

# Design Standard.

Architecture, Structural, Mep system, Facade.

LSG Solutions provides construction management, design and advisory services in various sectors such as real estate, hospitality, medical, industrial and infrastructure.

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- schematic design
- design development
- construction documentation

# DESIGN STANDARD

ARCHITECTURE	PD* 10%	SD* 30%	DD* 70%	CD* 100%
MEP SYSTEMS		SD* 30%	DD* 70%	CD* 100%
STRUCTURAL		SD* 30%	DD* 70%	CD* 100%
FAÇADE		SD* 30%	DD* 70%	CD* 100%

## DESIGN BRIEF

- Area description And objectives
- Building type:
  - Residential
  - Commercial
  - Industrial
  - Hotel
  - Food & beverage
  - Multifunctional
  - Healthcare
  - Wellness
  - Entertainment
  - Other

## FUNCTIONAL ZONING

### Territory

- Outdoor parking lot
- Fencing construction site
- Greenery
- Playground
- Small architectural objects
- Sport grounds
- Outdoor swimming pool
- Other

### Building spaces

- Living
- Indoor parking lot
- Technical
- Commercial
- Office
- Conference room
- Spa
- Fitness
- Indoor swimming pool
- Food & beverage
- Other

SPACE QUANTIFICATION SCHEDULE

PRELIMINARY MASSING OF THE BUILDING

**CLIENT'S INSPIRATION (VISUAL/REFERENCES)**

DESIGN SCOPE

- Urban Development plan
- Vertical planning
- Landscaping
- Architecture
- Structural Engineering
- Indoor/outdoor engineering networks
- Interior Design
- Lighting Design
- Kitchen Design
- Construction logistics plan
- Other

**PROJECT DEADLINES AND DELIVERY STAGES**

COMMERCIAL PART AND PAYMENT TERMS

DESIGN STANDARDS

DRAWING REGISTER AND FORMAT

MATERIALS TO BE SUBMITTED BY THE CLIENT

PROJECT ORGANIZATION CHART

EXCEPTIONS

# ARCHITECTURE

# ARCHITECTURE

PD\*  
10%

SD\*  
30%

DD\*  
70%

CD\*  
100%



# PRELIMINARY DESIGN

Preliminary design is the stage in which general Architectural project location and design concepts are determined.

## RESEARCH OF THE TERRITORY

## TOPOGRAPHIC SURVEY

- Outlining the existing buildings in the area
- Outlining the existing above-ground and below-ground communications, networks
- Outlining the greeneries
- Graphic measurements of terrain (isohypses)

## GEOLOGICAL SURVEY

### RESULT OF ENGINEERING-GEOLOGICAL INVESTIGATION

- Introduction
- Conclusions and recommendations
- Physical-geographical conditions of the investigated area
- Physical-mechanical properties of soils
- Used literature
- Geotechnical task
- Engineering-geological studies program
- Topographical plan of the territory
- Results of point test of bedrock with spherical indenters
- The results of statistical processing of the results of point test of rocky rocks with spherical indenters (in natural and water-saturated states)
- Layout scheme of mining works and engineering-geological trenches, scale 1:500
- Engineering geological trenches I-I, II m-bi 1:100
- Geotechnical columns of works M-bi 1:100

**DETERMINATION OF ZONE/COEFFICIENTS**

**TAXATION OF GREENERY**

**HISTORICAL AND ARCHITECTURAL RESEARCH (IF APPLICABLE)**

**ENVIRONMENTAL IMPACT ANALYSIS (IF APPLICABLE)  
ANALYSIS OF THE IMPACT ON ADJACENT BUILDINGS (IF APPLICABLE)**

**DETERMINING THE STATUS OF THE EXISTING BUILDING**

## PRELIMINARY PREPARATION OF THE GENERAL PLAN

- **Determination of orientation**
- Zoning: determination of K1, K2, K3 coefficients
- **Determination of front, back and side setbacks according to the neighbors' lot lines**
- **Determinations of setback line**
- Traffic/transport schemes (taking into account the pedestrian carriageway)
- **Sketch**
- **Location of the building into the existing environment**
- Determination of shape/massing

## DEMOLITION: (IN CASE OF EXISTING BUILDING)

- Demolition organization project
- Demolition organization project expertise
- Demolition Impact report on adjacent Buildings
- Measurement drawings of existing building
- Required demolition permit for construction permit

## RECONSTRUCTION/RESTORATION (IN CASE OF EXISTING BUILDING)

- In the case of a building with historical/cultural heritage, the relevant expert's report
- A drawing of the existing building, which includes: plans, sections and wall elevations describing and fixing all wall cracks or other damages (if any)
- Determination of foundation conditions and base characteristics
- Expert technical examination of the building (must be visual and, if necessary, instrumental) determining the causes of deformations

