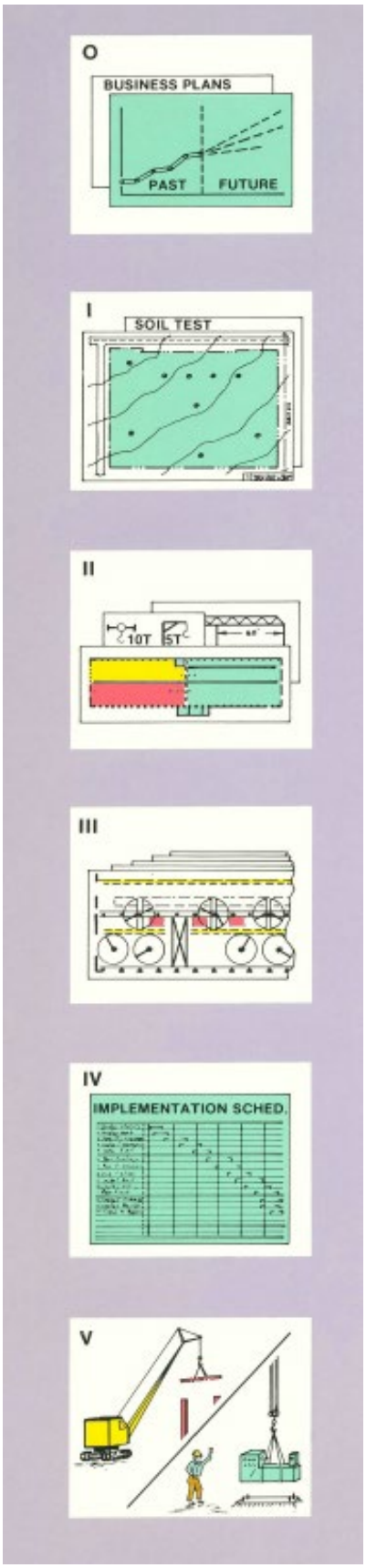


# New Plant Project Planning Task List

## Based upon *Systematic Planning of Industrial Facilities (SPIF)*

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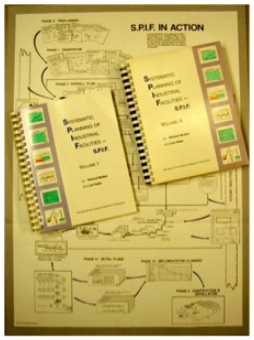
# Preface

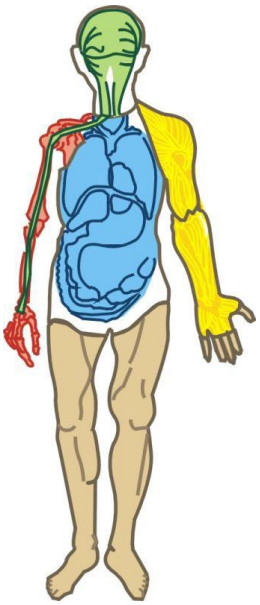
This task list is meant to be a starting point for those tasked with bringing up a new industrial plant, although it may also be useful for distribution centers and other types of facilities. It is written for the planners of the company that will occupy and operate the facility. Tasks normally performed by professional architects and engineers and contractors are included at a very high level, and only as place holders and "touch points" with those of the company's internal planning process.

Sections 1 & 2 on Plant Layout and Material Handling make reference to 3-digit numbered Working Forms. Most of these may be obtained in Excel format on the Downloads page of www.RichardMuther.com

The task list structure derives from our method: Systematic Planning of Industrial Facilities (SPIF), documented in a two-volume text available in soft copy on the Publications page at www.RichardMuther.com




SPIF consists of 5 components: Layout, Handling, Communications (Information Technologies), Utilities, and Building. These define the "anatomy" of the facility being planned, as suggested below.



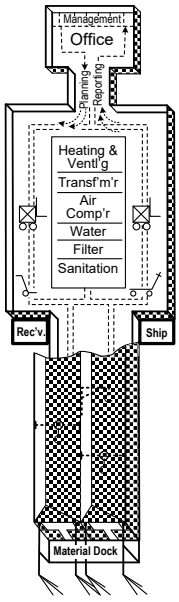
Skeleton (Layout)

Muscular System (Material Handling)

Nerve System (Communications and Controls)

Respiratory, Circulatory, Digestive Systems (Utilities and Auxiliaries)

Flesh and Skin (Building Shell)

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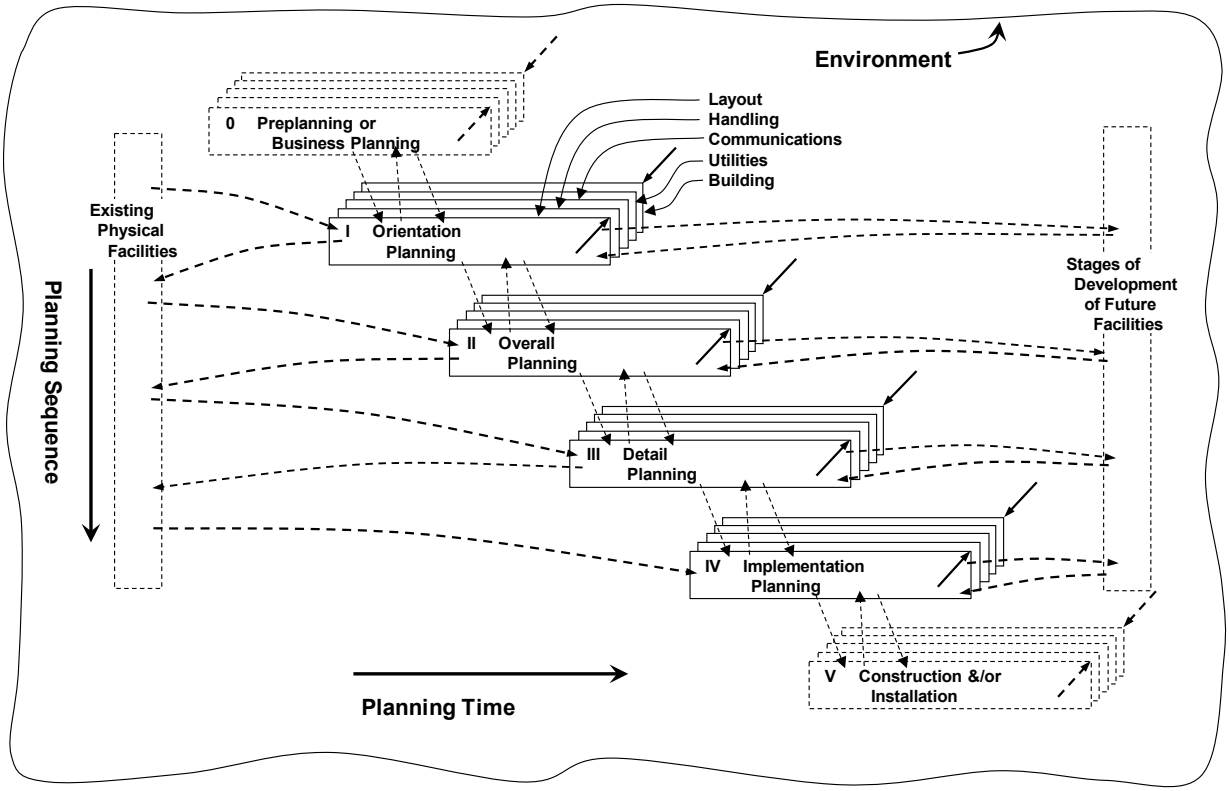
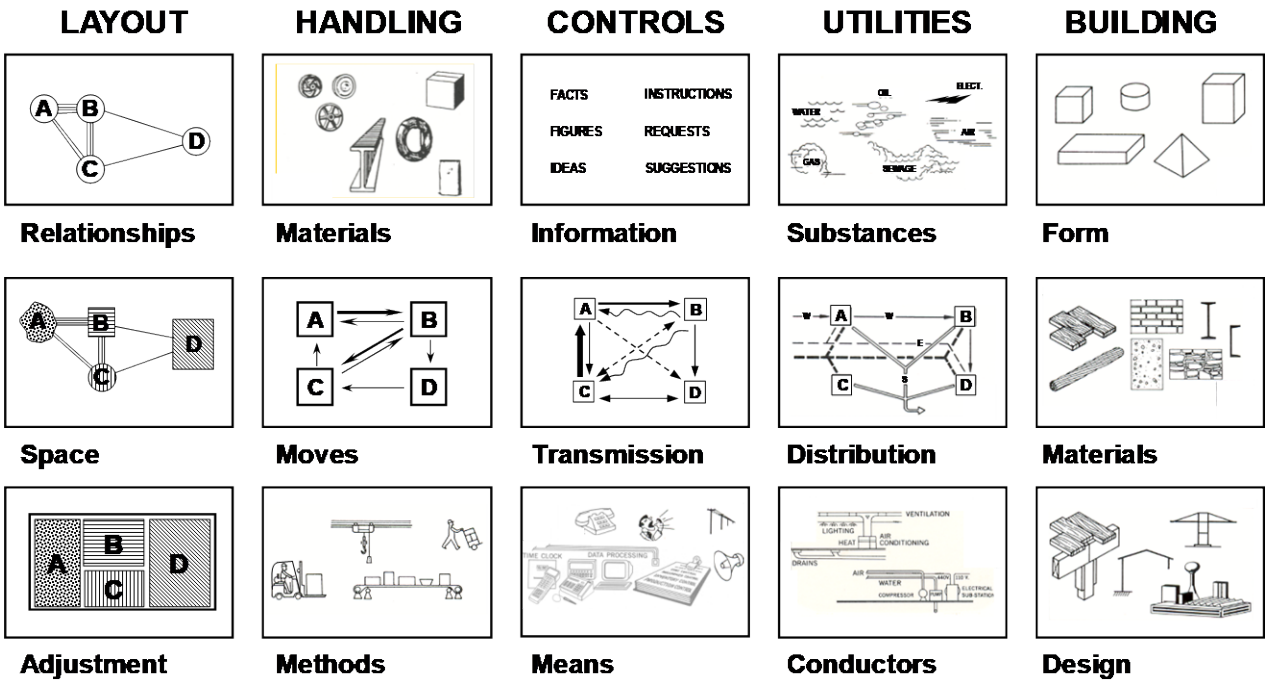
Each component is planned in overlapping phases.




