

Warehouse/DC Layout

Preview of On-Site 3-day work course

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3-Day Work Course Outline

- **Day one –**
 - **Case Exercise in Greenfield Layout, Storage & Handling Methods, Data Analysis**
- **Day Two –**
 - **Measured Flow of Materials, Space estimating, Case Exercise to Improve Existing Layout**
- **Day Three –**
 - **Detailed (equipment layout); Case Problem; Warehouse expansion; consolidation; new product introduction.**



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About This Preview

- **Not teaching *how*; just showing *what* we teach.**
- **Not fully-explaining each slide; just giving you an idea of what we cover.**
- **Going to move very fast; clicking through animations that we do slowly in class.**
- **Showing case exercises; not reading them.**
- **Time permitting, will show applications by users of the method we are teaching, incl. graduates of the class.**
- **Available for follow-up questions by email or phone.**
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3

Notes



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Main Points

1. Most layouts are developed by instinct and experience. This approach can be very effective but also runs the risk of oversight or error in unfamiliar situations.
2. Many layouts are in fact copied from “standard” or popular arrangements observed in others’ facilities or in texts; or by replicating earlier layouts.
3. Layout planning is a good opportunity to involve representatives of departments, labs, and work areas. But without a structured approach, participants soon become frustrated with the trade-offs involved.
4. Material flow is always important. But flow alone is not a sufficient basis for layout planning. There are always other important relationships that should be honored.
5. Systematic Layout Planning (SLP) was developed by Richard Muther & Associates to capture the benefits of each approach, without their shortcomings.

Typical Approaches to Layout Planning

- The Plain Instinct-and-Experience Approach



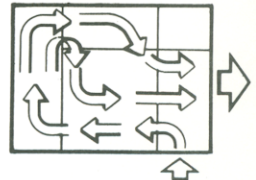
- The Get-One-Like Joe’s Approach



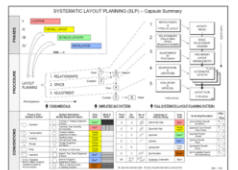
- The Keep-Everyone Happy Approach



- The Flow of Materials Approach



- The Systematic Methodology Approach (SLP)



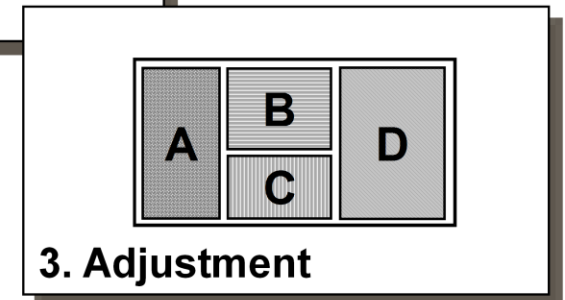
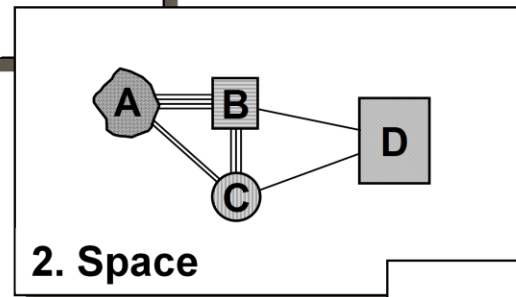
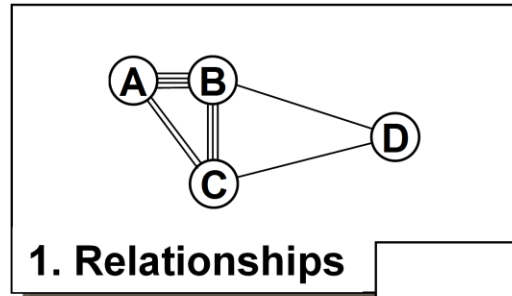
RICHARD MUTHER & ASSOCIATES - 2120-a-ppt

Notes

Main Points

1. All layout planning rests on the three fundamentals of:
 - a. Relationships between the activities in the layout.
 - b. Space for each activity-area, in amount, kind, and shape.
 - c. Adjustment of relationships and space into an effective plan.
2. By applying the three fundamentals – *in the order shown* – the planner assures better decisions and layouts.

Fundamentals of Layout Planning



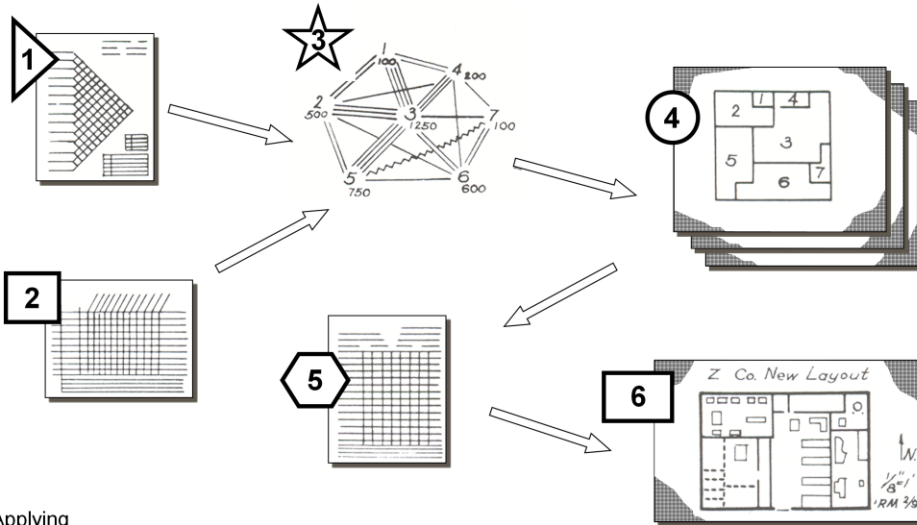
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Notes

SIMPLIFIED SYSTEMATIC LAYOUT PLANNING....

Main Points

1. Simplified Systematic Layout Planning is a set of six procedures to follow when laying out an area. It is suited to smaller projects that do not require the full S.L.P. treatment.
2. Basically, any layout involves:
 1. Relationships between various functions or activities.
 2. Space in a certain amount and kind for each activity.
 3. Adjustment of these into a layout plan.
3. The six steps of Simplified S.L.P. follow these three basic elements; and the six steps form a pattern shown symbolically here.
4. Each of the six steps carries its own easy-to-note symbol:
 1. **Triangle** –triangular-shaped relationship **chart**.
 2. **Square** –**square** feet and physical features.
 3. **Star** –diagram connecting activities at different **points**.
 4. **Circle** –**round** and round to adjust the layout diagrammed.
 5. **Hexagon** –examine from **all sides**; evaluate all factors.
 6. **Rectangle** –layout plan on **sheet of paper** or building print.



Instructions for Applying
S I M P L I F I E D S Y S T E M A T I C L A Y O U T P L A N N I N G

1 – Chart the Relationships

2 – Establish Space Requirements

3 – Diagram Activity Relationships

4 – Draw Space Relationship Layouts

5 – Evaluate Alternative Arrangements

6 – Detail the Selected Layout Plan

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Notes

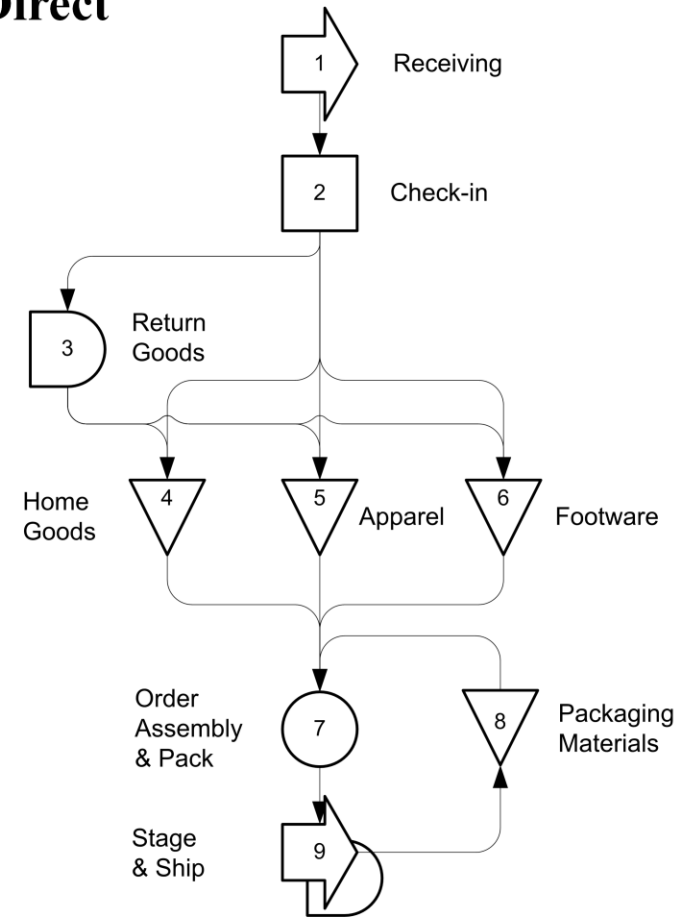
Case Problem

Please review all pages of the case. Then use the information provided to prepare a Preliminary Layout Plan.

Homart Direct

Homart Direct distributes clothing and soft home goods to catalog and Internet customers. Three product lines – footwear, apparel, and home goods – are promoted in catalogs several times per year and on the Homart web site. In addition, the company does some contract fulfillment for other e-tailers. Footwear and apparel are promoted in a common catalog. Home goods has its own catalog.

The company's operational flow is shown at the right. In addition to fulfillment operations, the company has offices, restrooms, and a small studio for photographing merchandise and catalog design.



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Case Problem

Please review all pages of the case. Then use the information provided to prepare a Preliminary Layout Plan.

Homart Direct continued...

Homart Direct has outgrown its current inefficient facilities. The Vice-President of Operations has asked the Warehouse Manager to submit an ideal layout for a new location nearby. (See RMA – 7135-6) He has been told to plan three years ahead, but for little or no increase in space because contract fulfillment will be drop off as the Company's own business increases.

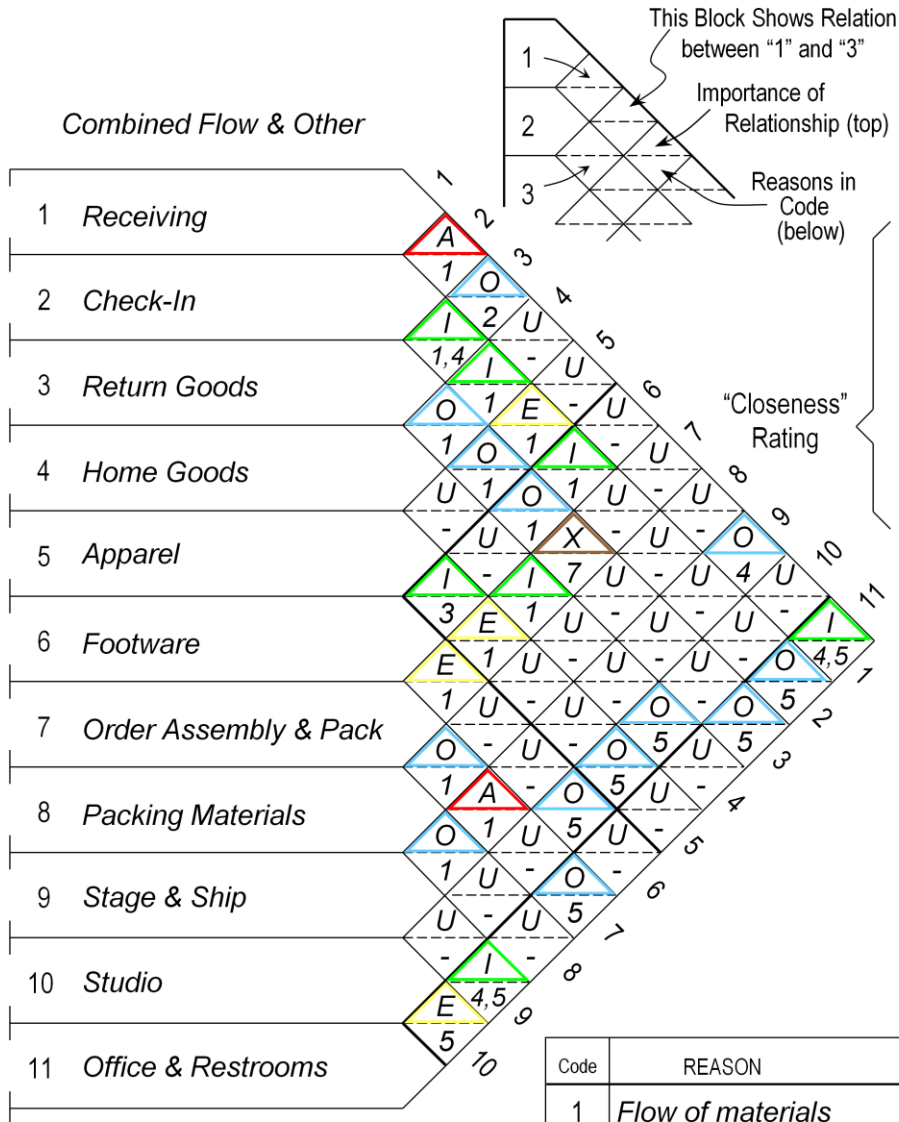
The plan is to use as much of the current storage equipment as possible. These are flexible and in good condition. The present methods of moving material on pallets and carts are highly flexible and are not expected to change.

The Warehouse Manager has begun to follow the steps of SLP and has produced a Relationship Chart, supported by a From-To Chart showing the flows between operations. He also developed space requirements. These appear on accompanying sheets. However, he became ill four weeks ago and has not yet returned to work. The Shipping Supervisor has been asked to take over the project.

Problem: Consider yourself the Shipping Supervisor. Using the data supplied, work out an approximate overall plan showing the ideal arrangement of space in the new location.

Notes

Homart Direct – Activity-Relationship Diagram



Value	CLOSENESS	No. of Ratings
A	Absolutely Necessary	
E	Especially Important	
I	Important	
O	Ordinary Closeness OK	
U	Unnecessary	
X	Not desirable	
Total = $\frac{N \times (N-1)}{2}$		

Problem: Using the data above provided by the Homart Direct planning team, follow the SLP procedure to develop an Activity Relationship Diagram in the space provided on the right.

Case Problem

Please review all pages of the case. Then use the information provided to prepare a Preliminary Layout Plan.

1. The activity-relationship diagram connects activities by a number-of-lines code.
2. The shape of each symbol indicates the type of activity; the number inside is the activity identification, usually corresponding to its line number on a Relationship Chart.
3. The number of connecting lines (and their color) indicates the rated closeness:
 - A – four red lines, ideally very short (like 4 rubber bands).
 - E – three orange/yellow lines, short.
 - I – two green lines, medium length.
 - O – one blue line, can be long.
 - U – no relationship; nothing to show.
 - X – one brown or two black wiggly lines, ideally long (think of a spring pushing apart).
4. First diagram the A's and E's. Then add the I's and X's, and finally the O's. It usually takes three to eight diagrams – each successively increased and refined – to get the most satisfactory arrangement.
5. Once diagrammed, the space allowed for each activity may be written next to its symbol.

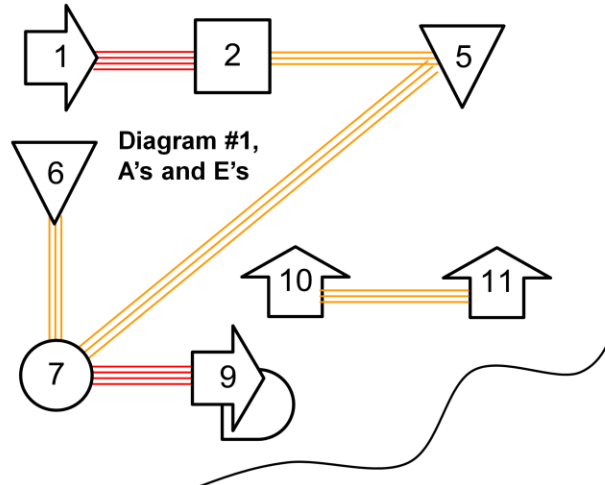


Diagram #1, A's and E's

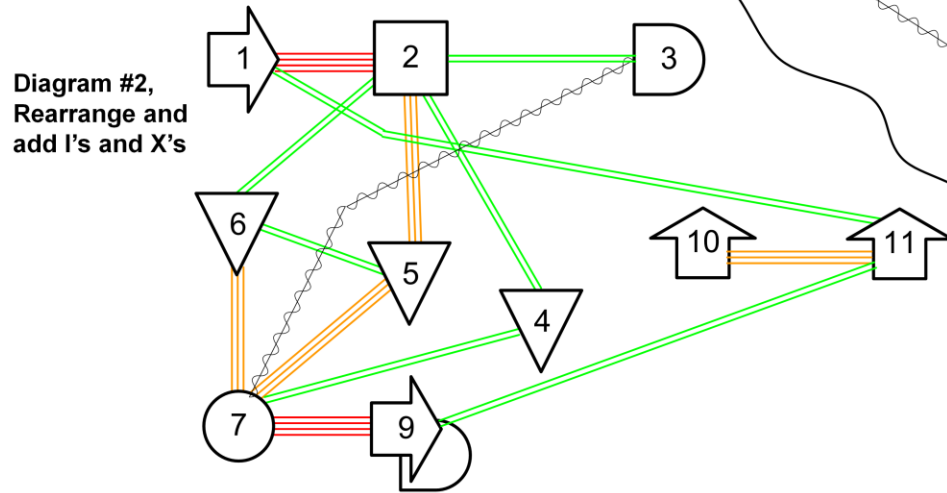
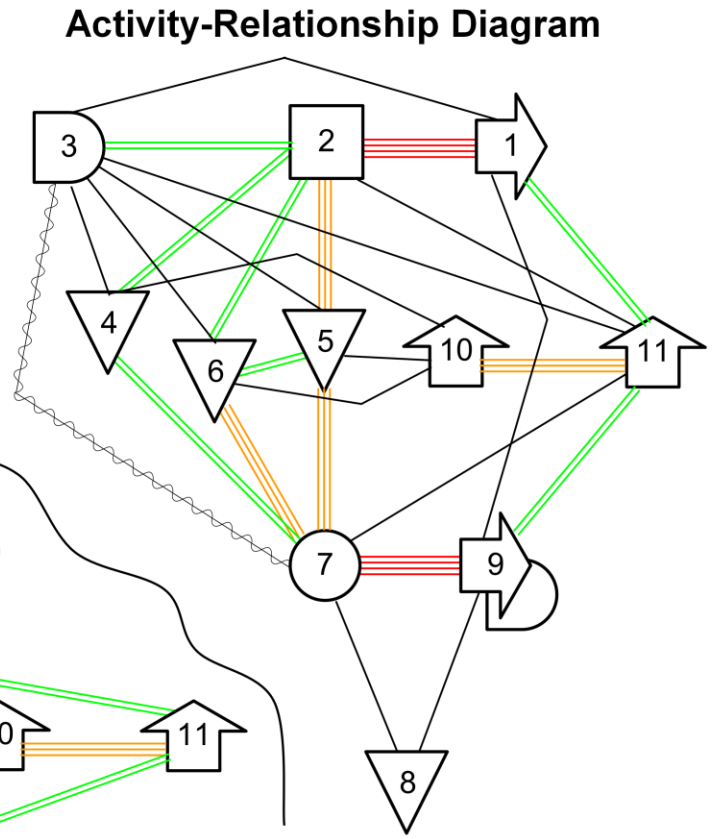


Diagram #2, Rearrange and add I's and X's



Activity-Relationship Diagram

Diagram #3, Rearrange and add O's, refine and add space

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Notes

ACTIVITIES AREA & FEATURES SHEET

Plant Homart Direct

Project DC Layout

By LT With RMA

Date 11/21 Page 1 of 1

No.	Name	Area in	Physical Features Required											Requirements for Shape or Configuration of Area (Space)		
			O'Head Clearance	Max. Overhead Supported Load	Max. Floor Loading	Min. Column Spacing	Water & Drains	Steam	Compressed Air	Foundations - or Pits	Fire or Explosion Hazard	Special Ventilation	Special Electrification			
		Total: Sq. Meters	Enter Unit and Required Amount under each				Relative Importance of Features						Enter Requirements for Shape or Configuration <u>and</u> Reasons therefore			
		3,425	mtrs	Kg/m2		A - Absolutely Necessary	O - Ordinary Importance		E - Especially Important		- - Not Required					
1.	Receiving	75	4	Normal building roof load only. Any conveyors floor supported.	1220	10 x 10 meters throughout warehouse space	--	--	--	--	--	--	--	Minimum width 10 meters		
2.	Check-In	75	4		1220		--	--	--	--	--	--	--		--	
3.	Return Goods	100	4		1000		--	--	--	--	--	--	--		(a)	
4.	Home Goods	750	6		1220		--	--	--	--	--	--	--		--	
5.	Apparel	700	6		1220		--	--	--	--	--	--	--		--	
6.	Footware	800	6		1220		--	--	--	--	--	--	--		--	
7.	Order Assembly & Pack	300	4		1000		--	--	A	--	--	--	--		--	
8.	Packing Materials	75	4		1220		--	--	--	--	--	--	--		--	
9.	Stage & Ship	200	4		1220		A	--	--	--	--	--	A		--	Minimum width 10 meters
10.	Studio	50	3		750		O	--	--	--	--	--	--		--	No windows
11.	Office & Restrooms	300	3		750		A	--	--	--	A	--	--		--	Windows needed
12.																
13.																
14.																
15.																

