Facility Design and Layout for Lean Manufacturing

A Step by Step Approach to Developing a World Class Layout

Presented by Kim Dixon

Welcome

Kim Dixon

- **30 Years' Experience**
- **Expertise**
  - Kaizen Events
  - Manufacturing Strategic Planning
  - Facilities Planning
  - Manufacturing Engineering
  - Six Sigma
  - Project management
  - 5S Housekeeping
- **Experience**
  - Project Coordinator
  - Manager – Manufacturing Engineering
  - Supervisor – Process Engineer
  - Production Manager
  - Sr. Manufacturing Engineer
- **Member**
  - **SME, AME**

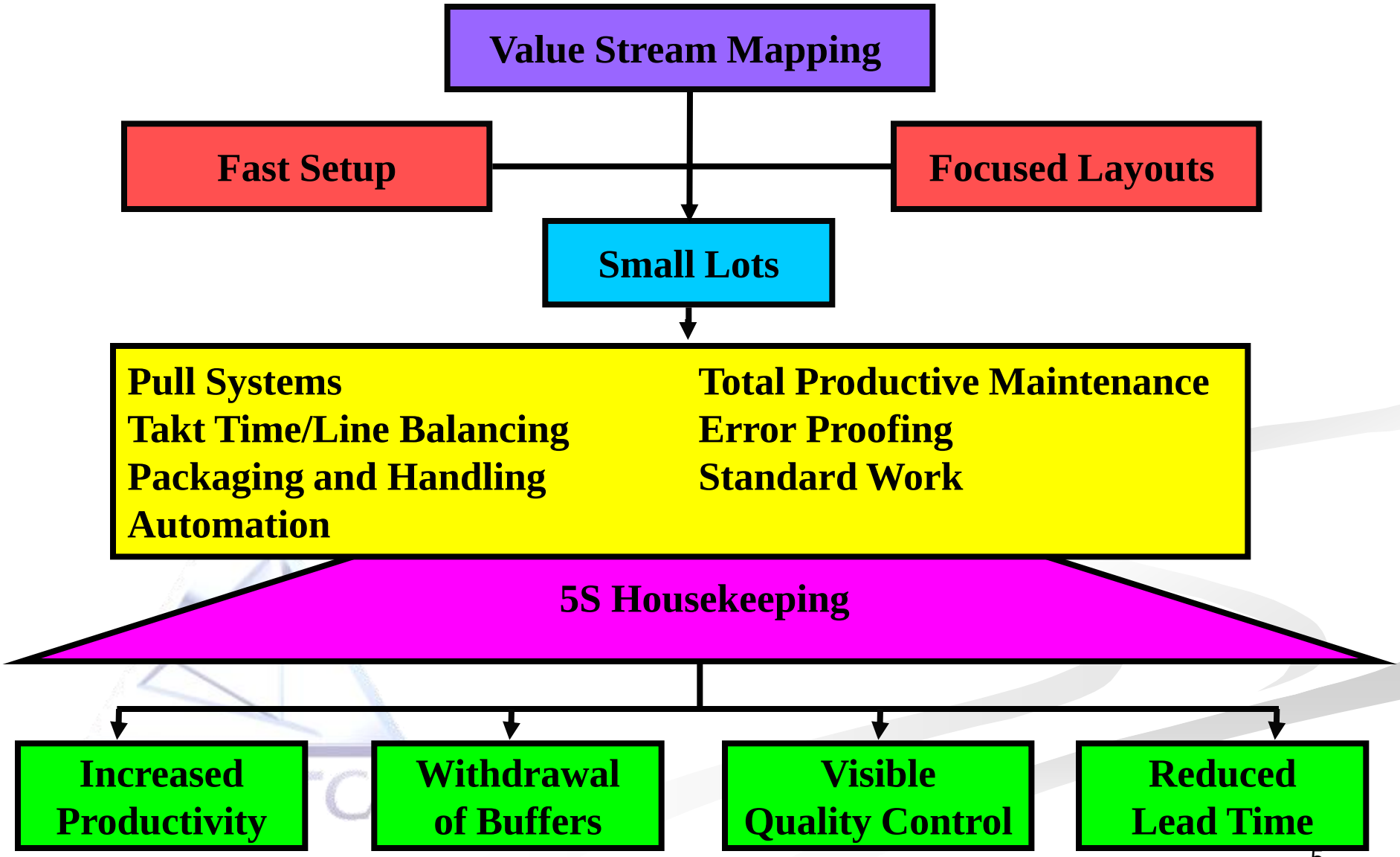
Seminar Objectives

- Review the Lean Business Practices
  - Discuss Why Getting the Layout Right is So Important
- Introduce the 30 steps to greatness
  - Discuss the importance of employee involvement
  - Discuss the importance of creating a flexible layout
  - Discuss how monuments and constraints can be incorporated into your flexible layout strategy
  - Discuss how this process will keep you out of the perpetual iteration trap
- Note: We will not spend time in discussing detailed layout or material handling plans in this seminar) (Steps 27 – 30)

No two facility designs are the same. Strategic objectives, customer requirements, products produced, volumes, machines, the facility that will be used and many other factors all play a roll in the development of the layout

Lean Overview

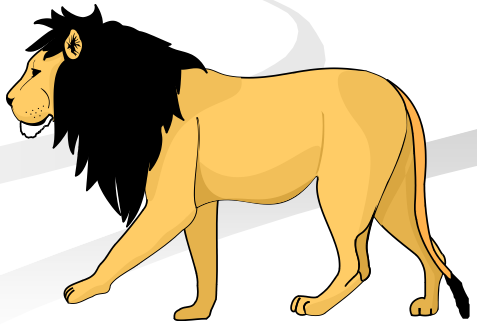
The Lean Business Practices



WCE Is Market Driven

Every morning in Africa, a Gazelle wakes up. It knows it must run faster than the fastest lion or it will be killed. Every morning a lion wakes up. It knows it must outrun the slowest gazelle or it will starve to death.

It doesn't matter whether you are a lion or a gazelle - when the sun comes up, you had better be running.



Your Layout Can Become The Competitive Weapon

Overall Strategy

- Although every facility design is different, specific patterns flow through every layout.
  - Cells and even the product mix may change over time but World class layouts stand the test of time in regards to overall material flow.

- Your layout must be designed with a LEAN focus.
  - If your layout is predominantly Process Functional then this process will help you to identify the product mix to move you to a more flexible cellular layout.
  - The macro layout process requires no less than 26 steps to complete and 30 steps to detailed layout
    - Each step may have numerous subtasks to complete them.

Overall Strategy (cont)

- On average for a 50K to 100K sq ft plant with multiple product lines and multiple pieces of equipment it will take between 30 to 40 man days to develop a World Class Layout

- Getting consensus as you move through the process in imperative

- Material handling plays a major roll in the layout process.
  - A strategy for moving materials will be designed early in the macro level project
  - As part of the material handling process the demand pull system is also a major factor.

Overall Strategy (cont)

- In Summary our strategy is to produce a product through the layout process that will meet or exceed expectations and create an audit trail to ensure that anyone who needs to can track the work completed and satisfy themselves that the work is thorough and meets the objectives

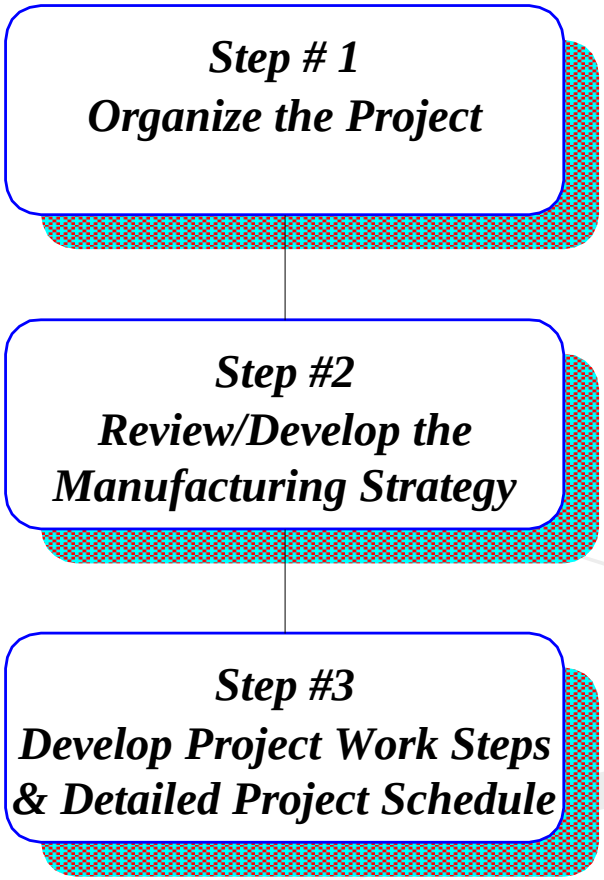
Origins

- The origins of the layout planning methodology was developed by Richard Muther and Associates in the 1950's.

- The methodology uses very sound industrial engineering principals to guide the facilities design team through a project.
  - The Muther process by itself will not create a cellular designed layout.

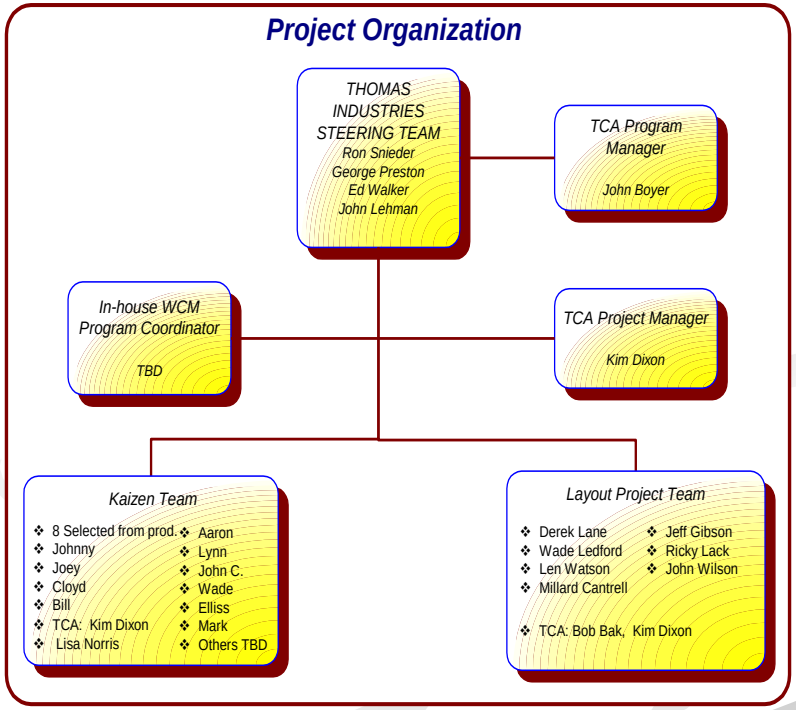
30 Steps to Greatness

Organization and Scheduling (Step 1 through 3)



Step 1: Organize the Project

- Organizing the project thoroughly on the front end is one of the major keys to having a successful project
  - Establish the scope and objectives of the project. Although the patterns are always there, each project is different
  - Determine who the players will be and what function/roll they will play in the project
  - Document the organization graphically
  - You may also need to document it in the strategic plan



Step 2: Review/Develop the Strategy

- The Manufacturing Strategy will become the baseline for all of the work that the team will do on the project.
- It is a key document and because it outlines what the world is like now and what it will look like in the future
- The strategic plan can come in the form of a completed Road Map Statement or should be developed by the project team in either case it is imperative that everyone in the organization agrees with the strategic direction.

Step 2: Review/Develop the Strategy (cont)

FACILITY LAYOUT DESIGN PROJECT PLANNING

- **Scope**
  - **All manufacturing operations, including**

Layouts are usually planned for five years but they may be less or more

- **Assumptions**
  - Normal growth assumptions are estimated at 5% per year
  - The layout will be modeled at a higher than normal growth rate for the year 2000 – 2001
  - Layout planning will include growth for the five years through 2005
  - A new 600 ton press shall be considered in the layout
  - All materials staging/storage will be designed for “Point of Use” (POU)

Step 2: Review/Develop the Strategy (cont)

- ***Constraints***
  - Press #202 will ~~not move~~.
  - Paint operations will not move but the paint load and load and unload area may be considered for a change
  - Due to the cost of moving presses 204,203,180 and 244 should not move without some cost savings justification.
  - Due to the costs involved, brick and mortar changes should not be considered without some cost savings justification.
  - New 600 ton press will be placed in the high bay area unless justified otherwise

Watch For Monuments

Step 2: Review/Develop the Strategy (cont)

Market-Driven Imperatives

- Services
- ¨Commodity Market
  - Walmart 35%
  - Strip 13%
  - Wrap 10%
  - Industrial 7%
  - Surface Mount 2%
- Exit Signs 3%
  - Potential for a 6 to 10 percent growth
  - Proprietary Products
  - Vapor Lume
- Hospital Light
- Vapor Seals
- Spray Booth Light
- Aztec
  - All of the above 27%

Market-Driven Imperatives

- Miscellaneous Reflectors
  - Under the Cabinets
  - Wall Brackets
  - New Products
  - Vapor Let
    - All of the above 3%

Step 2: Review/Develop the Strategy (cont)

Manufacturing Mission/Vision

1. In general, create a manufacturing resource that distances Thomas Industries from competitors through extraordinary delivery, quality and cost performance while supporting a very effective New Customer Capability.

2. Elements of the Thomas Industries (Tupelo) manufacturing mission, in priority order, are:

   a. Convert from Monthly Batching to Weekly Customer Usage

   b. Improve Quality
      - Integrate TQM into cell operations
      - Foster personal accountability
      - Support continuous improvement

   c. Reduce Lead Time
      - Reduce order entry lead time
      - Reduce job prep lead time
      - Reduce manufacturing lead time

If You Don't Have A Mission/Vision Use This As A Template

Step 2: Review/Develop the Strategy (cont)

d Reduce Cost

- Improve productivity
- Reduce paperwork
- Maximize benefits of new layout
- Identify opportunities for process technology improvements
- Identify make vs. buy opportunities
- Institutionalize fast setup
- Implement tooling management

e. Improve Overall Training Level of Workforce

- Implement in-house college

f. Reduce Inventory

- Cellular manufacturing/pull systems
- Smaller lot sizes
- Supplier alliances

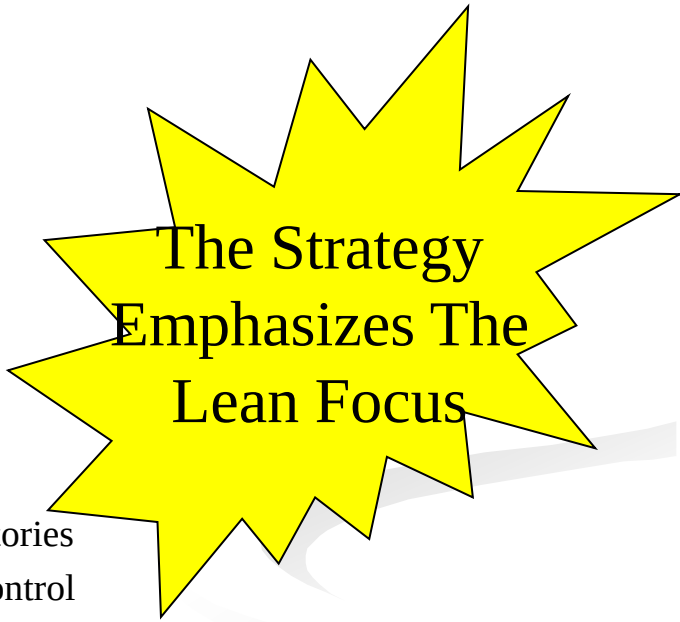
g. Support Rapid New Customer Development

Step 2: Review/Develop the Strategy (cont)

Manufacturing Strategy

1. Process Technology
    a. Cellular/Focused Factory Structures
    b. New and Upgraded Process Technologies

2. Facilities
    a. Support Capacity Needs with Adequate Space
    b. Minimize Material Handling Labor and Distance
    c. Provide for Cellular Operations and Focused Factories
    d. Provide Kanban Locations for Pull Production Control
    e. Provide Point-of-Use Stocking Locations
    f. Meet Environmental and Safety Requirements
    g. Support a Superior Quality of Work Life
    h. Provide Adequate Space for Service and Support Areas



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Step 2: Review/Develop the Strategy (cont)

3. Systems
   - a. Convert from Monthly to Weekly Batches
   - b. Develop First-Rate Sales, Production and Inventory Planning
   - c. Develop Long Term and Day-to-Day Capacity Planning Tools that Provide Perfect Visibility of Labor and Equipment Loading
   - d. Adapt DCD to Lean Environment
   - e. Develop Paperless Job Documents and Data Collection
   - f. Design and Implement Pull Production Control System
   - g. Institute Closed Loop Quality-at-the-Source Controls (Buddy Checks)

