TECHNIMARK EXPANSION PROJECT

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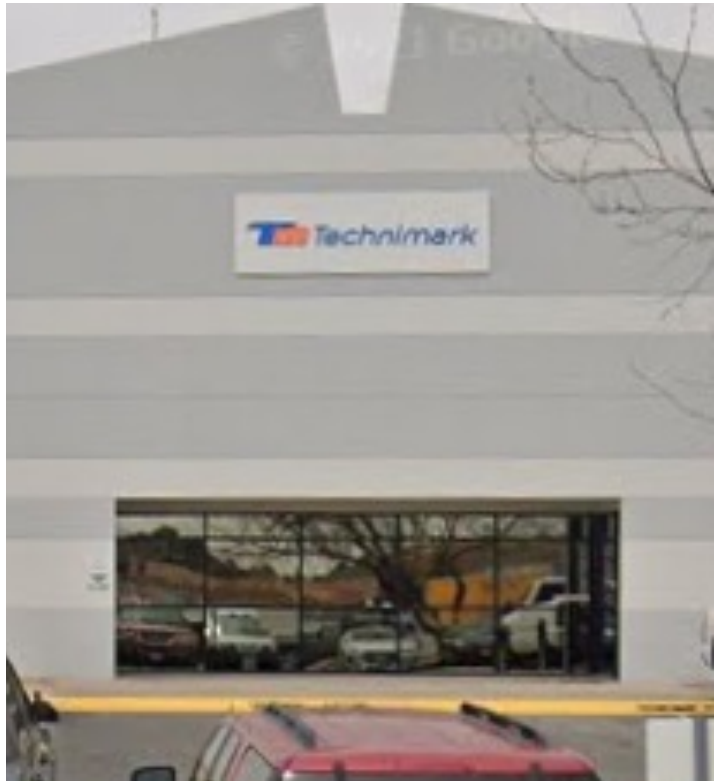
TECHNIMARK

- As a leading supplier for consumer goods, healthcare and industrial companies around the world. Technimark El Paso is part of a successful global network of facilities offering advanced injection-molded medical devices. In fact, Technimark has been expanding locations and increasing sales for more than three decades.
- Here at the El Paso plant, we're focused on the growth of the company and the growth of our employees. We operate in an active, fast-paced atmosphere that encourages teamwork, innovate thinking and mutual respect.
- 425 Pan American Dr, El Paso, TX 79907

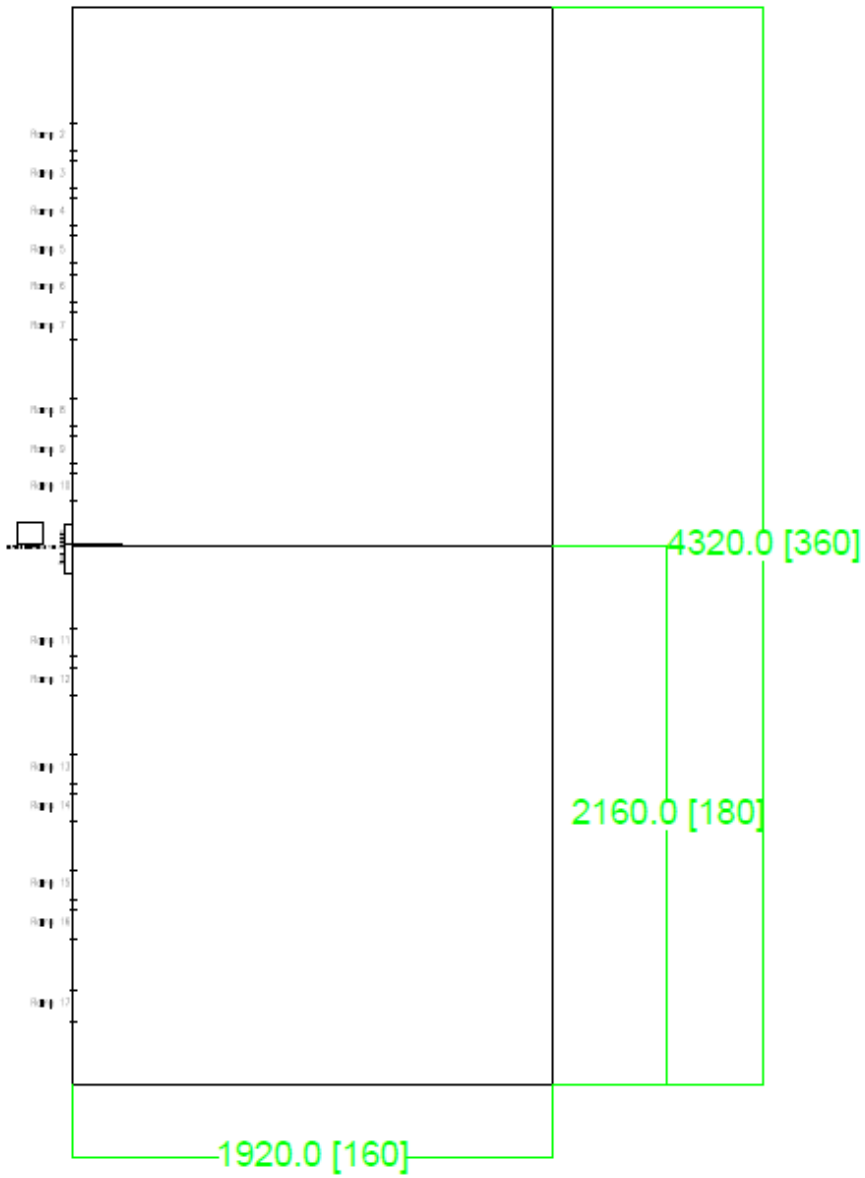
Technimark

PROJECT STATEMENT



Technimark is expanding to another building to support new production demand and storage capacity. Technimark needs to organize a 28,800sqft area considering all the entities to run their manufacturing operations.

BUILDING LAYOUT



Stakeholder Category	Stakeholder:	Interest/Relation:
Business	Technimark Company	Company requesting project for expansion.
Academic	UTEP Senior Design Team	Advising for project.
Customer	Technimark Customer	Customer affected by expansion facility.
Business-employees	Production Operators	Labor to operate production equipment.
Business-employees	Quality Specialists	Labor to test finished goods.
Business-employees	Material Handlers	Labor to transport material to each area.
Business-employees	Tool Cleaners	Labor to clean tools for production equipment.
Business-employees	Maintenance Technicians	Labor to service production equipment.
Business-employees	Process Technicians	Resource to assist Production Operations.