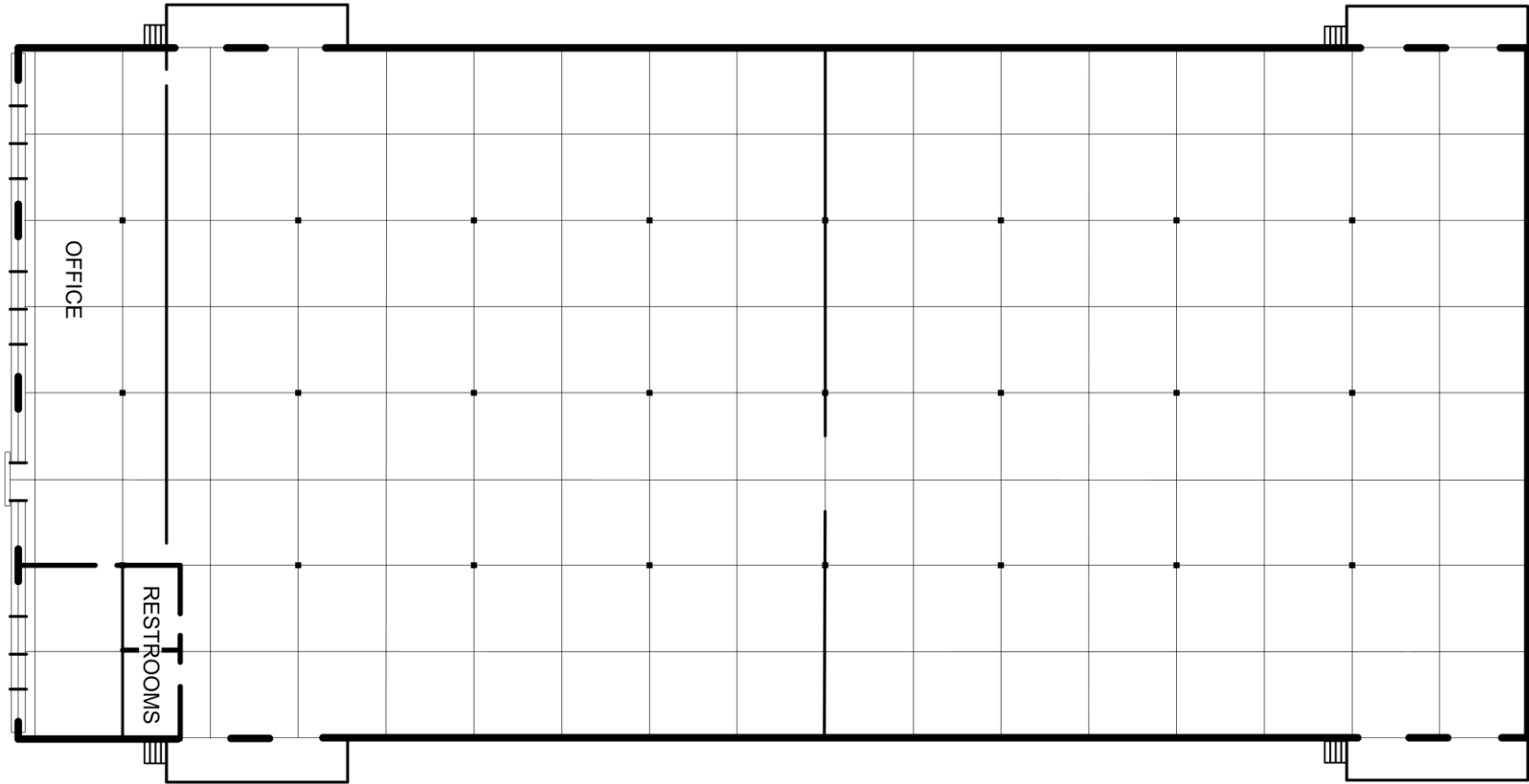
a Fenced-off area

Notation b Eyewash station next to battery charger

References c

No. _____ Activity _____ Sheet _____ of _____

Available Building



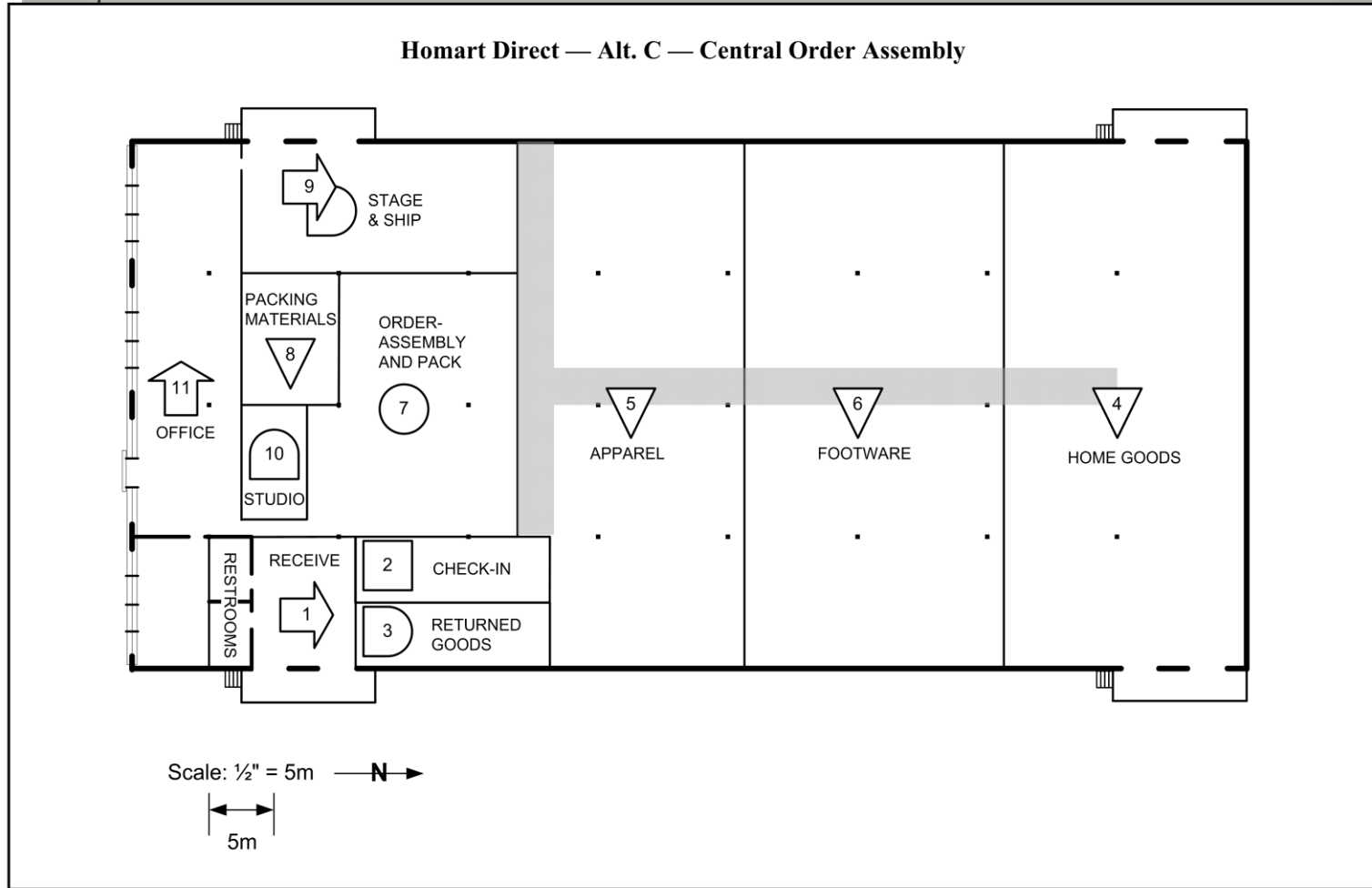
Scale: 1/2" = 5m — N →
5m

Homart Direct – Alternative Layout Plans

Homart Direct — Alt. A — North-South racks

Homart Direct — Alt. B — Order Assembly along West wall

Homart Direct — Alt. C — Central Order Assembly



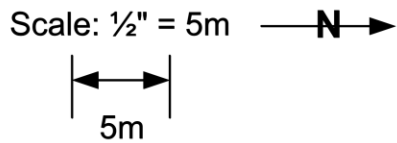
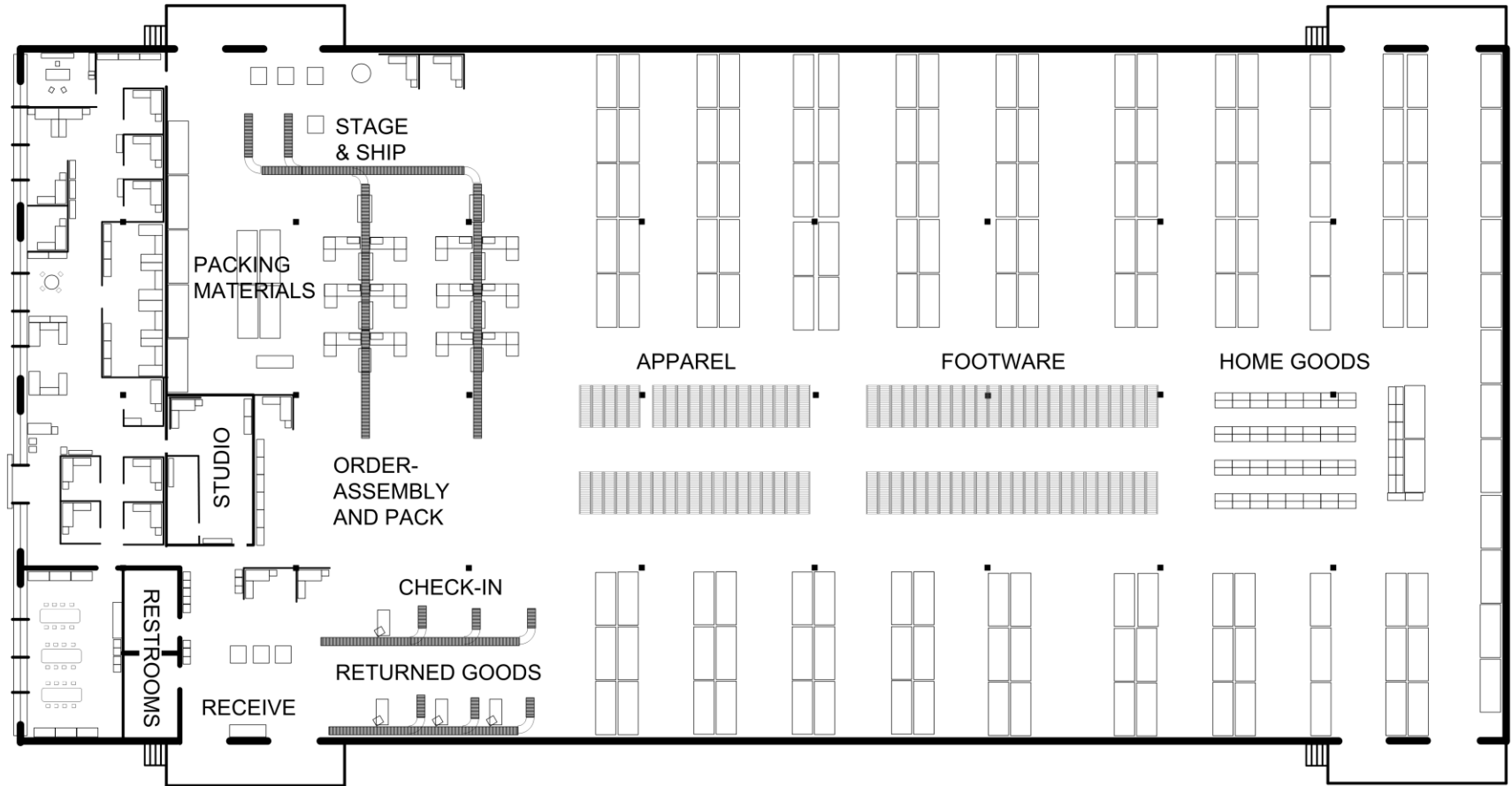
Main Points

1. Alternative plans are evaluated on the basis of costs and intangible factors or considerations.
2. SLP uses a vowel-code convention to rate the performance of each plan on each of several weighted factors.
3. Vowel code ratings are converted to points and multiplied by factor weights to arrive a scores. These are totaled for each plan.
4. A plan must score 15% better than the next highest alternative to be considered better.
5. Plans receiving an "X" (Not acceptable) rating on any factor are removed from consideration unless the objectionable feature can be eliminated or corrected.
6. In this example, Plans A and C are comparable, and both are significantly better than Plan B.
7. Costs and payback are considered separately. To be selected, Plan A or C must provide an acceptable financial return. The less desirable Plan B could be chosen on the basis of financial considerations.
8. As a point of reference, the existing situation has been evaluated as Alternative D.

EVALUATING ALTERNATIVES				Plant	<i>Homart Direct</i>				
				Project	<i>DC Layout</i>		Date	<i>12/2</i>	
Weights set by <u>RI, RM,</u> Tally by <u>LH</u>									
Ratings by <u>Plan Team</u> Approved by _____				Description of Alternatives:					
EVALUATING DESCRIPTION				Enter a brief phrase identifying each alternative.					
A	Almost Perfect	O	Ordinary	A. <i>North-South racks</i>					
E	Especially Good	U	Unimportant	B. <i>Order Assembly along West wall</i>					
I	Important	X	Not Acceptable	C. <i>Central Order Assembly</i>					
				D. <i>Existing facility</i>					
				E.					
				ALTERNATIVE					
FACTOR / CONSIDERATION			WT.	A	B	C	D	E	
1	<i>Flow of materials</i>			10	A 40	I 20	E 30	U 0	
2	<i>Effective use of space</i>			5	I 10	I 10	E 15	U 0	
3	<i>Flexibility</i>			5	I 10	E 15	I 10	O 5	
4	<i>Ease of installation</i>			6	I 12	I 12	I 12	A 24	
5	<i>Ease of supervision</i>			8	E 24	O 8	A 32	I 16	
6	<i>Employee convenience</i>			3	E 9	O 3	A 12	I 6	
7	<i>Working conditions & safety</i>			8	A 32	E 24	E 24	O 8	
Totals					137	92	135	59	
Reference Notes:									
a.				d.					
b.				e.					
c.				f.					