4. Human Resources
   - a. Provide for Management Development in Support of the Company's Growth and Change
   - b. Provide Education and Training of the Hourly Workforce with the Objective of Developing Employees Who:
     - Accept only zero defects
     - Are not passive witnesses
     - Keep the flow
     - Continually suggest improvement
     - Are interested in production

Step 2: Review/Develop the Strategy (cont)

- Know how to do their jobs
- Know how to do other's jobs
- Can stop the process
- Assist their compatriots
- Predict and avoid problems
- Measure their own output
- Measure their own quality
- Understand the product
- Understand the process
- Call in resources as needed
- Communicate-Cooperate-Collaborate
- Are team players and team leaders

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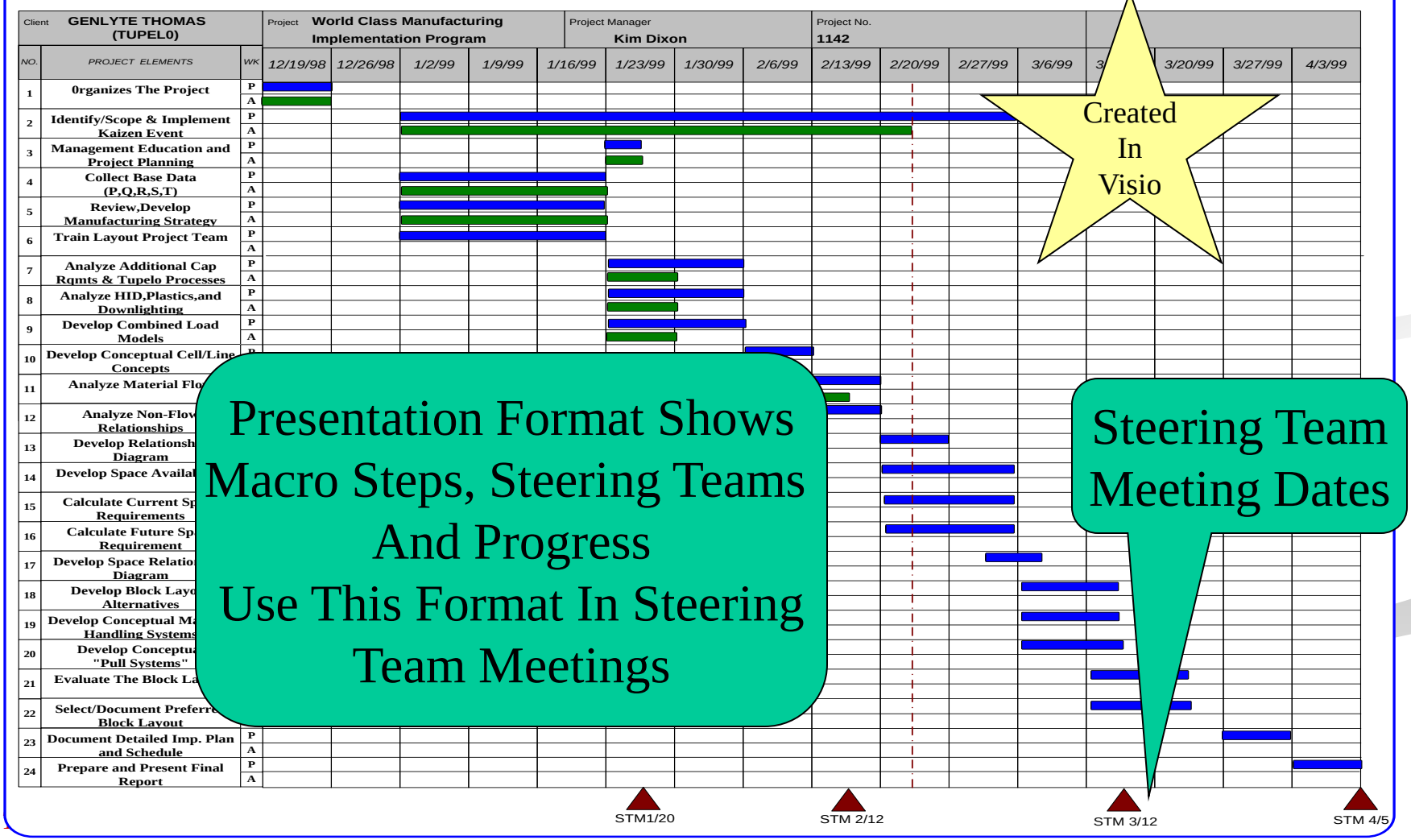
c. Institute Innovative Compensation Systems that Reward Desire Behaviors

d. Develop Expectations and Measure of Performance Integrate Appropriate Support Personnel into Process Teams

Step 3: Develop Project Work Steps and Detailed Project Schedule

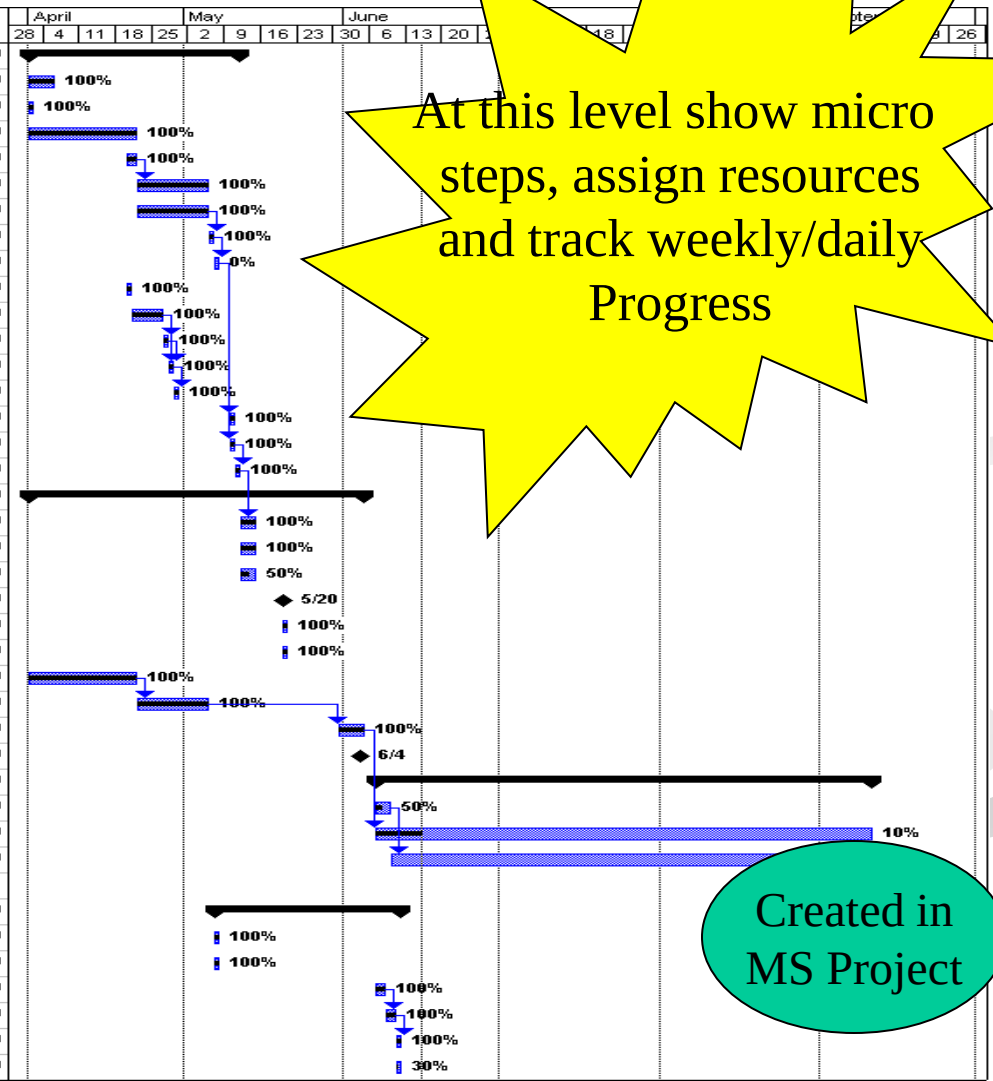
Show Project Schedules In Two Formats. ***Presentation*** and Detailed

Step 3: Develop Project Work Steps and Detailed Project Schedule



Step 3: Show Project Work Steps and Detailed Project Schedule

ID	Task Name	Start	Finish
1	**Phase I Education/Organization**	**Thu 4/1/99**	**Tue 5/11/99**
2	Organize the Project	Thu 4/1/99	Mon 4/5/99
3	Review,Develop Manufacturing Strategy	Thu 4/1/99	Thu 4/1/99
4	Collect ...B,S,T)	Thu 4/1/99	Wed 4/21/99
5	...ncepts	Tue 4/20/99	Wed 4/21/99
6	...dels	Thu 4/22/99	Wed 5/5/99
7		Thu 4/22/99	Wed 5/5/99
8		Thu 5/6/99	Thu 5/6/99
9		Fri 5/7/99	Fri 5/7/99
10	...Areas	Tue 4/20/99	Tue 4/20/99
11		Wed 4/21/99	Mon 4/26/99
12	...hips	Tue 4/27/99	Tue 4/27/99
13	...bine Flow and Non-Flow Relationships	Wed 4/28/99	Wed 4/28/99
14	Develop Relationship Diagram	Thu 4/29/99	Thu 4/29/99
15	Calculate Current Space Requirements	Mon 5/10/99	Mon 5/10/99
16	Calculate Future Space Requirements	Mon 5/10/99	Mon 5/10/99
17	Develop Space Relationship Diagram	Tue 5/11/99	Tue 5/11/99
18	**Phase II Layout**	**Thu 4/1/99**	**Fri 6/4/99**
19	Develop Block Layout Alternatives	Wed 5/12/99	Fri 5/14/99
20	Develop Conceptual Mat. Handl. Systems	Wed 5/12/99	Fri 5/14/99
21	Develop Conceptual "Pull Systems"	Wed 5/12/99	Fri 5/14/99
22	Steering Team Meeting	Thu 5/20/99	Thu 5/20/99
23	Evaluate the Block Layout	Thu 5/20/99	Thu 5/20/99
24	Select/Document Preferred Block Layout	Thu 5/20/99	Thu 5/20/99
25	Comp. Equip. Inventory	Thu 4/1/99	Wed 4/21/99
26	Comp. CAD Templates Of Equipment	Thu 4/22/99	Wed 5/5/99
27	Complete Detailed Layout (Macro Level)	Mon 5/31/99	Fri 6/4/99
28	Steering Steam Meeting	Fri 6/4/99	Fri 6/4/99
29	**Phase III Implementation**	**Mon 6/7/99**	**Fri 9/10/99**
30	Document Detailed Imp. Plan and Schd.	Mon 6/7/99	Wed 6/9/99
31	Complete Micro Detailing of The Layout	Mon 6/7/99	Fri 9/10/99
32	Complete Training	Thu 6/10/99	Wed 9/1/99
33			
34	**Conduct Kaizen Event**	**Fri 5/7/99**	**Fri 6/11/99**
35	Identify/Scope Kaizen	Fri 5/7/99	Fri 5/7/99
36	Set Baselines and Ojectives	Fri 5/7/99	Fri 5/7/99
37	Train Kaizen Team	Mon 6/7/99	Tue 6/8/99
38	Execute Kaizen Project	Wed 6/9/99	Thu 6/10/99
39	Team Presentation Of Results	Fri 6/11/99	Fri 6/11/99
40	Plan Next Kaizen Event	Fri 6/11/99	Fri 6/11/99



Match The Phases With The Proposal

At this level show micro steps, assign resources and track weekly/daily Progress

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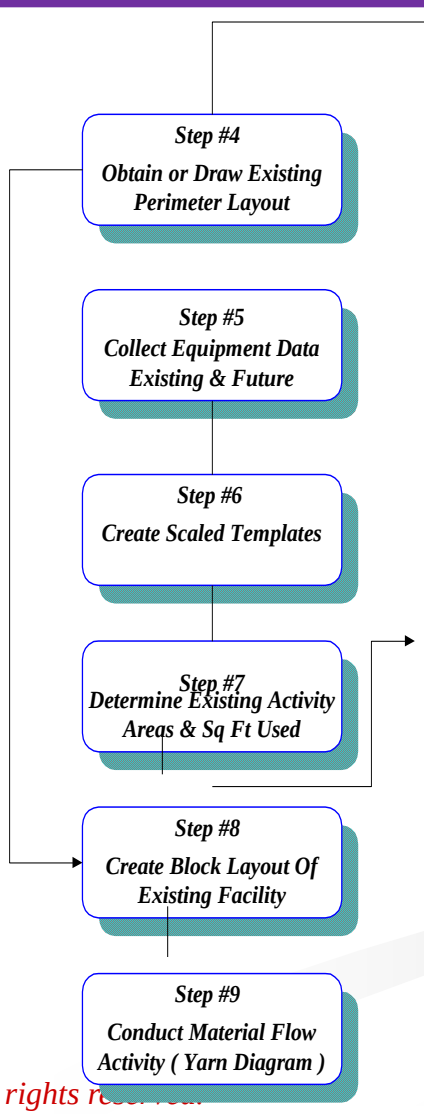
Layout Preparation Activities (Steps 4 through 9)



Step #5: Collect Equipment Data Existing and Future

Machines must be Identified by a number and description.

Eventually cell assignments will be made for all equipment. Identify equipment by activity area on initial inventory

Equipment Numbering System

1) Primary Machines are labeled with a number ie: **#005**

2) Support equipment for that machine is labeled with the machine # and an alpha character prefix, ie; **a005, b005,c005** and so on.

3) Static material handling equipment, ie; racks and shelving that do not support a specific machine and labeled with a number and with an "sm" Prefix, ie; **sm001, sm002, sm003** and so on.

4) Movable material handling equipment, ie; carts, forklifts are labeled with a number and an "m" prefix, ie: **m001,m002,m003** and so on.

Most equipment templates are simple rectangular shapes but some require more complex sketches. Include notes and dimensions in this column

Voltage and amperage information is critical at later stages of the layout process. Note: Amperages should be identified by startup loads. Note: If existing circuit sizes are none then include as well

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BC/AR		EQUIPMENT LIST/CELL ASSIGNMENTS					
		Avon Facility					
Machine Number	Work Ctr. I.D.	Description	Cell Assignment	Voltage	Amps Used	Circuit Size	Template Dimension/Remarks/Sketches
	013	Star [illegible]25, FMB Loader	1	220	20	30	
	022	[illegible]os R125	1	220	10	20	
	035	Mill, Bridgeport (old)	1	220	10	20	
		DeBurr/Mill, Barker Mill	1	110	[illegible]0	20	
	100	Broach, Ty Miles	1	220	2[illegible]	30	
	101	Hand Screw, DSM	1	220	10	20	
	107	Burr Bench Tumbler	1	110	5	20	
	114	HSL Bench Lathe	1	220	3	[illegible]0	
	059	Methods Slant JR, Barfield	1	220	53		
	045	Chucker, HC Manual	2	220	10		
	058	Methods Slant 1	2	220	66	1[illegible]	
	072	Straighten, Bertolette	2	220		60	
	092	DeBurr, General	2	110	5	20	
	010	Star JNC-16	3	220	20	30	
	014	Star JNC-25, FMB Loader	3	220	20	30	
	039	Bridgeport	3	22	10	20	
	033	Matsuura RA-1, Twin Pallet	3	220	60	75	
	057	Methods TMC-15, Barfield	3	220	53	75	
	065	Infeed C/G, Cinco 15	3	220	50	75	
	079	Hand Straigtening Press	3				
	093	Barker Mill/DeBurr	3	220	10	20	
	103	Hand Screw, DSM	3	220	10.8	20	
	032	Cinc/Milacron 5VC	3	220	40	60	
	011	Citizen L-16	4	220	17	30	
	012	Star JNC-25	4	220	20	30	
	017	Star SST-16	4	220	20	30	
	019	Strohm M-45	4	220	4.7	20	
	023	Tornos R-10	4	220	20	30	
	024	Tornos R-10	4	220	20	30	
	026	Tornos R-10	4	220	20	30	
	036	Mill, Bridgeport (new)	4	220	10	20	
	037	Bridgeport (Tool work)	4	220	10	20	
	083	Drill Press & Clausing	4	220	3	20	
	084	Burgmaster Turret Drill	4	220	3	20	
	089	Schaublin Lathe	4	220	3	20	
	201	Grinder , Tool	4	220	3	20	
	206	Grinder, (on bench)	4	110	3.9	20	
	207	Craftsman Tool Grinder	4				
	96	Horizontal Chuck		110	10	20	
	054	Lathe, Clausing 15"	10(AR5)	220	24.4	40	
	055	17" Clausing Lathe	10(AR5)	220	13.6	30	
	056	Methods Slant 3BSL	10(AR5)	220	92	125	
	074	Straighten, Dennison Press	10(AR5)				
	086	P & W Sensitive Drill Press	3(near 010)	115	5	20	
	075	Straighten, Hand Press Arbors	All				
	062	Thrufeed C/G, O/M (Polish)	AR Finish	220		75	
	066	Thrufeed C/G, 220-8	AR Finish	220	71	125	
	067	Cyl. Grinder, Kellenberger	AR Finish	220		30	
	105	Re-Tap, Somma	AR Finish				
	Purchase	Straightener Press	AR Finish				
	77A	Belt Sander	AR Prep	220	5	20	
	034	Bridgeport	AR tool room	220	10	20	
	046	Lathe, HC Manual	AR Tool Room	220	14	20	
	051	Lathe, HLV Tool Room	AR Tool Room	220	5	30	
	053	13" Clausing Lathe	AR Tool Room	220	13.6	30	
	077	Band Saw	AR Tool Room	220	5	20	
	104	Lathe, 10" Southbend	AR Tool Room	220	10	20	
	108	Rockwell Drill Press	AR Tool Room	110	7.5	20	
	199	Buffalo Drill Press	AR Tool Room	110	7.8	20	
	095	Bench Polishing Wheel	Bench	110	5	20	
	098	DeBurr Lathe	Bench	220	1.9	20	
	106	Mr. DeBurr Tumbler	Clean/Tumble				
	110	DeBurr(Tumbler)	Clean/Tumble				
	111	Magnus Degreaser	Clean/Tumble				
	112	DeBurr(Tumbler)	Clean/Tumble				
	002	Heat Treater, Lepel	Heat Treat				
	003	Temp. Oven, Young & Bertke	Heat Treat				