## SPECIFYING THE TIMELINES OF THE STAGES

- Schematic Design
- Design Development
- Construction Documentation

## AN ARCHITECT'S VISION

- Functional, stylistic, theoretical

## DETERMINING THE APPROXIMATE BUDGET

## PERMIT ISSUES

- Receive the architectural-planning task from the municipality
- During the stage process, the Architect receives a project assignment or GRG from the municipality
- The initiation of the next stage is carried out by the

# SCHEMATIC DESIGN

## BUILDING SHAPE GENERATION AND DETERMINATION

- Building footprint
- Distance to property line (red line) and regulation line (blue line)
- Setback line

## DETERMINATION OF STRUCTURE

- Type of Structure
- Structural grid
- Structural height of floor and building
- Openings of staircases and elevators
- Preliminary determination of seismic joints and structural walls

## DETERMINATION OF TECHNICAL SPACES

- **Determination of rough area of technical spaces**
  - Location of technical space (indoor/outdoor)
  - **Load bearing requirements**
  - Assessment of the impact from the engineering/technical space (acoustics, vibration, temperature, ventilation, etc.)
  - Determination of the size and the location of horizontal/vertical engineering openings
- 
- Current stage (SD) is limited to technical consultation.
  - The design of the Structural part and Engineering details starts on the next stage (DD).



## INCORPORATION OF RESOLUTION 41 EXPERT

- Coordination of already existing zoning (staircases, elevators, corridors, evacuation exits, adaptation for PWD (a person with disabilities))
- Determination of fire safety norms

## EMERGENCY MANAGEMENT SERVICE

- Consulting with the Emergency Management Agency of the Ministry of Internal Affairs.

## REPORT OF COEFFICIENTS

- Development coefficient (k-1)
- Development intensity coefficient (k-2)
- Greening coefficient (K-3)

## TOTAL BUILD-UP AREA OF PROJECT

### TECHNICAL AND ECONOMIC PARAMETERS OF BUILDINGS

- GEA (Gross External Area) - outer perimeter
- NFA (Net Floor Area) - useful area

- It is possible to define additional specific areas upon request.

## STAGE DELIVERABLES

### GENERAL PLAN

- Location of existing buildings within cadastral boundaries
- Site access road
- Layout of outdoor parking lot
- Greenery Schematic Design
- Landscaping Schematic Design

## FLOOR PLAN

- Partition plan
- Space / Room areas
- External and internal openings - doors and windows
- Allocation of WCs with furniture
- Staircases/Elevators/Ramps
- Indoor car parking lots
- Circulation scheme
- Roof plan

## SCHEMATIC FACEDE OF THE BUILDING

## SCHEMATIC SECTIONS OF THE BUILDING

## STAIRCASES/ELEVATORS/RAMPS

## DESIGN TIMELINE

## DRAWING REGISTER

## VISUALIZATION/RENDERING

## INVOLVEMENT OF DISCIPLINES IN THE CURRENT PHASE

- Structural engineer
- MEP Group
- Resolution 41 Expert
- Transport scheme expert
- Other
  - Only after the approval of the current stage by the customer the initiation of the next stage is possible.

# DESIGN DEVELOPMENT

An important design stage on which the final construction documentation depends. A process where a general revision with argumentative reasons is allowed.

The design development is the phase during which the detailed design begins and the budget is determined. Various disciplines are involved in the process

- Structural Engineer
- MEP Engineer
- FLS Consultant/Resolution 41 Expert
- Interior designer
- Lighting consultant
- Facade engineer
- Kitchen technologist
- Landscape Designer
- Vertical planning specialist
- Acoustics consultant
- BOQ consultant
- Different consultants according to specific purpose

## STAGE DELIVERABLES

EXPLANATORY NOTE

DRAWING REGISTER

GENERAL PLAN

- Roof plans of the buildings
- Site access road and circulation scheme
- Outdoor parking lot and circulation scheme
- Greenery design according to the Dendrology
- Landscaping Design

## PLANS

- General structural scheme including structural columns, reinforced walls and seismic joints
- General arrangement plan
  - SSL, FFL and absolute level marks
  - Functions of spaces and areas/m<sup>2</sup>
  - **Marking of columns and vertical communication shaft**
  - Marking of windows/doors and curtail walls
  - **Types of drainage systems**
  - **Types of handrail systems**
  - **Furniture arrangement**
- Partition plan with internal and external door/window openings, wall types and dimensions
- **Reflected ceiling plan with ceiling types, heights and revision openings**
- Electrical plans with electrical and FLS fixtures
- Finish plan with the wall, ceiling and floor finish types and schedules
- **Roof plan with slopes and MEP equipment**
- **Enlarged detailed plans**

## DETERMINING THE AREAS OF THE BUILDING

- GEA - Gross External Area
- GEA - NFA - Net Floor Area
- Technical and Economical indicators of the project

## SECTIONS

- Informational sections of a functionally important part of the plans. A number of the sections is to be determined as needed
- SSL, FFL and Absolute level marks
- Implementations of vertical communication shafts and staircases
- Implementation of Elevators with Machinery space and pit
- Implementation of outdoor and Indoor Ramps with slopes
- Level marks of surrounding areas
- Enlarged detailed sections