Notes

Homart Direct — Detailed Layout

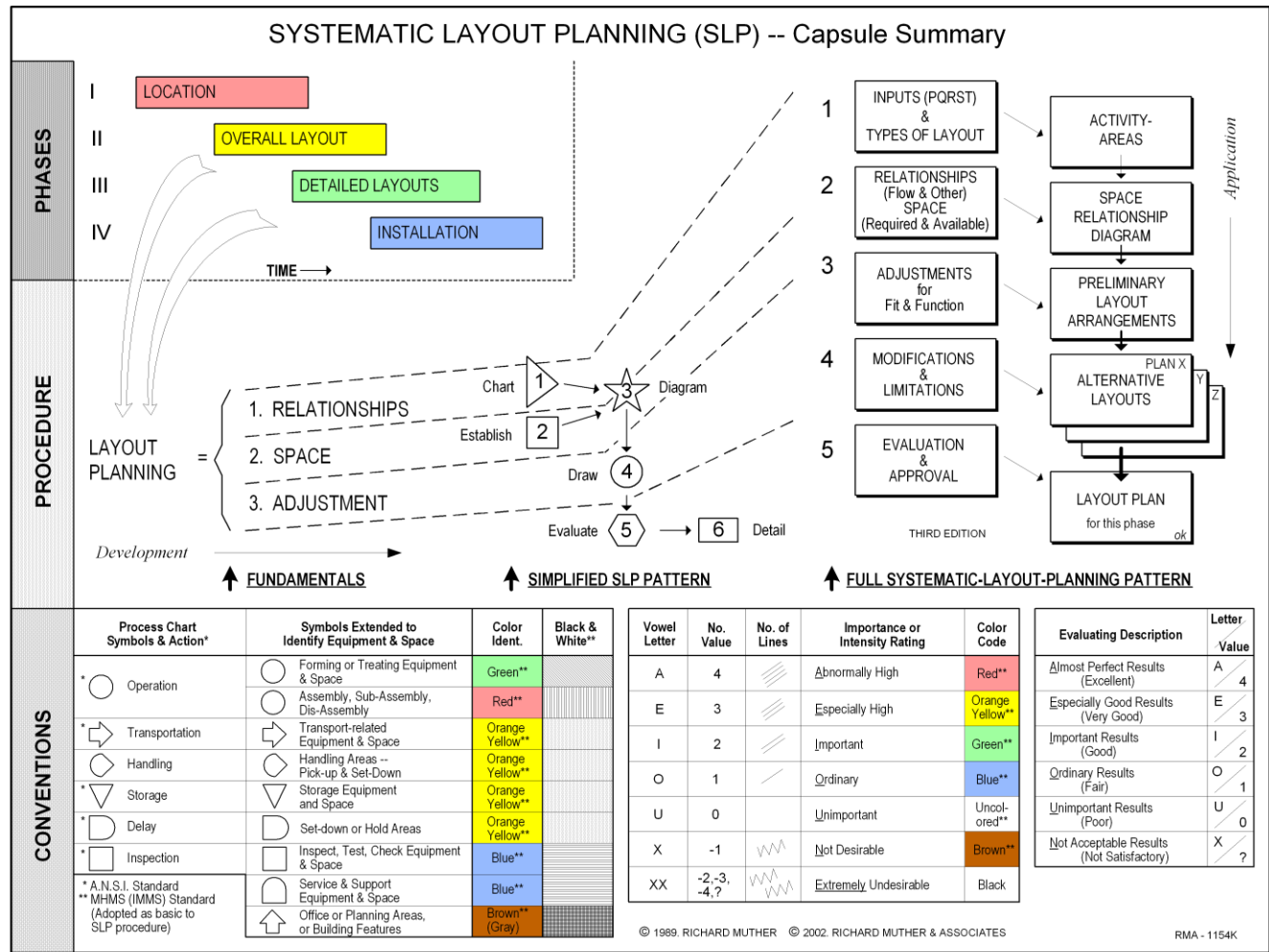


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Main Points

1. Systematic Layout Planning (SLP) is an organized, universally-applicable approach to any layout planning project.
2. SLP consists of:
 - Framework of Phases
 - Pattern of Procedures
 - Set of Conventions
3. SLP was first published in 1960 by Richard Muther. It is widely taught, has been translated into nine languages, and is used throughout the world.



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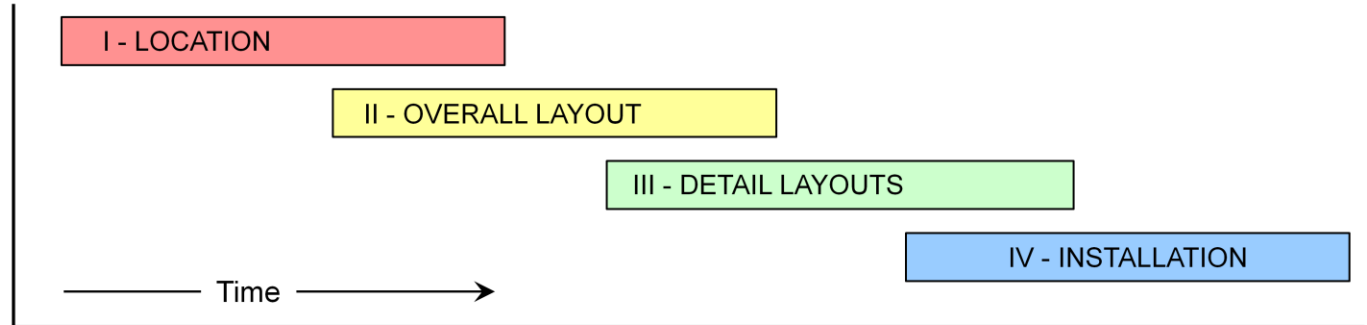
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Main Points

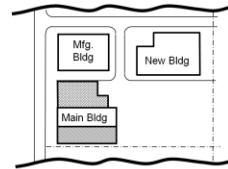
1. As each project runs its course – from initial stated objective to installed physical reality – it passes through four sequential and phases. For best results, the phases should overlap.
2. Phase I and Phase IV are frequently not part of the layout planner's specific role and are often performed by others. In a sense, they "frame" the strictly planning phases II and III.
3. Phase I considers situations and conditions *outside* our problem area, over which we may have little or no control. Yet these "externals" may influence or constrain our plans in Phases II and III.

The Phases of Systematic Layout Planning



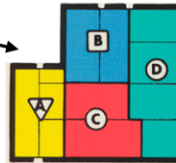
Phase I:

Establish the location of the area to be planned. Determine space available and surrounding influences.



Phase II:

Plan the arrangement of activity-areas and departments. Define main aisles.



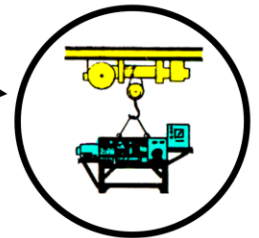
Phase III:

Plan the arrangement of specific machinery and equipment, ready to install.



Phase IV:

Prepare drawings and specifications: obtain and install equipment; train workers; follow through.



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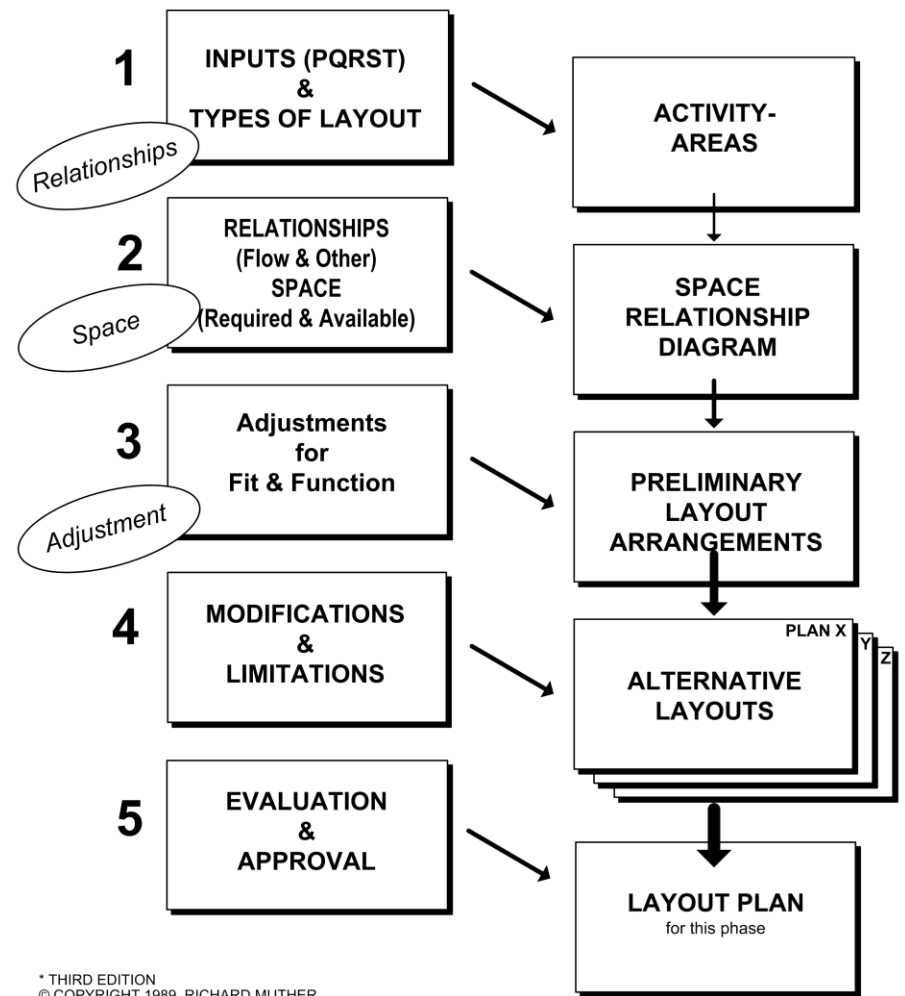
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Notes

Main Points

1. The SLP Pattern of Procedures is a five-section series of procedures resting squarely of the three fundamentals of *relationships, space* and *adjustment*.
2. The Pattern applies to both Phase II, Overall Layout, and Phase III, Detail Layouts.
3. The left-hand boxes of the pattern represent data collection and analysis.
4. The right-hand boxes represent synthesis and output of results.
5. The SLP Pattern requires that two or more alternatives be developed and evaluated before a plan is approved.
6. The more complicated the problem, the more useful and time-saving this pattern becomes.

Systematic Layout Planning Pattern*



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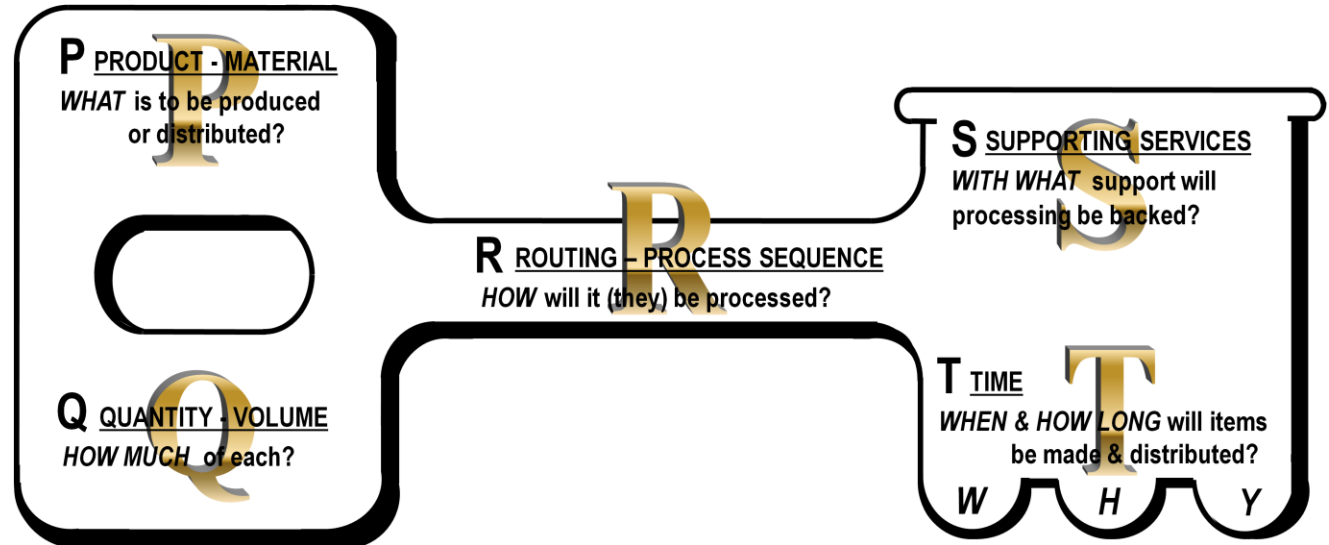
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Notes

Main Points

1. Facilities planning requires five types of key input data.
2. For ease of recall, the five key inputs are designated by the five-letter sequence: P-Q-R-S-T. These stand for:
 - *Products* (or materials or services)
 - *Quantities* (sales volumes & inventory)
 - *Routing* (or processes of necessary operations)
 - *Supporting Services* (for people, processes and information systems)
 - *Timing* (operating hours, seasons, urgency...)
3. The facilities planner must collect data from others for each of the five key inputs.
4. When collecting data, be sure to challenge its correctness and underlying assumptions, especially regarding “R” the routing or process.
5. This act of challenging is symbolized by the letters W-H-Y on the teeth of the key.

Key Inputs



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19

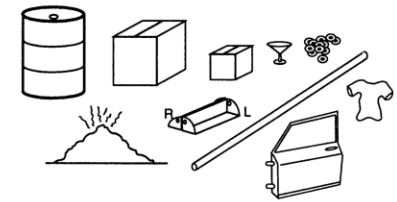
Notes

Five Key Elements Influence Warehouse Layout Planning

P

PRODUCT
(Materials,
Items &
Orders)

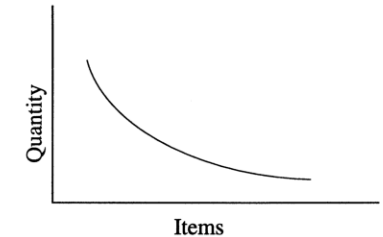
The layout must be planned for the physical characteristics of items and orders. Storage areas will be defined for common material storage groups – items with similar physical characteristics, common ordering patterns, or other controlling factors.



Q

QUANTITY
(Flows &
Levels)

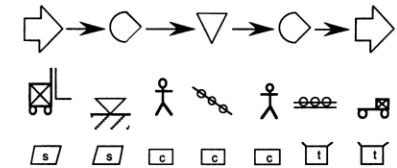
Quantity has two different meanings:
Flow rate in and out (Intensity of flow)
Inventory level (Quantity on hand)
 Great differences in flow or inventory levels will lead to separate methods and areas for fast and slow movers, and for high- or low-quantity items.



R

ROUTING
(Process
Sequence
& Methods)

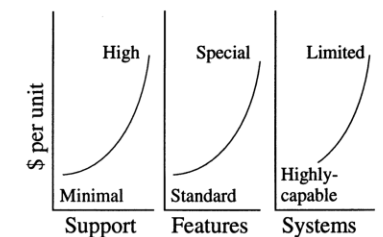
The purpose of warehouse layout is to support and enable the desired process, methods and routing of materials from receipt through shipment.
 Distance moved should be minimized on routes with high intensities of flow.



S

SUPPORTING SERVICES
(Surroundings
& Systems)

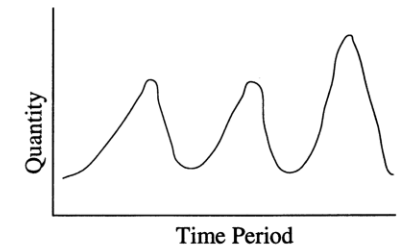
Maintenance, battery charging, personnel areas and the like are supporting services that need placement in the layout.
 Features of the building and site are surroundings that will influence the layout.
 Information systems for managing activity will also influence methods and layout.



T

TIME
(Timing,
Regularity,
Urgency,
Duration)

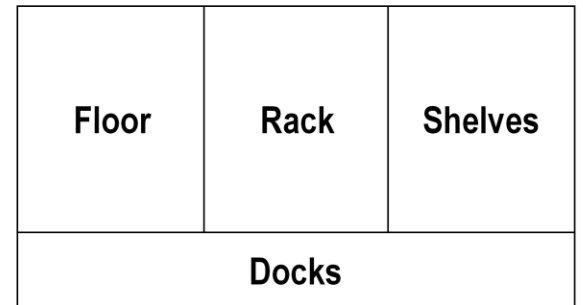
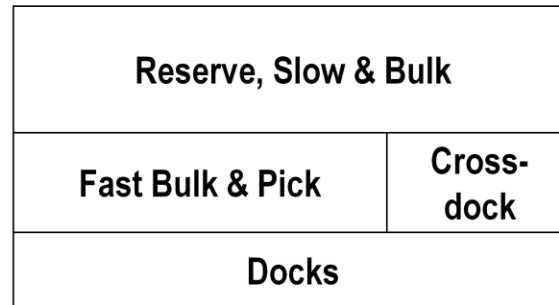
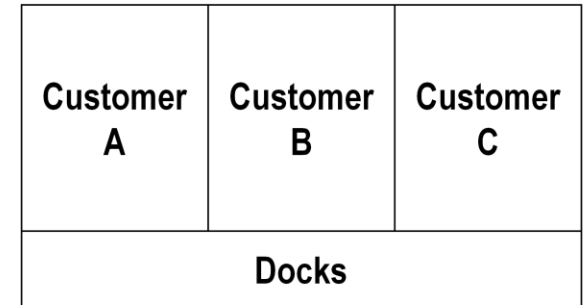
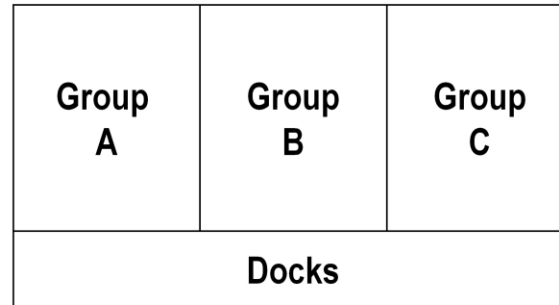
The regularity and duration of activities influences the size, throughput and capacity of the layout. Dock schedules, ordering cut-offs, and working hours must all be considered.
 Periodic peaks and seasonality must be identified and considered.



Types of Storage Area Layouts

Main Points

1. The storage areas of most warehouses and distribution centers can be broken into zones or activity-areas by applying one or more of the classical layout types shown here.
2. Determining which type(s) to use is a first step in Systematic Layout Planning (SLP), since it defines the storage activity-areas that will appear on the layout.
3. Choice of layout type generally depends upon the key inputs of P-Q-R-S-T, and especially on P, Q, and R.
4. Most warehouse layouts are a combination of the following classical types:
 - Layout by Physical Product Characteristics
 - Layout by Customer (or Supplier)
 - Layout by Velocity or Activity Level
 - Layout by Storage & Handling Method or Equipment Type.



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21

Notes

Factors Affecting the Grouping of Materials

Main Points

1. Items with common physical characteristics, order structure or other factors can typically be stored and handled in the same way.
2. Using these 15 factors, hundreds or even thousands of items can be grouped into a few manageable categories for storage methods selection.
3. Procedurally, it is best to start with the five physical characteristics, since differences here will usually have the most impact on storage methods. Then consider order structure, and finally other factors as may be appropriate.

• Physical Factors

- Size
- Weight
- Shape
- Risk of Damage
- Condition

• Order Structure

- Popularity
- Order Quantity
- Similarity (family)
- Time or Urgency
- Seasonality

• Other Factors

- Annual Usage
- Turnover or Stock Level
- Value or Special Condition
- Procedures
- Regulations

Each material class should consist of items which are similar in one dominant characteristic or in a combination of several characteristics. Basically, we want each class of materials to be capable of being stored in the same way – that is to say, by the same storage and handling methods.