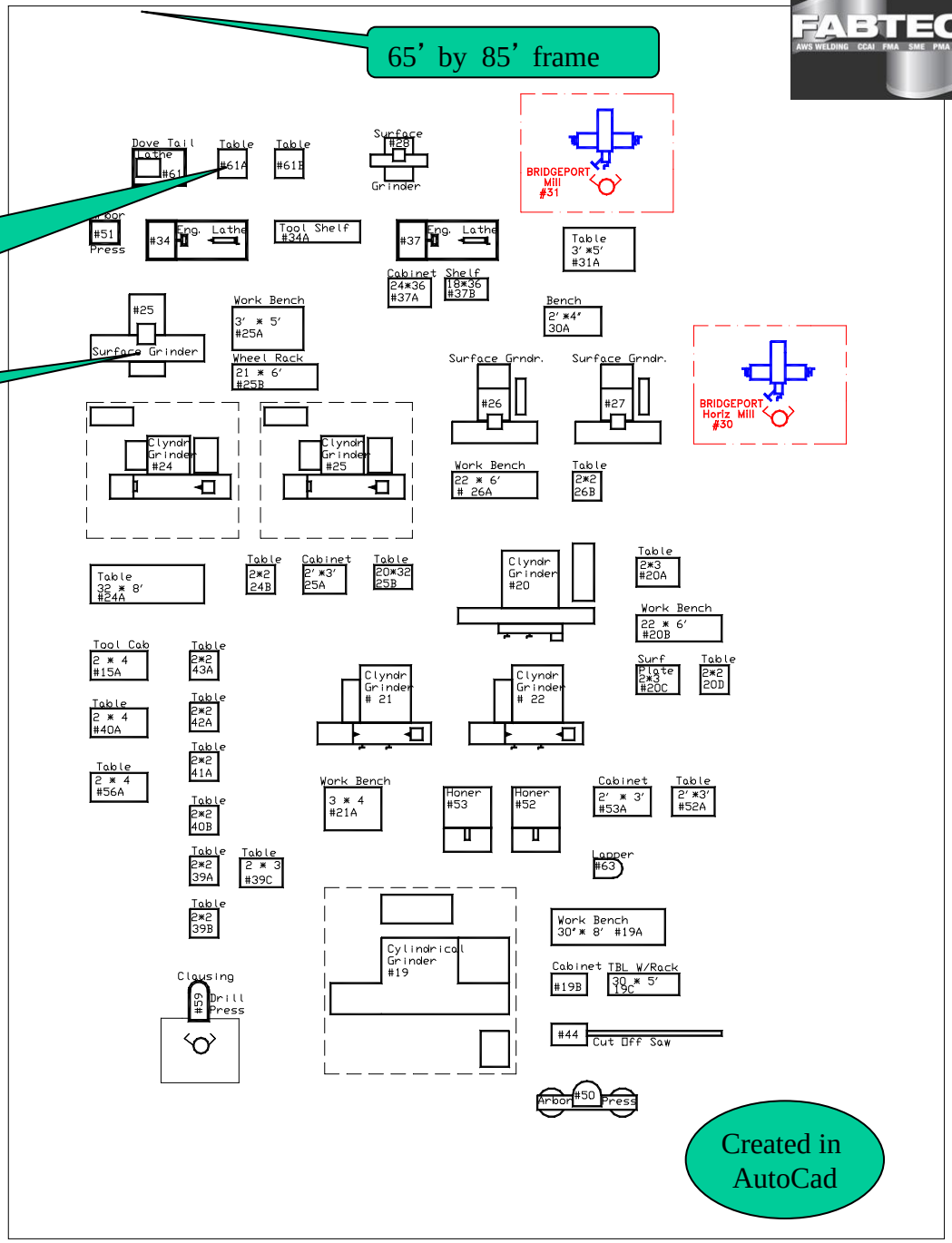
Step #6: Create Scaled Templates

If the template is to small, always put number inside of template and name on top. All names and numbers will match inventory list

Templates will be labeled with Machine #, Equipment/Machine name and rectangular dimensions (equipment only)

Template Generation Specifications

1) Set AutoCad Units to Architectural
2) Set Polyline Feature to 1”
3) Create All Templates with polyline feature
4) All text will be black “MONO Type”
5) Text will be set no less than 6 inches in height and no more than 12”.
6) Primary equipment templates will be blue
7) Support equipment templates will be blue
8) Static material handling equipment will be red
9) Mobile material handling equipment will be green.
10) Templates will be placed in a 65’ by 85’ frame. This converts to an 8 1/2” by 11’ page size for printing
11) Group templates and label by functional or cellular requirements. Note: some adjustments may be required as the project progressesoll



Step #4: Obtain or Draw Existing Perimeter Layout

These three activities are closely related and build upon each other

Use Existing Drawings If Possible
Check Carefully For Mistakes.
Look For Correct Door Placements, Beam Spacing, Structure Dimensions, and Monument Locations

Step #7: Determine Existing Activity Areas and Sq. Ft. Used

Take Care in Creating the Activity List. It Becomes The Basis For Several Other Steps in The Process

The Block Layout Is A Graphic Culmination of the Existing Perimeter Layout and the Activity List

Step #8: Create Block Layout of Existing Faciltiy

Step #7: Determine Existing Activity Areas and Sq. Ft. Used

On the first pass walk through identify every activity area by name and assign it a number.

This requires a knowledgeable client person to walk through the plant with you

Identify square footages by area. Physically measure them or use the as is drawing if available. Don't leave out the client !

Next you need to consolidate. More than 35 activity areas is impossible to evaluate later on. It is best to be less than 25. Consolidation does not mean you have cellularized the plant

Thomas Existing Activity Area Work Sheet

Final Cut Activity #	First Cut Activity #	Activity Name	Existing Square Ft.	Get Well equireme	Total Sq. Ft. Required	Width	Length	Rer
	1	Rec. Dock Steel	2430			81	30	
		Steel Storage	0	0	0	70	75	move 1880 sq.ft. to Louver Cell
		Steel Storage	0	0	0	118	10	move 4550 sq. ft. to High Volume Support
1		**Recieving / Stores**	**2430**					Fabrication Cell
		Alum. Storage	1880					
	2	Press Room Alum.	8450			130	65	
		Die Storage	6179			167	37	
2		**Louver Cell**	**16509**					Press Rm. Alum./Die Storage
	3	Fab Office	1650			33	50	
3		**Fab Office**	**1650**					
	4	Enclosure Assby Line	5445			45	121	
4		**Enclosure Sub Assy. Cell**	**5445**					Enclosure Assy. Line
	5	Stockroom	0			42	121	Moved 8933 SQ. FT. Stockroom to each
		Comp. Pur/Fab	0			226	124	of 4 areas TG Assembly Cell,Designer Cell,
		AWP Purchase Fab.	0			71	37	Paralouver Assy. Cell Semi-Auto Line
5		**Stockroom Pur./Fab**	**0**	0	0			2x2-3" Paralouver/designer Assy. Cell
	7	Plastics Dept.	360			18	20	
			4050			75	54	
			2520			30	84	
			300			15	20	
			4550			35	130	
			1620			30	54	
			1512			28	54	
	8	Plastics Office	120			10	12	
6		**Plastics Dept.**	**15032**					
	10	TG Body Storage	0			75	47	
		Storage	0			37	84	Need to swap with TG Material #5
7		**TG Body Stockroom**	**0**	0	0			Moved to TG Assy.Cell
	5	RIP/ Stock	8933					
	10	TG Body Storage	3525			75	47	
		Storage	3108			37	84	
	11	TG Assembly	12060			90	134	
	9	RestRooms	375			15	25	
8		**TG Assembly Cell**	**28001**					TG Assy/Restrooms
	5	RIP / Stock	8933					
	12	Surface Paralouver Assby.	4920			40	123	
9		**2 x 2 - 3" Paralouver/ Designer Assy. Cell**	**13853**					Surface Paralouver Assy.
	13	Louver Assembly	13776			112	123	
10		**Louver Sub Assembly Cell**	**13776**					Louver Assy.
	5	RIP / Stock	8933					
	14	Paralouver	15252			124	123	
11		**Paralouver Assembly Cell Semi-Automated Line**	**24185**					Paralouver Assy.
	15	AWP Office & Restrooms	2250			45	50	
12		**AWP Office/Restroom**	**2250**					
	16	Enclosure Storage	0			78	44	combine w/ Designer Assembly Cell
13		**Enclosure Stockroom**	**0**	0	0			
	5	RIP / Stock	8933					
	17	Designer Assembly	19712			154	128	
		Enclosure Stockroom	3432					
14		**Designer Assembly Cell**	**32077**					Designer Assy.

Step #7: Determine Existing Activity Areas and Sq. Ft. Used

Note anything significant. Your notes are part of your audit trail.

The spread sheet calculates these numbers for you . But if you want to type them in for functional areas you know won't change you can enter a number.

Thomas Existing Activity Area Work Sheet (Continued)

Final Cut Activity #	First Cut Activity #	Activity Name	Existing Square Ft.	Get Well Equireme	Total Sq. Ft. Required	Width	Length	
	18	Press #39	7018			121	58	
		Die & Steel Storage	4020			68	106	
15		**Press 39 Body Fabrication Cell**	**11038**					Press # 39/D&S Storage
		Steel Storage	4550					
		Rework Area				17	37	
	32		1035			23	45	
		Area	5712			56	102	
		High Volume Support Fab. Cell	**11926**					Brake Press Room
	20	**Press Room Steel**	8874			87	102	
17		**Secondary Body Fab. Cell**	**8874**					Press Room Steel
	21	Rework Area	0			17	37	
18		**Rework Area**	**0**	0	0			Move to High Volume Cell
	22	Downlighter Fab	0			51	39	
19			0			16	17	Downlighter Fab.
		Downlighter Fab.						Moved to Downlighter Assy.
	23		5328			48	111	
20			1824			48	38	Special Fab.
		Special Fabrication Cell	**7152**					
	24	Scrap Area Steel/Alum.	720			15	48	
21		**Scrap Area Steel/Alum.**	**720**					
	26	SEO, NO, TRO, Conf.	3320			83	40	
	6	Dock/Employee Entrance	1296			27	48	
22		**Spec. Office/Entry**	**4616**					
	27	Maint. Area	4214			98	43	
		Tow Motor Shop	900			30	30	
	25	Maint. Office	250			25	10	
23		**Maint. Dept.**	**5364**					
	28	Tool Room	3256			88	37	
			7785			173	45	
			1998			74	27	
	29	Tool Crib	1924			37	52	
24		**Tool Room Dept.**	**14963**					
	30	E.C. Assembly	14112			147	96	
	36	Wire Warehouse	575			25	23	
25		**E.C. Assy./Wire Dept.**	**14687**					
	31	Front Office/Café/Restroom	14707			191	77	
26		**Front Office/Café/Restrooms**	**14707**					
	33	Stock Staging/Q.C.Lab	990			33	30	Break out Check point Charley
		Check point Charley	0	0	0	30	30	now 27A
27		**AWP Drop**	**990**					Insection / Q. C. Lab
27A		**Check Point Charley**	**900**			30	30	
	35	Press #31	460			23	20	
28		**Press # 31**	**460**					

Step #7: Determine Existing Activity Areas and Sq. Ft. Used

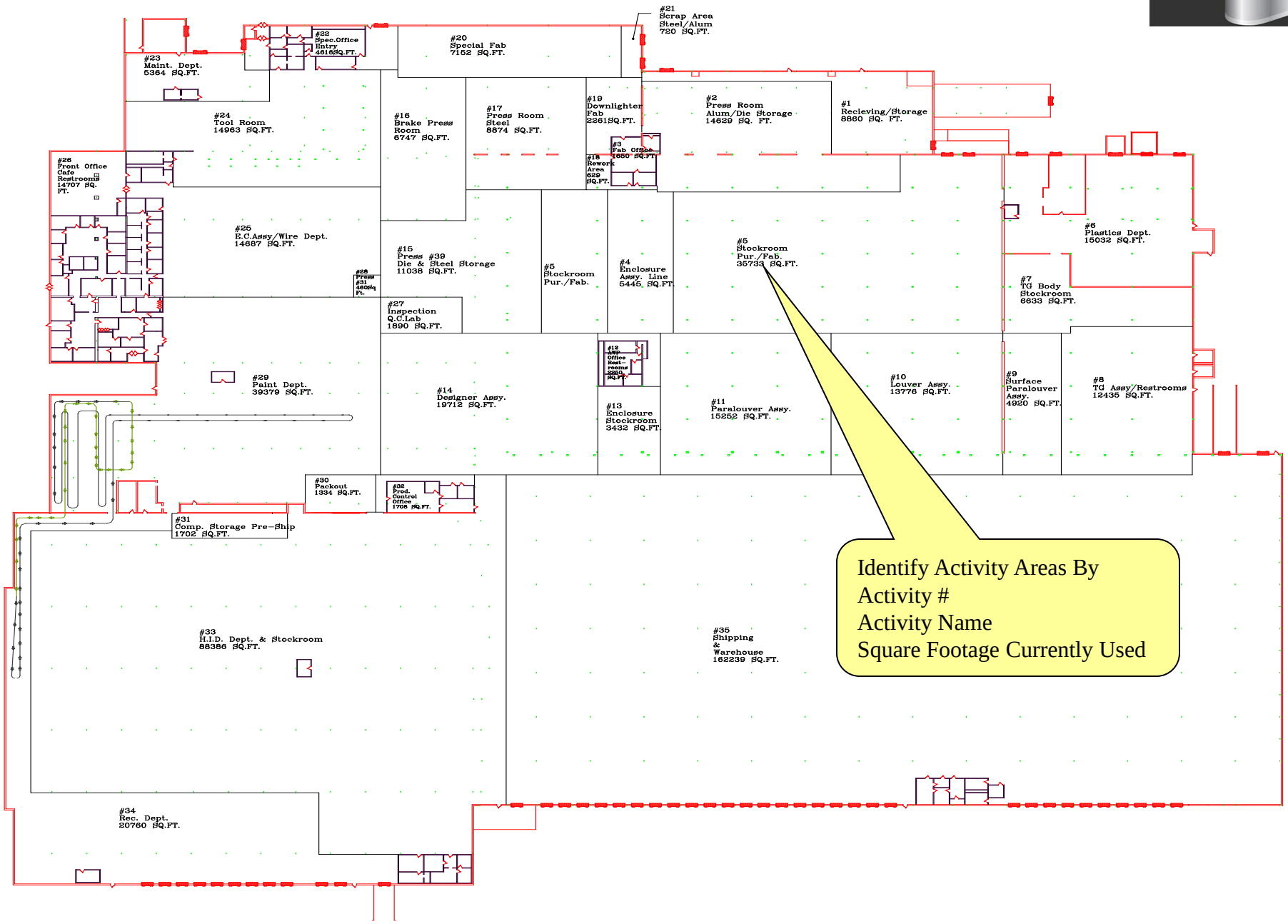
Account for every square foot of the plant. If you consolidate an activity area you must note that you did so. SOMEONE WILL ASK !!