Each component's planning rest on three fundamentals.

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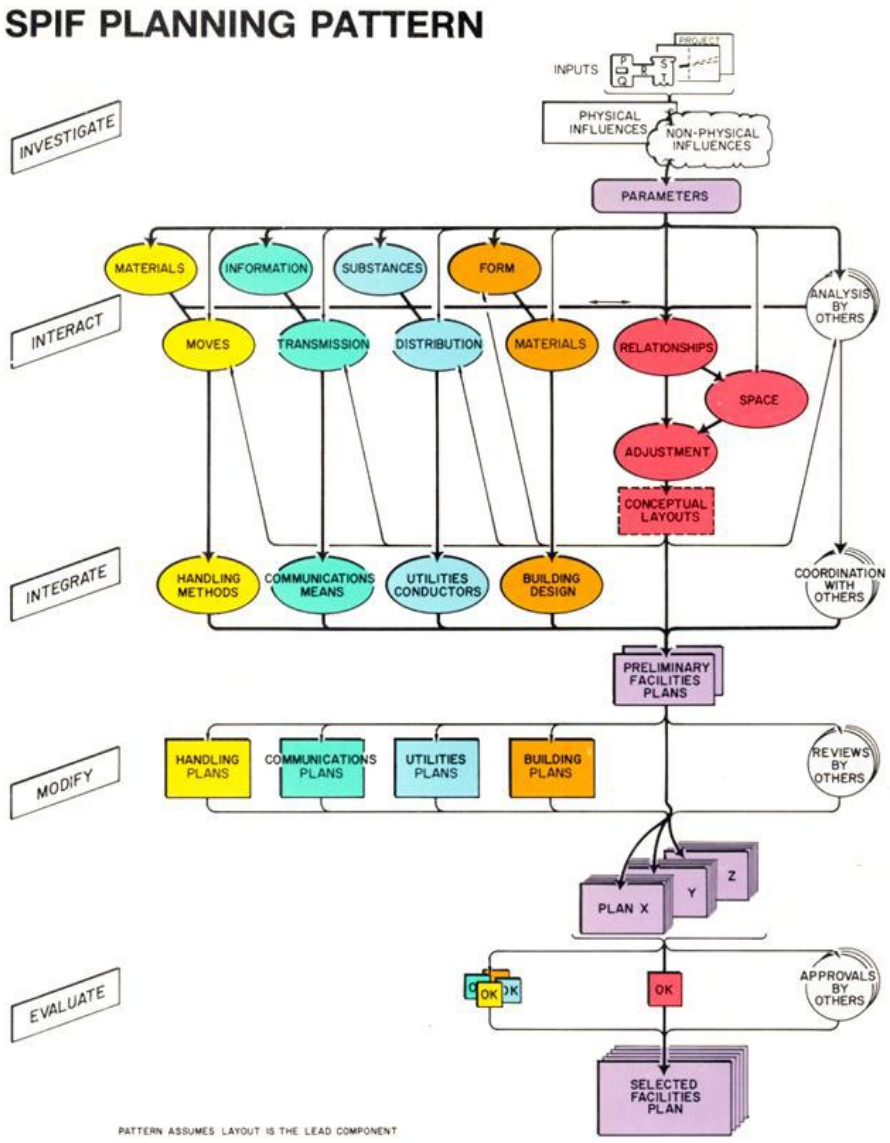
In practice, the planning process must integrate the three fundamentals of the five components, more or less as shown here. The task list includes some cross references that honor the primary points of integration illustrated below.




The task list includes some brief, high-level sections that go beyond the planning of the five components. Section 6 on Construction is empty as we consider this out of scope. Obviously, it is necessary but will be planned by the construction contractor. Sections 7 – 11 on Procurement, Organizational planning, Move planning, Communications, and Project Management may be of interest and within the responsibilities of those doing the facilities planning.

We do not contend that this task list is complete. On the contrary, it is an incomplete starting point, but one that may save you some time and avoid oversights in your project plan and schedule. Our thought is that you will copy and then edit, expand, insert or add tasks relevant to your project and in this way make our task list your own.