STAKEHOLDERS

CONCEPT OF OPERATIONS

UTEP Senior Design Team will provide	Technimark will provide
AutoCAD capability to construct Layout	Building Infrastructure and Total Area
Statistical capability to study Layout	Administrative/Technical Staff requirement
Technical Specifications for Layout	Operational Equipment dimensions
Simulation capability to study Process Flow	Process Flow Diagram for Production Operations

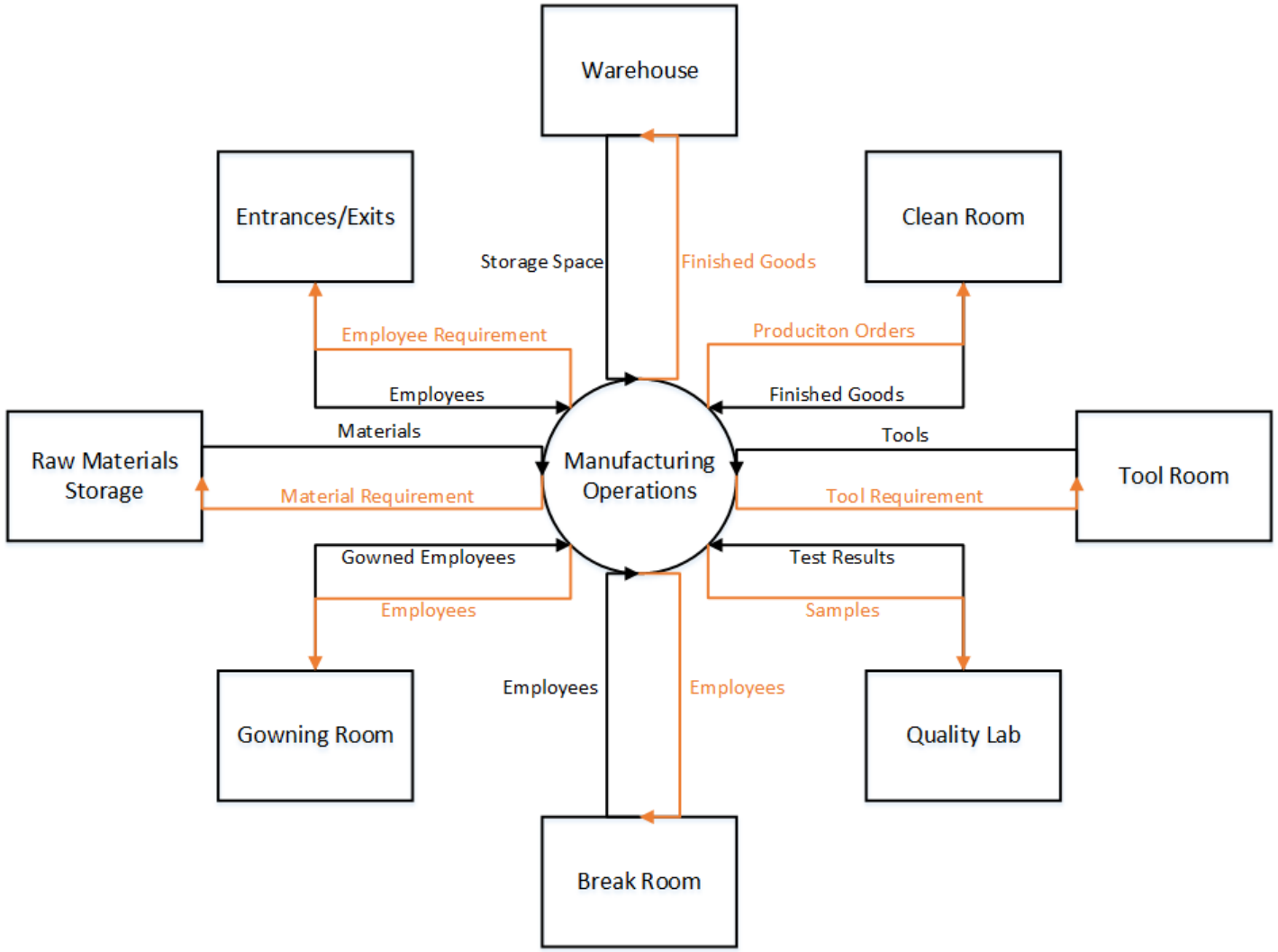
OPERATIONAL CONCEPT

How the Layout will function:
Layout accommodates all departments required for Production Operations.
Layout designed for safe evacuation in case of emergencies.
Layout includes all required power sources.
Bridge Crane suitable to interchange equipment.
Entry and Exit locations follows Process Flow.
Layout flexible and versatile to change Production Operations per demand.
Layout suitable for efficient production.

GROUND RULES

Ground Rule	Source
• Dock doors should be spread out throughout the clean room for machine flow.	Technimark Sponsor
• Two 10 Ton cranes have been budgeted for project and must be positioned for maximum coverage.	Technimark Sponsor
• Design must account for flow of production.	Technimark Sponsor
• Three scale stations must be placed in optimal locations.	Technimark Sponsor

CONTEXT DIAGRAM



SYSTEM REQUIREMENTS

- The Layout shall maintain to 28,800sqft.
- The Layout shall include: a Clean Room, Tool Room, Quality Lab, Break Room, Gowning Room, Raw Material Storage, Entrances/Exits, and Warehouse.
- The Layout shall interconnect all Production Operation Departments.
- The Layout shall have 12' aisles to transport material and equipment.
- The main aisles in the cleaning room shall line up to dock door openings.

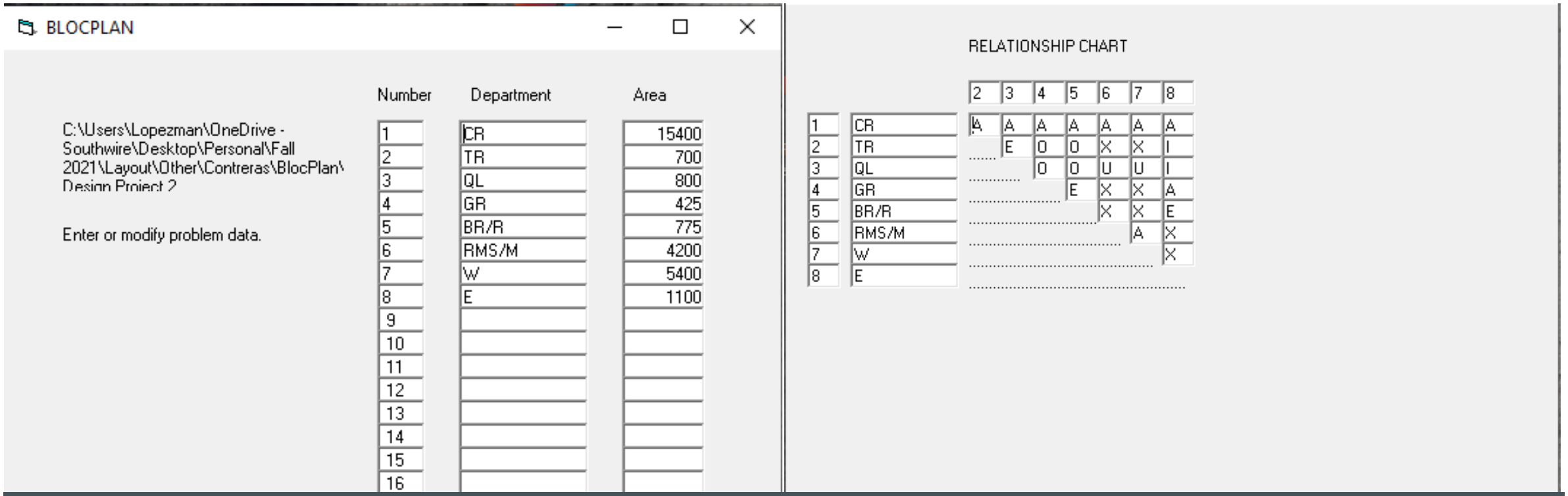
BLOCPLAN

- Generates initial layout and makes enhancements on those layouts
- Follows both construction and improvement method
- Uses a relationship chart and/or a from-to chart as input data for the flow

The automatic search algorithm generates an initial layout randomly using the random layout algorithm and then uses improvement algorithm to develop a better layout.

