

**PPP Study Notes – Programming, Planning & Practice Section**

15 min Intro  
2 hr 85 multiple choice  
15 min break  
15 min intro  
1 hr Site zoning vignette  
15 min exit questions  
4 hours total

**Critical things to remember:**

FAR (Floor Area Ratio) =  $\frac{\text{gross floor area}}{\text{Site area}}$   
Efficiency factor has no bearing\*

One acre = 43,560 sf

Allow 400 sf per car for parking & circulation

Project construction budget = 85% construction costs  
15% surveys, testing, fees, furnishings

Building Efficiency = Net Area / Gross Area

## **Programming & Analysis Topics:**

### **Problem Seeking – William M. Pena - 24 programmatic concepts:**

1. Phasing – project must be completed in stages to accommodate cost or time constraints

### **Floor Area Ratio (FAR)**

$$\text{Floor Area Ratio} = \frac{\text{Total building area}}{\text{Total site area}}$$

### **Programming Process: (short)**

1. State broad objectives & problems
2. Develop functional requirements described by size & relationships
3. Develop detailed requirements

### **Programming Process: (long)**

1. Establish objectives / goals
  - a. Primary
  - b. Secondary
  - c. Tertiary
  - d. Etc.
2. Collect Data
  - a. Site
  - b. Costs
  - c. Spatial requirements
  - d. Systems
3. Formulate Relationships
  - a. Elements
  - b. Components
  - c. Sub-groups
  - d. Interrelationships
4. Establish Priorities
  - a. Primary functions
  - b. Secondary (servant) functions
  - c. Locational priorities
  - d. Circulation priorities
5. Program Statement
  - a. Review and refine draft statement
  - b. Proof of concept analysis of draft
  - c. Final Statement

### **Programming Process (other):**

1. Owner describes project goals
2. Collect data
3. Develop programmatic concepts
4. Reconcile list of spaces with project budget
5. Define the problem

**Programming Statement** – states the problem but does not offer a solution or strategy

**Design Concept** – suggests a physical solution to a problem

**Functional Program** – provides raw data for analysis and development of a Facilities Program; sometimes provided by an owner as standard space requirements

**Facilities Program** – considers scope, area requirements, adjacencies, costs and site analysis

**Programming Framework Matrix / Index:**

	Goals	Facts	Concepts	Needs	Problem
Function					
Form					
Economy					
Time					

Need	Context	Form
• Space requirements	• Site	• Zoning
• Relationships	• Zoning	• Circulation
• Priorities	• Services	• Structure
• Processes	• Macro Climate	• Enclosure
• Objectives	• Micro Climate	• Construction Type
• Maintenance	• Adjacent buildings	• Construction Process
• Access	• Geological Factors	• Energy
• Equipment	• Vehicular Access	• Climate Control
• Environment		• Image

**Space / Area Allocations:**

$$\begin{array}{l} \text{Net Area} \\ \text{Spaces \& areas} \end{array} + \begin{array}{l} \text{Circulation} \\ \text{Structure} \\ \text{Mechanical} \\ \text{Shared Spaces} \end{array} = \text{Gross Area}$$

**Building Efficiency = Net Area / Gross Area**

Room Data Sheets – establish space relationship requirements

- Internal room requirements
- Equipment
- Activity zones
- Lighting requirements
- Conditioning & comfort requirements

**Planning Diagrams: (in order of development)**

1. Matrix Chart -
2. Bubble Diagram – indicate required adjacencies, priorities of relationships, relative size of spaces; best for showing relationships just prior to space planning
3. Block Diagram – represents the first results of spatial organization based on the adjacency diagram

**Blocking & Stacking Diagram** - most critical when considering site limitations

**Stacking:** As an activity of programming, assigning floors or areas of floors to particular departments based upon their adjacency requirements and support requirements.

**Blocking:** As an activity of programming, assigning departments to a particular area of a floor based upon adjacency and support requirements.

## **Site Analysis – starts the design phase**

- Site Survey
- Soils Report
  - Legal description
  - Zoning classification
  - Site Boundaries
  - Restrictions / Easements
  - Access to the property
  - Existing structures
  - Topography
  - Landscape
  - Drainage
  - Soils
  - Utilities

## **US Survey System**

- Begun in 1784; Divided land that was not already surveyed into a square grid system of meridians 24 miles apart called checks
  - Check – area 24 miles on a side bounded by parallels & meridians; further divided into 16 townships
  - Township – area 36 miles on a side; further divided into 36 1 mile sections
  - Section – 1 mile square parcel of land containing 640 acres
  - Quarter Section – area .25 miles on each side
- 1 acre of land = 43,560 SF
- Baseline – parallel used as a primary starting point for the east-west layout of the US Survey system
- Meridian – north-south lines that follow the longitudes of the earth and are used as a basis for the US Survey system
- Guide meridian – meridian between the principal meridians
- Principal Meridian – meridian that serves as the basis for the north-south grid layout of the US Survey system
- Metes-and-bounds property description – verbal description of land that begins at a known point and describes the bearing and length of each side of the property until the point of the beginning is reached
- Parallels – east-west lines that follow the latitudes of the earth
- Range – row of townships running north and south from a principal meridian; given a number to describe where it is located north and south of a baseline
- Standard Parallels – parallels between the baselines in the US Survey system
- Township – the row of townships running east and west from a baseline; given a number to describe where it is located east or west of a principal meridian