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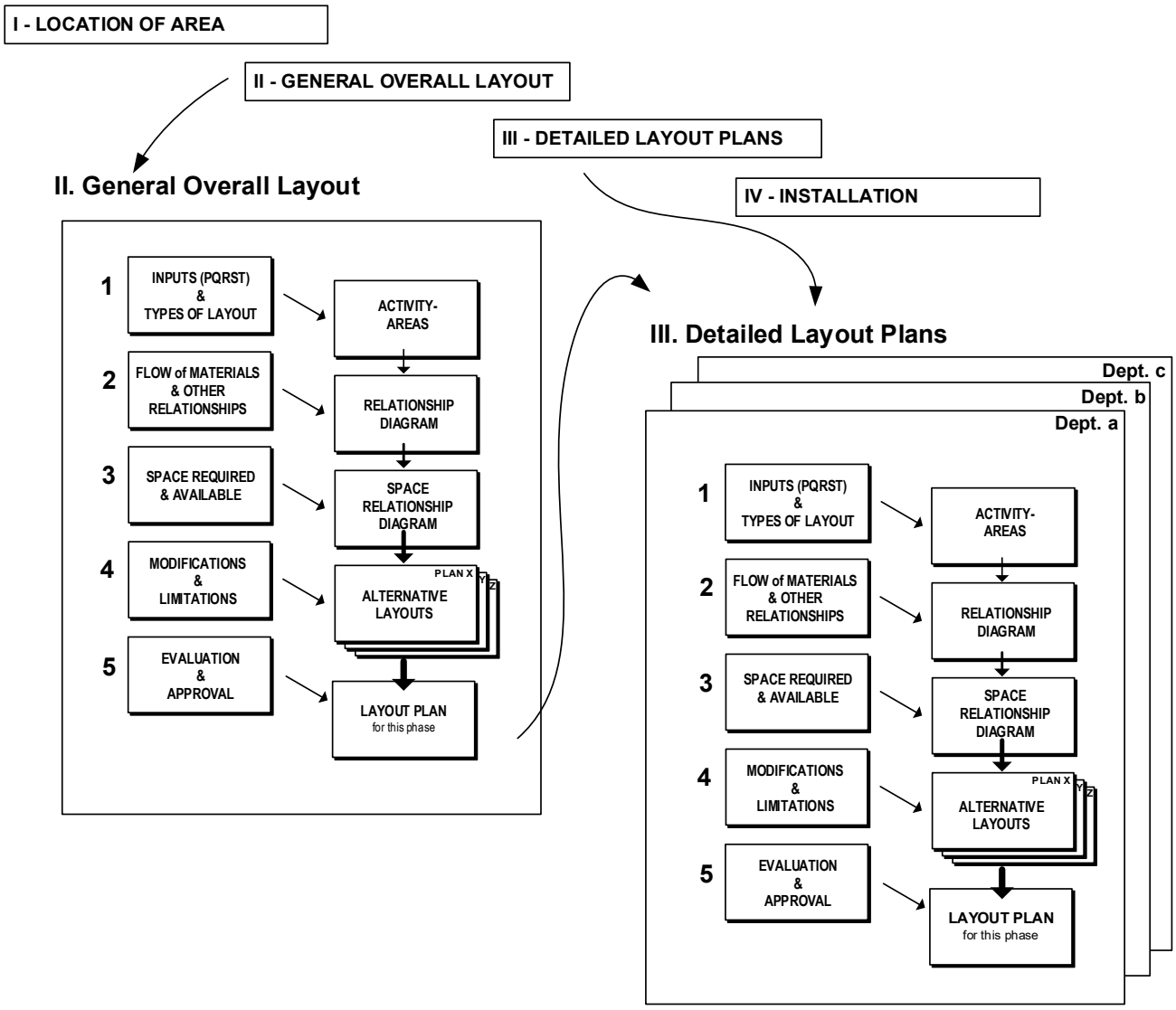
# Plant Layout




The Systematic Layout Planning (SLP) Pattern of Procedures applies to both Phase II, General or Overall Layout, and Phase III, Detailed Layout Plans. That is, the same steps are followed although the degree of application will be different in the two phases.

Phase II is devoted to planning the sizes and arrangement of areas or departments in the layout. Phase III is devoted to arranging machinery and equipment within each area or department in the overall plan.

With its overlapping phases and repeating pattern of procedures, SLP enables the planner to tackle problems of any size or complexity.

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# 1. Plant Layout

## a. Site Location

1. Requirements Definition
    a. Prepare Site Mission Statement (incl. make/buy)
    b. Develop Forecast (Form 341, 358) & Capacity Plan
    c. Confirm basic processes and methods
    d. Calculate or convert under roof space requirements
    e. Establish yard space ratios and estimate yard space requirements
    f. Estimate utility requirements
    g. Parking & Traffic requirements
    h. Develop manpower projections
    i. Analyze transportation costs & market geography
    j. Define site selection factors and weights
2. General Location Selection
    a. Retain realtor, if appropriate
    b. Contact development authorities, as appropriate
    c. Identify alternative locations
    d. Review economic factors (including inducements, if any)
    e. Review intangible factors
    f. Review transportation implications and costs
    g. Confirm availability of suitable sites (in each general location)
    h. Conduct executive visits
    i. Evaluate & confirm best general location
3. Site Selection
    a. Get firm economic information
        1. Estimate development costs
        2. Estimate purchase price
        3. Determine financing costs
        4. Determine economic inducements, if any
    b. Conduct soil tests (if needed)
    c. Compare economic factors
    d. Compare intangible factors (including environmental & legal)
    e. Conduct executive visits
    f. Evaluate & confirm top two sites

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4. Negotiation & Site Procurement (Go to 2nd choice if 1st choice fails)
    a. Negotiate financial inducements and incentives, if appropriate
    b. Attend relevant hearings and meetings with appropriate authorities
    c. Negotiate purchase of top rated site
    d. Conduct appropriate legal searches
    e. Secure appraisal if appropriate
    f. Conclude purchase

**b. Master site (land use) plan**

1. Establish buildable and useable area.
2. Develop site saturation plan based on ratios of yard to under roof and class of space projections
3. Identify dominant planning considerations – physical & non-physical; present & future (Form 365)
4. List activity-areas for first stage of development (Use Form 371 to identify supporting areas)
5. Analyze relationships (Form 130)
6. Establish size of activity areas for first stage of development (Form 155)
7. Prepare alternative site arrangements
8. Evaluate economic factors
9. Evaluate intangible factors (Form 173)
10. Select & confirm master site (land use) plan

**c. Overall (block) layout**

1. Get Key Input Data
    a. Develop forecast by product – short and long-range
    b. Prepare operation process chart(s) and value stream map(s)
    c. Calculate machinery, equipment and workstation requirements
    d. Survey, evaluate and decide future disposition of any existing major machinery & equipment
    e. List supporting services required (Use Form 371 to identify supporting areas)
    f. Establish operating hours and shifts by process step
    g. Challenge current and planned methods and decide relevant improvements
2. Define Activity-Areas
    a. Decide layout type (product/cells; process, fixed-position)
    b. List and define activity-areas

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3. Analyze Relationships between Activity Areas
    a. Prepare From-To Chart (or equivalent flow analysis) (Move summary, or quantified process chart)
    b. Prepare relationship chart of other-than-flow relationships (Form 130)
    c. Select combining ratio and combine flow and other (Form 142)
    d. Prepare Relationship Chart of combined flow & other relationships (Form 130)
    e. Prepare activity relationship diagram
4. Establish Space Requirements by Activity-Area
    a. Choose estimating method for each activity area
    b. Estimate initial occupancy (Stage I) space for each activity area
    c. Prepare Activity-Area & Features sheet (Form 150)
    d. Estimate future (Stage II+) space for each activity-area
    e. Prepare Space Requirements Converting sheet (Form 155)
    f. Prepare space relationship diagram
5. Draw Preliminary Layout Arrangements
6. Review with Others, Modify & Refine into viable alternatives
7. Evaluate economic factors
8. Evaluate intangible factors (Form 173)
9. Select best overall layout plan
10. Confirm selection with management

**d. Detailed Layouts (repeat for each activity area (plant & office) needing detail)**

1. Get Key Input Data
    a. Prepare operation process chart of local/internal operations
    b. Prepare value stream map
    c. List and confirm equipment and machinery
    d. List supporting services required
    e. Challenge planned methods and decide relevant improvements
2. Define Activity-Areas
3. Analyze Relationships between Activity Areas
    a. Prepare relationship chart (Form 130) (or use operation process chart)
    b. Prepare activity relationship diagram (or quantify process chart)

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4. Establish Space Requirements by Activity-Area
    a. If production area: Prepare Machinery & Equipment Layout Data sheet (Form 154) for each machine or workplace. Summarize on Machinery & Equipment Area & Features Sheet (Form 153).