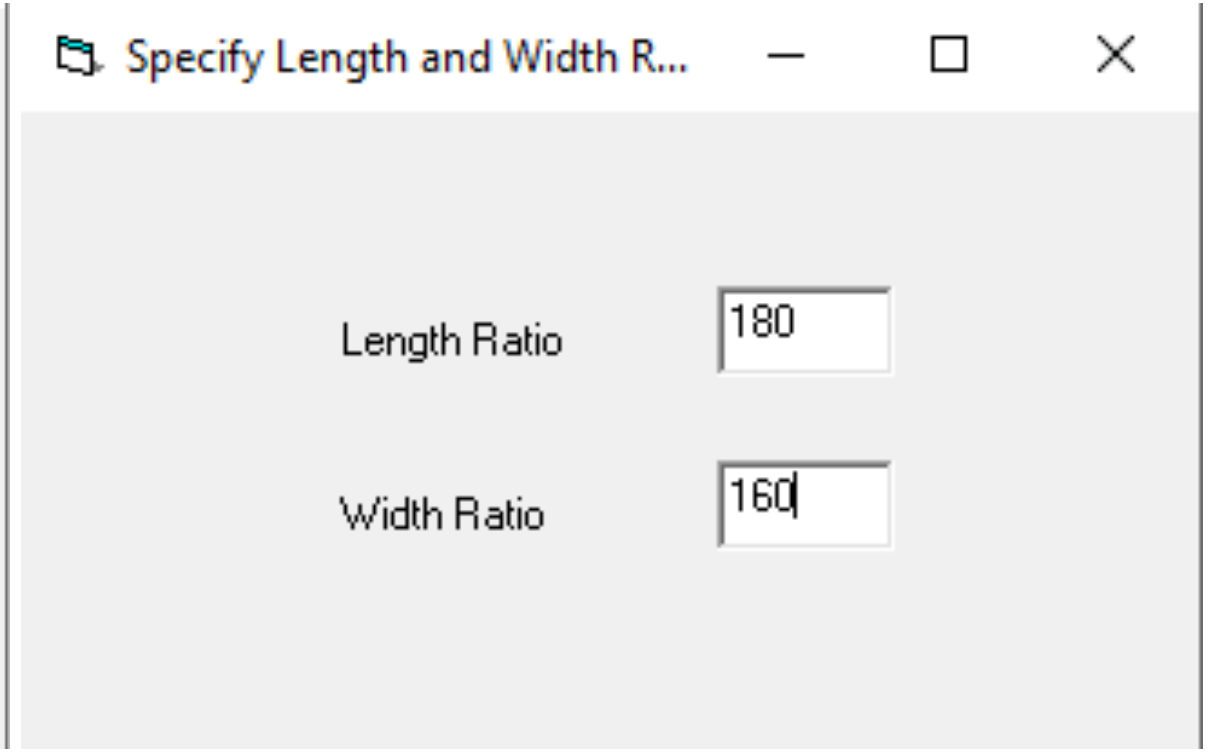
DEPARTMENT DIMENSIONS

Department	Area
Clean Room	15,400
Tool Room	700
Quality Lab	800
Gowning Room	425
Break Room/Restrooms	775
Raw Material Storage/Mezzanine	4,200
Warehouse	5,400
Entrances/Exits	1,100
Total	28,800
Available	28,800



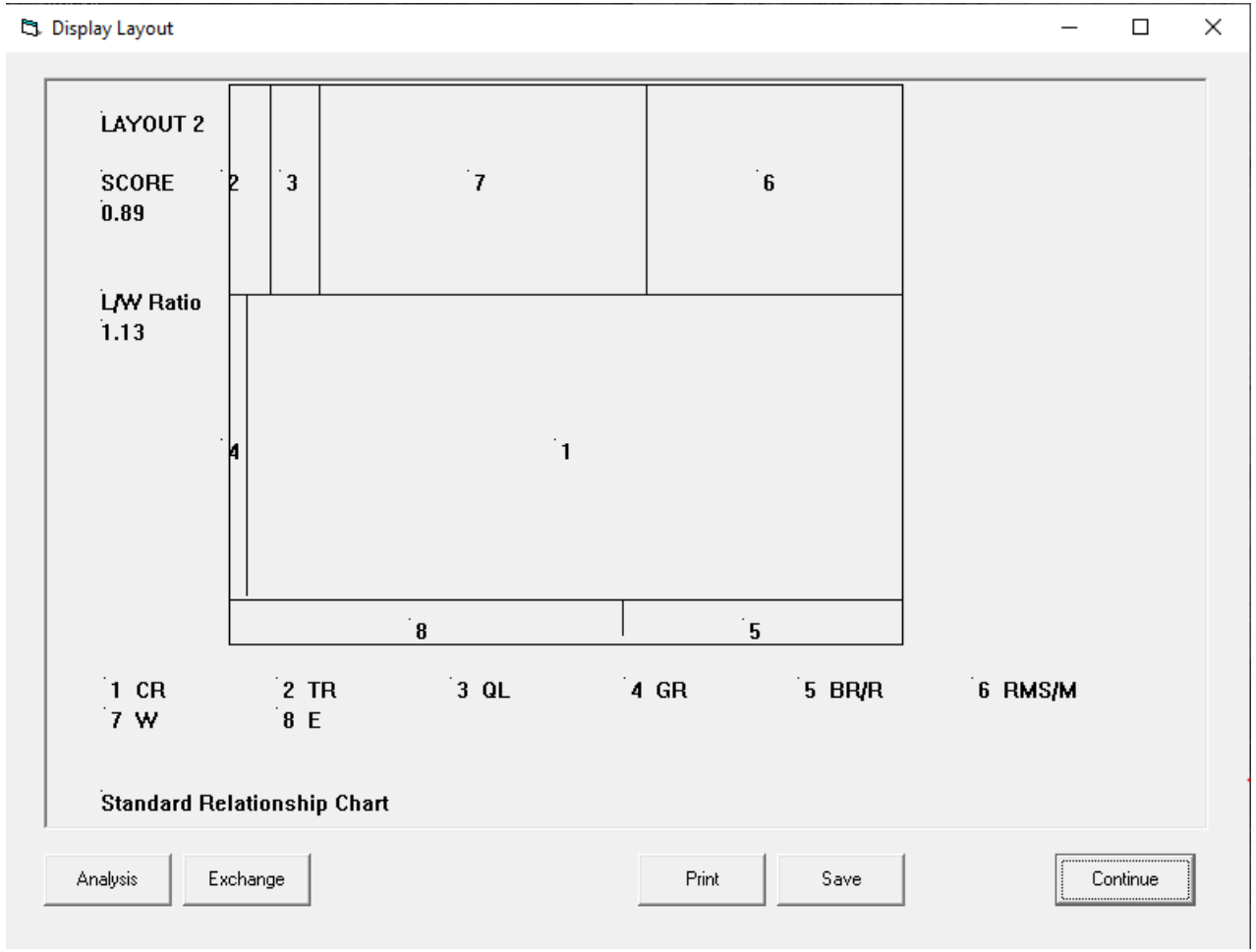
BLOCPLAN SET-UP

Number	Department	Score
1	CR	70
2	TR	-1
3	QL	19
4	GR	7
5	BR/R	2
6	RMS/M	-20
7	W	-20
8	E	9