## **Topography & Site Contours:**

- Ridge / Crown – contours point “down” toward the lower elevation
- Valley / Swale – contours point “up” towards the higher elevation
- Hills – concentric circles with elevations getting higher towards the center
- Depression – concentric circles with the elevations getting lower towards the center

## **Riparian Rights**

- system of rights and duties that determine the reasonable use, duties, and allocations of water to owners of waterfront property
- rights ensure that riparian owners can make reasonable use of water adjacent to their property while protecting the rights of other riparian owners
- person must own land adjacent to a body of water to be considered a riparian owner

- owner usually has exclusive rights to his bottomland for anchoring docks or rafts, his beach, and his upland, but not to the water itself. The owner cannot infringe upon the rights of other riparian owners or the public to make reasonable use of the water

#### **Detention vs. Retention**

- **retention pond**
  - designed to hold a specific amount of water indefinitely. Usually the pond is designed to have drainage leading to another location when the water level gets above the pond capacity, but still maintains a certain capacity
- **detention pond:**
  - low lying area that is designed to temporarily hold a set amount of water while slowly draining to another location. They are more or less around for flood control when large amounts of rain could cause flash flooding if not dealt with properly

**Swamp:** a wetland that features permanent inundation of large areas of land by shallow bodies of water, generally with a substantial number of hummocks, or dry-land protrusions

**Swale:** an elongated depression in the land surface that is at least seasonally wet, is usually vegetated and is normally without flowing water.

#### **Proctor test:**

The Proctor compaction test and the related modified Proctor compaction test, named for engineer Ralph R. Proctor (1933), are tests to determine the maximum practically-achievable density of soils and aggregates, and are frequently used in geotechnical engineering. The test consists of compacting the soil or aggregate to be tested into a standard mold using a standardized compactive energy at several different levels of moisture content. The maximum dry density and optimum moisture content is determined from the results of the test. Soil in place is tested for in-place dry bulk density, and the result is divided by the maximum dry density to obtain a relative compaction for the soil in place

## Environmental, Social & Economic Issues:

### Existing Building Assessments / Surveys:

- Laser scanning – quickly and remotely measure existing spaces
- Photogrammetry – takes more time, control points must be established & hand surveyed to establish base coordinate system
- Field Measurements- taken by hand

### Assessments: Official valuation of property for the purpose of taxes

#### Methods of assessments:

1. Income Approach: is one of three major groups of methodologies, called valuation *approaches*, used by appraisers
  - particularly common in commercial [real estate appraisal](#) and in business appraisal
2. Market Approach: defines market value as "the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently, and without compulsion"
  - market value is "the true underlying value" according to theoretical standards
3. Cost Approach: theory is that the value of a property can be estimated by summing the land value and the depreciated value of any improvements
  - cost approach is considered reliable when used on newer structures, but the method tends to become less reliable for older properties. The cost approach is often the only reliable approach when dealing with special use properties (e.g. -- public assembly, marinas).

### Asbestos:

- Naturally occurring mineral found throughout the world
  1. Three most common used in buildings are:
    - Chrysotile – "white asbestos"; accounts for 95% of asbestos found in commercial products
    - Amosite – "brown asbestos"
    - Crocidolite – "blue asbestos"
- Laboratory analysis is the only way to positively identify samples
- Used for spray fireproofing, sound proofing; pipe insulation; ceiling & floor tiles
- Major risk comes from inhaling fibers – "friable"
- ACM – asbestos containing materials
- 1973 – EPA banned spray application of asbestos containing fireproofing materials
- 1978 – spray painting of asbestos banned
- Occupant health risks are less of a concern if no children will be living in the building
- Cost of removal is borne by the owner
- ACM is regulated by EPA, OSHA, Consumer Product Safety Commission, individual state and local agencies
- EPA & OSHA control exposure to asbestos
- EPA regulations:
  1. NESHAP (National Emission Standards for Hazardous Air Pollutants)
    - May require ACM removal before renovation &/or demolition projects to prevent significant asbestos releases in the air
  2. AHERA (Asbestos Hazards Emergency Response Act)
    - Separate regulation to handle asbestos material used inside K-12 schools
    - Require that all schools be inspected to determine the presence & quantity of asbestos
- OSHA regulations:
  1. Designed to protect workers who handle ACM

- 2. PEL = Permissible Exposure Limit; standard that sets the number of fibers that a worker can be exposed to; maximum workplace concentration limit of 0.1 f/cc measured as an 8 hour time-weighted-average
- Health Hazards:
  1. Disabling respiratory disease
  2. Asbestiosis – non-cancerous chronic respiratory disease caused by accumulation of asbestos fibers in the lungs
  3. Lung cancer
  4. Mesothelioma – rare cancer in the thin membrane lining the chest and abdomen
  5. Cancer of stomach & colon
- Removal is often not the best course of action to reduce asbestos exposure
- Methods to minimize / contain asbestos fibers:
  1. Wet methods
  2. HEPA vacuuming
  3. Area isolation
  4. PPE – personal protective equipment
  5. Avoid sawing, sanding & drilling ACM