       If support or non-production area: Prepare Activity Area & Features sheet. (Form 150)
    b. Prepare digital models and CAD templates for each piece of machinery and equipment, and workstation.
    c. Prepare template relationship diagram.
5. Develop Alternative Detailed Layouts
6. Evaluate & select the best detailed layout (Form 170/173)
7. Confirm selection with management

**e. Installation Planning** – repeat for each detailed area layout in 1.d. above

1. Compile list of all equipment to be installed
2. Code compiled list as purchased new, relocated as-is, relocated after refurbishment
3. Set dates for installing each item.
4. Prepare Installation Instructions Summary (Form 315) for each piece of machinery and equipment.

Tie in with:

**Section 2 – Material Handling Planning**

**Section 4 – Utilities Planning**

**Section 5 – Building Design**

Continue in:

**Section 7 – Procurement & Installation of New Equipment**

**Section 8 – Relocation of Existing Items**

**Section 12 – Program & Project Management**

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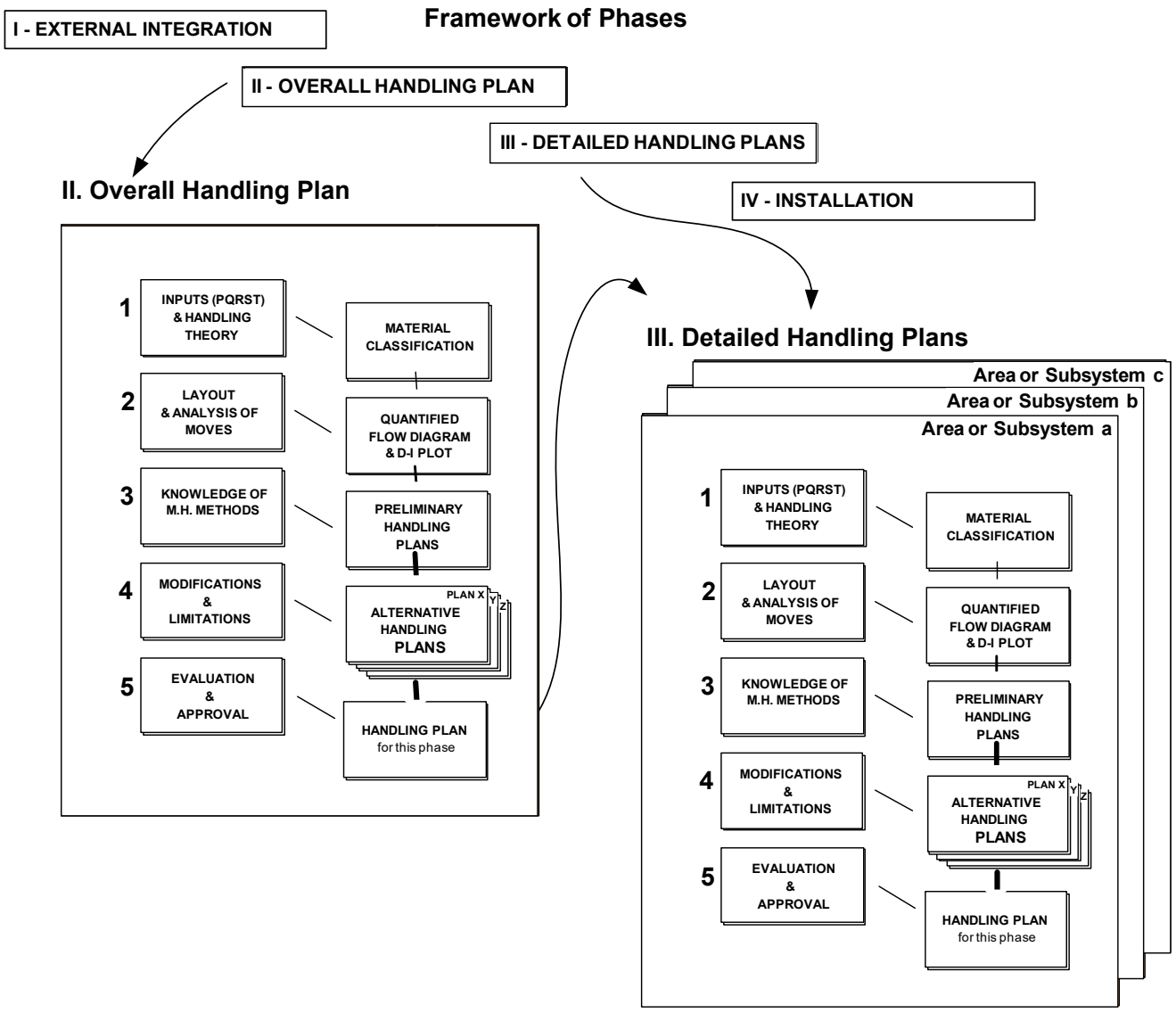
# Material Handling Plan




The SHA Pattern of Procedures applies to both Phase II, Overall handling Plan, and Phase III, Detailed Handling Plans. That is, the same steps are followed although the degree of application will be different in the two phases.

Phase II is devoted to planning the moves between areas or departments in the layout. Phase III is devoted to planning local moves within areas or departments.

Phase III can also be devoted to detailing sub-systems in the overall plan, such as a conveyor, or monorail, or an indirect tug-and-cart delivery system, or a system of automated mobile robots.

With its overlapping phases and repeating pattern of procedures, SHA enables the planner to tackle problems of any size or complexity.

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## 2. Material Handling Plan

### a. External Integration (tie in with 1.b. Master Site Plan)

1. Develop truck traffic plan – access, egress & staging
2. Develop personnel traffic and pedestrian movement plan
3. Develop emergency vehicle, fire, routine delivery, express mail delivery plan
4. Develop rail access and siding plan
5. Develop barge dock plan, if appropriate
6. Confirm curb cuts, access points, traffic signals, turn-in lanes with appropriate governmental authorities and/or developers

### b. Overall Handling Plan – movement between activity-areas in the plant layout

1. Classify materials to be moved (Form 221)
2. Prepare Movement Summary (Form 245) showing all moves for each material class Tie in with Overall Layout 1.c. Match route and move origins and destinations to layout activity-areas.
3. Prepare preliminary handling plans – document on Tie-In Sheet (Form 282) or directly on Overall Layout prepared in 1.c. Set prospective handling methods (system, equipment, transport unit) for each move of each class
4. Calculate resource requirements – equipment and personnel; impact on direct and indirect labor and on throughput
5. Review with Others, Modify & Refine into viable alternatives. Apply discrete event simulation modeling if appropriate.
6. Evaluate economic factors
7. Evaluate intangible factors (Form 173 or 202)
8. Select best overall handling plan for the facility (all classes on all routes)
9. Confirm selection with management

### c. Detailed Handling Plans – movement within areas and subsystems (repeat for each)

1. Classify local or internal materials to be moved (Form 221)
2. Prepare Movement Summary (Form 245) (or mark on layout)
3. Prepare preliminary (detailed) handling plans – document on Tie-In Sheet (Form 282) or directly on Detail Layout prepared in 1.d.
4. Calculate resource requirements – equipment and personnel; impact on direct and indirect labor and on throughput
5. Review with Others, Modify & Refine into viable alternatives
6. Evaluate economic factors (Form 170)
7. Evaluate intangible factors (Form 173 or 202)