## FACADES

- All elevations of the building with FFL and SSL level marks and other heights doors, windows, curtain walls and other façade elements
- Indication of materials with codes
- Level marks of surrounding areas
- Indication of handrail system with codes
- Indication of various architectural elements with codes
- With rainwater system
- Enlarged Detailed Elevations

## WALL TYPES

Wall detailed sections with finishing and connection details to the existing floor and ceiling

## FLOOR TYPES

Floor build-ups, with structural slab and other layers including finishing materials

## CEILINGS TYPES

Ceiling details, with structural slab, other layers and finishing materials

## STAIRCASES

- Detailed plans of the staircase, Indication of the ceiling, floor, wall and handrail types
- Detailed longitudinal and transverse sections of the staircases
- Detailed drawing of the railing arrangement

## ELEVATORS

- Detailed plan with dimensions of slab openings and cabin
- Detailed section displaying headroom and pit
- Details of the frame

## SPECIFICATIONS

- Exterior and Interior doors and windows specifications
- Curtain wall and window system specifications
- Handrail specifications
- Louver and grill specifications

## VISUALIZATION

- Visualization of façade
- Visualization of common interior spaces(if necessary)

## BOM (BILL OF MATERIALS)

# CONSTRUCTION DOCUMENTATION

The Design completion stage, with final design documentation.

**Document includes final and detailed design drawings coordinated with all disciplines involved in the project.**

STAGE DELIVERABLES

EXPLANATORY NOTE

DRAWING REGISTER

## MASTER PLAN AND AREA LANDSCAPING / ACCOMPLISHMENT PROJECT INCLUDES:

- Vertical planning including the ground floor of the building;
- Cross-sectional longitudinal and transverse profiles of the area;
- Plan with engineering networks;
- External floor types (showing the build-ups);
- Typical and non-typical details (with connection details);
- External Lighting Arrangement Plan;
- Greenery according to the dendrology project;
- Structural elements, (small architectural objects, support walls, structural solution barrier and curbs if necessary)
- Landscape furniture plan;
- Roof plans of the building(s);
- Site access road and circulation scheme;
- Outdoor parking lot and circulation scheme;

## FLOOR PLANS, REFLECTING:

- General structural scheme including structural columns, reinforced walls and seismic joints
- General arrangement plan:
  - SSL, FFL and absolute level marks
  - Functions of spaces and areas/m<sup>2</sup>
  - Marking of columns and vertical communication shaft
  - Marking of windows/doors and curtain walls
  - Types of drainage systems
  - Types of handrail systems
  - Furniture arrangement
- Partition plan with internal and external door/window openings, wall types and dimensions
- Reflected ceiling plan with ceiling types, heights and revision openings
- Electrical plans with electrical and FLS fixtures
- Finish plan with the wall, ceiling and floor finish types and schedules
- Roof plan with slopes and MEP equipment
- Enlarged detailed plans

## SECTION DRAWINGS:

- Informational sections of a functionally important part of the plans;
- SSL, FFL and Absolute level marks;
- Implementations of vertical communication shafts and staircases;
- Implementation of Elevators with Machinery space and pit;
- Implementation of outdoor and Indoor Ramps with slopes;
- Level marks of surrounding areas;
- Enlarged Detailed sections

## FACADE LAYOUT:

- All elevations of the building (With detailing) coordinated with the façade engineer.
- All elevations of the building with doors, windows, curtain walls and other façade elements;
- Indication of materials with codes
- Levels marks of surrounding areas
- Indication of external handrail system with codes;
- Indication of various architectural elements with codes;
- Indication lighting system with lighting fixtures;
- Façade lighting system with lighting fixtures
- **Enlarged Detailed Elevations.**



## WALL TYPES

- Detailed wall sections with finishes and connection details to the existing floor and ceiling
- Material Specifications (fire resistance, thermal insulation, sound insulation, etc.)
- Seismic and expansion joints

## FLOOR TYPES

- Floor build-ups, with structural slab and other layers including finishing materials
- Material Specifications (fire resistance, thermal insulation, hydro insulation, sound insulation, vapour barrier, etc.)
- Seismic and expansion joints

## CEILING TYPES

- Ceiling details, with structural slab, other layers and finishing materials
- Indication of access hatches
- Seismic and extension joints

## STAIRCASE DRAWING

- Detailed plans of the staircase, indication of the ceiling, floor, wall and handrail types
- Detailed longitudinal and transverse sections of the staircase showing the FFL and SSL levels on the floor slab and middle floor slab
- Detailed drawing of the railing arrangement

## ELEVATOR DRAWING

- Detailed plan with dimensions of slab openings and cabin
- Detailed section Showing headroom and pit
- Details of the frame
- Considering the openings for a call button and a control panel

## INTERIOR ELEVATIONS, FOR THE WALL WITH SPECIFIC DETAILS

## SPECIFICATIONS

- Exterior and Interior doors and windows specifications
- Characteristics of glass
- Handrail specifications
- Louvers and grills specifications
- Specification of insulating materials: (Hydro, sound, steam, heat and others)
- Specifications of finishing materials
- Detailed annotation of all materials that are considered in the design work

## VISUALIZATION

Rendering, closer to the real project. (With appropriate quality and resolution of materials);

## SITE FOUNDATION MARKINGS / TRACING PLANS

Whole floor plan with columns grids, shear walls and edges of the slabs in the overall coordination system.