Check the activity areas against the as is drawing and make sure it balances by some + or - that you and the client can agree on

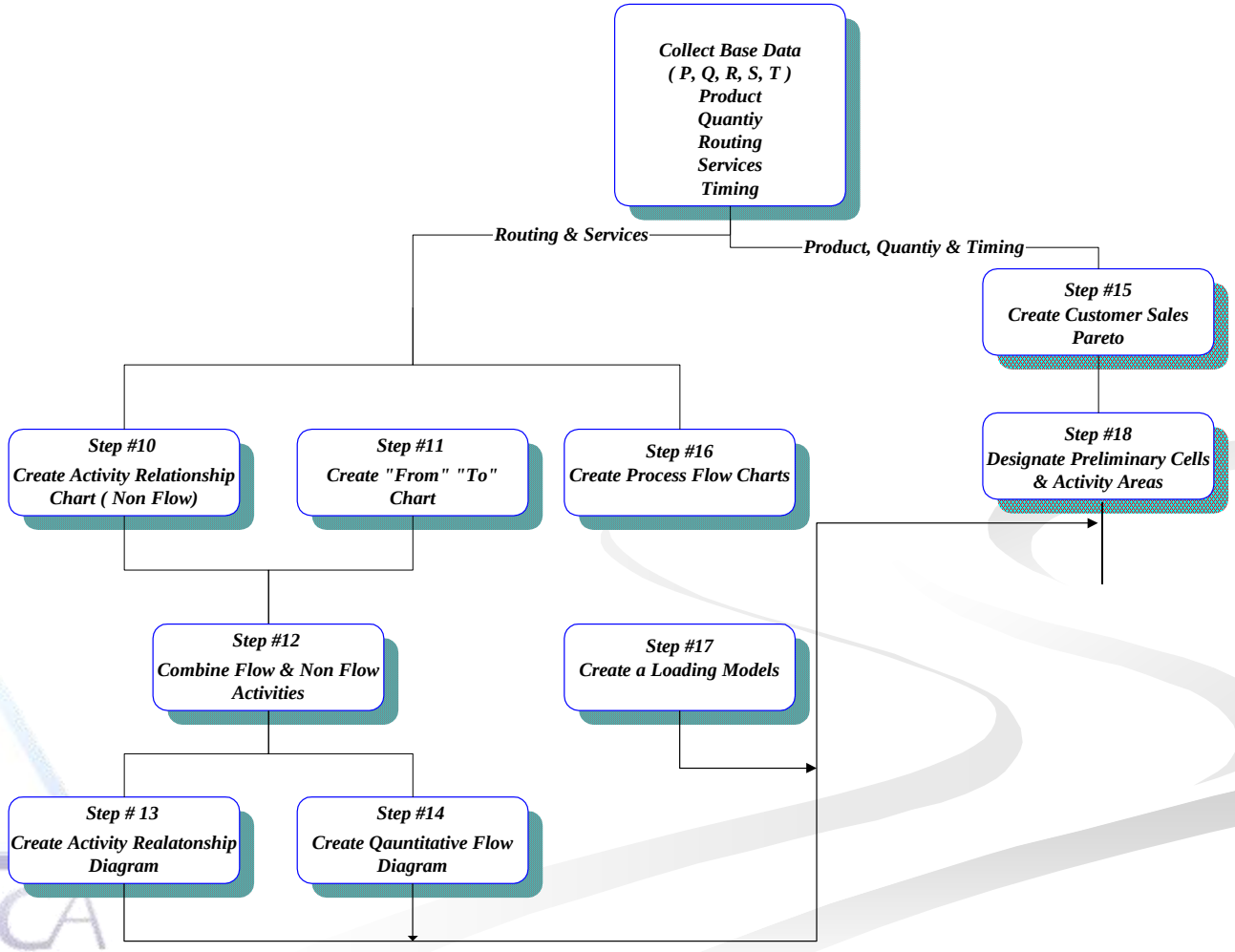
Thomas Existing Activity Area Work Sheet (Continued)

Final Cut Activity #	First Cut Activity #	Activity Name	Existing Square Ft.	Get Well Equireme	Total Sq. Ft. Required	Width	Length	Remarks
	37	Beadblast	966			42	23	
	38	Paint Line & Storage	12848			88	146	Move 22,836 sq. ft. to 29A Paint Load Area / Que.
			13629			177	77	
			1932			92	21	
						107	44	
			3080			154	20	
			592			8	74	
		Paint Line Office	144			16	9	
	39	Restrooms	1480			37	40	
29		**Paint Dept.**	**16543**					
29A		**Paint Load Area / Que**	**22836**			150	150	
	40	Packout	1334			29	46	
30		**Packout**	**1334**					
	42	Comp. Storage/Pre Ship	0			23	74	
31		**Comp. Storage/Pre Ship**	**0**	0	0			Moved to HID Stockroom
	44	Production Control Office	1708			61	28	
32		**Production Control Office**	**1708**					
	22	Downlighter Fab.	2261			51	39	
	46	Downlighter Assembly	6864					
	48	Downlighter Staging	4440					
	49	Downlighter Stockroom	18000					
33A		**Downlighter & Stockroom**	**31565**					
	42	Comp. Storage/Pre Ship	1702			23	74	
	45	HID BRA Sub-Assby	600			20	30	Breakout HID from Downlight
	46	HID Assembly	16280			88	263	
			2925			45	65	
	47	HID Office	1377			51	27	
	48	HID Staging	5920			280	37	
	49	HID Stockroom	30000			200	248	
	53	Supervisor Office	150			10	15	
	41	Accessory (HID)	1830			61	30	
33		**HID Dept. & Stockroom**	**60784**					
	50	Dock Rec. & Inspection	13991			200	84	RGA is part of Receiving Break Out
	51	Obsolete Storage	3780			21	180	
	52	Rec. Office	180			15	12	
		Rec. Dept.	**17951**					
34A		**RGA**	**2809**			53	53	
	54	Shipping Office	162,239			301	539	
		Shipping Dock						
		Warehouse						
35		**Shipping & Warehouse**	**162,239**					
		Total per Plant	**569,375**					
		Total per Drawing	**570,405**					
		Difference	**1,030**					

Step #8: Create Block Layout of Existing Facility


#21
Scrap Area
Steel/Alum
720 SQ.FT.
#20
Special Fab
7152 SQ.FT.
#22
Spec.Office
Entry
4616SQ.FT.
#23
Maint. Dept.
5364 SQ.FT.
#24
Tool Room
14963 SQ.FT.
#16
Brake Press
Room
6747 SQ.FT.
#17
Press Room
Steel
8874 SQ.FT.
#19
Downlighter
Fab
2261SQ.FT.
#2
Press Room
Alum/Die Storage
14629 SQ. FT.
#1
Recieving/Storage
8860 SQ. FT.
#3
Fab Office
1650 SQ.FT.
#18
Rework
Area
629
SQ.FT.
#26
Front Office
Cafe
Restrooms
14707 SQ.
FT.
#25
E.C.Assy/Wire Dept.
14687 SQ.FT.
#15
Press #39
Die & Steel Storage
11038 SQ.FT.
#5
Stockroom
Pur./Fab.
#4
Enclosure
Assy. Line
5445 SQ.FT.
#5
Stockroom
Pur./Fab.
35733 SQ.FT.
#6
Plastics Dept.
15032 SQ.FT.
#7
TG Body
Stockroom
6633 SQ.FT.
#28
Press
#31
4605Sq
Ft.
#27
Inspection
Q.C.Lab
1890 SQ.FT.
#12
Office
Rest-
rooms
2850
SQ.FT.
#29
Paint Dept.
39379 SQ.FT.
#14
Designer Assy.
19712 SQ.FT.
#13
Enclosure
Stockroom
3432 SQ.FT.
#11
Paralouver Assy.
15252 SQ.FT.
#10
Louver Assy.
13776 SQ.FT.
#9
Surface
Paralouver
Assy.
4920 SQ.FT.
#8
TG Assy/Restrooms
12435 SQ.FT.
#30
Packout
1334 SQ.FT.
#32
Prod.
Control
Office
1705 SQ.FT.
#31
Comp. Storage Pre-Ship
1702 SQ.FT.
#33
H.I.D. Dept. & Stockroom
88386 SQ.FT.
#35
Shipping
&
Warehouse
162239 SQ.FT.
#34
Rec. Dept.
20760 SQ.FT.
Identify Activity Areas By
Activity #
Activity Name
Square Footage Currently Used

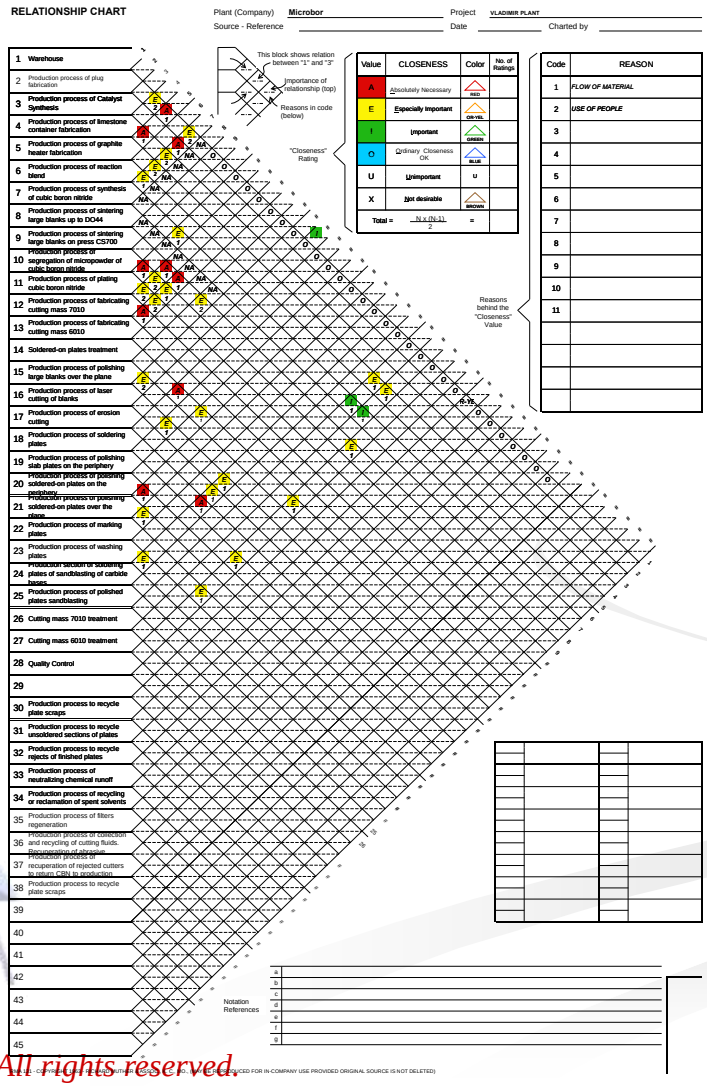
Steps #10 – 18



Critical Data – Steps #10 - #18

- The consolidated activity areas are critical at this point they are the base for the flow and non-flow data in steps 10 and 11
- The Routing and Services data is critical data. Review the product data and any new products or processes in detail to ensure that the focused factory/cellular concepts that evolve out of the process are accurate.

Step #10: Create Activity Relationship Chart (Non-Flow)



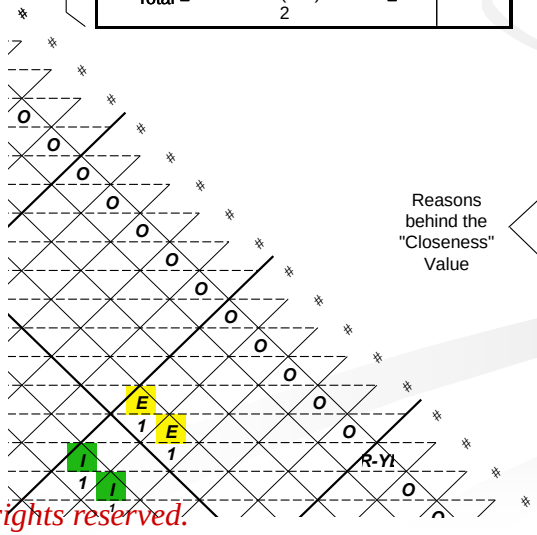
Step #10: Create Activity Relationship Chart (Non-Flow)

Project VLADIMIR PLANT

Date _____ Charted by _____

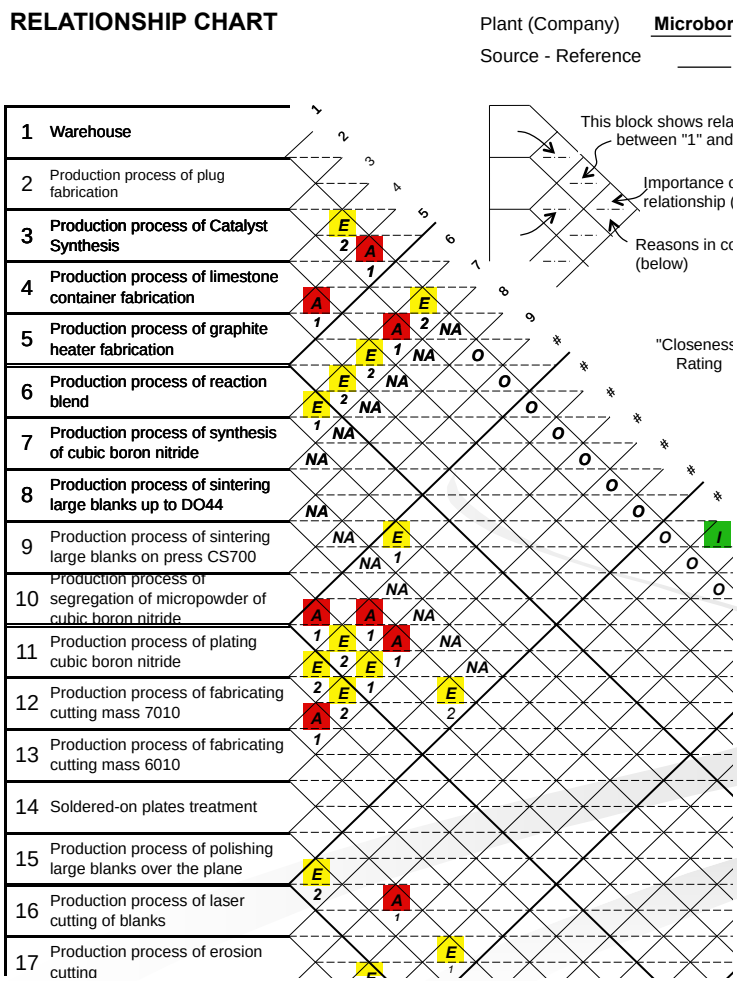
Value	CLOSENESS	Color	No. of Ratings
A	Absolutely Necessary	RED	
E	Especially Important	OR-YEL	
I	Important	GREEN	
O	Ordinary Closeness OK	BLUE	
U	Unimportant	U	
X	Not desirable	BROWN	
Total =	$\frac{N \times (N-1)}{2}$	=	

Code	REA
1	*FLOW OF MATERIAL*
2	*USE OF PEOPLE*
3	
4	
5	
6	
7	
8	
9	
10	
11	



Reasons behind the "Closeness" Value

Step #10: Create Activity Relationship Chart (Non-Flow)



Step #10: Create Activity Relationship Chart (Non Flow)