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8. Select best handling plan internal to each area or subsystem
9. Confirm selection with appropriate managers and staff

**f. Installation Planning**

1. Compile list of all handling equipment to be installed
2. Set dates operational dates for each item.

Tie in with:

**Section 2 – Material Handling Planning**

**Section 3 – Information Systems and Procedures Planning**

**Section 4 – Utilities Planning**

**Section 5 – Building Design**

Continue in:

**Section 7 – Procurement & Installation of New Equipment**

**Section 8 – Relocation of Existing Items**

**Section 12 – Program & Project Management**

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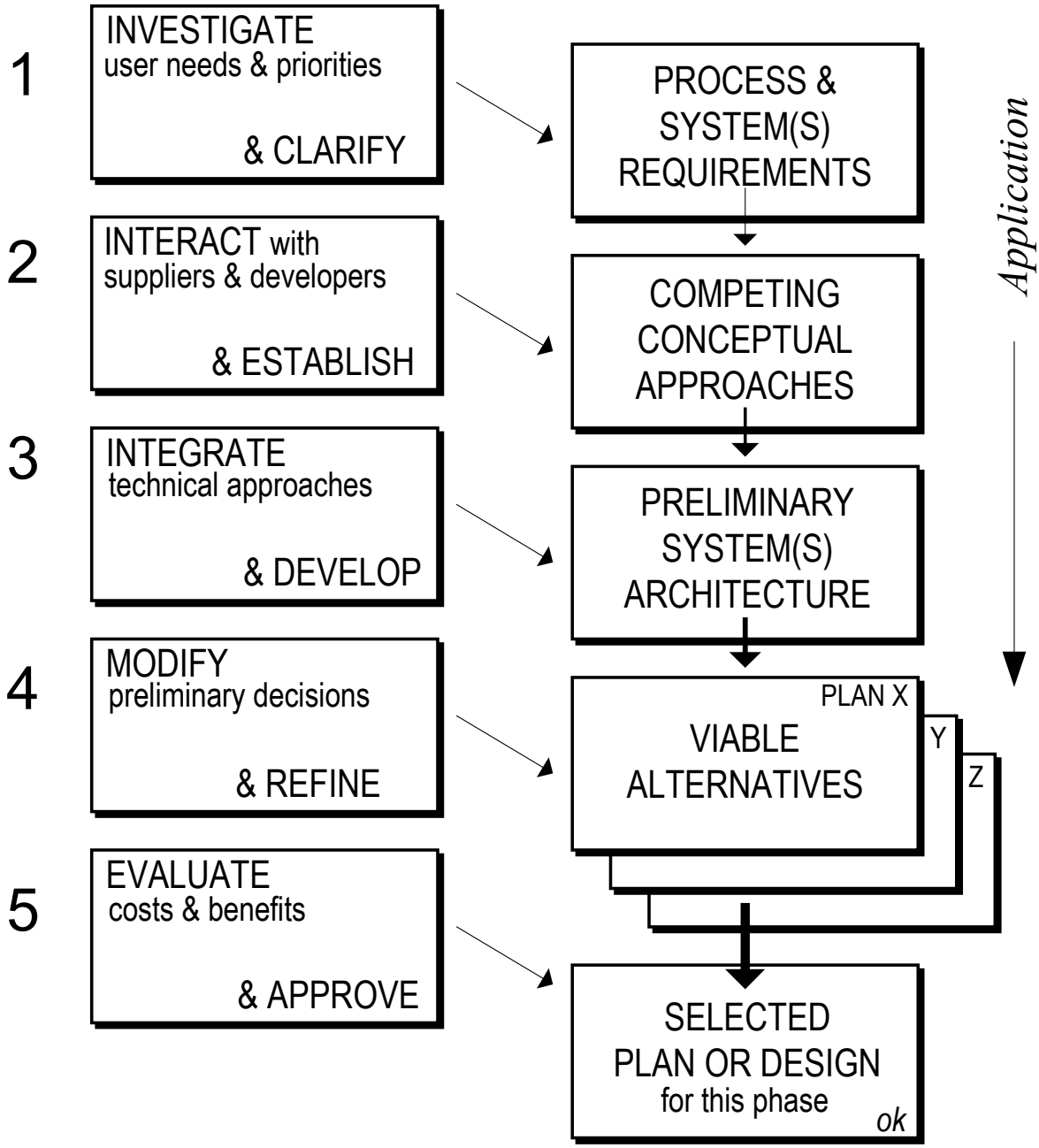
# Information Systems & Procedures Plans




Note: This is an illustration of the MAXiT Pattern of Procedures for Information Systems Integration. It presumes defined business processes that are to be supported by appropriate information systems technologies. MAXiT is used today in place of the Systematic Communications Analysis (SCA) method originally published as part of SPIF.

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## 3. Information Systems & Procedures Plans

**a.** **External Integration** – Identify and plan for secure communications external to the site: Voice, data, image, video, and multi-media exchange with:

1. Web-based, hosted services
2. Wide-area networking
3. Corporate information and data management systems
4. Supplier information systems
5. Customers and customer systems
6. Logistics providers – off-site warehousing; inbound logistics services; inbound and outbound transportation
7. Public agencies
8. Security and Emergency services
9. Telecom service providers
10. Tie in with Master Site Plan 1.b. and Material Handling External Integration 2.a.

**b.** **Overall Policies & Procedures** – List, confirm/define:

1. Quality Management Policies & Practices
2. Engineering Policies & Practices
3. Materials Management Policies & Practices
4. Production Management Policies & Practices
5. Maintenance Policies & Practices
6. Personnel Management Policies & Practices
7. Accounting Policies & Practices
8. Other additional policies & procedures as needed. (Hazmat, Disaster, etc.)

Tie in with Section 9 – Organizational Plan for the facility.

**c.** **Detailed Operating Procedures** – List and write for each department in 3.b. above and for workplaces within:

1. Quality: First-article and in-process inspections; non-conformance reporting and disposition; lab testing and certificates of analysis; corrective and preventive action; quality data recording and traceability…
2. Engineering: New product introduction; Bills of materials, change control, work instructions, drawing and specification control…
3. Materials Management: Receiving and inspection; put-away and storage; issue to production; kitting; cycle counting and inventory accuracy; supplier returns; scrap handling…

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4. Production Management: Master scheduling, detailed shop floor scheduling; work order creation and release; performance reporting (Overall Equipment Effectiveness, yield, efficiency)…
5. Maintenance: Preventive and predictive; work order management; spare parts and tool crib management; equipment calibration and certification; breakdown response…
6. Personnel Management: Requisition, hiring, on-boarding; job bidding and internal transfers; performance reviews; corrective actions and disciplinary processes; training and skills matrix management; recognition and reward programs…
7. Accounting: Supplier invoice processing and three-way match; standard costing; inventory valuation; production costing and variance analysis; month-end close; payroll and labor costing…
8. Other additional procedures as needed. (Hazmat, Disaster, etc.)

**d. Requirements Definition** – to support detailed operating procedures in section 3c.

1. Identify and prioritize application software features and functions
2. Define use cases for critical operating procedures.
3. Document system performance requirements: uptime/availability; response times needed to enable and support desired operating procedures.

Repeat for department and function.