## BOM (BILL OF MATERIALS)

## BOQ (BILL OF QUANTITIES) WITH PRICES

## DETERMINING THE AREAS OF THE PROJECT BUILDING

- GEA - Gross External Area
- GEA - NFA - Net Floor Area
- Technical and Economical indicators of the project

# MEP SYSTEMS

# MEP SYSTEMS

SD\*  
30%

DD\*  
70%

CD\*  
100%

- Design deadlines and delivery stages

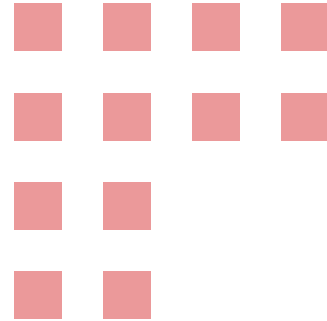
Submission of project documentation is carried out in three stages

- Stage #1 – 30%, Schematic Design
- Stage #2 – 70%, Design Development
- Stage #3 – 100% Construction Documentation

# SCHEMATIC DESIGN

## MEP SYSTEMS

Determining design criteria and preparation of design brief. Coordination with architect, system selection.



## Explanatory Notes with standards proposed system description & etc

Basis for design:

- 1.1.1 Design standards;
- 1.1.2 Codes of architectural drawings;
- 1.1.3 Thermal data of the building envelope;
- 1.1.4 Technical task;
- 1.1.5 Technological task;
- 1.1.6 Climatic data;
- 1.1.7 Description of each system. Each system should have:
- 1.1.8 Dedicated abbreviation;
- 1.1.9 Source of systems, main components, and source locations;
- 1.1.10 Service area;
- 1.1.11 Special features;
- 1.1.12 Description of locations and materials of main ducts and pipes;



## Floor layouts of engineering networks included:

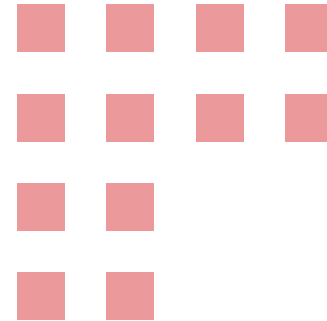
- 2.1 Determination of location and configuration of technical area;
- 2.2 Determination of approximate configuration of vertical shafts and horizontal openings;
- 2.3 Determining the approximate configuration (weight and dimensions) of the central equipment;
- 2.4 Identifying preliminary locations and type of indoor equipment;
- 2.5 Determining the approximate routing & dimensions of the main installations;
- 2.6 Preliminary determination of required installation heights;
- 2.7 Information about equipment impact such as acoustics, vibration, temperature, ventilation, etc.;

## Preliminary mechanical load calculations

# DESIGN DEVELOPMENT

## MEP SYSTEMS

Preparing calculation report, identifying central equipment arrangement and main route of installations.



## 1. Explanatory note including:

- 1.1 Basis for design:
  - 1.1.1 Design standards;
  - 1.1.2 Codes of architectural drawings;
  - 1.1.3 Thermal data of the building envelope;
  - 1.1.4 Technical task;
  - 1.1.5 Technological task;
  - 1.1.6 Climatic data;
- 1.2 Description of each system. Each system should have:
  - 1.2.1 Dedicated abbreviation;
  - 1.2.2 Source of systems, main components and locations of source;
  - 1.2.3 Area of service;
  - 1.2.4 Special features;
- 1.3 Description of locations and materials of main ducts and pipes;
- 1.4 Explanation of working logic for control system;

## 2. Preliminary mechanical schedule of equipment;

## 3. Engineering calculation reports, including;

- 3.1.1 Hydraulic calculation;
- 3.1.2 Aerodynamic calculation;
- 3.1.3 Heat gain & loss calculation;
- 3.1.4 Air balance sheet;
- 3.1.5 Lighting intensity calculation;
- 3.1.6 Electrical load calculation;
- 3.2 Voltage drop & short circuit calculation;
- 3.3 Grounding & lightning protection calculation;
- 3.4 Cable sheet;
- 3.5 Back-up equipment calculation.