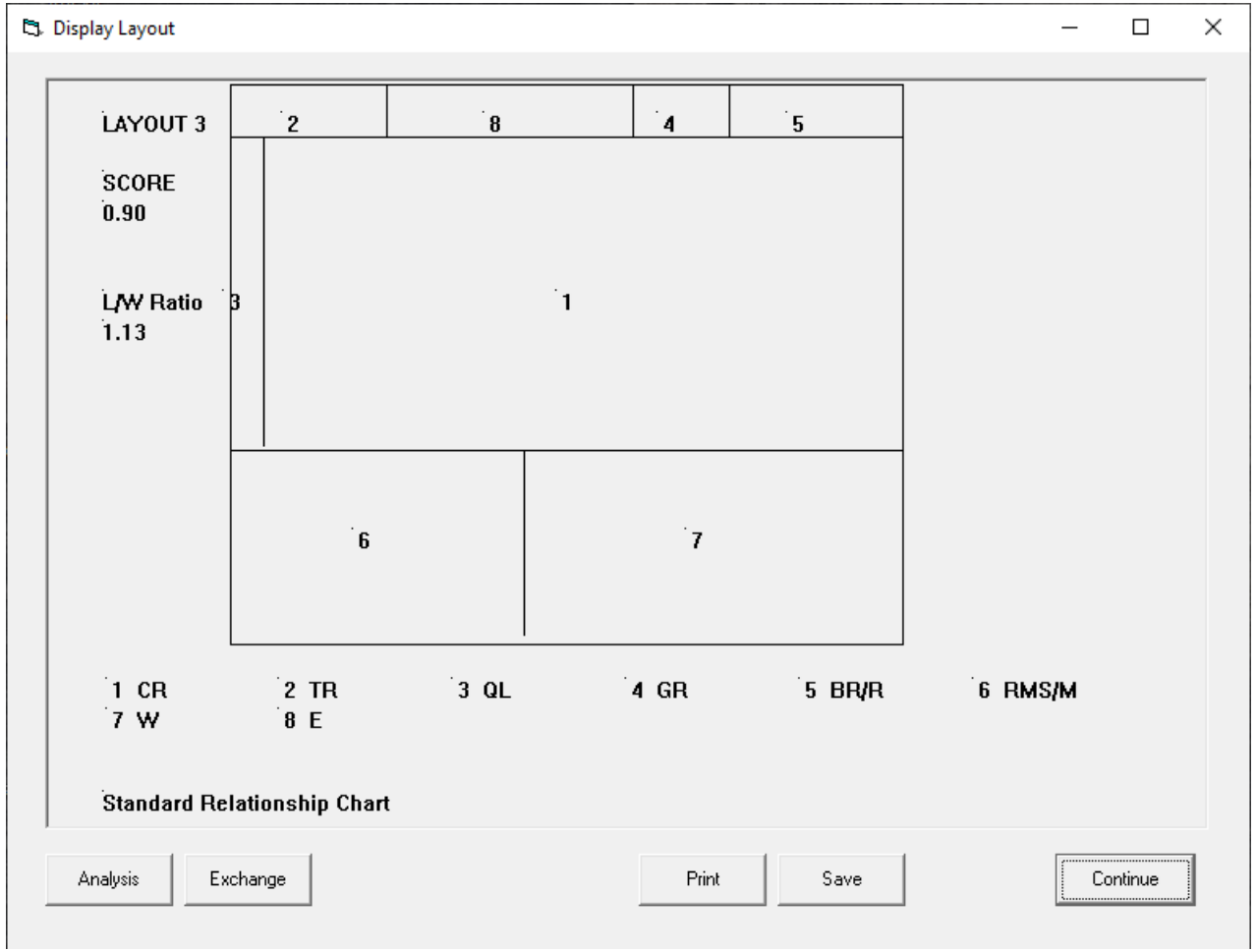
BLOCPLAN SET-UP CONT.

BLOCLAN RESULT (LAYOUT 2)



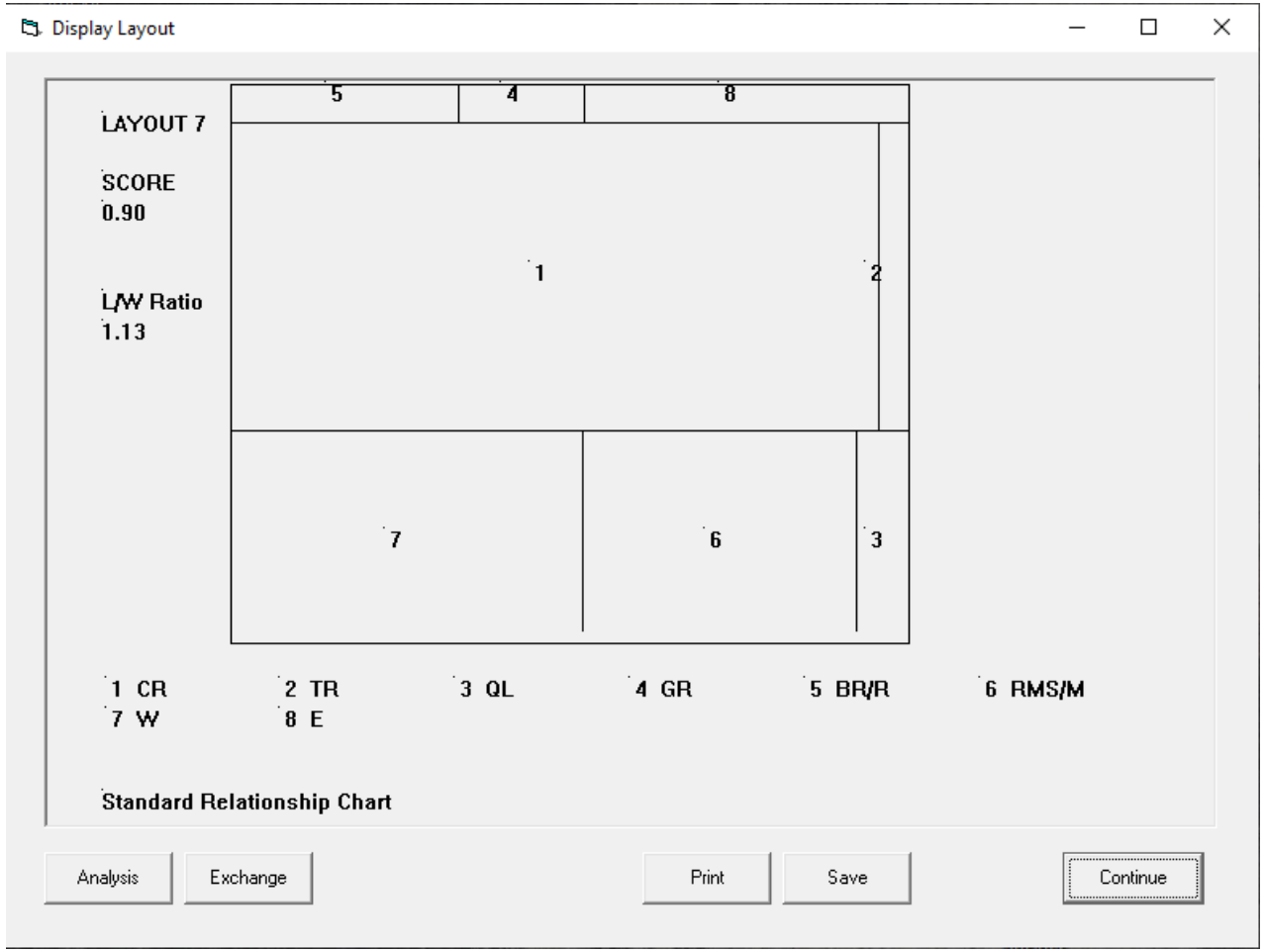
Department	Description
1	Clean Room
2	Tool Room
3	Quality Lab
4	Gowning Room
5	Break Room/Restrooms
6	Raw Material Storage/Mezzanine
7	Warehouse
8	Entrances/Exits