**e. Information Technology and Integration Plan**

1. Establish/agree on systems architecture for secure industrial computing, data management and communications.
    a. Standards and protocols for secure networking and network segmentation, data acquisition, data and file transfer/exchange, remote access, firewalls, data diodes, data management…
    b. Data management (warehouses, lakes); site/facility data governance and master data management, tied-in with corporate level governance
    c. Cybersecurity protocols and middleware for protection of operational systems
    d. Edge computing for real-time data acquisition
    e. Process historians
    f. Servers, routers, switches, cabling and outlets, wireless access points…
    g. Terminals, monitors, displays (human-machine interfaces), personal computers, tablets, handhelds, wearables, voice headsets…
    h. Machinery and process controls: programmable logic controllers, distributed control systems…
    i. Field devices: sensors, actuators, transmitters, converters, switches, limit devices, input/output modules

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2. Establish sourcing policies and preferences
    a. Owning vs. Licensing (on-premises, perpetual licenses).
    b. Hosting (self-hosted, managed service).
    c. Customization level allowed (low-code vs. heavy customization).
    d. Preferred suppliers of software and hardware
3. Enterprise and external applications – Decide/agree on software and systems to implement and support planned policies and procedures (features, functions and use cases required and desired).
    a. Engineering interface (Product Lifecycle Management)
    b. Quality management
    c. Customer Relationship Management and portals
    d. Order management
    e. Production planning
    f. Procurement and supplier portals
    g. Inventory management
    h. Accounting
    i. Human resources
    j. Document management
    k. Workplace personal computing, teamwork, email…
    l. Data management
    m. Analytics, Machine Learning
    n. Artificial intelligence applications
    o. Digital twins
4. Facility operations management – Decide/agree on software and systems for:
    a. Manufacturing execution systems
    b. Real-time work-order and production tracking
    c. Warehouse management and execution systems
    d. Quality control, genealogy, traceability…
    e. Dashboards and visualizations for operators, teams and managers
    f. Maintenance and asset management
    g. Middleware and integration strategy, including methods and standards for secure connectivity between site-level and enterprise systems; application programming interfaces; event-driven integration, data formats, and monitoring
5. Process control – Decide/agree on software and hardware for:
    a. Mobile material handling equipment dispatching, monitoring and control. (fork trucks, cranes, automatic guided vehicles and mobile robots)
    b. Conveyor system controls. Tie in Overall and Detail Handling Plans, 2.b and c.

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c. Supervisory control and data acquisition (SCADA); displays for operators, managers and teams. Tie in physical locations with Detail Layout Plans, 1.d.

d. Programmable logic controllers (for production equipment and for plant utilities)

e. Or Distributed Control System(s) if continuous processes

f. Field devices: sensors, actuators, transmitters, converters, switches, limit devices, input/output modules

6. Networking – Physical planning for server rooms, cabling and outlets, wireless access points, back-up (uninterruptible) power supply…

   Tie in with: Detail Layout Plans, 1.d.; Utilities Plans, 4.b. and c.; and Detailed Building Designs, 5.d.

7. Disaster Recovery/Business Continuity – target recovery time and recovery point objectives for critical systems, and strategies/methods to achieve

8. User and Super-User Training Plan – for each software application and system

9. Prepare Implementation Plan consistent with:
   - organizational priorities;
   - sourcing policies and preferences;
   - hardware and software acquisition lead times;
   - internal or contracted development lead times.

   Tie in with Detailed Operating Procedures 3.c.

   Repeat as needed:

   a. Get quotes.

   b. Evaluate bids and select suppliers.

   c. Schedule installation.

   d. Install and debug.

   e. Test all systems and software.

   f. Convert data as required.

   Tie in with installation plans for Layout, Handling, Utilities, Building

10. Plan for go-live, start-up support.

Continue in:

**Section 7 – Procurement & Installation of New Equipment**

**Section 8 – Relocation of Existing Items**

**Section 12 – Program & Project Management**

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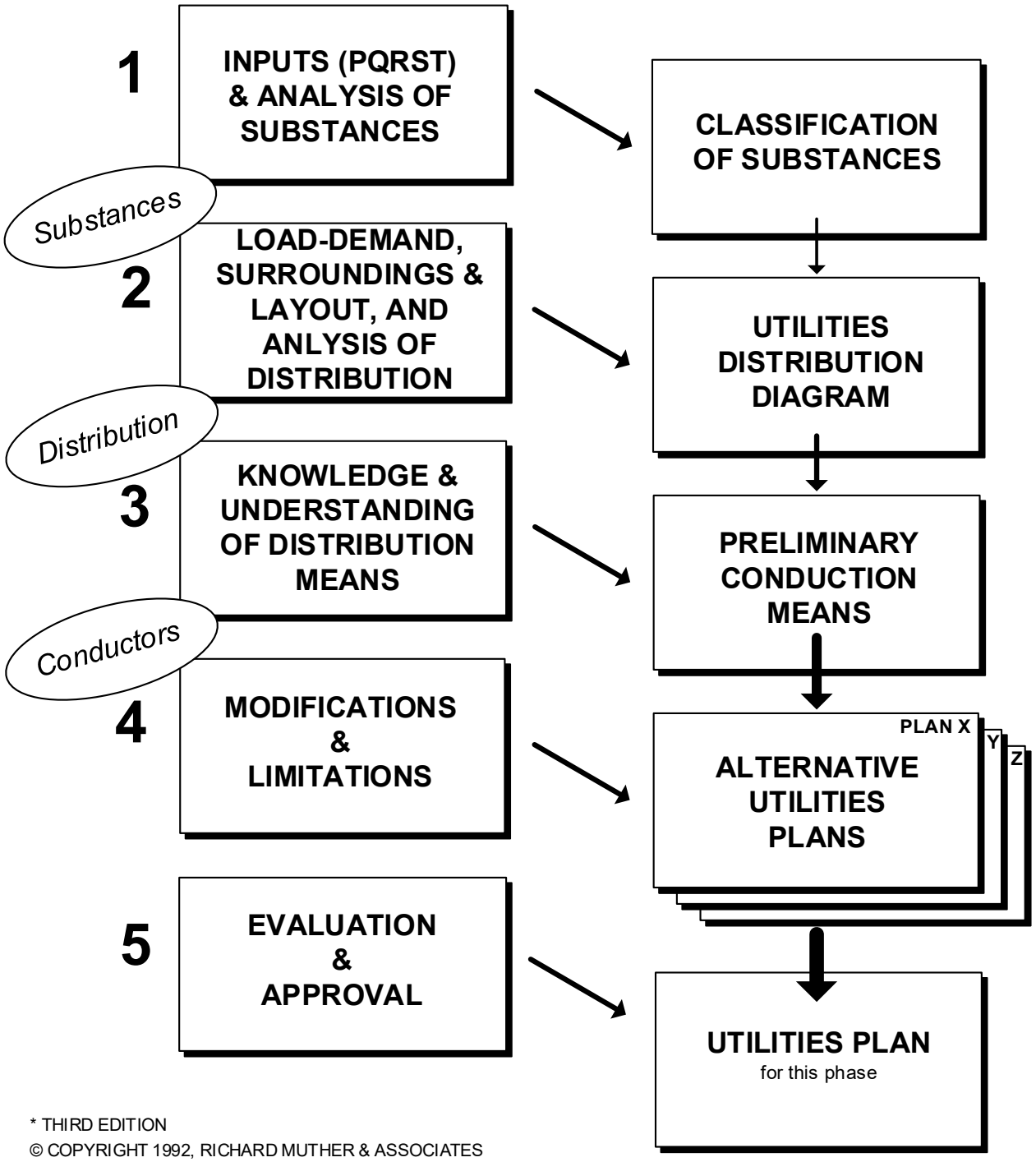
# Utilities Plans

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## 4. Utilities Plans -- Repeat for each service to be provided

- Process Water
- Potable Water
- Waste Water Treatment
- Sewer
- Stormwater detention
- Electrical
- Stand-by; back-up power
- Solar power
- Heating, ventilating, air conditioning
- Paint vapor and over spray recovery
- Dust collection
- Compressed air
- Natural Gas
- Process Gas (burn tables)
- Nitrogen generation
- Steam
- Clean-in-place systems
- Heat recovery and use
- Fire protection
- Security

Tie in with Sustainability objectives in 5.b.3 Preliminary Building Design

**a. Utilities -- External Integration** (tie in with 1.b. Master Site Plan)

1. Confirm entry points to site for all utilities
2. Confirm distribution paths across site for all utilities

**b. Overall Utilities Plan** (tie in with 1.c. Overall Layout Plan)

1. Locate runs of each utility & auxiliary service on overall layout
2. Locate stationary equipment – fans, blowers, transformers, pumps, compressors, etc.