## 4. Floor layouts of engineering systems, including:

- 4.1 Pipeline layout indicating installation sizes, valves & other relevant elements;
  - 4.1.1 Tags of type and size of pipes;
  - 4.1.2 Tags of equipment according to number of rooms;
  - 4.1.3 Tags of pipes when go to another level or another building;
  - 4.1.4 Locations of valves;
  - 4.1.4 Technological task;
  - 4.1.5 Legend with explanation of all tags and systems;
  
- 4.2 Air Duct layout indicating installation sizes, dumpers, grills & other elements;
  - 4.2.1 Tags of type and size of ducts;
  - 4.2.2 Tags of equipment according to number of rooms;
  - 4.2.3 Tags of ducts when go to another level or another building;
  - 4.2.4 Locations of valves;
  - 4.2.5 Legend with explanation of all tags and systems;
  
- 4.3 Explication of rooms with number according to heat/air balance table;
- 4.4 Cable tray layout indicating sizes and appropriate fittings;
- 4.5 Cable distribution plan, indicating installations sizes;
- 4.6 Lighting plan, indicating types of fixtures;
- 4.7 Switch & Sockets plan, indicating types of fixtures;
- 4.8 Electrical Distribution Boards layout.

## 5. Mechanical systems riser diagram including

- 5.1 Explication of rooms with number according to heat/air balance table;
- 5.2 Schematic designation of equipment;
- 5.3 Airflow of supply and exhaust terminals;
- 5.4 Airflow of AHUs and fans;
- 5.5 Designation of valves (Kv, DN, etc.);
- 5.6 Preliminary heating and cooling capacity of equipment;
- 5.7 Tags of pipes and ducts;
- 5.8 Legend with explanation of all tags and systems;

6. Single line diagrams for Electrical systems; indicating electrical components and loads;

7. Indoor & Outdoor equipment layouts;

8. Arrangement drawing of central MEP Rooms;

**9. Preliminary definition of equipment capacities;**

10. Section drawings of critical intersections

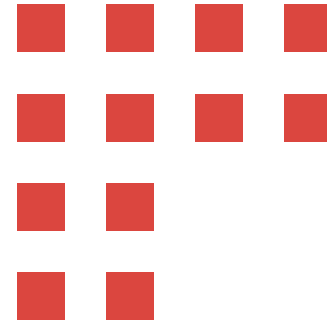
11. Final mechanical load calculations;

12. Preliminary BoQ

# CONSTRUCTION DOCUMENTATION

## MEP SYSTEMS

Final coordination with all discipline, checking engineering calculations, final drafting. Preparation of specification and material take-off.



■ SCHEMATIC DESIGN ■ DESIGN DEVELOPMENT ■ CONSTRUCTION DOCUMENTATION



## EXPLANATORY NOTE WITH STANDARDS, SYSTEM DESCRIPTION & ETC

- 1.1 Basis for design:
  - 1.1.1 Design standards;
  - 1.1.2 Codes of architectural drawings;
  - 1.1.3 Thermal data of the building envelope;
  - 1.1.4 Technical task;
  - 1.1.5 Technological task;
  - 1.1.6 Climatic data;
- 1.2 Description of each system. Each system should have:
  - 1.2.1 Dedicated abbreviation;
  - 1.2.2 Source of systems, main components and locations of source;
  - 1.2.3 Area of service;
  - 1.2.4 Special features;
- 1.3 Description of locations and materials of main ducts and pipes;
- 1.4 Explanation of working logic for control system;
- 1.5 Table of rooms with designed indoor parameters (DB temperatures, level of humidity, etc.)

### 2. Final mechanical schedule of equipment;

### 3. Final engineering calculation reports, including:

- 3.1 Hydraulic calculation;
- 3.2 Aerodynamic calculation;
- 3.3 Heat gain & loss calculation;
- 3.4 Air balance sheet;

- 3.5 Calculations related to size of equipment and materials (if necessary):
  - 3.5.1 Calculations of expansion tanks volume;
  - 3.5.2 Calculations of insulation thickness;
  - 3.5.3 Calculations of pressure opening of safety valves;
  - 3.5.4 Calculations of volume of tanks;
  - 3.5.5 Calculations of pipes extensions compensation;
  - 3.5.6 Other
- 3.6 Lighting intensity calculation;
- 3.7 Electrical load calculation;
- 3.8 Voltage drop & short circuit calculation;
- 3.9 Grounding & lightning protection calculation;
- 3.10 Cable sheet;
- 3.11 Back-up equipment calculation.

#### 4. Detailed floor layouts of engineering systems, including:

- 4.1 Pipeline layout indicating installation sizes, valves & other relevant elements;
  - 4.1.1 Tags of type and size of pipes;
  - 4.1.2 Tags of equipment according to number of rooms;
  - 4.1.3 Tags of pipes when go to another level or another building;
  - 4.1.4 Locations of valves;
  - 4.1.5 Legend with explanation of all tags and systems;
  - 4.1.6 Dimensions between pipes and between pipes and building structures;

- 4.2 Air Duct layout indicating installation sizes, dumpers, grills & other elements;
  - 4.2.1 Tags of type and size of ducts;
  - 4.2.2 Tags of equipment according to number of rooms;
  - 4.2.3 Tags of ducts when go to another level or another building;
  - 4.2.4 Locations of valves;
  - 4.2.5 Legend with explanation of all tags and systems;
  - 4.2.6 Dimensions between ducts and between ducts and building structures;
- 4.3 Cable tray layout indicating sizes and appropriate fittings;
- 4.4 Cable distribution plan, indicating installations sizes;
- 4.5 Lighting plan, indicating types of fixtures
- 4.6 Switch & Sockets plan, indicating types of fixtures;
- 4.7 Electrical Distribution Boards layout.