BLOCLAN RESULT (LAYOUT 3)



Department	Description
1	Clean Room
2	Tool Room
3	Quality Lab
4	Gowning Room
5	Break Room/Restrooms
6	Raw Material Storage/Mezzanine
7	Warehouse
8	Entrances/Exits

BLOCLAN RESULT (LAYOUT 7)

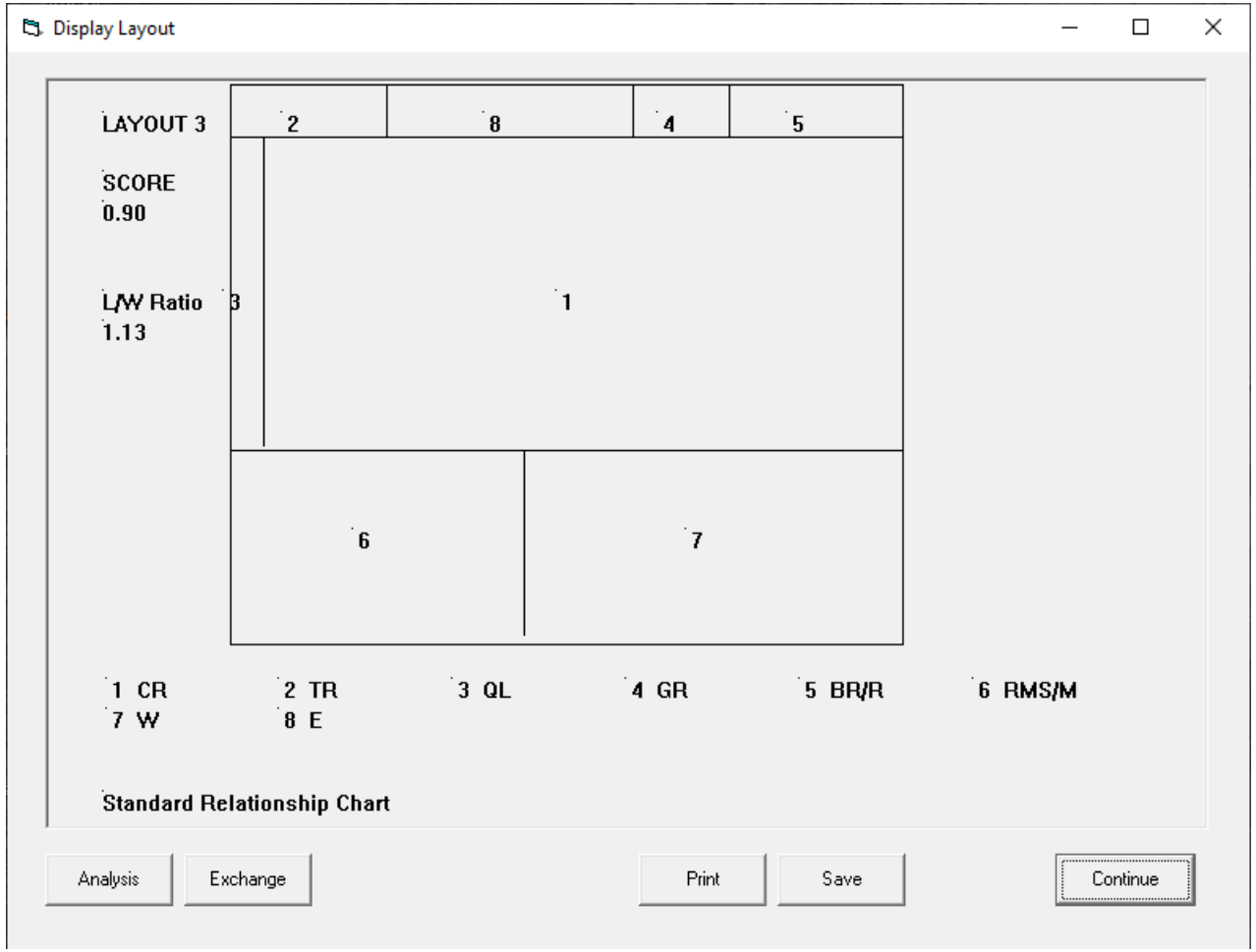


Department	Description
1	Clean Room
2	Tool Room
3	Quality Lab
4	Gowning Room
5	Break Room/Restrooms
6	Raw Material Storage/Mezzanine
7	Warehouse
8	Entrances/Exits

TECHNIMARK'S SUGGESTED LAYOUT

Recommendations

- Modify Layout 3
- Place Dept. 3 next to Dept. 2
- Place Dept. 7 to former Dept. 3 location
- Place Dept. 6 to former Dept. 7 location



AUTOCAD RENDERING

AUTOCAD RENDERING CONT.