**c. Detailed Utilities Plans** (tie in with 1.d. Detailed Layout Plans)

1. Locate service drops for each utility and auxiliary on detailed layouts
2. Locate stationary equipment on detailed layouts.
3. Specify capacities and performance of each utility/auxiliary system.

**d. Installation Plans**

1. Develop task list for installation of utilities and auxiliaries.
2. Schedule installation dates.
3. Assign installation responsibilities.
4. Prepare/write system test procedures.

Continue in:

**Section 7 – Procurement & Installation of New Equipment**

**Section 8 – Relocation of Existing Items**

**Section 12 – Program & Project Management**

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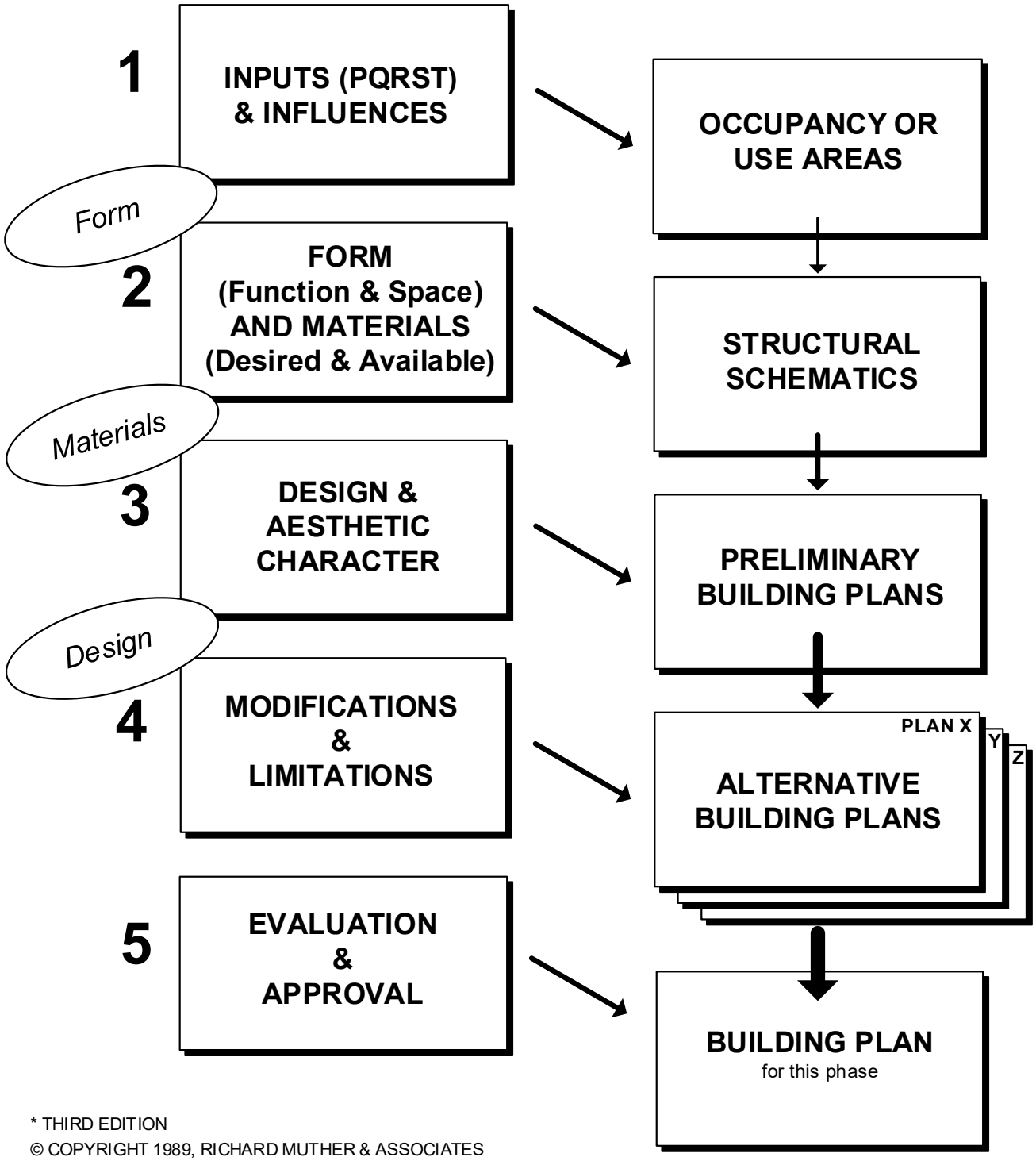
# Building Design

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# 5. Building Design

**a. Design Program** – Tie in with and derive from:

- Master Site Plan, 1.b.
- Overall Layout Plan, 1.c.
- Material Handling External Integration, 2.a.
- Material Handling Overall Plan, 2.b.
- Information Systems and Procedures Plans, Section 3.
- Utilities External Integration, 4.a.

1. Define high-level functional requirements
2. Define aesthetic requirements
3. Set sustainability objectives and certification goals, if desired
4. Establish budget and timing
5. Establish digital model – 3D, Building Information Model and Execution Plan, with agreed level-of-detail progression and coordination with other disciplines.

**b. Site and civil planning** – Tie in with and derive from:

- Master Site Plan, 1.b.
- Overall Layout Plan, 1.c.
- Material Handling External Integration, 2.a.
- Material Handling Overall Plan, 2.b.
- Information Systems and Procedures External Integration, 3.a.
- Utilities External Integration, 4.a.

1. Conduct environmental survey
2. Conduct necessary soil tests
3. Confirm, adjust, adapt master site and overall layout plans, 1.b and c.
4. Prepare preliminary site grading and drainage plan.
5. Prepare preliminary site road and paving plan
6. Prepare preliminary site utility distribution plan

**c. Preliminary building plans** – Tie in with and develop around:

- Overall Layout Plan, 1.c.
- Detailed Layouts (if/when available), 1.d.
- Overall Handling Plan, 2.b.
- Detailed Handling Plans (if/when available), 2.c.
- Information Technology and Integration Plan, 3.e.
- Overall Utilities Plan, 4.b.

1. Model foundation alternatives – prepare plans & elevations
2. Model framing and structural alternatives – prepare plans & elevations

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3. Model exteriors – prepare elevation plans, drawings, and digital visualizations
4. Select/confirm exterior materials
5. Model interior partitioning – prepare elevation plans, drawings, and digital visualizations
6. Model and integrate fixed production machinery and equipment – including, pits, foundations, isolation and enclosures
7. Model and integrate material handling
8. Model and integrate lighting; Mechanical, Electrical and Plumbing
9. Integrate other utilities, including stationary equipment per Utilities Plan, 4.b. and c.
10. Energy modeling and simulation, daylighting
11. Conduct reviews for accessibility, life safety and shelter, security…
12. Prepare preliminary cost estimate
13. Value engineering/cost review if appropriate

**d. Detailed building designs** – Tie in with and develop around:

- Detailed Layouts, 1.d.
- Detailed Handling Plans, 2.c.
- Information Technology and Integration Plan, 3.e.
- Detailed Utilities Plan, 4.c.