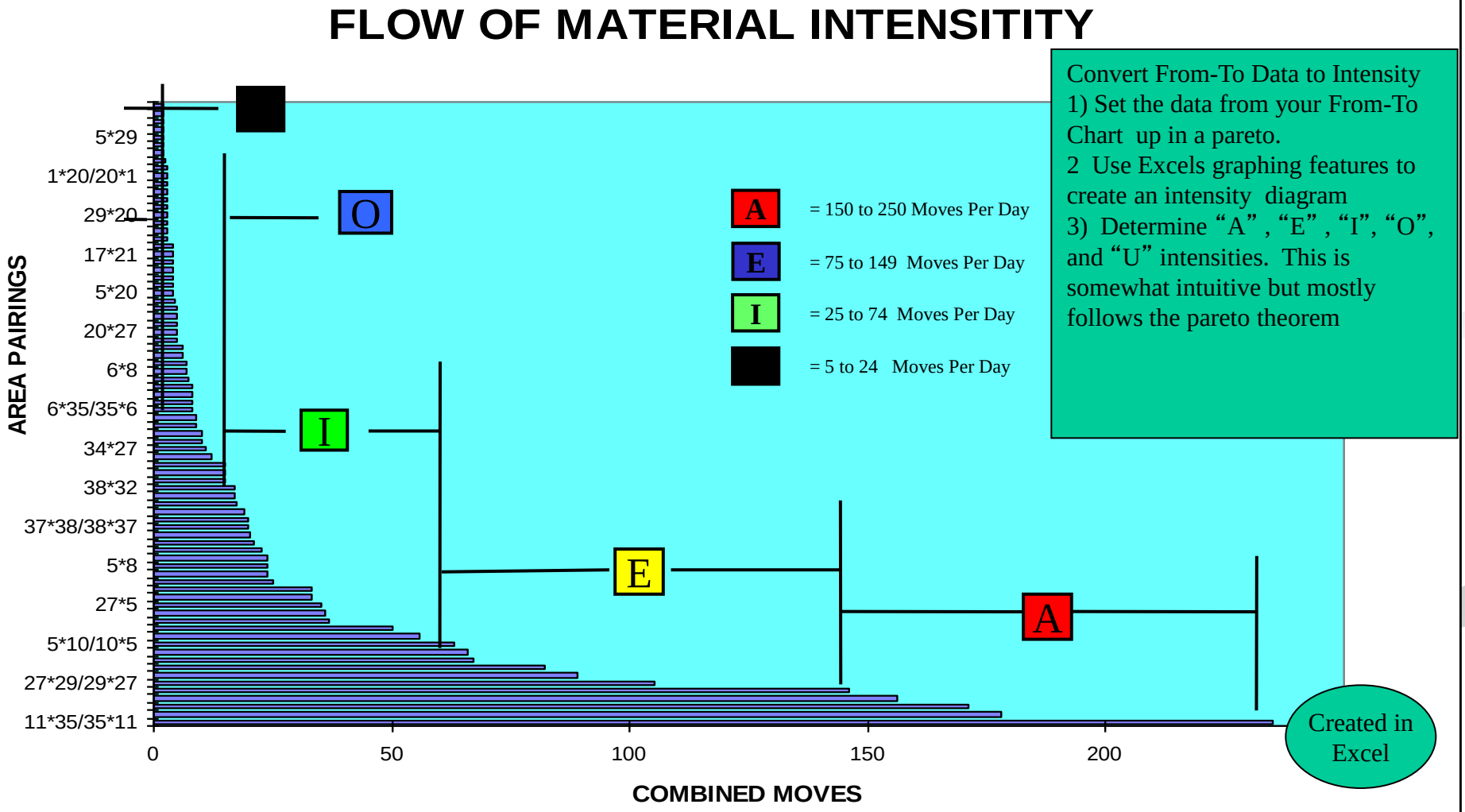
From to Analysis
1) Identify equivalent move containers/types, ie; pallets, carts
2)Use activity list to fill out the chart
3)Utilizing client historical data and knowledgeable people to determine how many moves are completed per day
Note:1st choice, use computer transaction data. 2nd choice do physical observations and verify with client, 3rd choice meet with knowledgeable layout team members and calculate the moves.

Moves will be calculated in moves per day.

Activity or Operation FROM \ TO		1 Rec. Stores Stee	2 Press Rm.Alum.	3 Fab. Office	4 Enclosure Assy.	5 Stkrm. Pur/Fab	6 Plastics Dept.	7 TG Body Stkrm.	8 TG Assy./Rstrm.	9 Surf. Parluvr. As	10 Louver Assy.	11 Paralouver Assy.	12 AWP Off./Rstrm.	13 Enclosure Stkrm	14 Designer Assy.	15 Press #39 D&S	16 Brake Press Rm	17 Press Rm. Steel	18 Rework Area	19 Downlighter Fab.	20 Special Fab.	21 Scrap Area S&A	22 Spec. Off./Entry	23 Maint. Dept.	24 Tool Rm. Dept.	25 E.C. Assy/wire D	26 Frt. Off./Café/rstr	27 AWP Drop/Q.C.	28 Press # 31	29 Paint Dept.	30 Packout	31 Comp.Str./Pre-S	32 Prod. Control Off	33 HID Dept./Stkrm	34 Rec. Dept.	35 Ship & Warehou	36 Ballast Drop	37 HID Drop
Rec. Stores Steel	1		25	9												8		9		2	2															
Press Rm.Alum.	2	12																				5			2			15					15			
Fab. Office	3																																			
Enclosure Assy.	4								8	4		3		10	15							0.5								1						
Stkrm. Pur/Fab	5				17				24	20	53	75			59		3				3.5								2	6						
Plastics Dept.	6				9				7																					0.5				6		
TG Body Stkrm.	7								24																											
TG Assy./Rstrm.	8					1		2							1.5							0.5												140		
Surf. Parluvr. Assy.	9					2.5																0.5												10		
Louver Assy.	10					10			1	5		24										0.5								3						
Paralouver Assy.	11					14									0.5							0.5						1						215		
AWP Off./Rstrm.	12																																			
Enclosure Stkrm.	13														10																					
Designer Assy.	14					8																0.5						1					0.5	130		
Press #39 D&S	15																					7			1.5			50								
Brake Press Rm.	16																					1			1.5			5								
Press Rm. Steel	17	10															4					4						20								
Rework Area	18																																			
Downlighter Fab.	19	1																				1						3								
Special Fab.	20	1																				1						5								
Scrap Area S&A	21																																			
Spec. Off./Entry	22																																			
Maint. Dept.	23																																			
Tool Rm. Dept.	24		2													1.5	1.5																			
E.C. Assy/wire Dept	25					0.5																0.5						1						2		0.5
Frt. Off./Café/rstrm.	26																																			
AWP Drop/Q.C.	27					35		33	2.5	1.5		7			20										0.5				39				2			
Press # 31	28																											1								
Paint Dept.	29														0.5						3							66			1					16
Packout	30					2																												5		
Comp.Str./Pre-Ship	31																																			
Prod. Control Off.	32																																			
HID Dept./Stkrm.	33																				6								2.5	4.5	1					104
Rec. Dept.	34						6		2	1		4			4										0.5			11		9			3		35	55
Ship & Warehouse	35						2		16	2		20			16																					
Ballast Drop	36					37			1.5			1.5			1.5																		0.5			
HID Drop	37					1				0.5											1								0.5	2			67	6		
HID Assy.	38																												0.5	2		17		1	178	
E.C. Drop	39					1																			0.5											
Totals		49	11	0	26	112	8	35	86	34	53	135	0	10	128	9.5	8.5	9	0	2	16	23	0	0	5	1.5	0		1	57	15	2	17	88	7.5	686	35	181

Created in Excel

Step #11: Create "From To" Chart



Step #12: Combine Flow and Non-Flow Activities

1. List all of the significant routing pairs from the From-To Chart (flow) and the Relationship Chart (non-flow). You will need to refer to the Flow Intensity chart to convert from moves per day to A,E,I,O.

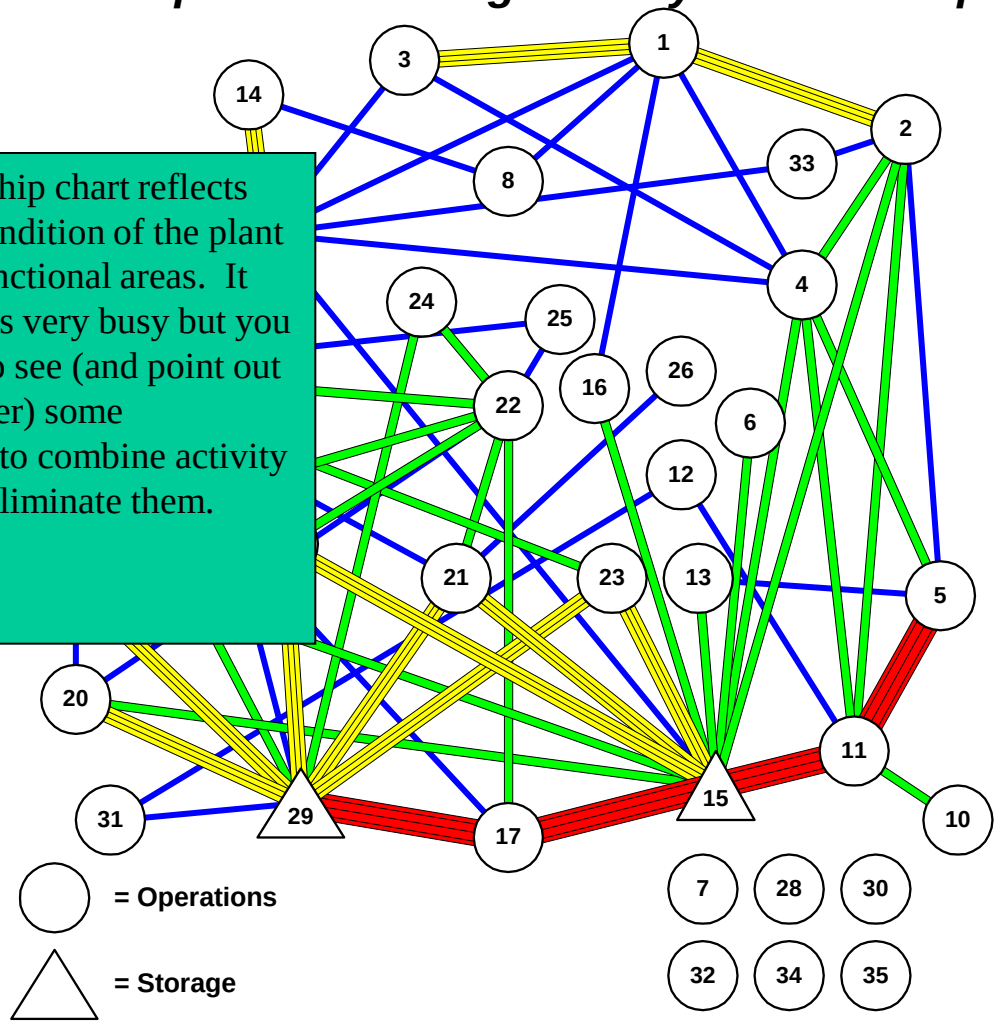
2) Combine the relationships by ranking them.

- **Ranking Criteria:**
  - Flow always takes precedence.
  - If Flow is an "A" and Non-flow is an "I" Combined, it remains an "A".
  - If flow is less than non-flow then ranking will rank up one non-flow will rank down one.
  - Flow = "I" and Non-flow = "A" then Combined = "E"
  - If flow has no corresponding non-flow then ranking stays the same as flow
  - If Non-flow has no corresponding flow then ranking remains the same as Non-flow.

Step #13: Create Activity Relationship Diagram

This relationship chart reflects the "as-is" condition of the plant with all its functional areas. It typically looks very busy but you will be able to see (and point out to the customer) some opportunities to combine activity areas and or eliminate them.

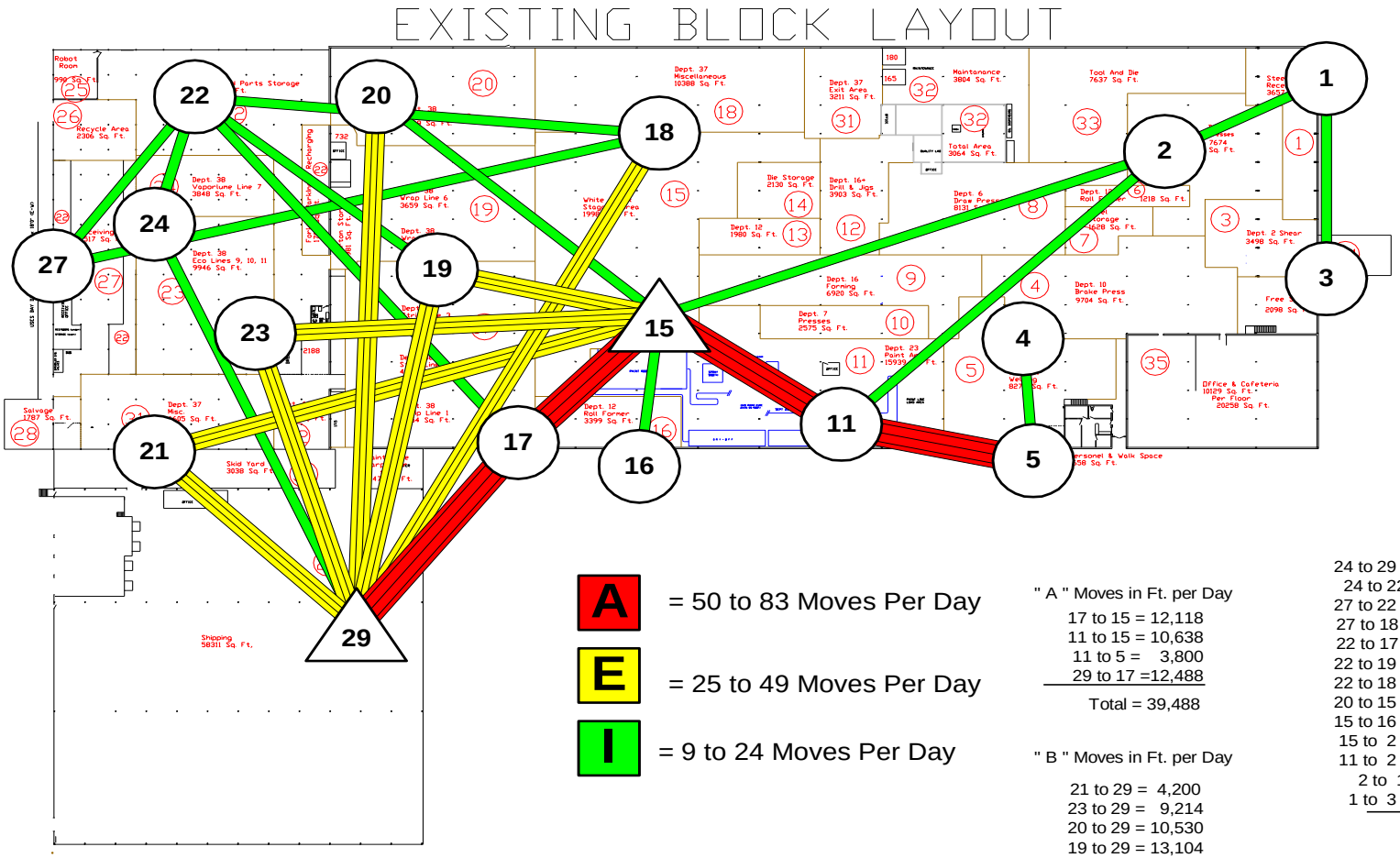
Sparta's Existing Activity Relationship Diagram



1) Steel Receiving
2) Large Presses
3) Shear
4) Brake Presses
5) Welding
6) Rollformer (Ind.)
7) Steel Storage
8) Draw Presses
9) Forming/ Stamping
10) Auto-Coil Press 202
11) Paint Area
12) Drill & Jigs
13) Rollformer (Wrap)
14) Die Storage
15) White Stock Area
16) Rollformer (Strip)
17) Strip Assy. Line
18) Misc. (Assy./ Comp.)
19) Wrap Assy. Line
20) Industrial Assy. Line
21)Proprietary Assy. Line
22) Pur. Parts Storage
23) Eco Assy. Line
24) Vaporlume Assy. Line
25) Robot Room
26) Recycle Area27) Pur. Parts Receiving
28) Salvage / RGA
29) Shipping
30) Skid Yard / Maint Shop
31) Exit Assy. Cell
32) Maint. Area
33) Tool & Die Rom
34) Compressor Room
35) Office & Cafeteria

