of frame, trip rating and interrupting capacity as shown on the drawings. The circuit breakers shall be quick-make, quick break, thermal-magnetic, trip-indicating and shall have common trip on all multiple breakers with internal trip mechanism.
- All current-carrying parts of the panel boards shall be plated. Provide solid neutral (S/N) assembly when required. The assembly shall be isolated from the enclosure.
- Panel boards serving laboratories should be near the door of the lab for access by staff.
- Circuit breakers for large equipment set-ups may be added in future so sizing of electrical equipment should be based on a fully occupied laboratory building.
- Provide laboratory equipment with dedicated circuit breakers as required by manufacturer's in the site facility preparation guides.
- Surface mounted raceways shall have a duplex receptacle spaced every 600 mm and circuit breakers shall be mounted on or at the raceways for safe shut-off during emergencies.
- GFI receptacles shall be used near wet areas per code.
- All receptacles shall be commercial grade with brushed metal face plates.
- All receptacles shall have labels or tags identifying the panel and circuit number as shown on the electrical power plans.
- All electric outlets shall be color-coded, i.e. metallic grey or approved color for outlets connected to emergency power source/ back-up generator.
- Sub-meters shall be provided for every individual Institute, office or laboratory space as indicated in the Schematic Plans or as specified by the University.

### **4.00 ELECTRICAL CONDUITS, BOXES AND FITTING.**

All conduits, boxes and fittings shall be standard rigid steel, zinc coated or galvanized.

- Rigid Steel Conduits (RSC)
- Rigid Metal Conduits (RMC)
- Intermediate Metal Conduits (IMC)
- Electrical Metallic Tubing (EMT)
- Unplasticized PolyVinyl Chloride (uPVC) if required shall be Schedule 40.

### **5.00 CONDUCTORS**

Wires and cables shall be of the approved type and unless specified or indicated otherwise, all power and lighting conductors shall be insulated for 600 volts.

- The conductors used in the wiring system shall be of soft-annealed copper having a conductivity of not less than 98% of that of pure copper and insulated for 60°C temperature.
- All conduits of convenience outlets and wire ways for lighting branch circuit homeruns shall be wired with a minimum of 3.5mm square in size.

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## **6.00 MASTER ANTENNA TELEVISION (MATV) AND CABLE TELEVISION (CATV) SYSTEM**

- Install provisions for MATV and CATV wiring pathways into program spaces.
- There shall be individual trunking for master antenna and cable television rising in the building.

## **7.00 STRUCTURED CABLING AND TELEPHONE SYSTEM**

- Install provisions for telephone systems to have conduit pathways going into individual program spaces.
- Install provisions for structured cabling in the ground floor (in anticipation of the proposed internet café).

## **8.00 FIRE DETECTION AND ALARM SYSTEM**

- The Fire Detection and Alarm System shall be of multiplex, microprocessor-controlled addressable or zonal conventional fire detection, alarm and communication system.
- The system shall consist of full integration automatic fire detection, voice alarm communication and fire fighters telephone system.
- The system shall consist of control station, mimic panel initiating and indicating devices, control modules and system of wirings.
- Actuation of the protective signaling system shall occur by manual pull station, automatic smoke or heat detector, sprinkler flow switch and tamper switch.
- The system shall be able to monitor the status of flow switches, supervisory switches and blowers installed at the Sprinkler System risers. These monitoring points are also addressable or the conventional zonal in the same way as the detectors are making them easily recognizable at the control panel.
- Occupant notification shall be accomplished automatically. Notification shall be the general, audible alarm type complying with the appropriate section of the NFPA.
- The system shall be installed with provision for future connection to the nearest fire services station in the locality.
- Fire alarm annunciators should comply with code requirements for each type of occupancy in mixed use buildings.

## **9.00 SECURITY SYSTEM**

- The Security System shall include intrusion detection and alarm, CCTV, access control or as may be required.
- A risk assessment of the security system in critical areas shall be made during design development and shall be recorded as a design reviewer's comment.

## **F. DRAWING REQUIREMENTS**

See Annex for Checklist.

*END OF SECTION 00630*

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