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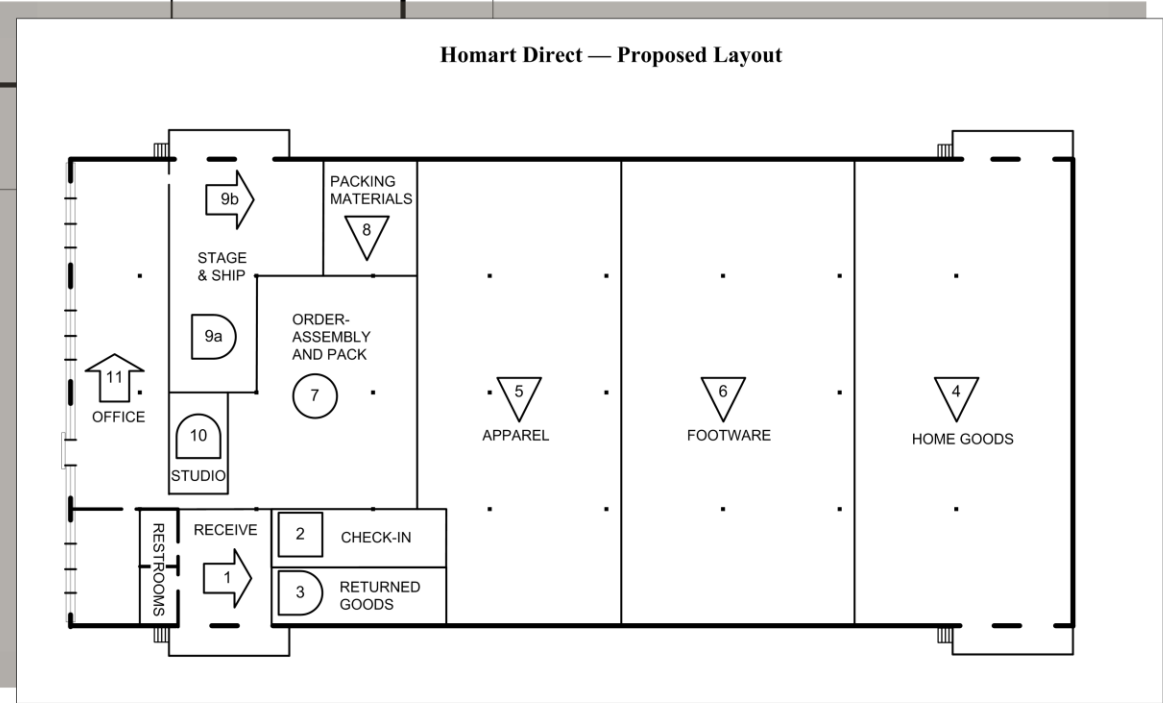
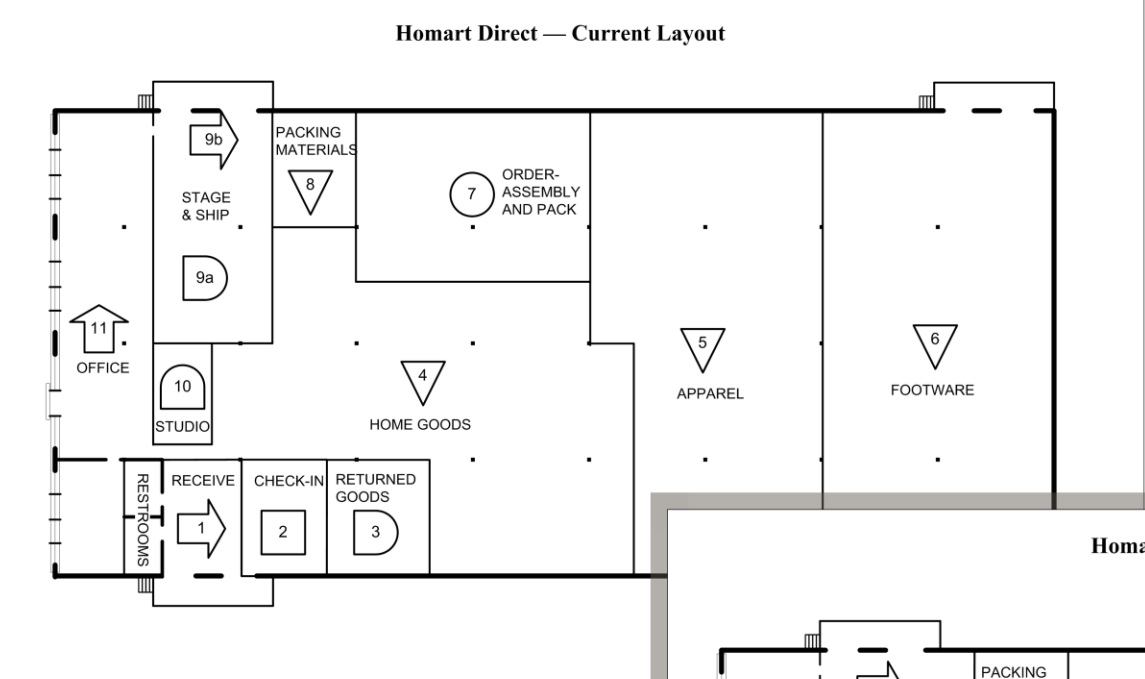
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22

Notes

Homart Flow Analysis

Is the proposed layout better?
If so, by how much?



Homart Flow Analysis

The Homart Direct distribution center is considering a new layout to improve its flow of materials. The changes will be disruptive. Before giving his approval, the General Manager wants to know by how much the material flow will be improved.

Questions:

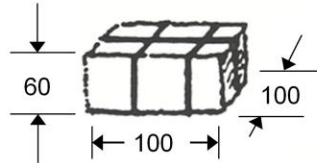
1. How do you define “better flow”? What does “improved flow” mean?
2. How will you measure flow of materials?
3. How will you compare the two plans?
4. What information will you need?

Homart Material Classes

Homart Direct distributes clothing and soft home goods to catalog and Internet customers. Large cartons and bundles are received, weighing up to 50 kilograms (about 100 lbs.) and are up to 1 meter (39 inches) cubed. A table of data showing the materials moved inside the building (in Kg./hour) is shown on RMA-7233-4.



a
Largest Size



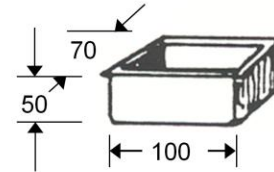
b



Flat Shipping
Cartons



Paper
Dunnage



c

Small
packages
(Orders)



d



Jiffy bag

All dimensions in centimeters

Movement Summary and calibration of total route flow intensities

		Classes of Materials				(e)	(f)
		Large Cartons (a)	Bundles, banded & Firm (b)	Tubs of Loose Items (c)	Small Pkgs. (d)		
Route							
1	1 -- 2	55	25	--	20		
2	2 -- 3	--	--	20	--		
3	2 -- 4	15	5	--	--		
4	2 -- 5	20	15	--	--		
5	2 -- 6	20	5	--	--		
6	3 -- 4	--	--	2	--		
7	3 -- 5	--	--	10	--		
8	3 -- 6	--	--	8	--		
9	4 -- 7	--	--	22	--		
10	5 -- 7	--	--	45	--		
11	6 -- 7	--	--	33	--		
12	7 -- 9a	--	--	--	105		
13	8 -- 7	--	5	--	--		
14	9a -- 9b	--	--	--	105		
15	9b -- 8		5	--	--		
Totals		110	55	140	230		

Movement Summary and calculation of Transport Work

		Classes of Materials				(e)	(f)
		Large Cartons (a)	Bundles, banded & Firm (b)	Tubs of Loose Items (c)	Small Pkgs. (d)		
Route							
1	1 -- 2	55	25	--	20	100	
2	2 -- 3	--	--	20	--	20	
3	2 -- 4	15	5	--	--	20	
4	2 -- 5	20	15	--	--	35	
5	2 -- 6	20	5	--	--	25	
6	3 -- 4	--	--	2	--	2	
7	3 -- 5	--	--	10	--	10	
8	3 -- 6	--	--	8	--	8	
9	4 -- 7	--	--	22	--	22	
10	5 -- 7	--	--	45	--	45	
11	6 -- 7	--	--	33	--	33	
12	7 -- 9a	--	--	--	105	105	
13	8 -- 7	--	5	--	--	5	
14	9a -- 9b	--	--	--	105	105	
15	9b -- 8	--	5	--	--	5	
Totals		110	55	140	230		

Current Dist. in m.	
	7
	7
	25
	50
	70
	15
	40
	60
	15
	30
	50
	25
	12
	10
10	

Movement Summary and comparison of plans

Route		Classes of Materials				(e)	(f)
		Large Cartons (a)	Bundles, banded & Firm (b)	Tubs of Loose Items (c)	Small Pkgs. (d)		
1	1 -- 2	55	25	--	20	100	
2	2 -- 3	--	--	20	--	20	
3	2 -- 4	15	5	--	--	20	
4	2 -- 5	20	15	--	--	35	
5	2 -- 6	20	5	--	--	25	
6	3 -- 4	--	--	2	--	2	
7	3 -- 5	--	--	10	--	10	
8	3 -- 6	--	--	8	--	8	
9	4 -- 7	--	--	22	--	22	
10	5 -- 7	--	--	45	--	45	
11	6 -- 7	--	--	33	--	33	
12	7 -- 9a	--	--	--	105	105	
13	8 -- 7	--	5	--	--	5	
14	9a -- 9b	--	--	--	105	105	
15	9b -- 8	--	5	--	--	5	
Totals		110	55	140	230		

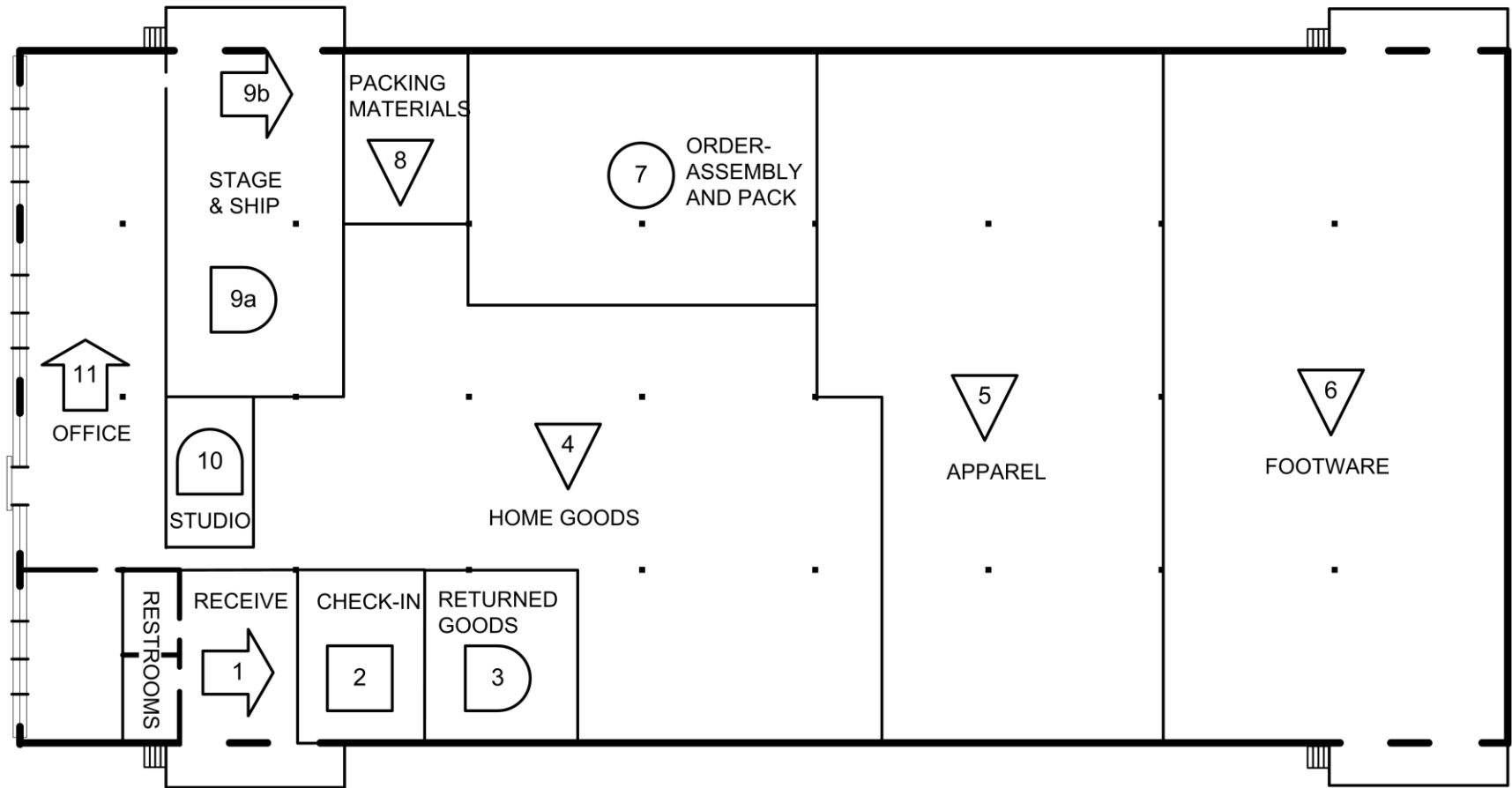
Current Dist. in m.	Current Transp. Work	Proposed Dist. in m.	Proposed Transp. Work
7	700	10	1000
7	140	5	100
25	500	65	1300
50	1750	30	1050
70	1750	45	1125
15	30	70	140
40	400	35	350
60	480	50	400
15	330	55	1210
30	1350	18	810
50	1650	35	1155
25	2625	10	1050
12	60	10	50
10	1050	10	1050
10	50	15	75
	12815		10865

Homart Flow Visualization

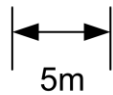
Problem: Using data on RMA-7233-4 and the floor plan on RMA-7233-9

1. Visualize the total flows on each route as a quantified flow diagram.
2. Identify at least 3 layout improvements that would reduce total material handling effort.

Homart Direct — Current Layout



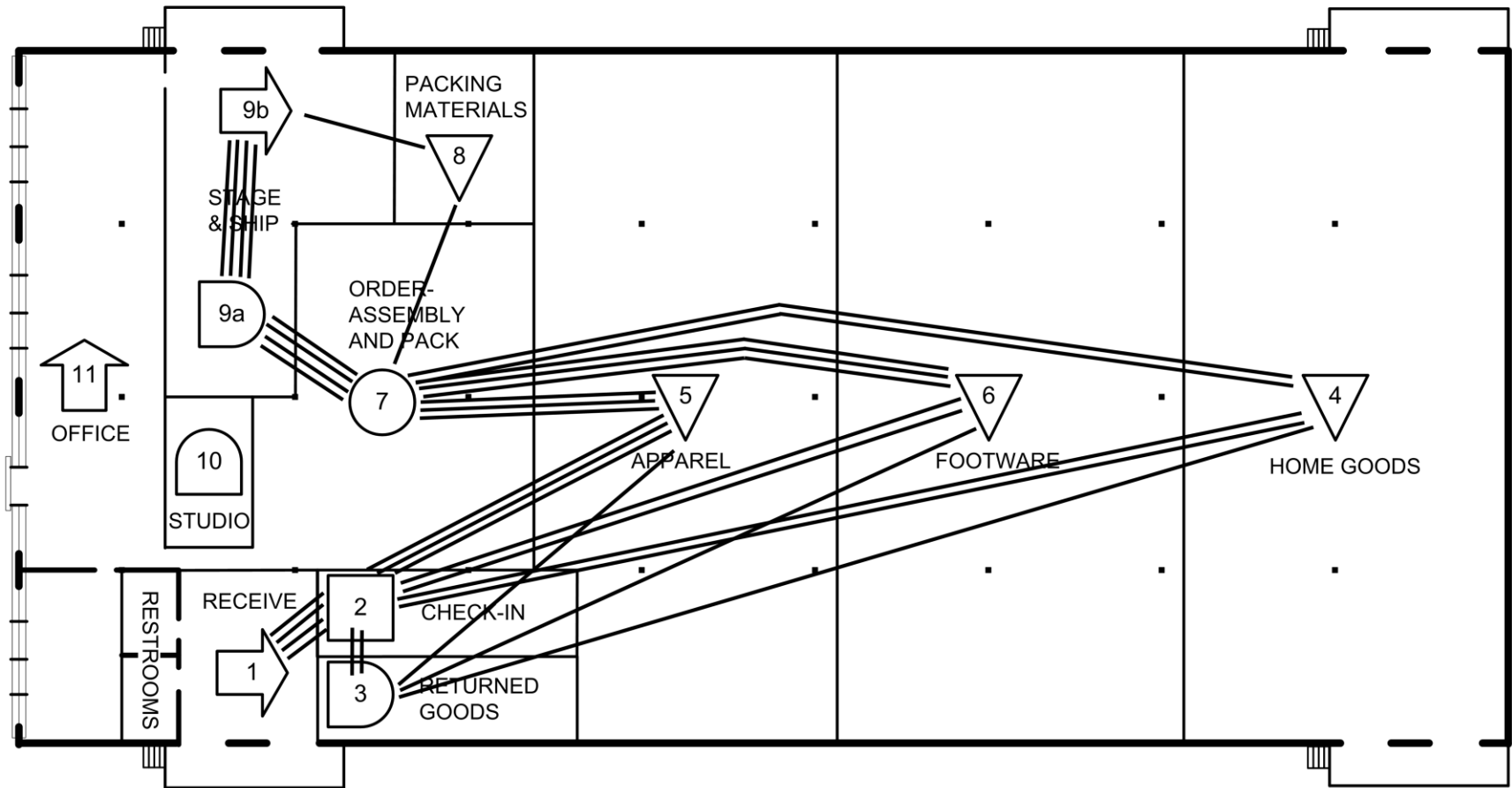
Scale: 1/2" = 5m — N →



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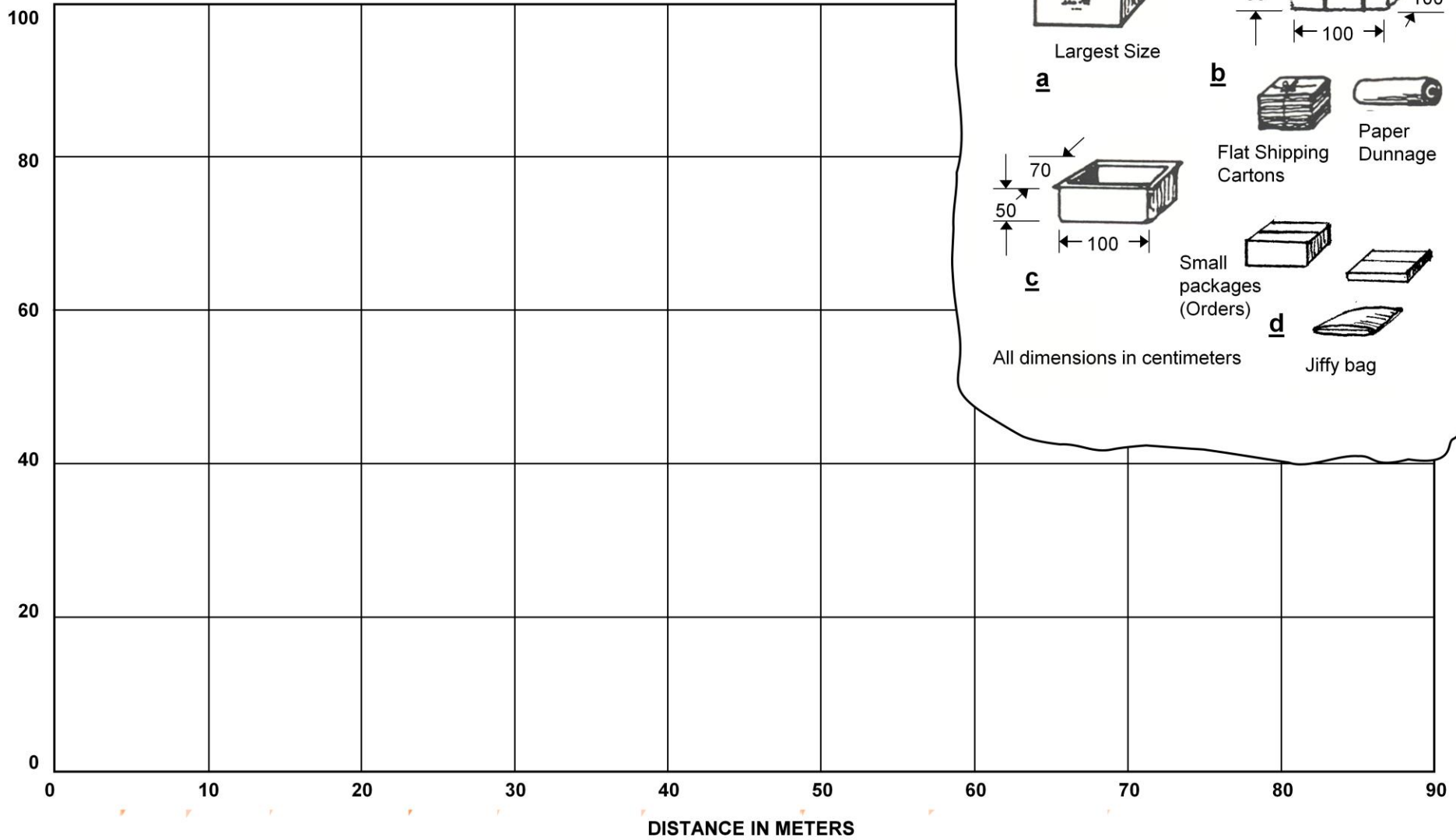
Homart Direct — Proposed Layout



Scale: 1/2" = 5m — N →
 5m

How can you quickly compare the material flow in this proposed layout with flow in current layout on RMA-7233-9?