Created In Visio

Step #14: Create Quantitative Flow Diagram



A = 50 to 83 Moves Per Day

E = 25 to 49 Moves Per Day

I = 9 to 24 Moves Per Day

" A " Moves in Ft. per Day

17 to 15 = 12,118
11 to 15 = 10,638
11 to 5 = 3,800
29 to 17 = 12,488

Total = 39,488

" B " Moves in Ft. per Day

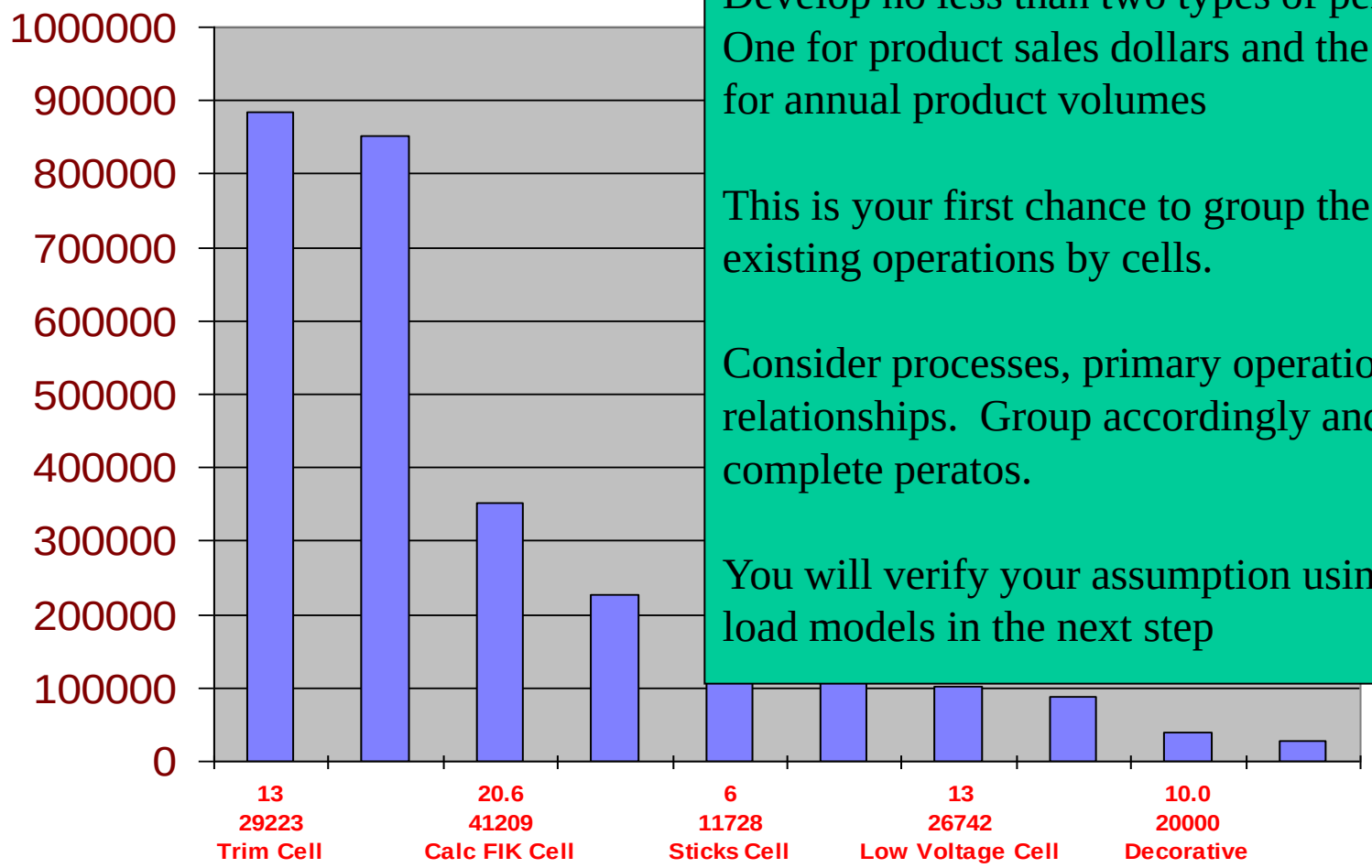
21 to 29 = 4,200
23 to 29 = 9,214
20 to 29 = 10,530
19 to 29 = 13,104
18 to 29 = 12,350
21 to 15 = 12,597
23 to 15 = 7,644
19 to 15 = 5,160

Total = 74,799

24 to 29 = 4,329
24 to 22 = 585
27 to 22 = 2,100
27 to 18 = 4,887
22 to 17 = 3,910
22 to 19 = 2,784
22 to 18 = 3,952
20 to 15 = 1,752
15 to 16 = 1,560
15 to 2 = 5,936
11 to 2 = 2,322
2 to 1 = 810
1 to 3 = 1,710

Created In Visio

Step #15: Create Customer Sales Peratos



Develop no less than two types of peratos. One for product sales dollars and the other for annual product volumes

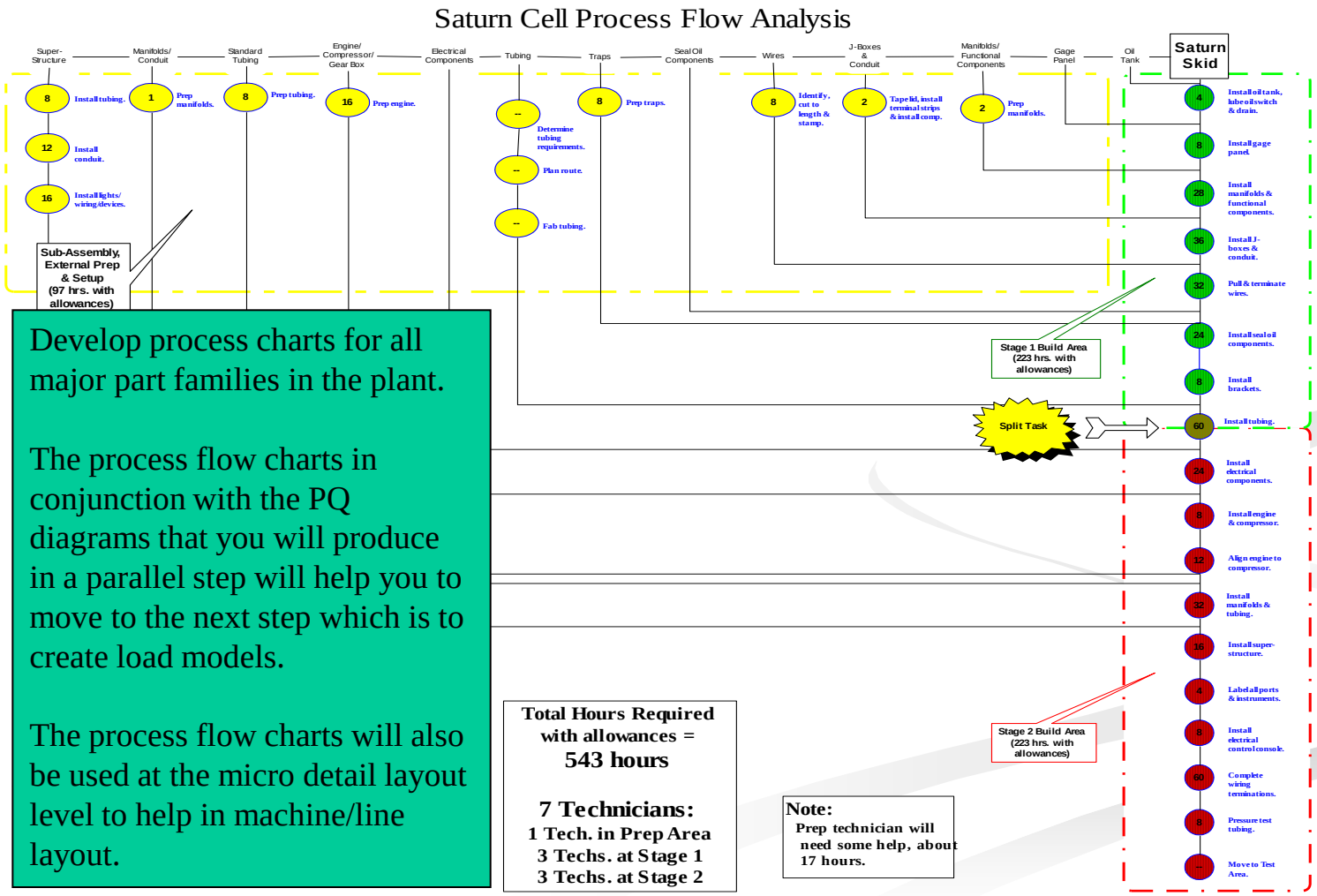
This is your first chance to group the existing operations by cells.

Consider processes, primary operations and relationships. Group accordingly and complete peratos.

You will verify your assumption using the load models in the next step

Created In Excell

Step #16: Create Process Flow Charts



Develop process charts for all major part families in the plant.

The process flow charts in conjunction with the PQ diagrams that you will produce in a parallel step will help you to move to the next step which is to create load models.

The process flow charts will also be used at the micro detail layout level to help in machine/line layout.

Total Hours Required with allowances = 543 hours

7 Technicians:
1 Tech. in Prep Area
3 Techs. at Stage 1
3 Techs. at Stage 2

Note:
Prep technician will need some help, about 17 hours.

Created In Visio

Step #17: Create Load Models

The purpose of the load models are to
assumptions made earlier on the perat
develop machine and manpower requi
of the conceptual cells
Load models must be developed for each conceptual fabrication cells.

MAKE SURE YOU REVIEW AND GET CONSENSUS !: C

Note variable data is listed at the top of the model and used for calculating and completing what if scenarios

Quantities must reflect total annual volumes for the representative part group

Use representative part numbers for the model if there are a lot of parts running through the cell with similar routings

Set up model by process steps for particular part families including down

Machine and man power requirements will sum for each process step.

		Current	Plan															
Total # Of Hours Worked Per Year		1,763	1,763															
Labor Productivity		85%	100%															
Sales Growth for 1998			30%															
					Weld Wings & Ovals			Assemble & Tack Weld			Finish Weld			Paint				
Part		Per Year	Avg # Of Lots Per Year	Lot Size	Setup	Run	Total	Setup	Run	Total	Setup	Run	Total	Setup	Run	Total	Setup	
206214 (7-		29	12	2.42		0.324	9.4		0.470	13.6		0.655	19.0		0.119	3.5		
206199 (7-		373	50	7.46		0.285	106.3		0.425	158.5		0.492	183.5		0.106	39.5		
206203 (8-		043	50	20.86		0.410	427.6		0.561	585.1		0.851	887.6		0.119	124.1		
206207 (8-		623	50	52.46		0.307	805.3		0.468	1,227.6		498	1,306.3		0.113	296.4		
206218 (10-L)	14 X 38 CR WING H 25	1805	50	36.10		0.440	794.2		0.620	1,119.1		86	1,490.9		0.136	245.5		
206217 (10-S)	14 X 32 CR WING H 25	2264	50	45.28		0.400	905.6		0.557	1,261.0			1,428.6		0.122	276.2		
206528 (12-L)	24 X 44 CR WING H 40	79							0.716	56.6			84.5		0.160	12.6		
206448 (12-S)	24 X 32 CR WING H 30	23							0.647	14.9		0	19.9		0.137	3.2		
SP 07-L	WING SPECIAL 07-L	25							0.470	11.8		0.6	16.4		0.119	3.0		
SP 07-S	WING SPECIAL 07-S	139							0.425	59.1		0.49	4		0.106	14.7		
SP 08-L	WING SPECIAL 08-L	67							0.561	37.6		0.851			0.119	8.0		
SP 08-S	WING SPECIAL 08-S	106							0.468	49.6		0.498			0.113	12.0		
SP 08-X	WING SPECIAL 08-X	32							0.561	18.0		0.851			0.119	3.8		
SP 10-L	WING SPECIAL 10-L	258	50	5.16		0.440	113.5		0.620	160.0								
SP 10-S	WING SPECIAL 10-S	269	50	5.38		0.400	107.6		0.557	149.8								
SP 10-X	WING SPECIAL 10-			5.75		0.440	30.4		0.620	42.8								
SP 12-L	WING SPECIAL 12-			4.42		0.528	28.0		0.716	37.9								
SP 12-S	WING SPECIAL 12-			5.00		0.476	28.6		0.647	38.8								
SP 12-X	WING SPECIAL 12-			1.33		0.528	8.4		0.716	11.5								
SP 16-L	WING SPECIAL 16-			6.00		0.720	4.3		1.009	6.1								
SP 16-S	WING SPECIAL 16-			6.50		0.630	8.2		0.965	12.5								
SP 16-X	WING SPECIAL 16-			1.00		0.720	0.7		1.009	1.0		1.486	1.5		0.160	0.2		
SP MD 07-L	WING MINE DUTY			3.00		0.713	8.6		1.034	12.4		1.441	17.3		0.119	1.4		
SP MD 07-S	WING MINE DUTY 07-S	1	1	1.00		0.627	0.6		0.935	0.9		1.082	1.1		0.106	0.1		
SP MD 08-L	WING MINE DUTY 08-L	15	4	3.75		0.902	13.5		1.234	18.5		1.872	28.1		0.119	1.8		
SP MD 08-S	WING MINE DUTY 08-S	26	12	2.17		0.675	17.6		1.030	26.8		1.096	28.5		0.113	2.9		
SP MD 08-X	WING MINE DUTY 08-X	3	1	3.00								1.872	5.6		0.119	0.4		
SP MD 10-L	WING MINE DUTY 10-L	257	50	5.14								1.817	467.0		0.136	35.0		
SP MD 10-S	WING MINE DUTY 10-S	192	50	3.84								1.388	266.5		0.122	23.4		
SP MD 10-X	WING MINE DUTY 10-X	19	12	1.58								1.817	34.5		0.136	2.6		
SP MD 12-L	WING MINE DUTY 12-L	105	50	2.10								2.352	246.9		0.160	16.8		
SP MD 12-S	WING MINE DUTY 12-S	19	12	1.58								1.905	36.2		0.137	2.6		
SP MD 12-X	WING MINE DUTY 12-X	3	1									2.352	7.1		0.160	0.5		
SP MD 16-L	WING MINE DUTY 16-L	7	2	3.50								3.269	22.9		0.160	1.1		
SP MD 16-S	WING MINE DUTY 16-S	2	1	2.00		1.386	2.8		2.123			2.754	5.5		0.137	0.3		
	Total Hours Rqd Per Year						4,189.9			5,963.8			7,401.5					
Current	Machines Required/Day						2.4			3.4			4.2					
	Manpower Required/Day (12.5 Total)						2.7			4.0			4.9					
	Total Hours Rqd Per Year						5,446.9			7,753.0			9,622.0					
Plan	Machines Required/Day						3.1			4.4			5.5			0.9		
	Manpower Required/Day (13.9 Total)						3.1			4.4			5.5			0.9		

Created In Excell

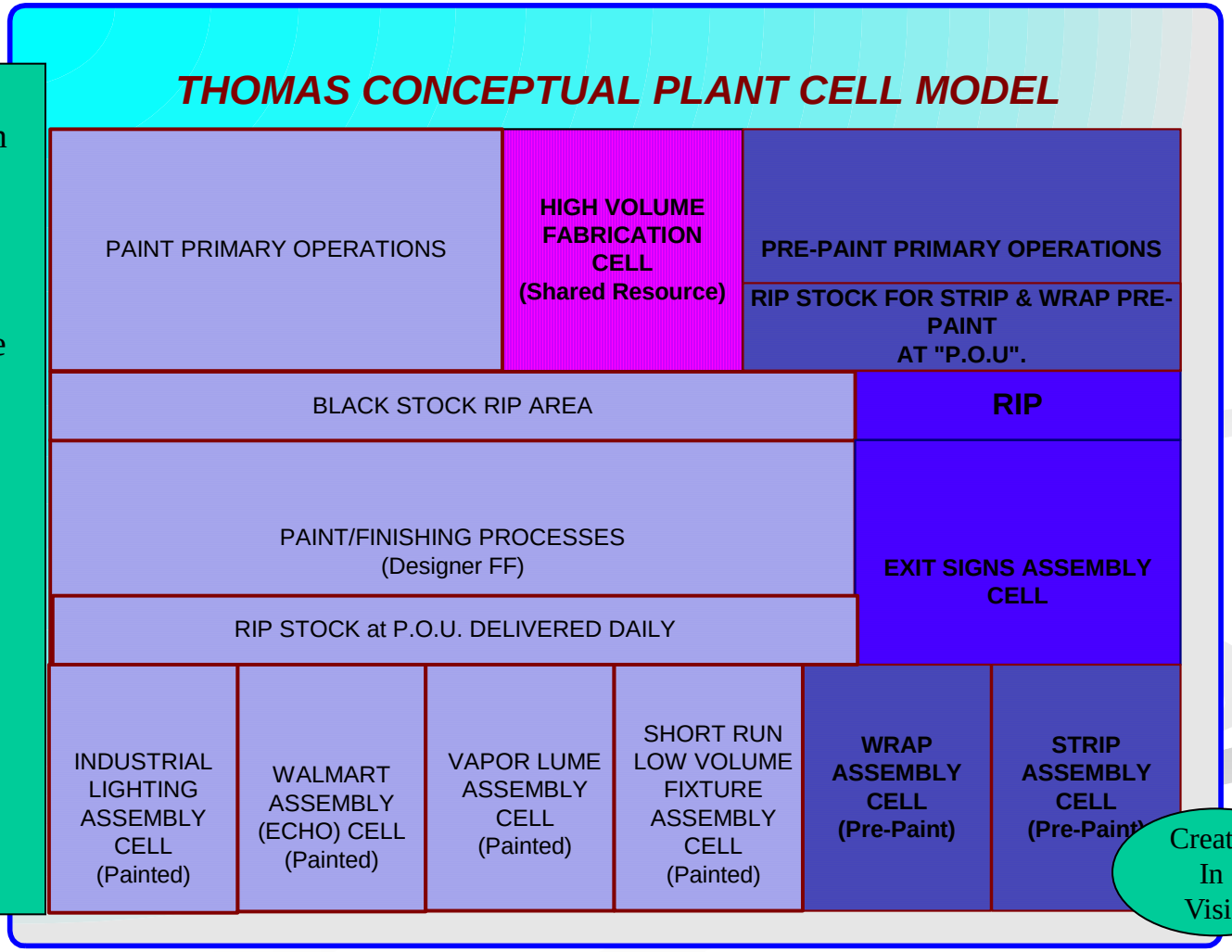
Step #18: Designate Preliminary Cells and Activity Areas

The conceptual model is the first graphical representation of the new plant when it is complete.