DEPARTMENT	LENGTH	WIDTH	AREA
Clean Room	141	-	15,365
Tool Room	35	20	700
Quality Lab	40	20	800
Gowning Room	25	17	425
Break Room/Restrooms	25	31	775
Raw Material Storage/Mezzanine	141.5	30	4,245
Warehouse	38.5	140	5,390
Entrances/Exits	55	20	1,100

LAYOUT PROPOSALS

Consider the following

Process Flow for Production

- Optimize Machine locations

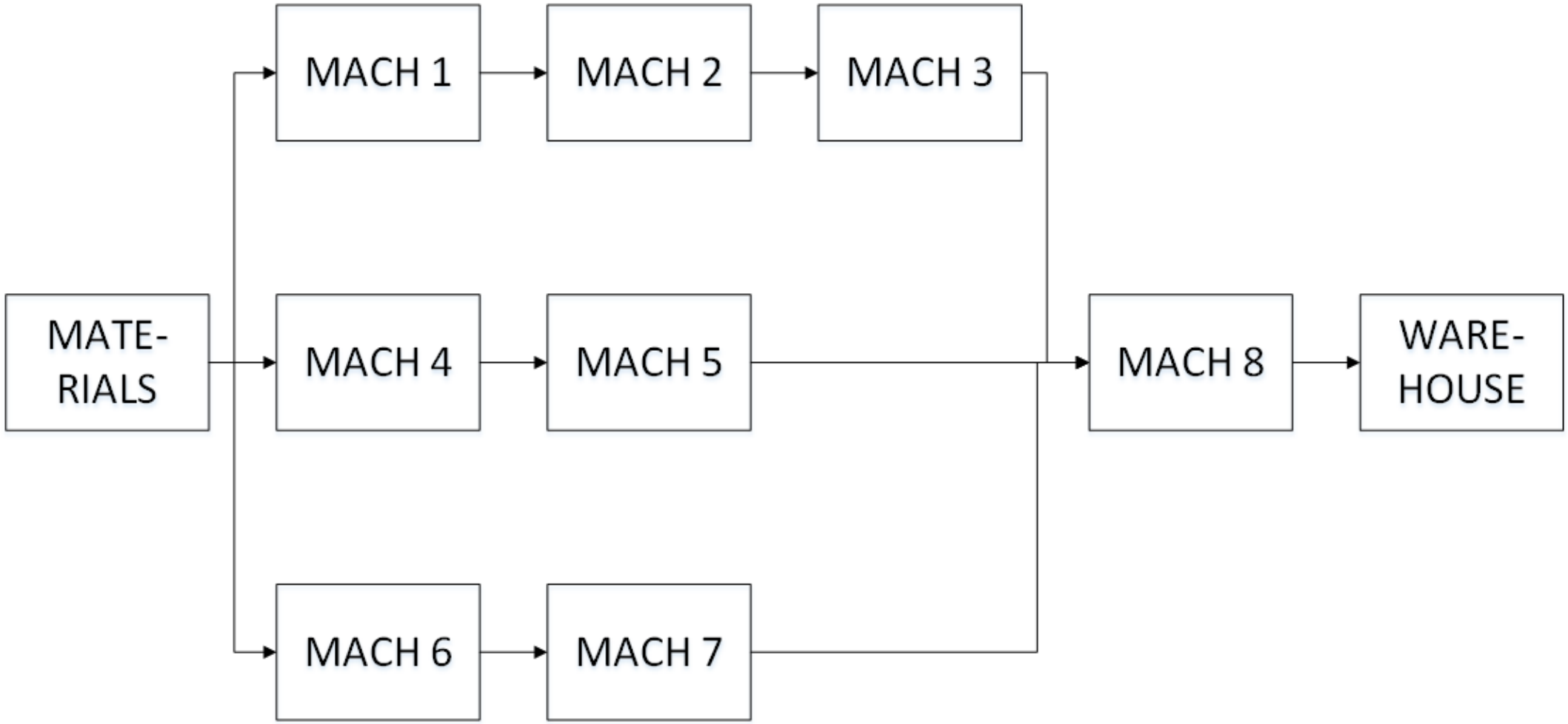
Bridge Crane Locations

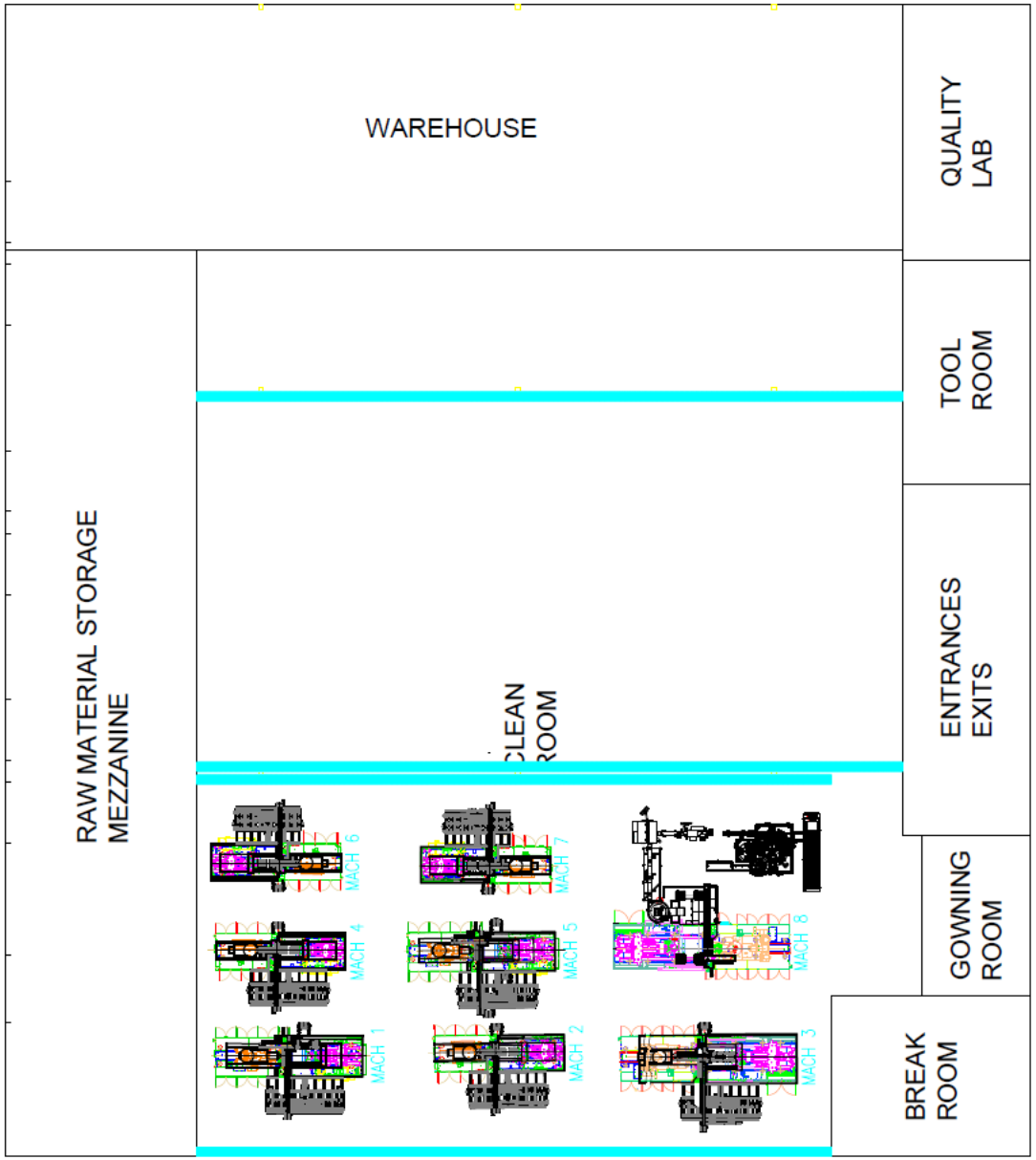
- Ensure Bridge Cranes over Machines

Safe aisles for Forklift and Pedestrians

- 12' for Forklifts
- 3' for Pedestrians

CLEAN ROOM PROCESS FLOW