DISTANCE-INTENSITY PLOT



Main Points

1. When sizing for highly-fixed machines or special construction, use very precise methods. For general storage or offices where somewhat less is at stake, overly precise estimates add little value.
2. Calculation is accurate but time-consuming. Use it when planning new storage methods, or in Phase IV – Installation to assign slots for individual items.
3. Warehouse calculations often use item-level inventory predictions. These may have little value beyond Year 1, especially if products are changing.
4. Conversion from an adjusted current state is quick and effective for 2- to 5-year projections for Phase I – Location and Phase II – Overall Plans, or when there is no data for calculation.
5. Rough Layout is for critical areas of high investment, large or unusually-shaped machinery, or conveyor lines.
6. Space Standards may be available, but use them with care if you do not understand their basis.
7. Ratio Trend and Projection relates space history to business activity and trends their relationship (ratio) into the future. Space is estimated by applying the projected ratio to a forecast of activity. This method is for long-range projections of total area. It is the least precise method and cannot determine individual activity areas.
8. Several methods may be used on the same project. Different methods tend to check each other, boosting confidence in the results.

The Calculation Method

Storage area example

Rack: 2000 positions @ 8 positions per bay = 250 bays
 (4 tiers) 1 bay = 9.25 ft. wide x 4.5 ft. deep = 41.625 sq. ft.
 250 bays x 41.625 = 10,406.25 = 10,400 sq. ft.

Aisle (12'): 250 bays x (9.25 ft. x 6 ft.) = 13,875 sq. ft.

Total Rack Area including access aisle = 24,275 sq. ft.

The Conversion Method

Area today: 20,000 sq. ft.
 Adjust for crowding 4,000 sq. ft.
 "Should Have" Today 24,000 sq. ft.

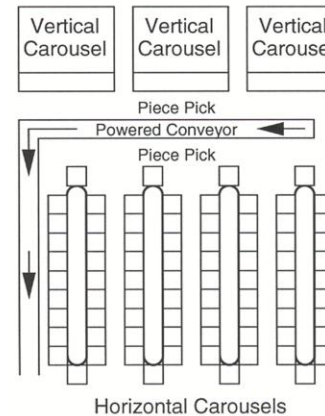
Projected changes

Increased volume +20%
 Increased storage height -25%
 Increased product variety +30%
 Increased turnover -20%

New area (space):

$24,000 \times 1.2 \times 0.75 \times 1.3 \times 0.8 =$
 22,464 sq. ft.
 rounded 22,500 sq. ft.

Rough Layout



All equipment is drawn or reproduced to scale. The enclosed area is the space required.

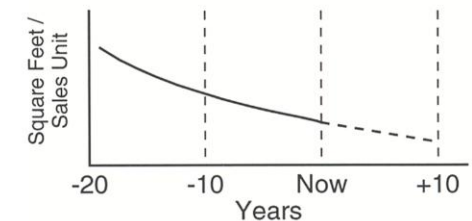
Five Ways to Determine Space Requirements

Space Standards

General space standards

Offices 125 sq. ft. per
 Car parking 300 sq. ft. per car
 Break room 15 sq. ft. per person

Ratio Trend & Projection



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33

Notes

Main Points

1. The need for additional space is typically driven by the factors listed here.
2. Some factors affect only a certain kind of space or a specific activity-area. Planners need to understand which ones are active and to what extent.
3. Projecting the key inputs of PQRST will help to identify and measure the relevant factors.

What drives your need for additional space?

- More business volume – with no change in inventory policy.
- More product variety.
- Changes in product packaging and density.
- New activities and services.
- Changes in product and service mix.
- Changes in processing methods and practices.
- Changes in sourcing & inventory management.

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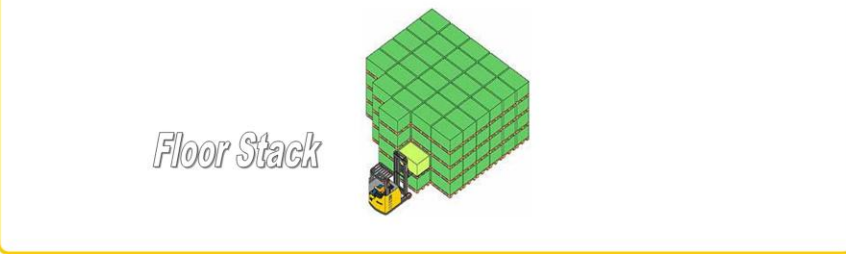
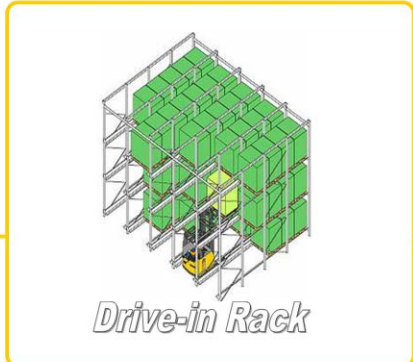
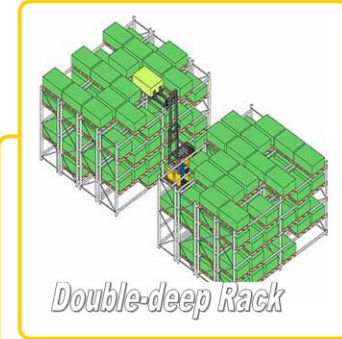
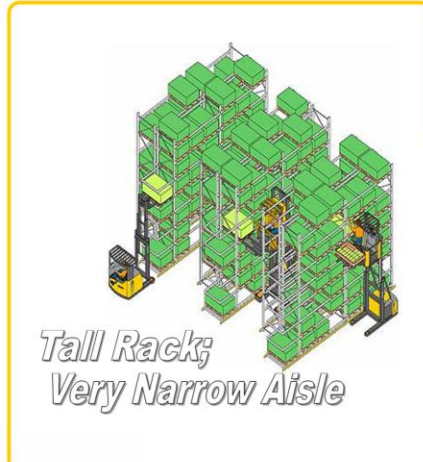
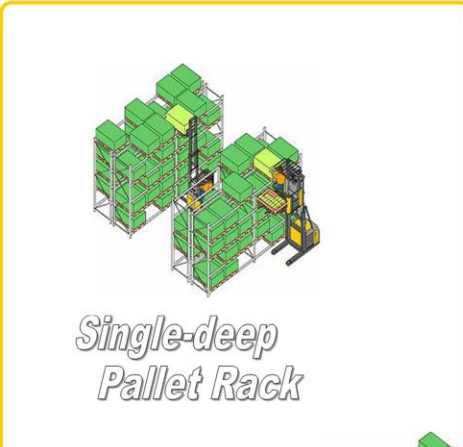
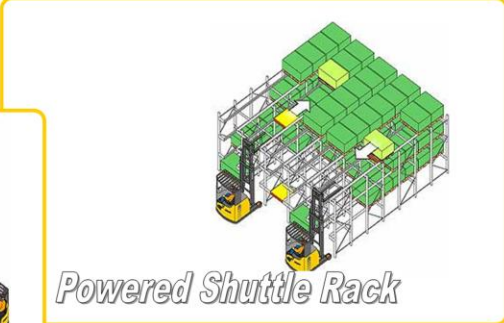
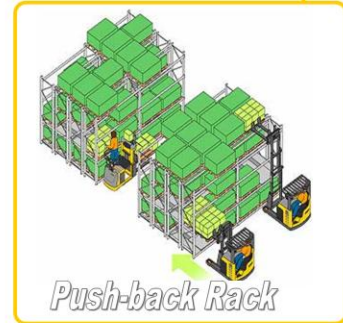
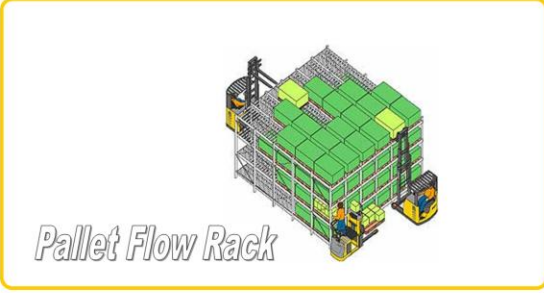
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34

Notes

R_x for Storage Equipment

FLOW Intensity (Cube/period)



**Inventory LEVEL
(Cube on hand)**

**SPACE
Cost or limits**

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Setting Warehouse Handling & Storage Methods

Main Points

1. Selecting warehouse handling and storage methods is best done by material-storage class or group.
2. Each group consists of items that are similar in physical and other characteristics, including order structure. Thus, they can be handled and stored in the same way.
3. Handling-and-storing methods must be compatible on either side of the storage. That is, the delivery and putaway equipment must be compatible with the storage equipment. And the picking and takeaway equipment must also be compatible with the storage equipment.
4. Compatibility and suitability depend upon a variety of factors.
5. Note that the method of picking and taking away may differ from the one used to deliver and put away.

Factors or considerations when selecting handling & storing methods

P – Product/mat'l. characteristics

P – Transport unit/container

Q – Inventory level

Q – Flow: Pick Q; Replenish Q

R – Routes & distance to-from

R – Picking methods

R – Equipment available

R – Mechanical interfaces

R – Ergonomics

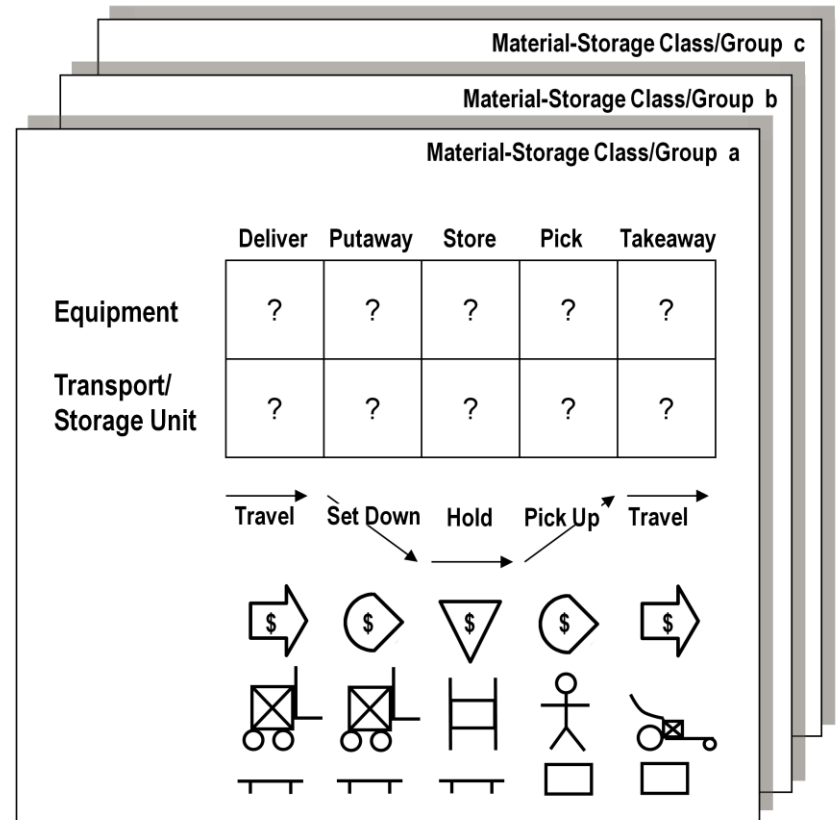
S – Space available/required

S – Service/maint. required

S – Skill/training required

T – Picking time/urgency

Budget; Date needed



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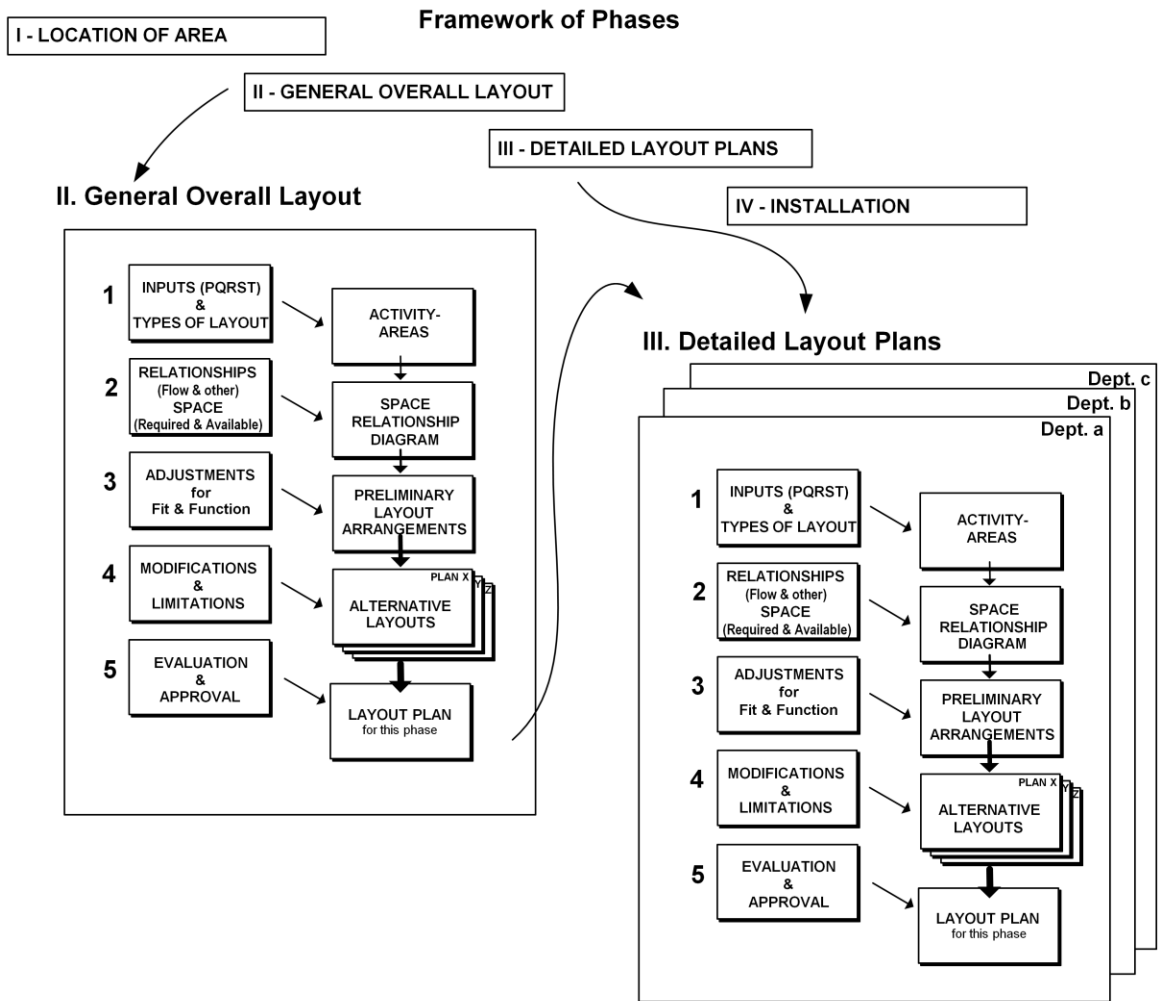
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Notes

The Pattern Repeats

Main Points

1. The 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.
2. Phase II is devoted to planning the sizes and arrangement of areas or departments in the layout.
3. Phase III is devoted to arranging machinery and equipment within each area or department in the overall plan.
4. With its overlapping phases and repeating pattern of procedures, SLP enables the planner to tackle problems of any size or complexity.