It is imperative that you get consensus at this time on the conceptual model/thinking.

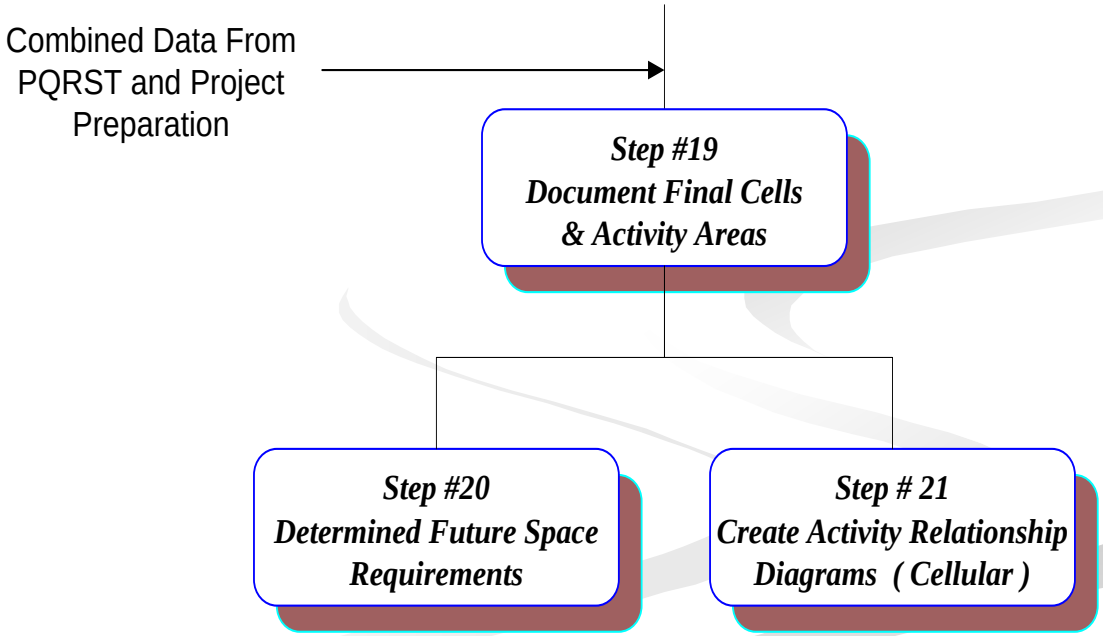
Load models and space requirements for assembly areas and shared resources will be developed from this model and modified later if required.

You can use color to help you show focused factory/cell boundaries



P.Q.R.S.T. Data Continued (Steps 19-21)

- At this point in the project you will have everything you need to begin sizing the plant and completing the consolidation of the activity areas.



Step #19: Document Final Cells & Activity Areas

Activity #	Activity Description	Current SQ_FT	Get Well SQ_FT	Total SQ_FT	Block Size Length	Block Size Width	Remarks
1	Receiving	6,000	0	6,000	116	52	
2	Raw Stock Stores	1,452	0	1,452	57	25	
3	Fab Shop/Finishing/Paint	16,542	0	16,542	193	86	
4a	WIP/RIP Stores (Fab Comp.)	5,600	-2,600	3,000	82	37	
		8,400	0	8,400			
		1,044	0	1,044	48		
		720	0	720	40		
		3,188	-688	2,500	75		
		3,188	-688	2,500	75		
		2,200	300	2,500	75		
		3,015	-1,015	2,000	67	30	
		1,550	450	2,000	67	30	
		3,720	-720	3,000	82	37	
13	RGA Cell	3,698	0	3,698	91	41	
14	Finished Goods Staging	2,664	0	2,664	77	34	
15	Finished Goods			0	0		Not applicable to Layout Project
16	Shipping			0	0		Not applicable to Layout Project
17	Main Offices	7,400	0	7,400	129	57	
18	Prog...	1,620	0	1,620	60	27	
19			0	1,650	61	27	
20			-1,741	2,000	67	30	
21			1,650	1,650	61	27	
22			0	3,000	82	37	
	Total Square Feet Required	80,391	-5,051	75,340			

•Adjustments to space come from analysis of load models and TAKT sheets
•Create engineering layouts (using machine templates) of cells and functional areas based from load model requirements
•Create TAKT sheets to determine work station requirements

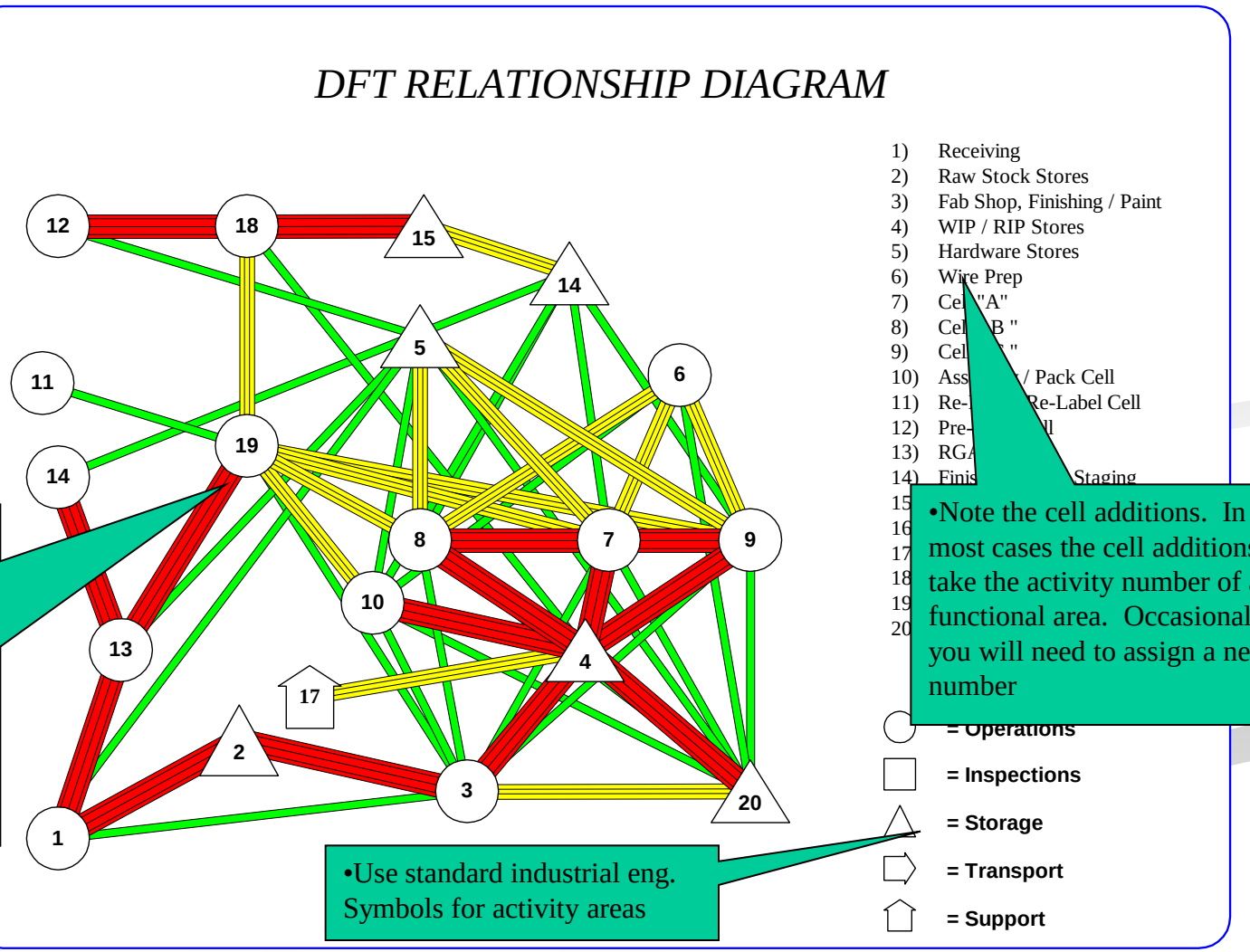
•Use rectangular shapes to begin. When you create the block layouts the shapes may change because of the location in the building

•Note that all of the activity areas are listed from the consolidated activity list

Step #21: Create Activity Relationship Diagram

- This diagram is a visual representation of your block layouts
- Look for flow between areas
- Try to set up the diagram so that you can clearly see relationships and begin to see material flow
- Make sure this diagram is available for reference when you create the block layouts

- Lines and activity area templates are in a Visio template file called "TCATemplates.VSS" Transfer file to the Visio Extras folder and open as a template

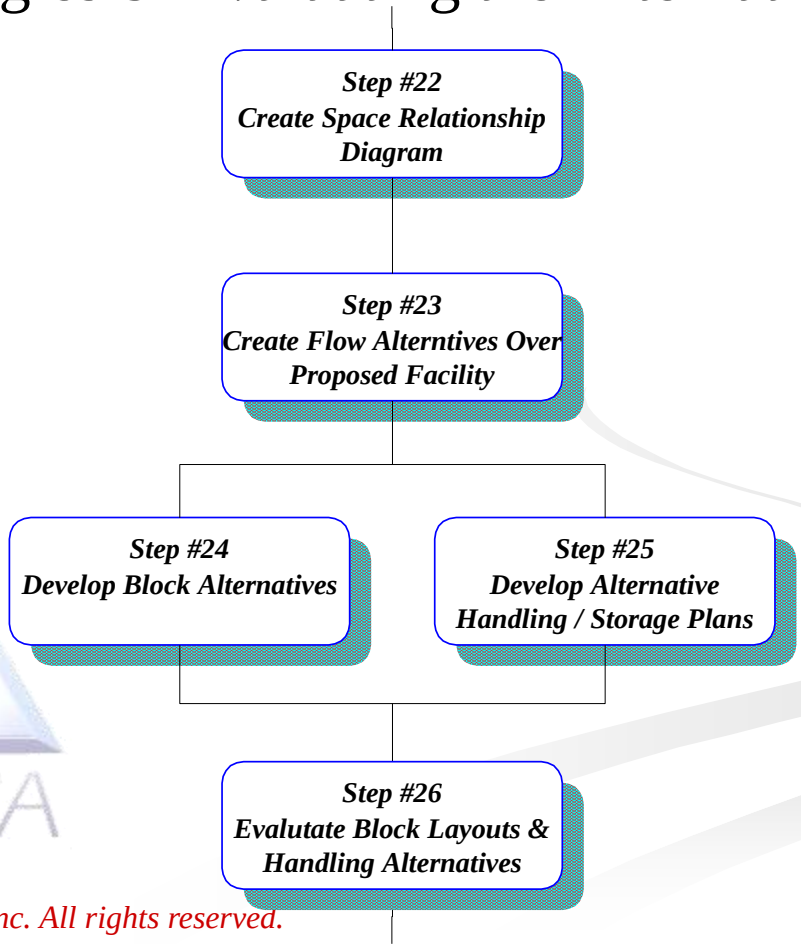


- Note the cell additions. In most cases the cell additions take the activity number of a functional area. Occasionally you will need to assign a new number

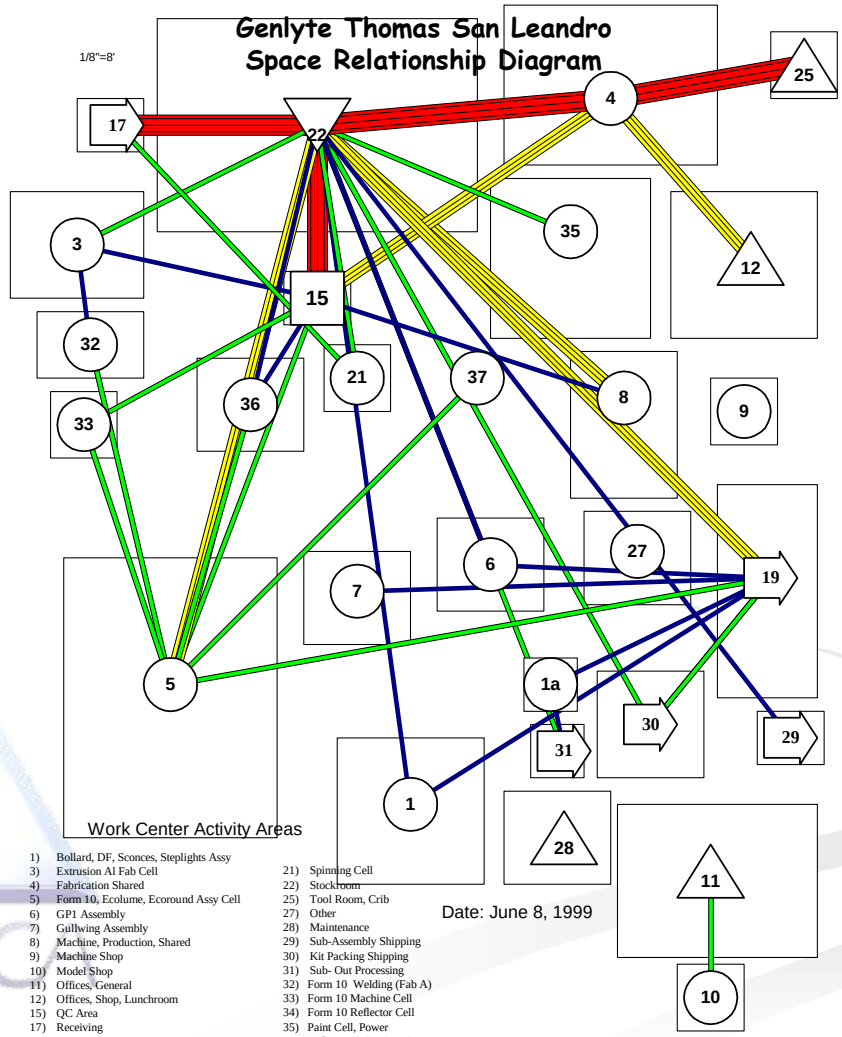
- Use standard industrial eng. Symbols for activity areas

Steps #22 - #26

- Creating Block Layout Alternatives and Material Handling Methodologies & Evaluating the Alternatives



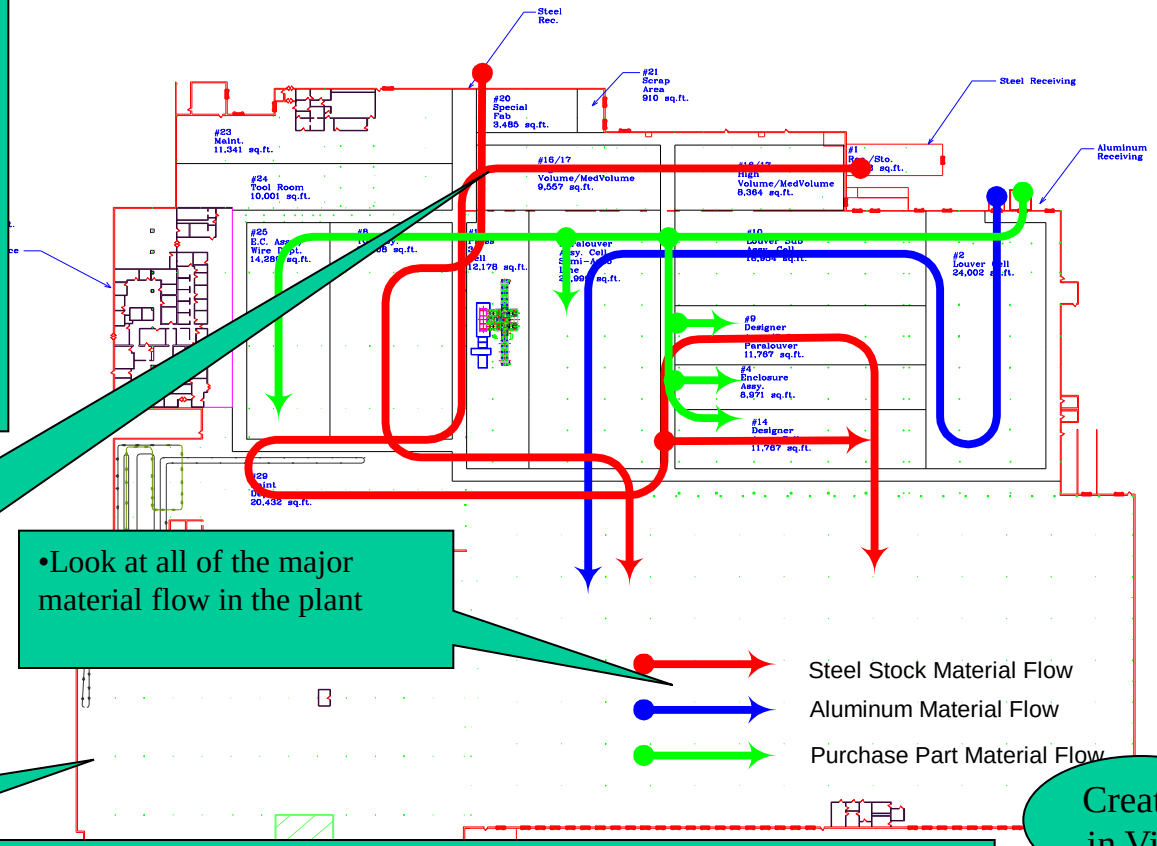
Step 22: Create Space Relationship Diagram



Step 23: Create Flow Alternatives Over Proposed facility

The major material flows in any plant will dictate the position of the activity areas. The number of flow alternatives will vary due to building or sight restrictions. In most cases you will need to create no less than 3 alternatives and you may create as many as 5 or 6. You will more than likely throw out some of the alternatives out if you create more than 4 because they become redundant.
Use hand sketched drawings to create block layouts and then finalize with visio drawings

Block Layout Alternative #3 Material Flow Diagram



•Look at all of the major material flows in the plant
•Sometimes trash or scrap removal paths a very important
•Flow lines should be 17pt wide with 1/2 inch radius.