## 5. Riser diagram for Mechanical system, indicating building spaces, water & air flow, equipment capacities & etc.

- 5.1 Explication of rooms with number according to heat/air balance table;
- 5.2 Schematic designation of equipment;
- 5.3 Airflow of supply and exhaust terminals;
- 5.4 Airflow of AHUs and fans;
- 5.5 Designation of valves (Kv, DN, etc.);
- 5.6 Heating and cooling capacity of equipment;
- 5.7 Settings of valves;
- 5.8 Tags of pipes and ducts;
- 5.9 Legend with explanation of all tags and systems;

## 6. 3D or axonometric schemes of mechanical systems including:

- 6.1 Tags with sizes of pipes and ducts;
- 6.2 Airflow of supply and return terminals;
- 6.3 Airflow of AHUs and fans;
- 6.4 Locations of valves;
- 6.5 Tags of valves (with settings if exist);
- 6.6 Marks of levels;
- 6.7 Legend;

## 7. Single line diagrams for Electrical systems, indicating electrical components and loads

## 8. Indoor & Outdoor equipment layouts;

## 9. Detailed Arrangement drawing of central MEP Rooms, including sections;

## 10. Abbreviations and typical installation details;

## 11. Section drawings of critical intersections;

## 12. Equipment detailed schedules;

## 13. Recommended spare parts and list of manufacturers;

## 14. Final Mechanical Load calculations;

## 15. Detailed BoQ;

External Networks, CD stage – 100%  
Explanatory note with standards, system description & etc.;  
Engineering calculations;  
Site layout, reflecting utility arrangement;  
Building connection details, incl. penetration, Levels & etc.  
Utility profile drawings, reflecting levels, slopes & etc.  
Typical installation details;  
Material Take-off & detailed specifications;  
The Bill of Quantities (BoQ).

### **Additional Notes for MEP Systems;**

- Engineering reports, including heat loss, sun radiation heat gains, hydraulic, etc., must be completed in a specialized program and electronically attached to the project;
- All MEP equipment & elements on layout drawings, including fixtures, must be to scale;
- MEP fixture layouts should be coordinated with interior / architectural shop-drawings
- The planning of engineering equipment should take into account the possibility of their further service, the drawings should include inspection hatches, access, etc.;
- The Bill of Quantities (BoQ) must be well detailed and fully reflect the information on the specific component (diameter, material, pressure, etc.);
- The general specification of materials should provide complete information on all components contemplated by the project, referring to the standards.
- Desired font is ISOCPEUR with angle 15 degrees. But it is acceptable any readable font.
- Size of fonts: 2.5 mm, 3.5 mm, 5 mm. In some cases 1.8 mm is acceptable.
- Scale of drawings - 1:2, 1:2.5, 1:4, 1:5, 1:10, 1:15, 1:20 – for details;  
1:25, 1:40, 1:50, 1:75, 1:100, 1:200 – for plans;
- It is possible to use another non-standard scale in case required.
- Heat air balance should include all type of heatgains (sun radiation, heat transfer, from people, from equipment, from dishes, etc.); moisture gains (from people, from equipment, etc.); supply and return of airflows for each room.
- Equipment should have real scaled dimensions;

# STRUCTURAL

# STRUCTURAL

SD\*  
30%

DD\*  
70%

CD\*  
100%

- Design deadlines and delivery stages

Submission of project documentation is carried out in three stages

- Stage #1 – 30%, Schematic Design
- Stage #2 – 70%, Design Development
- Stage #3 – 100% Construction Documentation

## STRUCTURAL PROJECT COMPOSITION

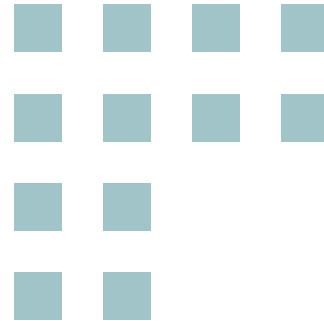
- Explanatory Note
- Foundation pit plans and sections;
- Foundation pit soil/ground strengthening plan;
- Temporary structural design/elements layout/plan;
- Foundation plan, reinforcement, sections;
- Waterproofing/hydro insulation work' plan;
- Concrete walls, ramps, plans, sections and other underground structural elements' drawings.



# SCHEMATIC DESIGN

## STRUCTURAL

Provides coordination with architectural layouts,  
recommend alternative solutions and underline hard details.