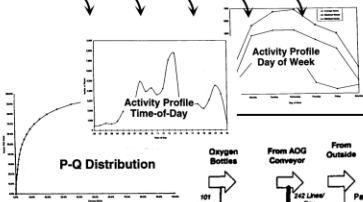
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Notes

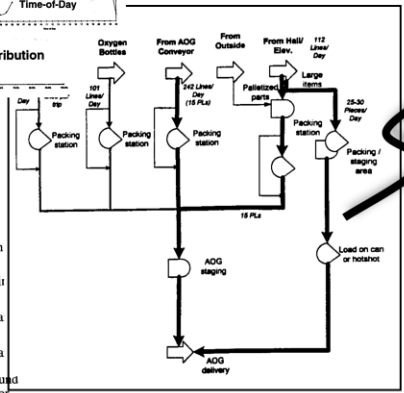
Key Input Data for: Shipping Department

P Q R S T

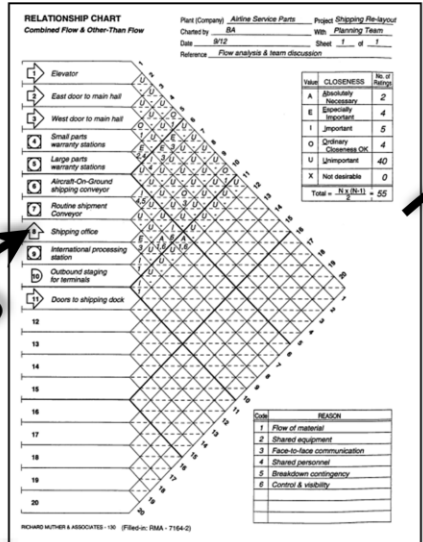


1. Activity-Areas

- 1 Elevator
- 2 East door to main
- 3 West door to main
- 4 Small parts warra
- 5 Large parts warra
- 6 Aircraft-On-Ground shipping conveyor
- 7 Routine shipment conveyor
- 8 Shipping office
- 9 International processing sta
- 10 Outbound staging for terminals
- 11 Doors to shipping dock

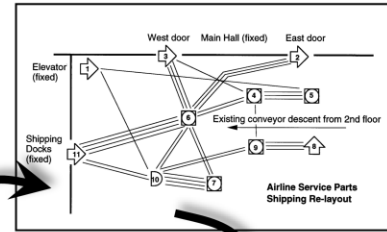


2a. Flow of Materials

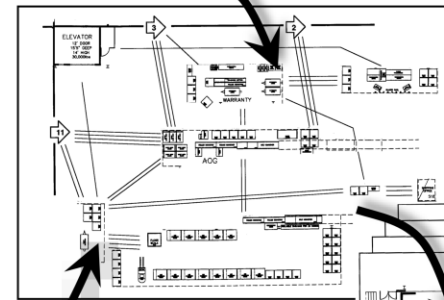


2a. Relationships (Flow & Other)

2a. Relationship Diagram



2.b. Space Relationship Diagram



2b. Space Requirements

ACTIVITIES AREA FEATURES SHEET

No.	Area	Area Sq. Ft.	Physical Features Required	Notes
1	Routine shipment conveyor	3,500	...	...
2	Inbound staging	600	...	...
3	Roll conveyor & packing station	400	...	...
4	Box sorting & consolidation area	200	...	...
5	Pallet sorting & consolidation area	200	...	...
6	ULD container sorting & consolidation area	1,800	...	...
7	Floor scale	100	...	...
8	Outbound pick-up	200	...	...

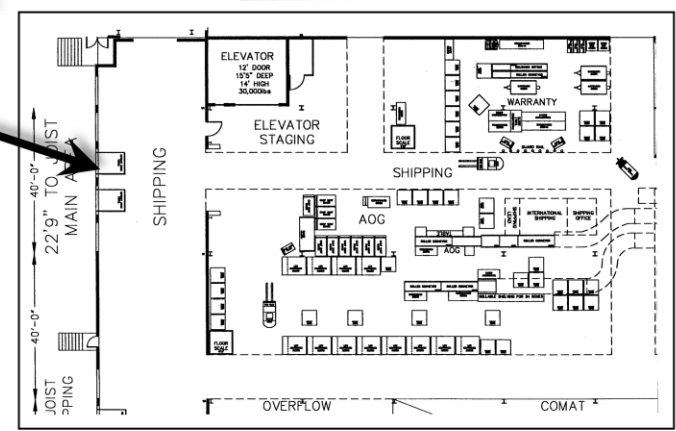
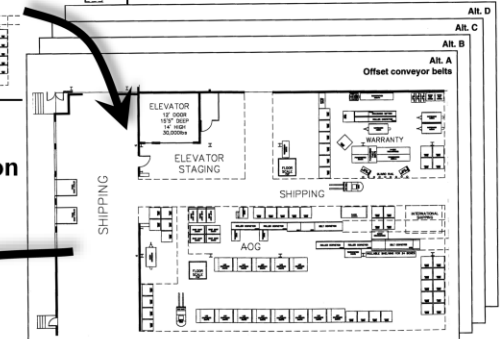
Rough Layout - Routine shipment conveyor

5. Evaluation & Selection

EVALUATING ALTERNATIVES

FACTORS/CONSIDERATION	Wt.	A	B	C	D	E	COMMENTS
1. Effectiveness of material flow	10	5	3	3	4	4	
2. Utilization of space	8	4	4	4	4	4	
3. Competition during peak periods	8	4	3	3	4	4	
4. Flexibility	2	5	3	3	4	4	
5. Ease of supervision	7	2	2	2	3	3	
6. Ease of sharing personnel	5	3	3	3	4	4	
7. Ease of installation	4	4	4	4	4	4	
TOTALS		143	134	137	126		

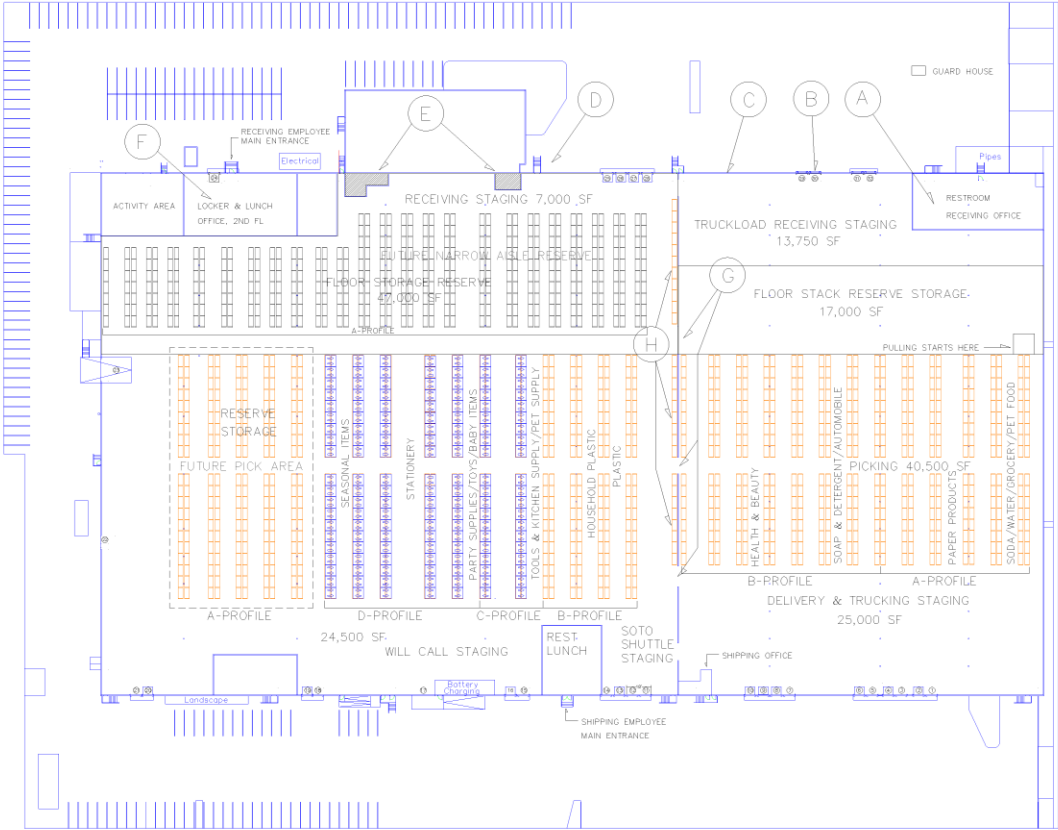
3 & 4 Preliminary Layout, Modification & Refinement into Alternatives



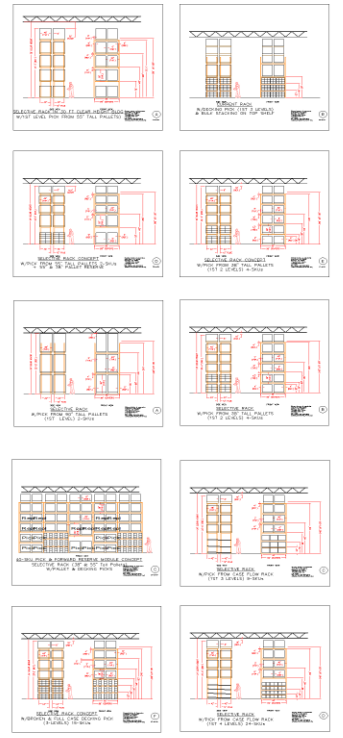
Detail Layout: Pallet Racks

Main Points

1. The need for additional space is typically driven by the factors listed here.
2. Some factors affect only a certain kind of space or a specific activity-area. Planners need to understand which ones are active and to what extent.
3. Projecting the key inputs of PQRST will help to identify and measure the relevant factors.



Rack Elevation Sketches & Dimensions



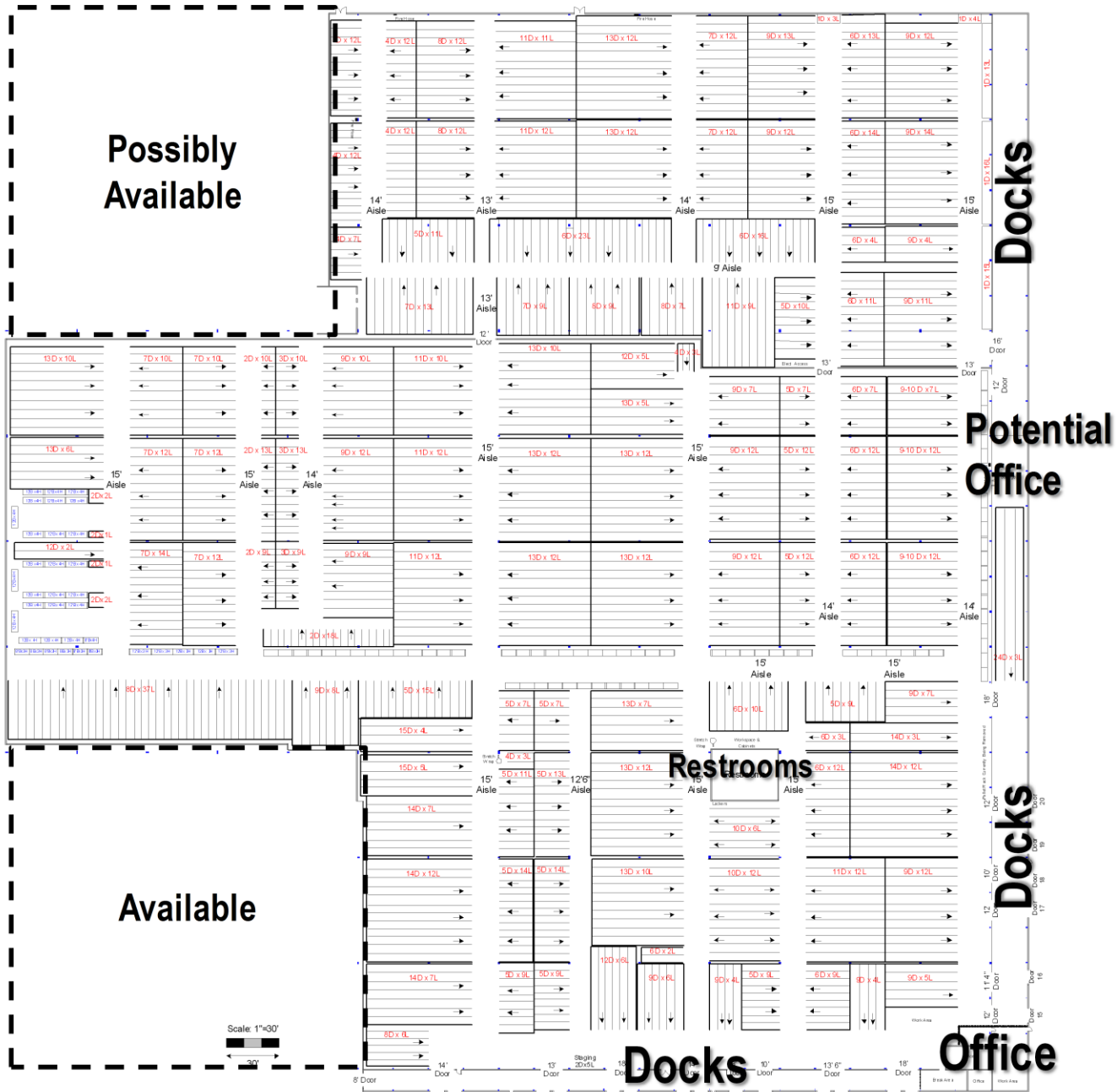
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Notes

Phase I: Location

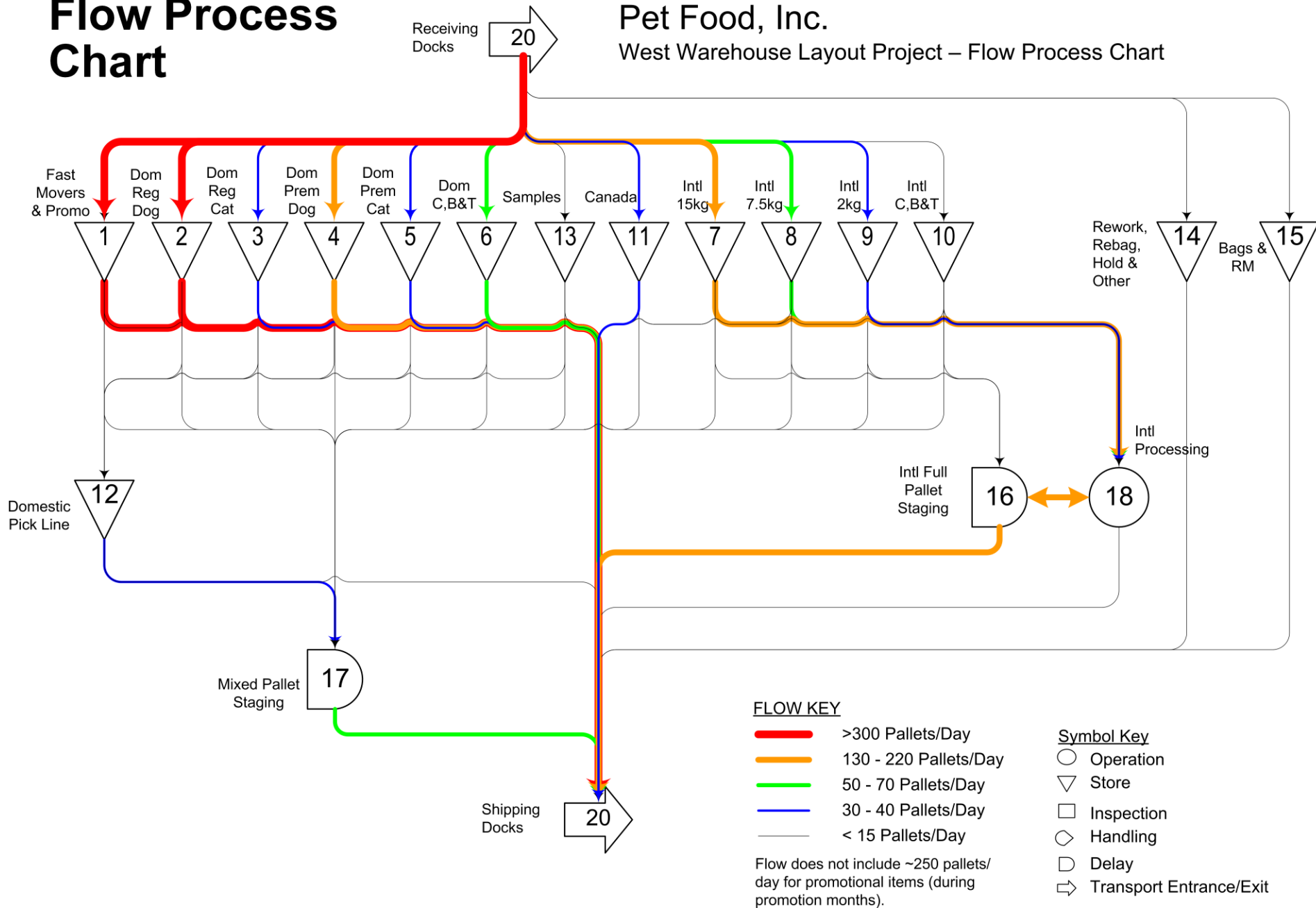
- Existing layout
- Fixed monuments
- Space Available



Flow Process Chart

Pet Food, Inc.

West Warehouse Layout Project – Flow Process Chart



Activity Areas

Activity Area Key

- Fast Movers & Promotional
- Domestic
- International
- Pick Line & Samples
- Rework, Rebag, Hold, RM & Bags
- Intl Staging
- Docks
- Canada
- Office, Break, Restrooms

ACTIVITY AREAS		Type of Space							U	Y	
No.	Name/Description	Operation	Handling	Transport	Inspection	Delay/Staging	Storage	Service/Support	Office or Bldg. Feature	U - Underroof	Y - Yard
1	Fast Movers & Promotions	○	◊	⇨	□	▷	▽	◐	↑	U	
2	Domestic Regular Dog Food	○	◊	⇨	□	▷	▽	◐	↑	U	
3	Domestic Regular Cat Food	○	◊	⇨	□	▷	▽	◐	↑	U	
4	Domestic Premium Dog Food	○	◊	⇨	□	▷	▽	◐	↑	U	
5	Domestic Premium Cat Food	○	◊	⇨	□	▷	▽	◐	↑	U	
6	Domestic Cans, Biscuits & Treats	○	◊	⇨	□	▷	▽	◐	↑	U	
7	International 15 Kg	○	◊	⇨	□	▷	▽	◐	↑	U	
8	International 7.5 Kg	○	◊	⇨	□	▷	▽	◐	↑	U	
9	International 2 Kg	○	◊	⇨	□	▷	▽	◐	↑	U	
10	International Cans, Biscuits & Treats	○	◊	⇨	□	▷	▽	◐	↑	U	
11	Canadian	○	◊	⇨	□	▷	▽	◐	↑	U	
12	Domestic Pick Line	○	◊	⇨	□	▷	▽	◐	↑	U	
13	Samples	○	◊	⇨	□	▷	▽	◐	↑	U	
14	Rework, Rebag, Hold	○	◊	⇨	□	▷	▽	◐	↑	U	
15	Empty Bags and Raw Materials	○	◊	⇨	□	▷	▽	◐	↑	U	
16	International Full Pallet Staging	○	◊	⇨	□	▷	▽	◐	↑	U	
17	Domestic Mixed Pallet Staging	○	◊	⇨	□	▷	▽	◐	↑	U	
18	International Processing	●	◊	⇨	□	▷	▽	◐	↑	U	
19	Office, Break & Rest Rooms	○	◊	⇨	□	▷	▽	◐	↑	U	
20	Docks (Receiving & Shipping)	○	◊	⇨	□	▷	▽	◐	↑	U	