1. Refine model for fabrication/assembly/construction – prepare construction drawings
2. Prepare construction specifications
3. Prepare take-off schedules for materials and purchased items
4. Prepare construction cost estimate.

**e. Interior design and finishes – office, support areas and factory**

1. Model, visualize and decide on décor for office and personnel support areas
2. Signage
3. Inventory existing office furniture; decide which to move
4. Identify new furniture required

**f. As-built model and drawings** – post-construction survey and update model to as-built status for digital twin and operational modeling.

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# Construction

## 6. Construction, including construction management

Out of scope

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# Procurement & Installation of New Equipment

## 7. Procurement & Installation of New Equipment

**a. Identify items to be purchased new** – Tie in with and derive from:

- Detailed Layouts, 1.d.
- Detailed Handling Plans, 2.c.
- Information Technology and Integration Plan, 3.e.
- Detailed Utilities Plan, 4.c.

1. List & specify Production machinery
2. List & specify Tooling, dies, and fixtures
3. List & specify Material handling equipment
4. List & specify Auxiliary and support equipment
5. List & specify Maintenance equipment
6. List & specify Office furnishings
7. List & specify Support Areas equipment and furnishings:
    a. Labs
    b. Lockers, restrooms
    c. Break rooms and cafeterias

**b. Get quotes**

**c. Review quotes and select provider**

**d. Visit demonstration or reference sites for major items**

**e. Negotiate and procure new items**

**f. Schedule delivery dates for new items**

**g. Prepare building for installation**

**h. Receive, install and hook up new items**

**i. Test, debug and run-in new machinery and equipment**

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# Relocation of Existing Items

## 8. Relocation of Existing Items

a. **List items to be moved in each work area**

b. **Publish move requirements for bid.**

c. **Meet with bidders for relocation.**

d. **Review bid responses.**

e. **Evaluate and select mover.**

f. **House cleaning; disposal of unused and no-move items**

a. **Develop tag-numbering system keyed to detailed layouts**

b. **Schedule packing and move date for each item**

c. **Prepare move staffing plan and assignments**

d. **Move inventory**

e. **Move equipment**

f. **Move dies and fixtures**

g. **Move tools and personal possessions**

h. **Move work-in-process**

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# Organizational Plan

## 9. Organizational Plan

a. **Establish organizational structure and reporting relationships**

b. **Establish and document supervisory policies & practices**

c. **Identify jobs/positions**

d. **Write position descriptions**

e. **Advertise job openings if appropriate**

f. **Interview applicants, if needed**

g. **Check references and backgrounds**

h. **Hire new personnel**

i. **Appoint managers & supervisors**

j. **Define performance measures and reports**

k. **Develop health & safety program**

l. **Develop orientation and training plan**

m. **Administer and monitor training plan**

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# Public & Employee Communications Plan

## 10. Public & Employee Communications Plan

**a. Issue press release on new site acquisition**

**b. Issue press release on ground-breaking**

**c. Plan Ground-breaking ceremony and extend invitations.**

**d. Conduct ground-breaking ceremony**

**e. Issue press release on occupancy**

**f. Plan open house & extend invitations**

**g. Conduct open house**

**h. Develop employee orientation session**

**i. Conduct employee orientation**

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# Program & Project Management

## 11. Program & Project Management

**a. Prepare high-level master program schedule**

**b. Decide on roles of outside professionals**

1. Site selection
2. Site appraisal
3. Methods, plant layout & facilities planning
4. Material handling analysis
5. Site selection
6. Site planning
7. Soil testing and civil engineering
8. Factory Building design
9. Office Building design
10. Office furnishings and interior design
11. Value engineering on building & interior design
12. Site & building construction
13. Construction management
14. Riggers and Haulers
15. Movers
16. Underwriters/Insurance Agents
17. Security Services
18. Janitorial Services
19. Building & Grounds Maintenance Services
20. Vending/canteen services

Repeat c, d, and e. below for each relevant service provider:

**c. Identify and evaluate (check references) for alternative service providers**

**d. Negotiate service contracts with outside professionals.**

**e. Schedule the involvement of chosen service providers**

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**f. Prepare cost estimates**

1. Prepare preliminary budget estimate – tie in with new equipment quotes 7.b.; preliminary building plans 5.c.; relocation bids 8.d.
2. Publish refined budget estimate – tie in with new equipment quotes 7.b.; detailed building design 5.d.; office interior design 5.e; relocation bids 8.d.

**g. Obtain environmental permits**

**h. Obtain construction permit – site prep**

**i. Obtain construction permit – building construction**

**j. Obtain occupancy permit**

**k. Obtain insurance protection**

**l. Review and approve progress (per service provider)**

**m. Pay service providers and contractors**

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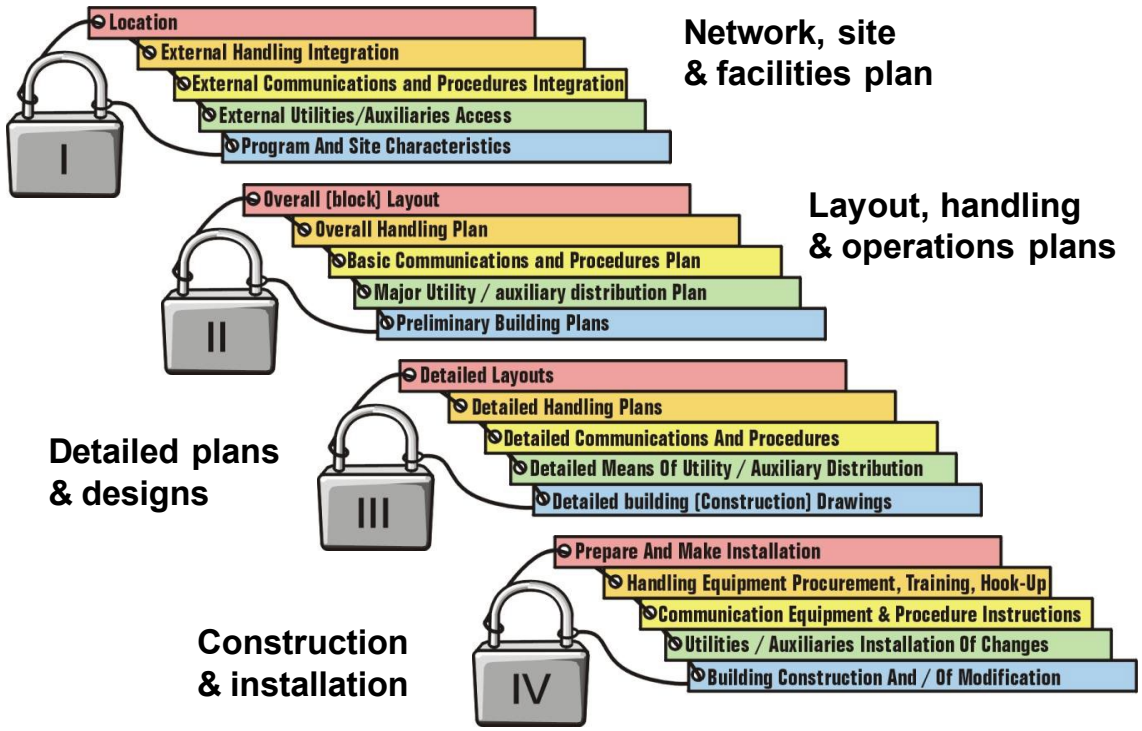
# Lock together in each phase

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