**DRAWINGS OF VERTICAL STRUCTURAL ELEMENTS (COLUMNS, PYLONS, STIFFNESS DIAPHRAGMS, ELEVATOR SHAFTS, STIFFNESS CORES ...) BY FLOORS**

**PLANS OF STRUCTURAL BEAMS BY LEVELS**

STRUCTURAL SLABS' PLANS BY FLOORS

**STAIRCASE STRUCTURAL ELEMENTS' DRAWINGS BY FLOORS/LEVELS**

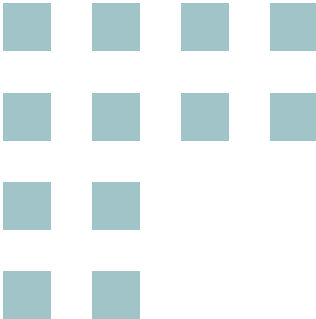
**ELEVATION PLAN OF THE STRUCTURAL (VERTICAL AND HORIZONTAL) ELEMENTS**

**SECTION DRAWINGS OF ALL THE ABOVE-MENTIONED STRUCTURAL ELEMENTS**

# DESIGN DEVELOPMENT

STRUCTURAL

Assembly of building frame based on calculation report, preparing of drawings, including details.



## CONSTRUCTION PROJECT COMPOSITION

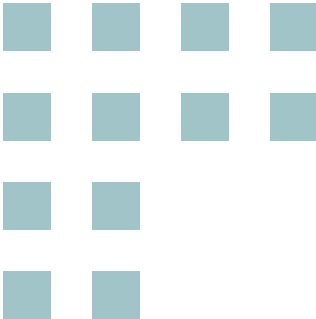
- **Explanatory Note**
- Structural calculation/modelling in LIRA (software)
- **Foundation Excavation pit plans and sections**
- Foundation pit soil/ground strengthening plan
- Temporary structural design/elements layout/plan
- **Detailing of compacted soil arrangement under the foundation**
- **Foundation plan, reinforcement, sections, joints**
- Waterproofing/hydro insulation work's plan
- Plans of reinforced walls, ramps and other underground structures, reinforcement, sections and joints
- Drawings of vertical structural elements (columns, pylons, stiffness diaphragms, elevator shafts, stiffness cores ...) by floors

- Structural beams' plans by floors
- Structural Roof slab plans by floor
- Plans of staircases structures by floors
- Disassembly of the longitudinal and transverse frames and elevations of the frame
- Section drawings of all the above-mentioned structural elements with proper and detailed cuts, and connection details (tie knots)
- Detail drawings of seismic and anti-vibration joints
- Detailing of sealing elements and joints
- Detailing of protective measures (anti-corrosion, fire, etc.) of structural elements
- Openings arrangement detailed plan/layout
- Drawings of Engineering/Technological equipment anchorage/foundation details and structure

# CONSTRUCTION DOCUMENTATION

## STRUCTURAL

Final coordination with all discipline, checking engineering calculations, final drafting.  
Preparation of specification and material take-off.



## CONSTRUCTION PROJECT COMPOSITION

- **Explanatory Note**
- Structural calculation/modelling in LIRA (software)
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- **Plans of reinforced walls, ramps and other underground structures, reinforcement, sections and joints**
- **Drawings of vertical structural elements (columns, pylons, stiffness diaphragms, elevator shafts, stiffness cores ...) by floors**

- Structural beams' plans by floors
- Roof plans by floor
- Plans of staircases structures by floors
- Elevation plan of the structural (vertical and horizontal) elements
- Section drawings of all the above-mentioned structural elements with proper and detailed cuts, and connection details (tie knots)
- Detail drawings of seismic and anti-vibration joints
- Detailing of sealing elements and joints
- Detailing of protective measures (anti-corrosion, fire, etc.) of structural elements
- Openings arrangement detailed plan/layout
- Drawings of Engineering/Technological equipment anchorage/foundation details and structure
- **Bill off Materials and Bill of quantities**



# FAÇADE.

# FAÇADE.

SD\*  
30%

DD\*  
70%

CD\*  
100%

- Design deadlines and delivery stages

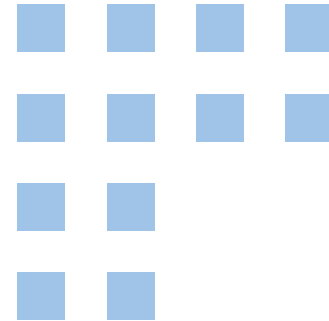
Submission of project documentation is carried out in three stages

- Stage #1 – 30%, Schematic Design
- Stage #2 – 70%, Design Development
- Stage #3 – 100% Construction Documentation

# SCHEMATIC DESIGN

## FAÇADE SYSTEMS

Provides coordination with architectural layouts,  
recommend alternative solutions and underline hard details