Flow Analysis: From-To Chart & Ratings

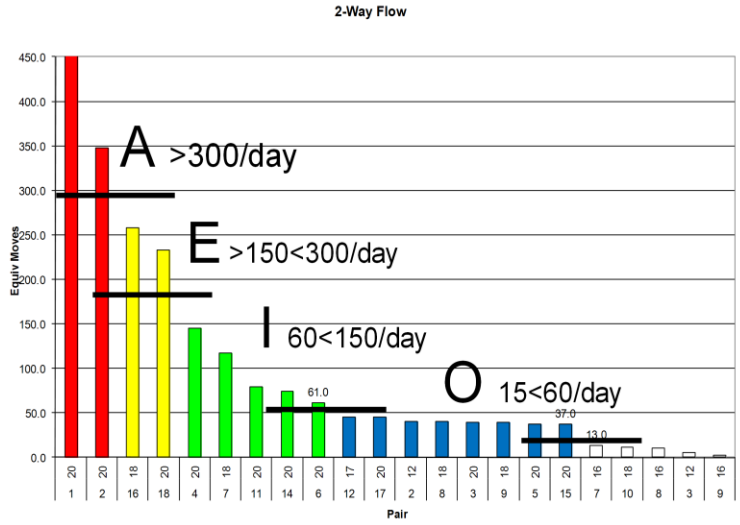
FROM-TO-CHART

Item(s) Charted:
Pallets per day

Basis of Values:
Outbound flows only (Inbound = Outbound)

Plant Pet Food, Inc. Project West Warehouse
By BS, BA, CP With LH, RMA
Date 11/22 Page 1 of 1

No.	Activity or Operation FROM Name/Description	Activity or Operation TO																			TOTAL		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		20	
No.	Activity Name	Fast Movers & Promotions	Domestic Regular Dog Food	Domestic Regular Cat Food	Domestic Premium Dog Food	Domestic Premium Cat Food	Domestic Cans, Biscuits & Treats	International 15 Kg	International 7.5 Kg	International 2 Kg	International Cans, Biscuits & Trea	Canadian	Domestic Pick Line	Samples	Rework, Rebag, Hold	Empty Bags and Raw Materials	International Full Pallet Staging	Domestic Mixed Pallet Staging	International Processing	Office , Break & Rest Rooms	Docks (Receiving & Shipping)	TOTAL	
1	Fast Movers & Promotions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	479	479	
2	Domestic Regular Dog Food	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-	-	-	-	-	-	348	388
3	Domestic Regular Cat Food	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	39	44
4	Domestic Premium Dog Food	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	145	145
5	Domestic Premium Cat Food	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	37
6	Domestic Cans, Biscuits & Treats	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61
7	International 15 Kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	117	-	130	130
8	International 7.5 Kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	40	-	50	50
9	International 2 Kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	39	-	41	41
10	International Cans, Biscuits & Trea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	12	12
11	Canadian	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79	79
12	Domestic Pick Line	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45	-	-	-	45	45
13	Samples	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Rework, Rebag, Hold	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	74	74
15	Empty Bags and Raw Materials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	37
16	International Full Pallet Staging	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25
17	Domestic Mixed Pallet Staging	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45	45
18	International Processing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	233	-	-	-	233	466
19	Office , Break & Rest Rooms	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	Docks (Receiving & Shipping)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL		-	-	-	-	-	-	-	-	-	-	-	45	-	-	-	258	45	233	-	1,577	-	-



NOTES:

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Relationships Other-Than-Flow

RELATIONSHIP CHART

Other-Than-Flow Relationships

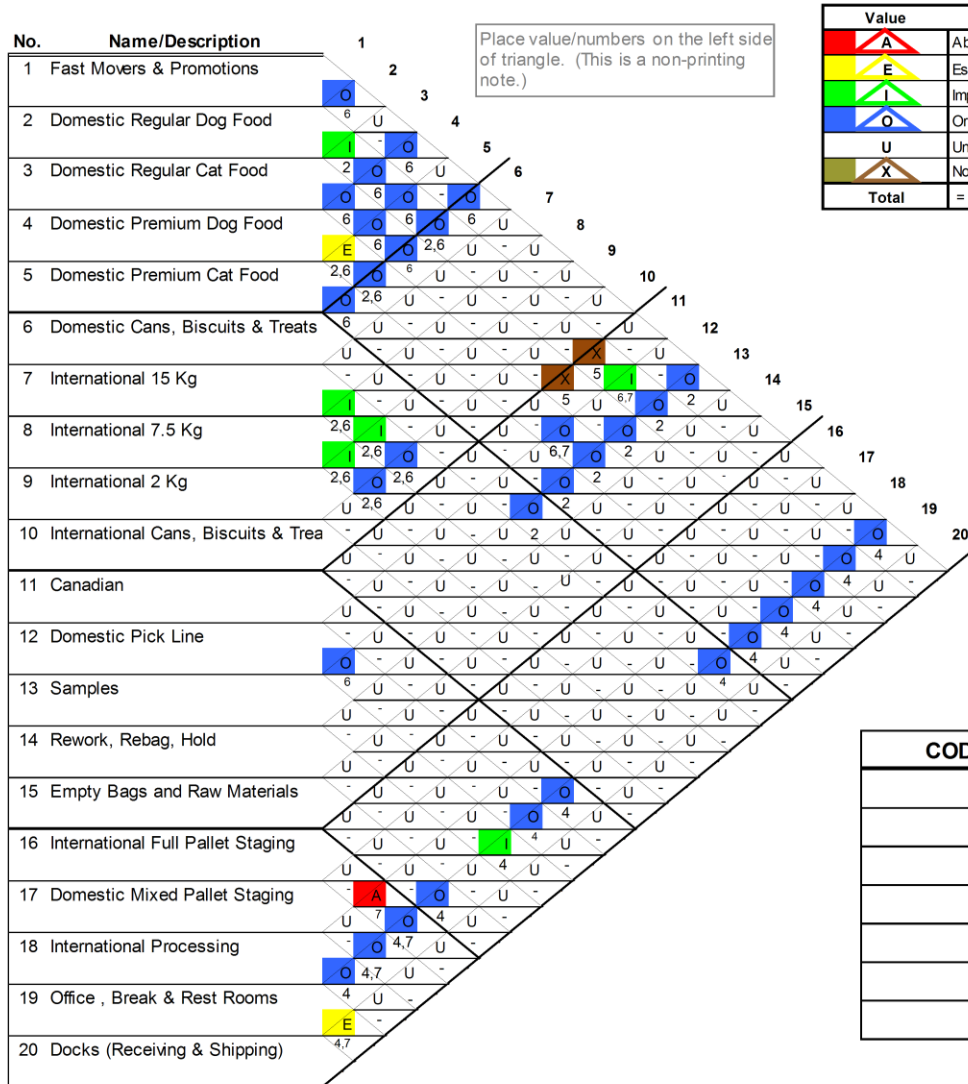
Plant (Company) Pet Food, Inc.

Project West Warehouse

Source - Reference LH, BA, BS, MR

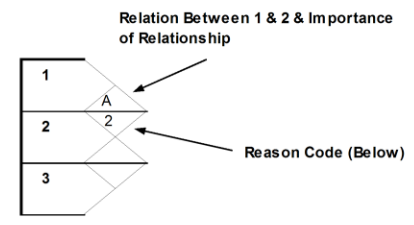
Date 11/21

Charted by BA, RMA



Place value/numbers on the left side of triangle. (This is a non-printing note.)

Value	Closeness	
A	Absolutely Necessary	1
E	Especially Important	2
I	Important	6
O	Ordinary Closeness	33
U	Unimportant	146
X	Not Desirable	2
Total	$= (N*(N-1))/2$	190



CODE	REASON
1	Material Flow
2	Picked Together
3	Supervision/Control
4	Convenience
5	Risk of mispick
6	Shared personnel
7	Visual management

Combining Flow & Other

COMBINING FLOW & OTHER RELATIONSHIPS WORKSHEET

Ratio of Flow to Other-Than-Flow:
2 to 1

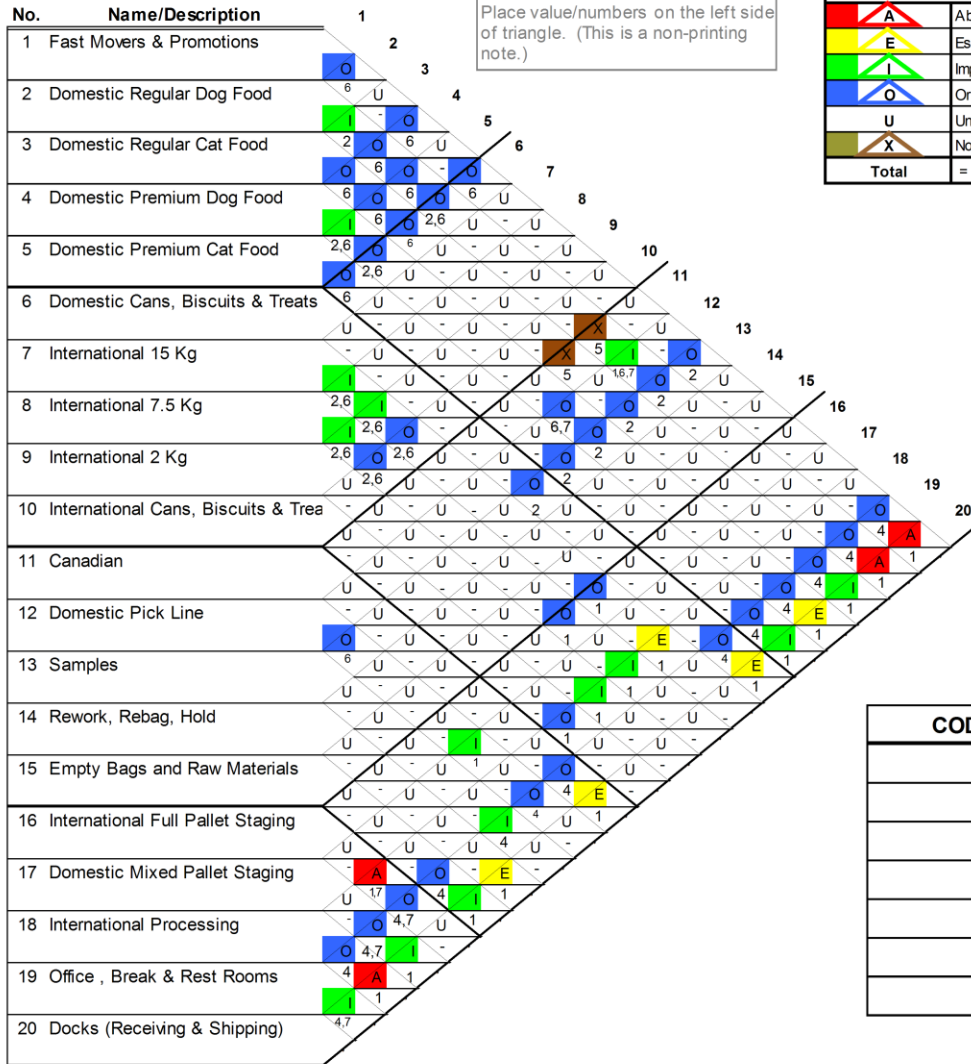
Line #	Activity-Pair			Two-Way Flow				Flow Rating			Other-Than-Flow				Combined Rating			Comments	
	From	Activity-Area	To	Activity-Area	From	To	From-To	To-From	2-Way	Vowel Rating	Value	Wt.	Vowel Rating	Value	Reasons	Wt.	Combined Value		Combined Rating	Final Assigned Rating
16	International Full Pallet Staging	18	International Processing	16	18	25.1	232.8	257.81	E	3	2	A	4	7	1	10	A	A	
1	Fast Movers & Promotions	20	Docks (Receiving & Shipping)	1	20	479.0	0.0	479.00	A	4	2	U	0	-	1	8	A	A	
2	Domestic Regular Dog Food	20	Docks (Receiving & Shipping)	2	20	348.0	0.0	348.00	A	4	2	U	0	-	1	8	A	A	
18	International Processing	20	Docks (Receiving & Shipping)	18	20	232.8	0.0	232.76	E	3	2	U	0	-	1	6	A	A	
2	Domestic Regular Dog Food	12	Domestic Pick Line	2	12	40.0	0.0	40.00	O	1	2	I	2	6.7	1	4	E	I	Low pallets/day
4	Domestic Premium Dog Food	20	Docks (Receiving & Shipping)	4	20	145.0	0.0	145.00	I	2	2	U	0	-	1	4	E	E	
6	Domestic Cans, Biscuits & Treats	20	Docks (Receiving & Shipping)	6	20	61.0	0.0	61.00	I	2	2	U	0	-	1	4	E	E	
7	International 15 Kg	18	International Processing	7	18	117.0	0.0	117.00	I	2	2	U	0	-	1	4	E	E	
14	Canadian	20	Docks (Receiving & Shipping)	14	20	79.0	0.0	79.00	I	2	2	U	0	-	1	4	E	E	
14	Rework, Rebag, Hold	20	Docks (Receiving & Shipping)	14	20	73.9	0.0	73.90	I	2	2	U	0	-	1	4	E	E	
4	Domestic Premium Dog Food	5	Domestic Premium Cat Food	4	5	0.0	0.0	0.00	U	0	2	E	3	2.6	1	3	I	I	
19	Office, Break & Rest Rooms	20	Docks (Receiving & Shipping)	19	20	0.0	0.0	0.00	U	0	2	E	3	4.7	1	3	I	I	
2	Domestic Regular Dog Food	3	Domestic Regular Cat Food	2	3	0.0	0.0	0.00	U	0	2	I	2	2	1	2	I	I	
3	Domestic Regular Cat Food	20	Docks (Receiving & Shipping)	3	20	39.0	0.0	39.00	O	1	2	U	0	-	1	2	I	I	
5	Domestic Premium Cat Food	20	Docks (Receiving & Shipping)	5	20	37.0	0.0	37.00	O	1	2	U	0	-	1	2	I	I	
7	International 15 Kg	8	International 7.5 Kg	7	8	0.0	0.0	0.00	U	0	2	I	2	2.6	1	2	I	I	
7	International 15 Kg	9	International 2 Kg	7	9	0.0	0.0	0.00	U	0	2	I	2	2.6	1	2	I	I	
8	International 7.5 Kg	9	International 2 Kg	8	9	0.0	0.0	0.00	U	0	2	I	2	2.6	1	2	I	I	
8	International 7.5 Kg	18	International Processing	8	18	40.0	0.0	40.00	O	1	2	U	0	-	1	2	I	I	
9	International 2 Kg	18	International Processing	9	18	39.0	0.0	38.95	O	1	2	U	0	-	1	2	I	I	
12	Domestic Pick Line	17	Domestic Mixed Pallet Staging	12	17	45.0	0.0	45.00	O	1	2	U	0	-	1	2	I	I	
13	Samples	19	Office, Break & Rest Rooms	13	19	0.0	0.0	0.00	U	0	2	I	2	4	1	2	I	I	
15	Empty Bags and Raw Materials	20	Docks (Receiving & Shipping)	15	20	37.0	0.0	36.95	O	1	2	U	0	-	1	2	I	I	
17	Domestic Mixed Pallet Staging	20	Docks (Receiving & Shipping)	17	20	45.0	0.0	45.00	O	1	2	U	0	-	1	2	I	I	
1	Fast Movers & Promotions	2	Domestic Regular Dog Food	1	2	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
1	Fast Movers & Promotions	4	Domestic Premium Dog Food	1	4	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
1	Fast Movers & Promotions	6	Domestic Cans, Biscuits & Treats	1	6	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
1	Fast Movers & Promotions	13	Samples	1	13	0.0	0.0	0.00	U	0	2	O	1	2	1	1	O	O	
1	Fast Movers & Promotions	19	Office, Break & Rest Rooms	1	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
2	Domestic Regular Dog Food	4	Domestic Premium Dog Food	2	4	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
2	Domestic Regular Dog Food	5	Domestic Premium Cat Food	2	5	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
2	Domestic Regular Dog Food	6	Domestic Cans, Biscuits & Treats	2	6	0.0	0.0	0.00	U	0	2	O	1	2.6	1	1	O	O	
2	Domestic Regular Dog Food	13	Samples	2	13	0.0	0.0	0.00	U	0	2	O	1	2	1	1	O	O	
2	Domestic Regular Dog Food	19	Office, Break & Rest Rooms	2	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
3	Domestic Regular Cat Food	4	Domestic Premium Dog Food	3	4	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
3	Domestic Regular Cat Food	5	Domestic Premium Cat Food	3	5	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
3	Domestic Regular Cat Food	6	Domestic Cans, Biscuits & Treats	3	6	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
3	Domestic Regular Cat Food	13	Samples	3	13	0.0	0.0	0.00	U	0	2	O	1	2	1	1	O	O	
3	Domestic Regular Cat Food	19	Office, Break & Rest Rooms	3	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
4	Domestic Premium Dog Food	6	Domestic Cans, Biscuits & Treats	4	6	0.0	0.0	0.00	U	0	2	O	1	2.6	1	1	O	O	
4	Domestic Premium Dog Food	12	Domestic Pick Line	4	12	0.0	0.0	0.00	U	0	2	O	1	6.7	1	1	O	O	
4	Domestic Premium Dog Food	13	Samples	4	13	0.0	0.0	0.00	U	0	2	O	1	2	1	1	O	O	
4	Domestic Premium Dog Food	19	Office, Break & Rest Rooms	4	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
5	Domestic Premium Cat Food	6	Domestic Cans, Biscuits & Treats	5	6	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
5	Domestic Premium Cat Food	13	Samples	5	13	0.0	0.0	0.00	U	0	2	O	1	2	1	1	O	O	
5	Domestic Premium Cat Food	19	Office, Break & Rest Rooms	5	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
6	Domestic Cans, Biscuits & Treats	13	Samples	6	13	0.0	0.0	0.00	U	0	2	O	1	2	1	1	O	O	
6	Domestic Cans, Biscuits & Treats	19	Office, Break & Rest Rooms	6	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
7	International 15 Kg	10	International Cans, Biscuits & Treats	7	10	0.0	0.0	0.00	U	0	2	O	1	2.6	1	1	O	O	
8	International 7.5 Kg	10	International Cans, Biscuits & Treats	8	10	0.0	0.0	0.00	U	0	2	O	1	2.6	1	1	O	O	
12	Domestic Pick Line	13	Samples	12	13	0.0	0.0	0.00	U	0	2	O	1	6	1	1	O	O	
18	International Processing	19	Office, Break & Rest Rooms	18	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
11	Canadian	19	Office, Break & Rest Rooms	11	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
12	Domestic Pick Line	19	Office, Break & Rest Rooms	12	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
15	Empty Bags and Raw Materials	19	Office, Break & Rest Rooms	15	19	0.0	0.0	0.00	U	0	2	O	1	4	1	1	O	O	
16	International Full Pallet Staging	19	Office, Break & Rest Rooms	16	19	0.0	0.0	0.00	U	0	2	O	1	4.7	1	1	O	O	
17	Domestic Mixed Pallet Staging	19	Office, Break & Rest Rooms	17	19	0.0	0.0	0.00	U	0	2	O	1	4.7	1	1	O	O	
7	International 15 Kg	16	International Full Pallet Staging	7	16	13.0	0.0	13.00	U	0	2	U	0	-	1	0	U	U	Flow matters
10	International Cans, Biscuits & Treats	18	International Processing	10	18	11.8	0.0	11.76	U	0	2	U	0	-	1	0	U	U	Flow matters
8	International 7.5 Kg	16	International Full Pallet Staging	8	16	10.0	0.0	10.00	U	0	2	U	0	-	1	0	U	U	Flow matters
3	Domestic Regular Cat Food	12	Domestic Pick Line	3	12	5.0	0.0	5.00	U	0	2	U	0	-	1	0	U	U	Flow insignificant
9	International 2 Kg	16	International Full Pallet Staging	9	16	2.1	0.0	2.05	U	0	2	U	0	-	1	0	U	U	Flow insignificant
2	Domestic Regular Dog Food	11	Canadian	2	11	0.0	0.0	0.00	U	0	2	X	-1	5	1	-1	X	X	
3	Domestic Regular Cat Food	11	Canadian	3	11	0.0	0.0	0.00	U	0	2	X	-1	5	1	-1	X	X	