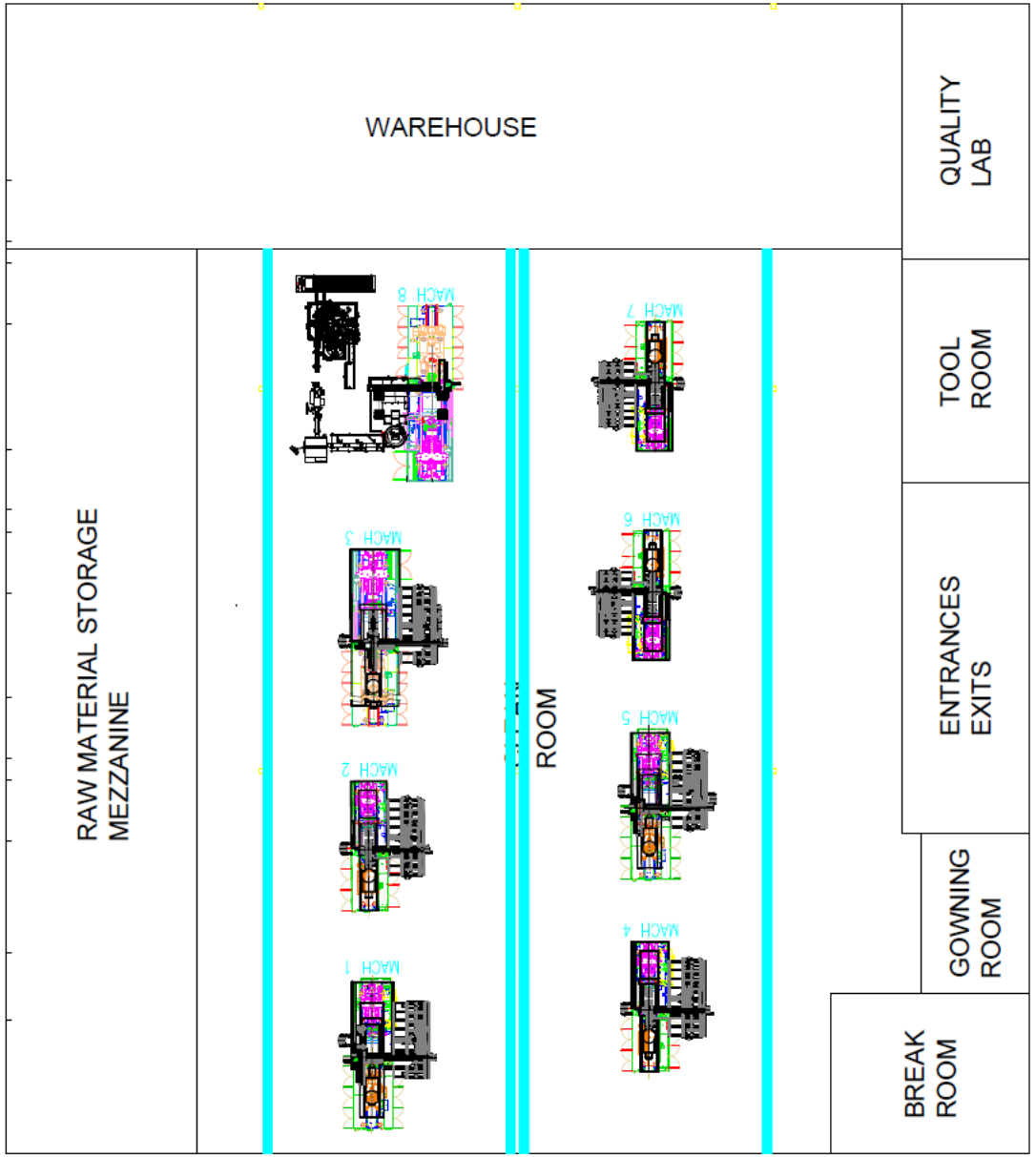
PROPOSAL 1-LAYOUT

Horizontal Bridge Crane

- Parallel Sets: 2
- Total Footage: 418 ft

Process Flow

- Left to Right



PROPOSAL 2

Vertical Bridge Cranes

- Parallel Sets: 2
- Total Footage: 566 ft

Process Flow

- Bottom to Top

SIMIO

- Uses 3D object-based modeling
- Allows for multiple modeling potential
- All in one, complete model
- Totally accurate portrayal

Cost Savings and/or Cost Avoidance in a typical SIMIO project are typically 10 to 20 times the initial investment over a time period of within four to six months of implementation.