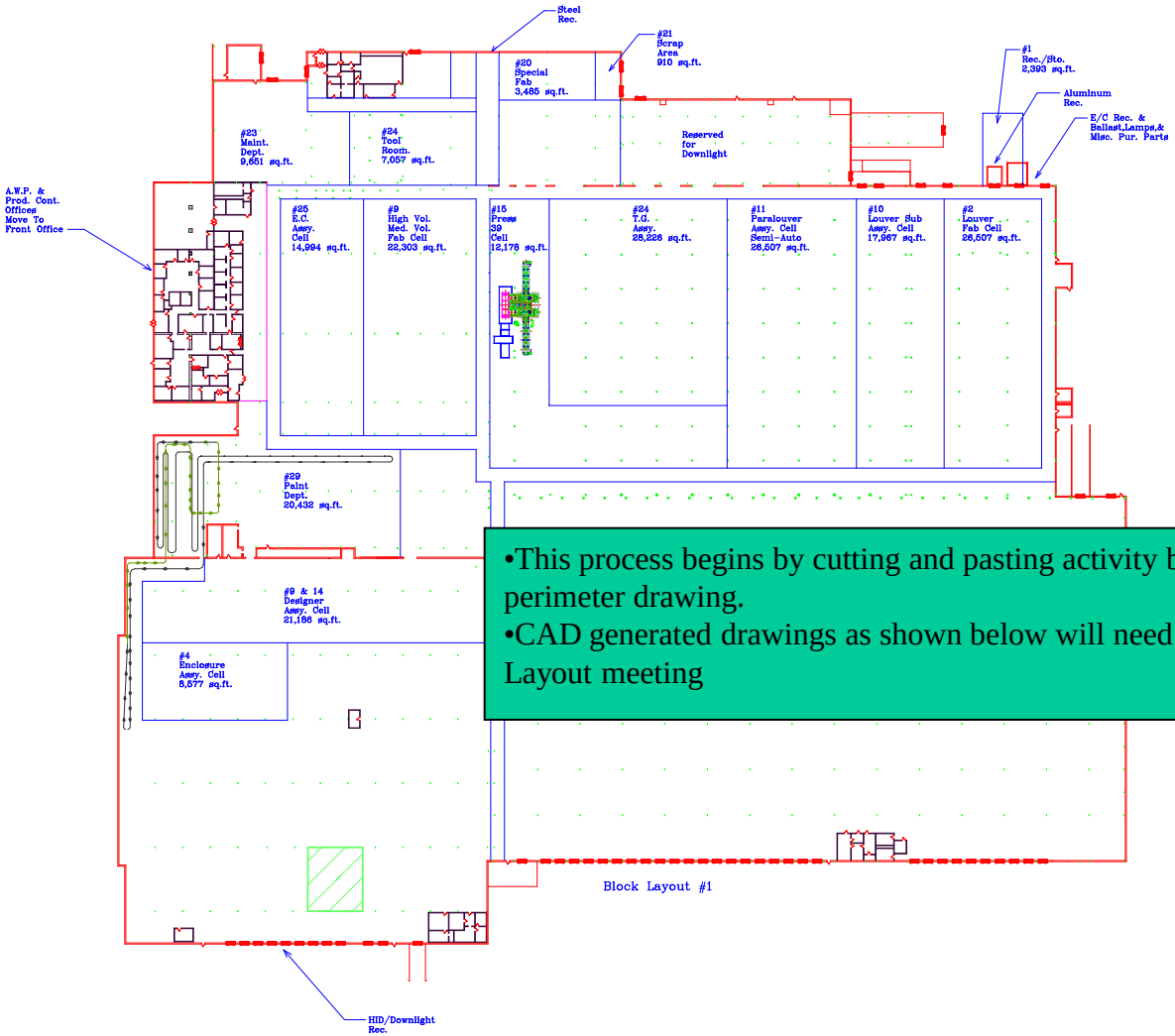
•Look at all of the major material flow in the plant

•Import each block layout that is going to be evaluated into Visio

Created in Visio

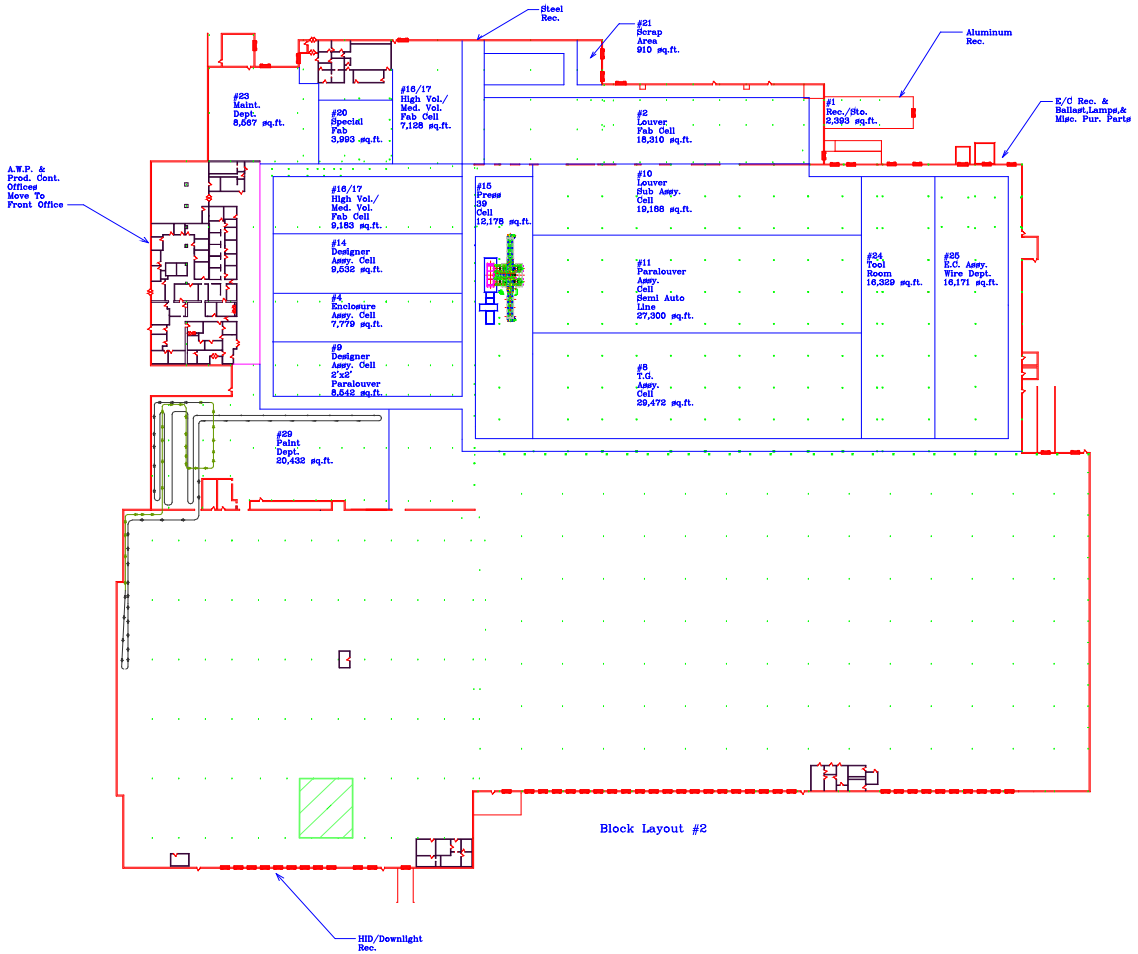
•Remember to have the relationship diagrams, space relationship diagram, and flow diagrams available to create the block layouts.
•Make sure you include the client in this process and the block layouts to follow

Step #24: Develop Block Alternatives



- This process begins by cutting and pasting activity block onto a building perimeter drawing.
- CAD generated drawings as shown below will need to be prepared for the Layout meeting

Step #24: Develop Block Alternatives



Step #25: Develop Alternative Handling /Storage Plans

Material Class	From-To	Unit/Container	Method	Remarks
Castings	Receiving-Repack	Pallet	Forklift	Repackaging to standard containers
Castings	Repack-Stores	Caster Basket	Tow Motor Transport	Casters on all baskets for easier handling
Castings	Stores-Fab/Mach	Caster Basket	Tow Motor Transport	Not Required To Count Out Work Order Quantity
Castings	Fab/Mach-Stores	Caster Basket	Tow Motor Transport	Put Back Caster Basket After Raw is Pulled
Castings	Fab/Mach-Paint	JIT Cart	Tow Motor Transport	
Castings	Paint-Assembly	JIT Cart	Tow Motor Transport	
Sheet/Extrusions	Receiving-Stores	Pallet	Forklift	
Sheet/Extrusions	Stores-Fab/Mach	Cart/Pallet	Tow Motor Transport	
Sheet/Extrusions	Fab/Mach-Paint	JIT Cart	Tow Motor Transport	
Sheet/Extrusions	Paint-Assembly	JIT Cart	Tow Motor Transport	
Common Purch Parts	Receiving-Stores	Pallet/Boxes	Tow Motor Transport	
Common Purch Parts	Stores-Assembly	JIT Cart	Tow Motor Transport	
Assy Specific Parts	Receiving-Repack	Pallet/Boxes	Forklift	Repackaging to standard containers
Assy Specific Parts	Repack-Assembly	Bins/Box	Manual/Forklift	Parts will be transferred and stored at point of use
Free Stock	Receiving-Bread Man	Box	Manual/Forklift	
Free Stock	Bread Man-Assembly	Carts/Bins	Tow Motor Transport	
Assemblies	Assembly-Packing	Assembly/Box	Conveyor	
Assemblies	Packing-Finished Goods	Pallet	Forklift	
Assemblies	Finished Goods-Shipping	Pallet	Forklift	

Step #26: Evaluate Block Layouts & Handling Alternatives

EVALUATING ALTERNATIVES

Plan/Area Hadco Project Littlestown Date

Description Of Alternatives: #1

#2 #3

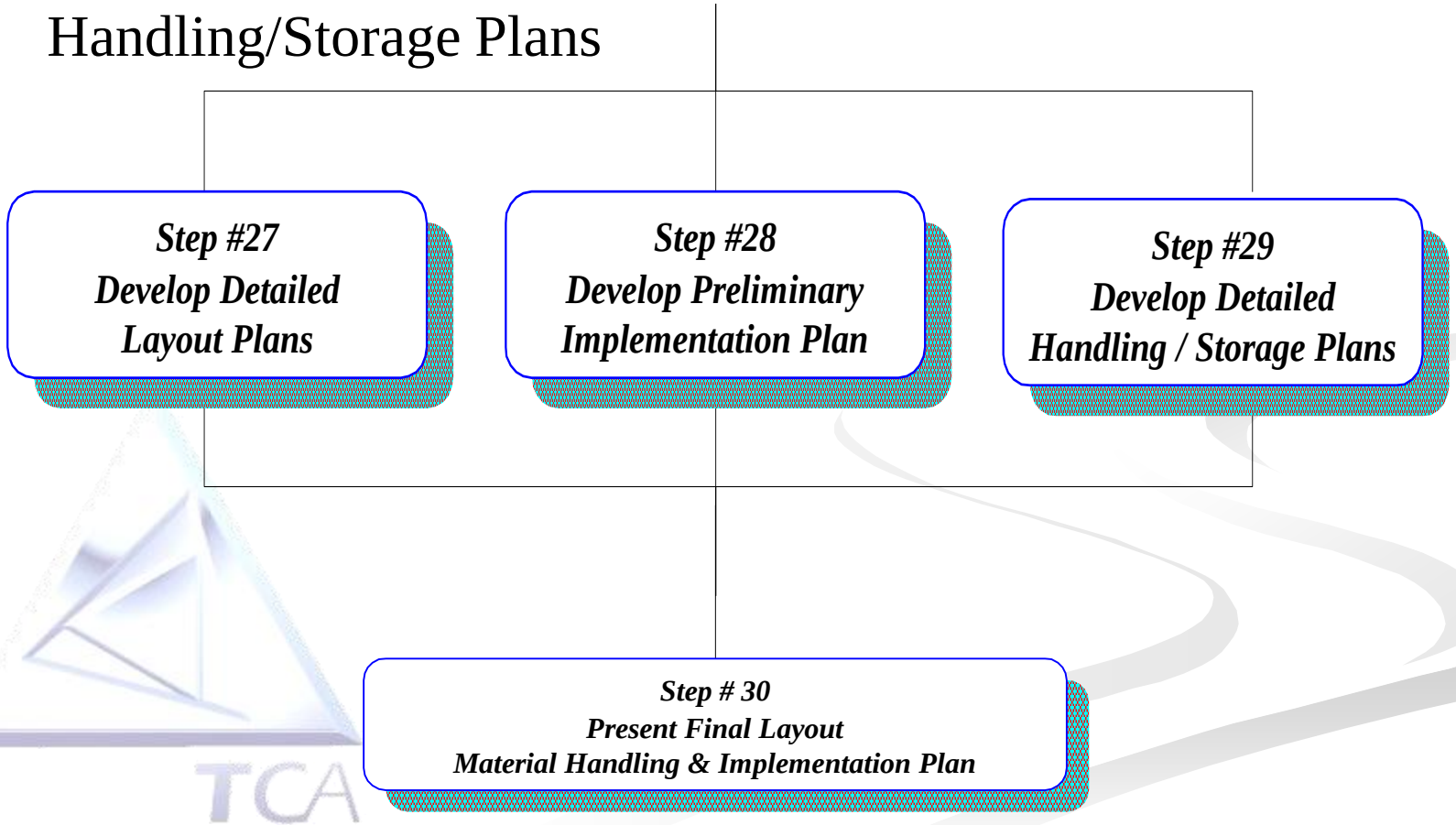
#4 #5.

Weight Set By: Ratings By: Tally By:

	FACTOR/CONSIDERATION	WT.	#1	#2	#3	#4	#5	COMMENTS
1	Ease Of Future Expansion	7	I 14	I	E 21	0	0	
2	Flexibility Of Layout	8	E 24	I 16	I 16	0	0	
3	Flow Of Materials	10	O 10	O 10	A 40	0	0	
4	Storage Effectiveness	5	U 0	I 10	I 10	0	0	
5	Space Utilization	5	O 5	E 15	I 10	0	0	
6	Ease Of Supervision & Control	6	I 12	I 12	E 18	0	0	
7	Minimum Congestion	7	O 7	O 7	I 14	0	0	
8	Safety & Housekeeping	9	O 9	O 9	I 18	0	0	
9	Environmental Control	7	U 0	E 21	E 21	0	0	
10	Appearance / Promotional Value	7	O 7	O 7	A 28	0	0	
11	Brick & Mortar Expansion	5	I 10	I 10	I 10	0	0	
12			0	0	0	0	0	
13			0	0	0	0	0	
14			0	0	0	0	0	
15			0	0	0	0	0	
	Totals		98	117	206	0	0	

Steps #27 - 30

- Develop Detailed Layout, Implementation Plan and Handling/Storage Plans



It Takes 43 Muscles to Frown and 17 to Smile, But it Doesn't take Any to Just Sit There with a Dumb Look on Your Face.

Questions

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