Combined Flow & Other Relationships

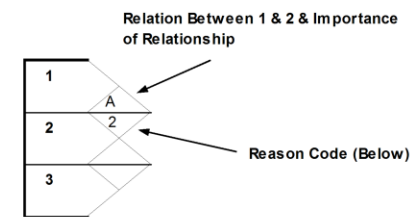
RELATIONSHIP CHART

Combined Flow and Other Relationships

Plant (Company) Pet Food, Inc. Project West Warehouse
 Source - Reference LH, BA, BS, MR Date 11/23 Charted by BA, RMA

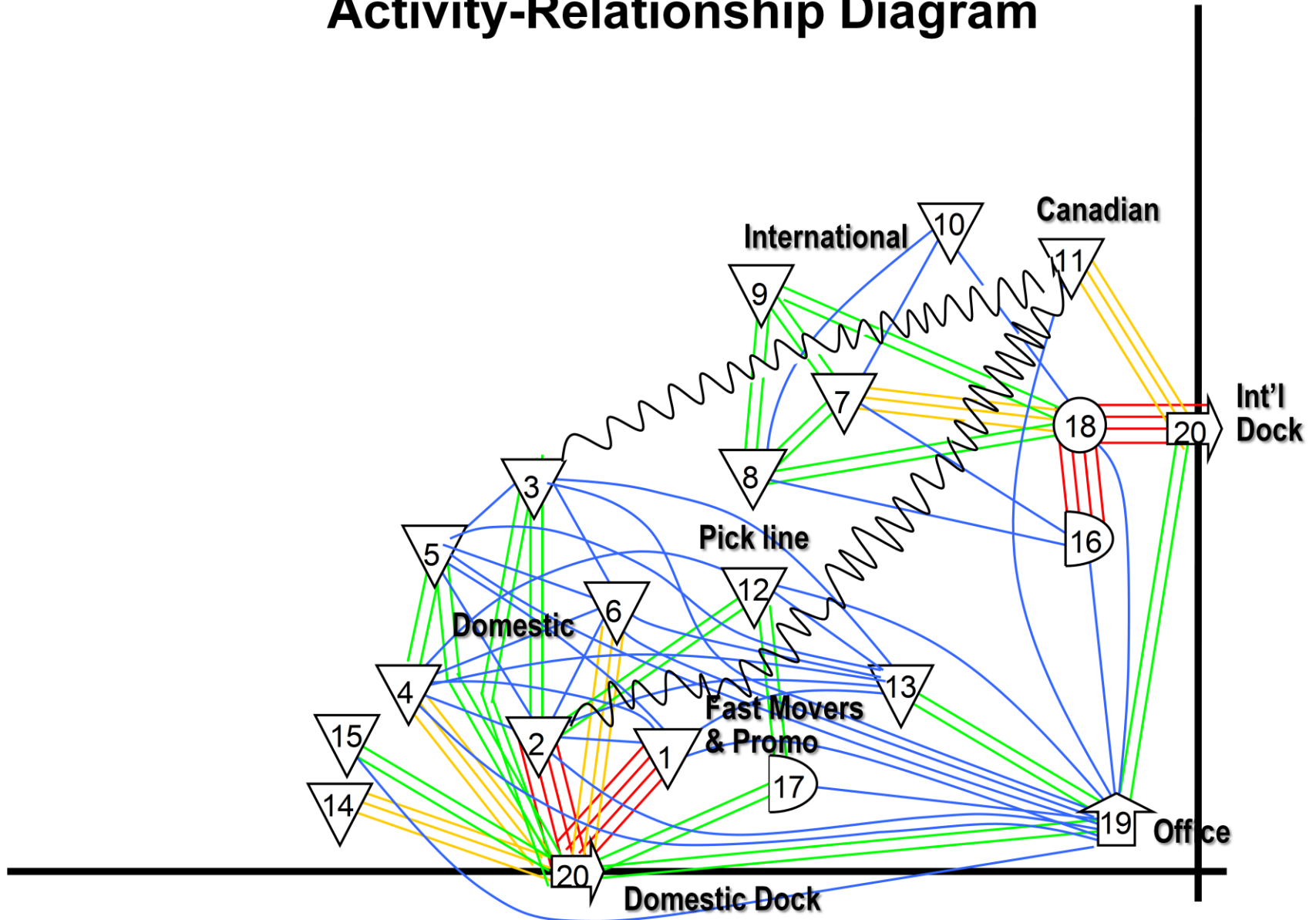


Value	Closeness	Target
A	Absolutely Necessary	4
E	Especially Important	5
I	Important	15
O	Ordinary Closeness	36
U	Unimportant	128
X	Not Desirable	2
Total	$= (N*(N-1))/2$	190



CODE	REASON
1	Material Flow
2	Picked Together
3	Supervision/Control
4	Convenience
5	Risk of mispick
6	Shared personnel
7	Visual management

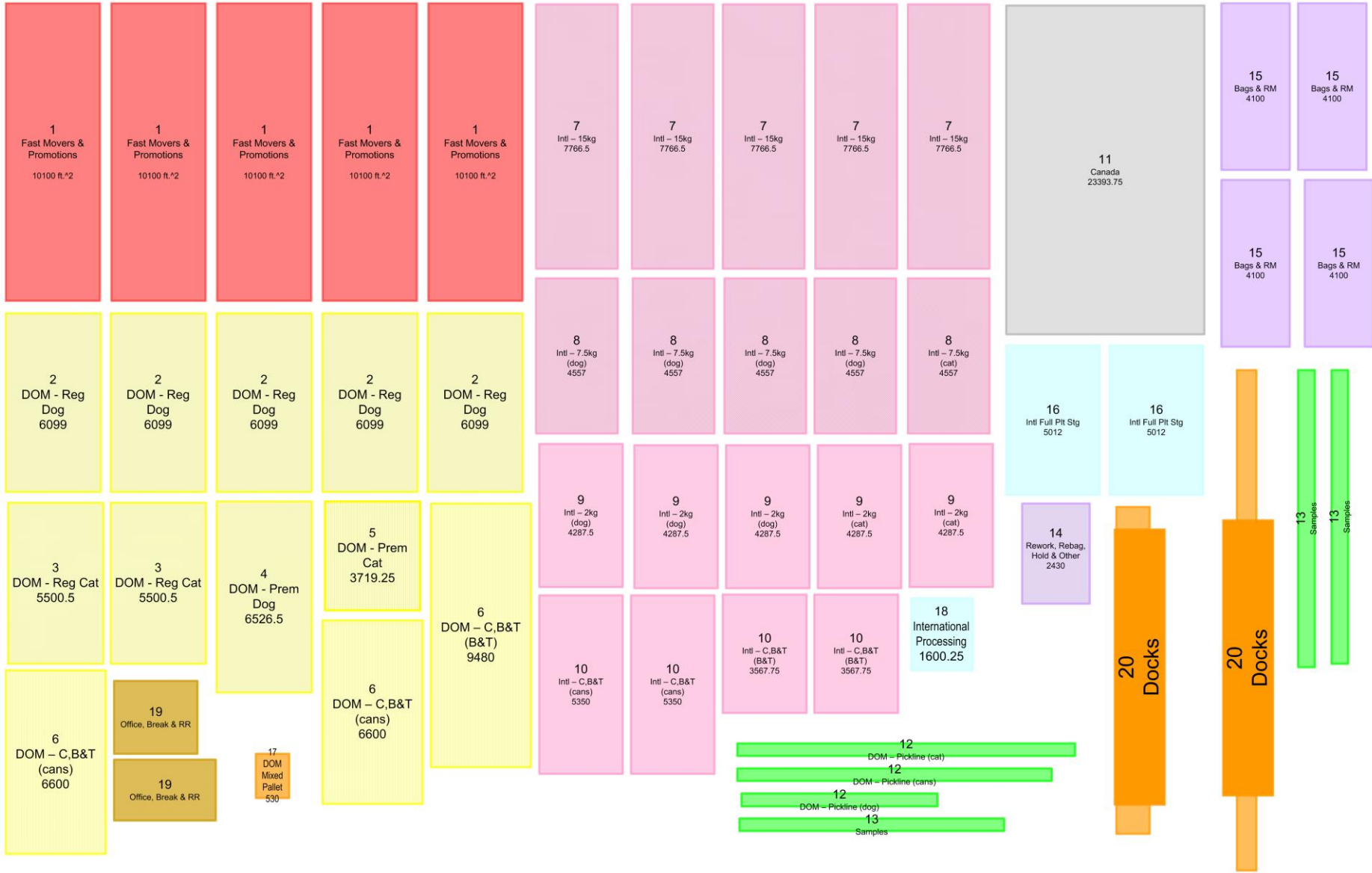
Activity-Relationship Diagram



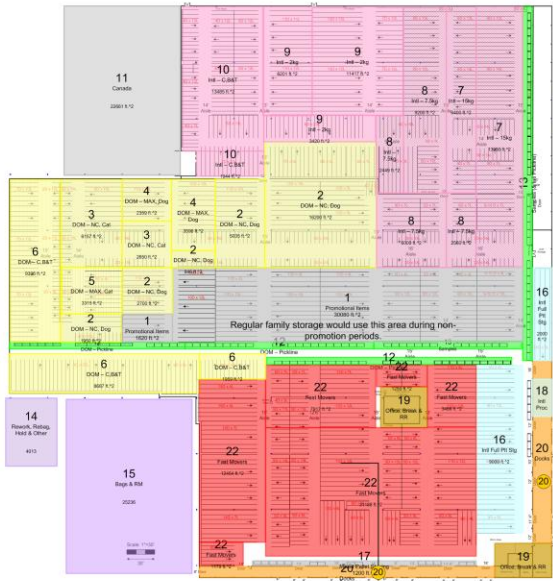
Future space needs

SPACE REQUIREMENTS -- CONVERTING							Plant	Pet Food, Inc.		Project	West Warehouse					
							By	BA, RMA		With	JR					
Basis (year, period, quantity) of Columns e, f, g							Next Year	Columns h, j, k		Date	11/23		Sheet	1	of	1
a	b	c	d	e	f	g	h	j	g							
Activity-- Area or Dept.	Current Space	+ or - Adjstmt.	Should Have Now	Increase Decrease	Req'd for (Year)	Plan-For Area (Year)	Increase Decrease	Req'd for (Year)	Plan-For Area (Year)							
	Unit →	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.							
1.	Fast Movers & Promotions	0	34250	34250	17350	51600	51600									
2.	Domestic Regular Dog Food	44500	-16500	28000	1800	29800	31600									
3.	Domestic Regular Cat Food	10900	-1100	9800	650	10450	11100									
4.	Domestic Premium Dog Food	21500	-15750	5750	400	6150	6550									
5.	Domestic Premium Cat Food	4200	-900	3300	200	3500	3700									
6.	Domestic Cans, Biscuits & Treats	19400	0	19400	1300	20700	22000									
7.	International 15 Kg	29150	0	29150	4800	33950	38750									
8.	International 7.5 Kg	17000	0	17000	2800	19800	22600									
9.	International 2 Kg	16100	0	16100	2650	18750	21400									
10.	International Cans, Biscuits & Treats	13450	0	13450	2200	15650	17850									
11.	Canadian	20700	0	20700	1350	22050	23400									
12.	Domestic Pick Line	4050	0	4050	0	4050	4050									
13.	Samples	5000	0	5000	0	5000	5000									
14.	Rework, Rebag, Hold	14450	-12050	2400	0	2400	2400									
15.	Empty Bags and Raw Materials	17150	0	17150	1700	18850	20550									
16.	International Full Pallet Staging	10050	0	10050	0	10050	10050									
17.	Domestic Mixed Pallet Staging	0	500	500	0	500	500									
18.	International Processing	800	800	1600	0	1600	1600									
19.	Office , Break & Rest Rooms	4400	0	4400	0	4400	4400									
20.	Docks (Receiving & Shipping)	6900	0	6900	0	6900	6900									
TOTALS		259700	-10750	248950	37200	286150	306000									

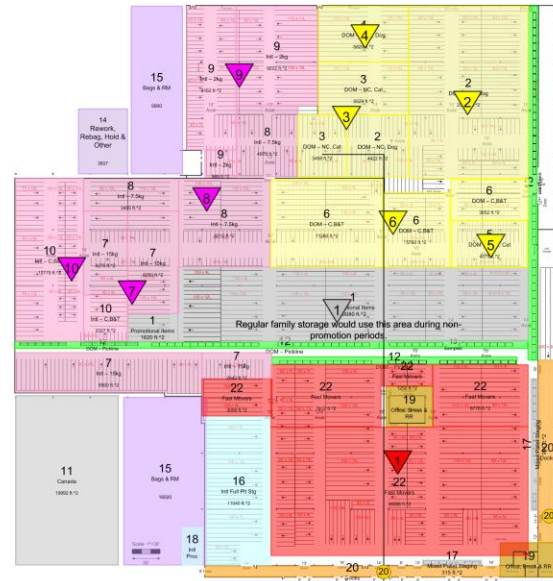
Scaled Templates



A

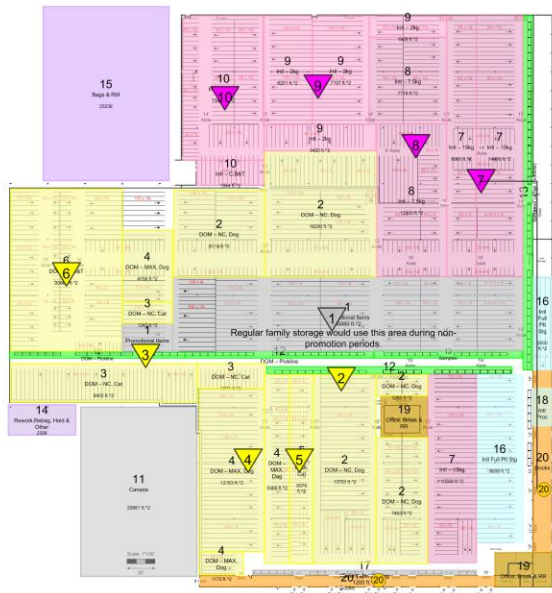


B

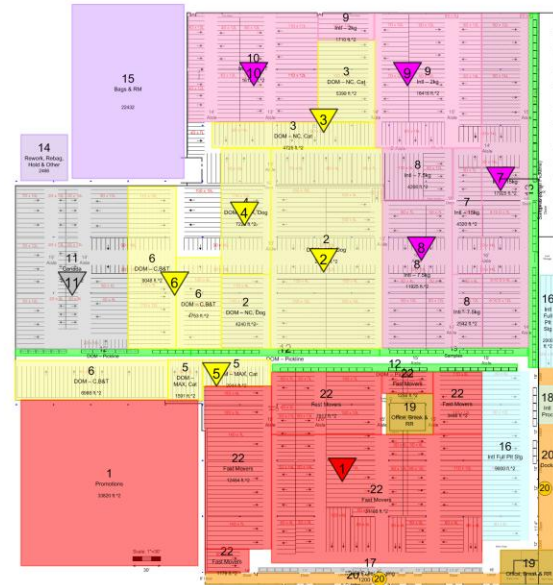


Alternative Plans

C



D



Evaluation

EVALUATING ALTERNATIVES		Plant	<i>Pet Food, Inc.</i>																			
		Project	<i>West Warehouse</i>		Date	<i>11/27</i>																
Weights set by <u>BA</u> Tally by <u>BA</u>		Description of Alternatives: Enter a brief phrase identifying each alternative. A. <i>Fast Movers & Promo South; Domestic West</i> B. <i>Fast Movers & Promo South; International West</i> C. <i>Like Today; No Fast Mover Area</i> D. <i>Fast Mover & Promo South; Domestic Center</i> E.																				
Ratings by <u>BA & MH</u> Approved by _____																						
<table border="1"> <thead> <tr> <th colspan="4">EVALUATING DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>A</td> <td><u>A</u>lmost Perfect</td> <td>O</td> <td><u>O</u>rdinary Results</td> </tr> <tr> <td>E</td> <td><u>E</u>specially Good</td> <td>U</td> <td><u>U</u>nimportant Results</td> </tr> <tr> <td>I</td> <td><u>I</u>mportant Results</td> <td>X</td> <td><u>N</u>ot Acceptable</td> </tr> </tbody> </table>		EVALUATING DESCRIPTION				A	<u>A</u> lmost Perfect	O	<u>O</u> rdinary Results	E	<u>E</u> specially Good	U	<u>U</u> nimportant Results	I	<u>I</u> mportant Results	X	<u>N</u> ot Acceptable					
EVALUATING DESCRIPTION																						
A	<u>A</u> lmost Perfect	O	<u>O</u> rdinary Results																			
E	<u>E</u> specially Good	U	<u>U</u> nimportant Results																			
I	<u>I</u> mportant Results	X	<u>N</u> ot Acceptable																			
FACTOR / CONSIDERATION		WT.	ALTERNATIVE																			
			A	B	C	D	E															
1	<i>Material handling effort</i>	10	<i>E</i> 30	<i>E</i> 30	<i>O</i> 10	<i>A</i> 40																
2	<i>Ease of finding product (for picking) & positions (for putaway)</i>	7	<i>O</i> 7	<i>O</i> 7	<i>O</i> 7	<i>O</i> 7																
3	<i>Ease of supervision</i>	5	<i>I</i> 10	<i>I</i> 10	<i>O</i> 5	<i>E</i> 15																
4	<i>Flexibility to accommodate product mix changes</i>	4	<i>I</i> 8	<i>I</i> 8	<i>I</i> 8	<i>I</i> 8																
5	<i>Sufficient space to operate efficiently</i>	10	<i>E</i> 30	<i>E</i> 30	<i>E</i> 30	<i>E</i> 30																
6	<i>Dock congestion & traffic</i>	6	<i>I</i> 12	<i>O</i> 6	<i>I</i> 12	<i>I</i> 12																
7	<i>Ease of implementation</i>	4	<i>I</i> 8	<i>U</i> 0	<i>E</i> 12	<i>I</i> 8																
Totals			105	91	84	120																

On-Screen Example

- DC Expansion to 800,000 Sq. Ft.
- Planned by team after receiving training in SLP
- Block layout in 1 week





Thank You!

For your interest in our methods & training.

Hope to see you or your associates at our November session

RICHARD MUTHER & ASSOCIATES

Consultants in Industrial Management & Engineering