**Defensible Space Concept:**

- Defensible space is a concept first proposed by the architect Oscar Newman and developed further by Alice Coleman. It is the idea that crime and delinquency can be controlled and mitigated through environmental design. The idea is important because it relates an individual's environment to his or her expectation of crime in the community.
- There are four factors that make a defensible space:
  1. Territoriality, or the idea that one's home is sacred
  2. Natural surveillance, or the link between an area's physical characteristics and the residents' ability to see what is happening
  3. Image, or the capacity of the physical design to impart a sense of security
  4. Milieu(environment), or other features that may affect security, such as proximity to a police substation or busy commercial area

**Personal Space Concept:**

- concept by Edward T. Hall; four basic distances can be understood through human behavior (closest to farthest)
  1. Intimate distance
  2. Personal distance
  3. Social distance
  4. Public distance
- Behavior setting – particular place with definable boundaries and objects w/in in which a standing pattern of behavior occurs at a particular time
- Density – number of people per unit area
- Proxemics – describes the study of spatial requirements of humans and the effects of population density on behavior, communication, & social interaction
- Territoriality – behavioral system where person, animal or group lays claim to an area and defends it against others
- Sociofugal – requires people face away from each other

**Historic Preservation:**

- 4 treatments applied to historic structures: (most historically accurate to least)
  1. Preservation – dictates that the least amount possible be done to stabilize a building and any interventions be made as invisibly as possible
  2. Rehabilitation – emphasizes the retention and repair of historic materials but gives some latitude for replacement of damaged materials

3. Restoration
4. Reconstruction

**Adaptive Re-Use:** process of adapting old structures for purposes other than those initially intended

- *Adaptive reuse*, or *re-use*, is a process that adapts buildings for new uses while retaining their historic features. An old factory may become an apartment building. A rundown church may find new life as a restaurant... And a restaurant may become a church
- Adaptive reuse, along with [brownfield](#) reclamation, is seen by many as a key factor in [land conservation](#) and reducing the amount of [sprawl](#)
- [loft](#) housing is one prominent result of adaptive reuse projects. Formerly-[industrial](#) areas such as the [Meatpacking District, Manhattan, New York](#) and [Callowhill, Philadelphia, Pennsylvania](#) are being transformed into residential neighborhoods through this process. This transformation is sometimes associated with [gentrification](#)

**Mothballing:**

- term used in historic preservation.
- when you designate certain areas to be repaired or restored at a later date, under a later contract.
- defined as a property is being purchased by a local gov. and "mothballing" it for future use because that's the "best" way to reserve the value of that pc of property within that particular neighborhood
- The actual mothballing effort involves controlling the long-term deterioration of the building while it is unoccupied as well as finding methods to protect it from sudden loss by fire or vandalism. This requires securing the building from unwanted entry, providing adequate ventilation to the interior, and shutting down or modifying existing utilities. Once the building is de-activated or secured, the long-term success will depend on periodic maintenance and surveillance monitoring.

**Secretary of Interior's Standards for Rehabilitation:**

- Developed by the Heritage Preservation Services branch of the National Park Service
- Must be met if Federal Tax Credits are to be used
- Standards take precedence over any state or local requirements
- Allow for new additions and alterations to be differentiated from the old while still being compatible in massing, size, scale and architectural features

**Sustainable Design Concepts:**

Vegetated Roofs:

- Reduces the amount of stormwater runoff on a site
- Reduces the impervious surface area on a site
- Will have a longer lifespan than a conventional membrane roofing system & lower overall maintenance costs b/c roof membrane is protected from ultraviolet radiation
- Can minimize heat island affects

Inadequate ventilation creates the majority of indoor air quality problems

80 decibels – threshold for sound levels that cause fatigue after prolonged exposure

**Organic feedstock** - organic feedstock simply refers to something organic (wood fiber, paper, cotton, etc.) that the mold can use as an energy source. Mold cannot eat inorganic materials like concrete, brick, or gypsum (but it loves the paper on drywall)

**Environmental Assessment Statement**

- **environmental impact assessment (EIA)** is an assessment of the possible impact—positive or negative—that a proposed project may have on the environment, together consisting of the natural, social and economic aspects originated in the [National Environmental Policy Act](#) (NEPA), enacted in 1970
- **environmental impact statement (EIS)** under [United States environmental law](#), is a document required by the [National Environmental Policy Act](#) for [federal government agency](#) actions "significantly affecting the quality of the human environment."<sup>[1]</sup> A tool for decision making, an EIS describes the positive and negative [environmental effects](#) of proposed agency action - and cites alternative actions

EIS typically has four sections:

1. An Introduction including a statement of the **Purpose and Need** of the **Proposed Action**.
2. A description of the **Affected Environment**.
3. A **Range of Alternatives** to the proposed action. Alternatives are considered the "heart" of the EIS.
4. An **analysis** of the environmental impacts of each of the possible alternatives