**DETERMINATION OF DESIGN STANDARDS****ESTABLISHING DESIGN LOADS**

including - wind, snow, seismic, temperature impact and others

**AN OVERVIEW REPORT OF ARCHITECTURALLY PRESCRIBED FACADE SYSTEMS**

with relevant conclusions and recommendations

**DETERMINATION OF BASIC TECHNICAL PARAMETERS OF GLASS AND SUPPORTING PROFILES**

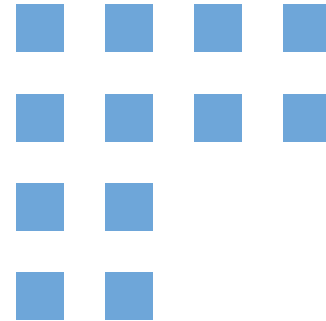
including heat transfer coefficient (U-Value); solar penetration factor (solar factor); glass types (glass-package, frosted, laminated, tinted); profile types and others;

**SECTION DRAWINGS OF CRITICAL INTERSECTIONS**

# DESIGN DEVELOPMENT

## FAÇADE SYSTEMS

Preparing calculation report, Selecting certain profiles  
and system solutions. Preparation of shop drawings



## DESIGN DEVELOPMENT

- Explanatory Note - with an overview of the technical solutions required for the realization of the system established by the architecture, indicating the used software, conveying the basic parameters established and agreed upon by the schematic design, etc.
- Spatial report of the facade system with authorized software, which at least includes and is not limited to - wind load report, seismic report, structure spatial report on structural loads, etc.
- **Information on the acoustic and fire resistance parameters** of the system
- Façade elevation, adding vertical and horizontal profiles
- **Sections of the facade system**, by applying the glazing and profile scales determined by the selected system to the scale
- Detailing of moving (removable) elements planned in the façade (glazing)

**DETAILING OF MOVING (REMOVABLE) ELEMENTS PLANNED IN THE FAÇADE (GLAZING)**

**DETAILING OF FASTENING PROFILES TO THE MAIN SUPPORTING CONSTRUCTION**

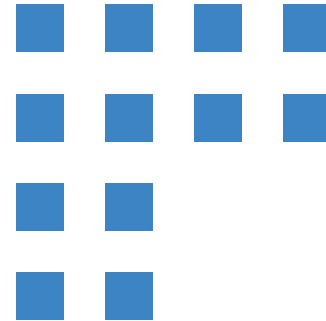
**DETAILING THE CLOSURE TO THE BUILDING, SHOWING ALL NON-TYPICAL NODES**

**TECHNICAL SPECIFICATION OF PLANNED ACCESSORIES**

# CONSTRUCTION DOCUMENTATION

## FAÇADE SYSTEMS

Final coordination with all discipline, checking engineering calculations, final drafting. Preparation of specification and material take-off.





- **Explanatory Note** - tage with basic parameters established and agreed upon by the project and overview of technical chang
- Refined **spatial reports** of the facade system
- **Façade elevations**, adding vertical and horizontal profiles
- **Sections** of the facade system, by applying the glazing and profile scales determined by the selected system to the scale
- **Detailing of fastening profiles** to the main supporting construction

**DETAILING OF FASTENING PROFILES TO THE MAIN SUPPORTING CONSTRUCTION**

**DETAILING THE CLOSURE TO THE BUILDING, SHOWING ALL NON-TYPICAL NODES**

**ESTABLISHING REQUIREMENTS FOR WARRANTY CONDITIONS OF USED MATERIALS**

**FORMING A REQUEST FOR A SAMPLE OF THE SELECTED SYSTEM**

**SECTION DRAWINGS OF ALL THE ABOVE-MENTIONED STRUCTURAL ELEMENTS**

**BILL OF QUANTITIES (BOQ), BY DETERMINING THE AREAS OF INDIVIDUAL DISSIMILAR SURFACES, AS WELL AS BY ADDING PROFILES, GLASS AND OTHER INTEGRATED ELEMENTS**

## CONSTRUCTION PROJECT COMPOSITION

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## PROJECT DOCUMENTATION NUMBERING AND FORMAT

BTH - LSG - WR - REP - 001 - R00

PROJECT CODE

ORIGINATOR CODE

DOC DISCIPLINE CODE

DOC. TYPE CODE

**SEQUENCE NO.**

REVISION

## DESIGN DRAWING NUMBERING AND FORMAT

BTH - LSG - AR - A - L01 - 100 - R00

PROJECT CODE

ORIGINATOR CODE

DOC DISCIPLINE CODE

**BUILDING CODE**

LEVEL CODE

**SHEET TYPE/SEQ. NUMBER**

REVISION CODE

- The design company must submit documentation both electronically and at least 3 copies in hard format
- A project submitted in electronic format must include both a working format **(DWG,RVT,PLA) and PDF files**
- The updated design document should consist of: an updated info, revision number and a revision cloud
- Project title information : Name, address and contact information of the company and disciplines involved

LSG  
■ solutions ■