PROCESSING TIMES

Processing Time for each Machine is Seconds per Finished Good Unit

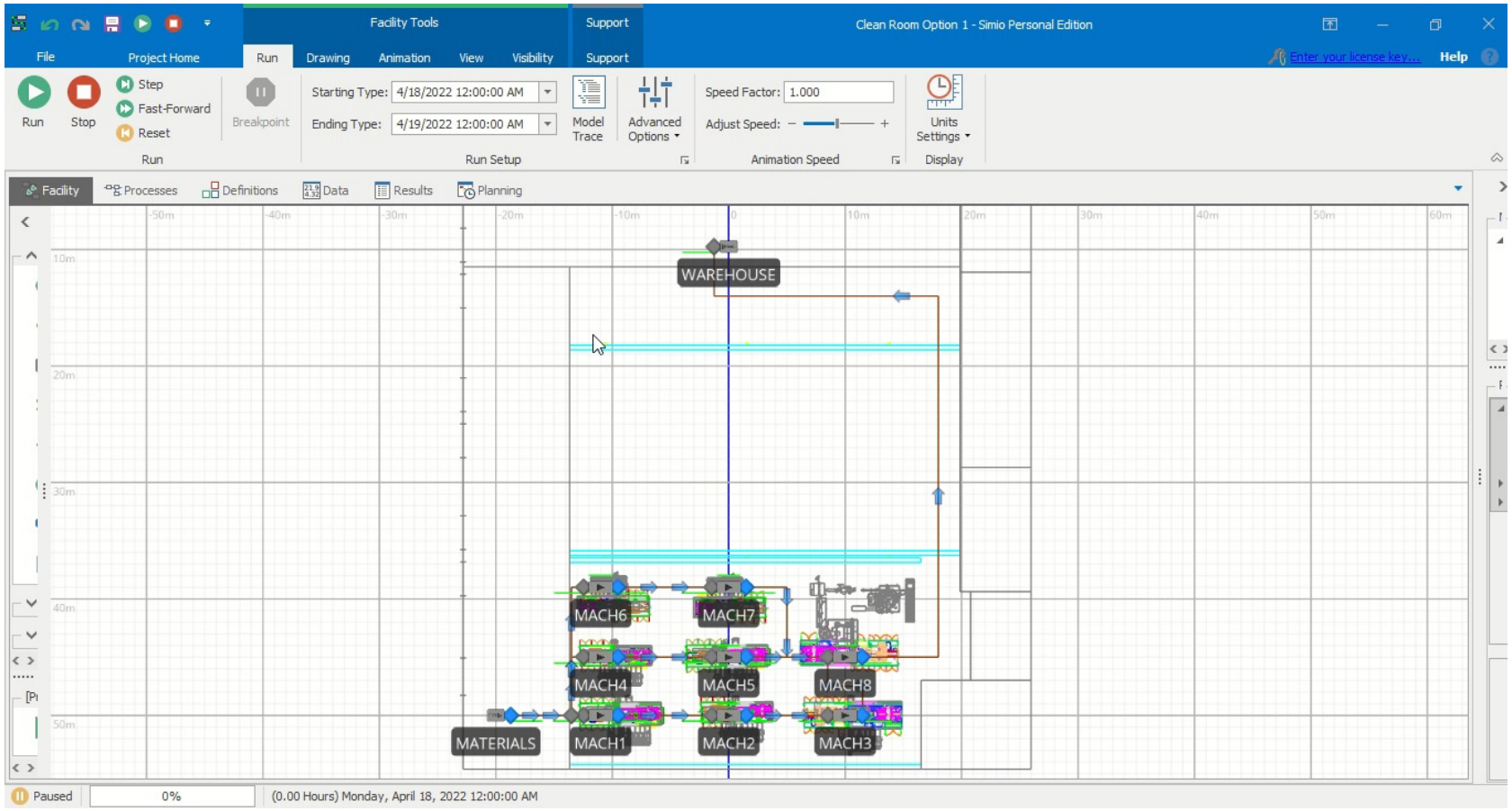
Pallet Jack Speed: 3.5 MPH

Walking Speed: 3 MPH

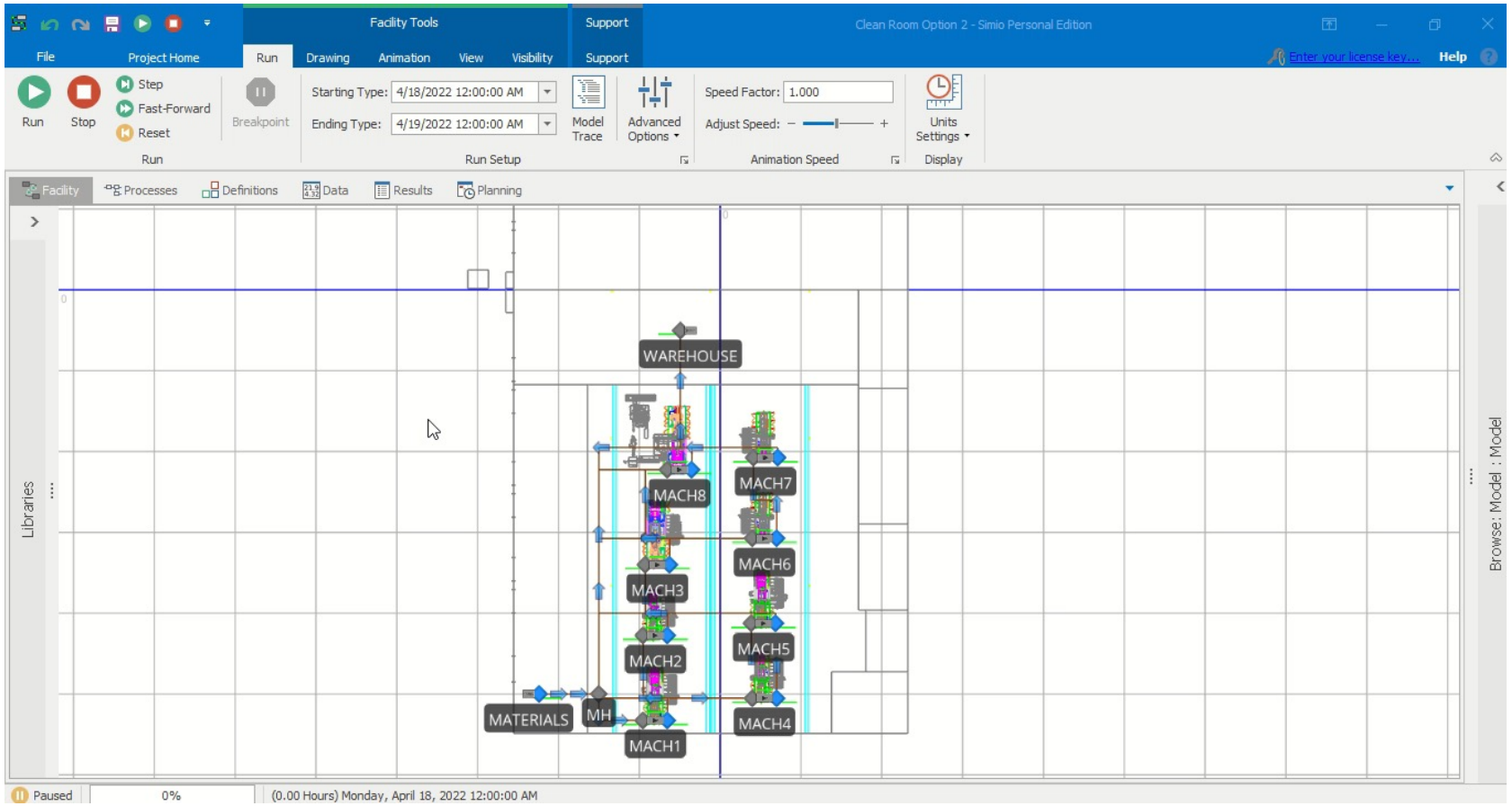
Forklift Speed: 6 MPH

Description	Min	Nom	Max
MACH1	14.7	15.2	15.7
MACH2	15.9	16.9	17.9
MACH3	27.8	28.3	28.8
MACH4	29.1	30.1	31.1
MACH5	28.2	29.2	30.2
MACH6	38.8	39.3	39.8
MACH7	30.7	31.7	32.7
MACH8	-	28.5	-

PROPOSAL 1- SIMULATION



PROPOSAL 2- SIMULATION



AFFORDABILITY ANALYSIS

Solution	Safety	Flow	Functionality	Versatility	Throughput	Total Performance	Total Cost
Proposal 1	0.50	0.50	0.75	1	.75	3.50	3
Proposal 2	1	1	1	0.50	1	4.50	4

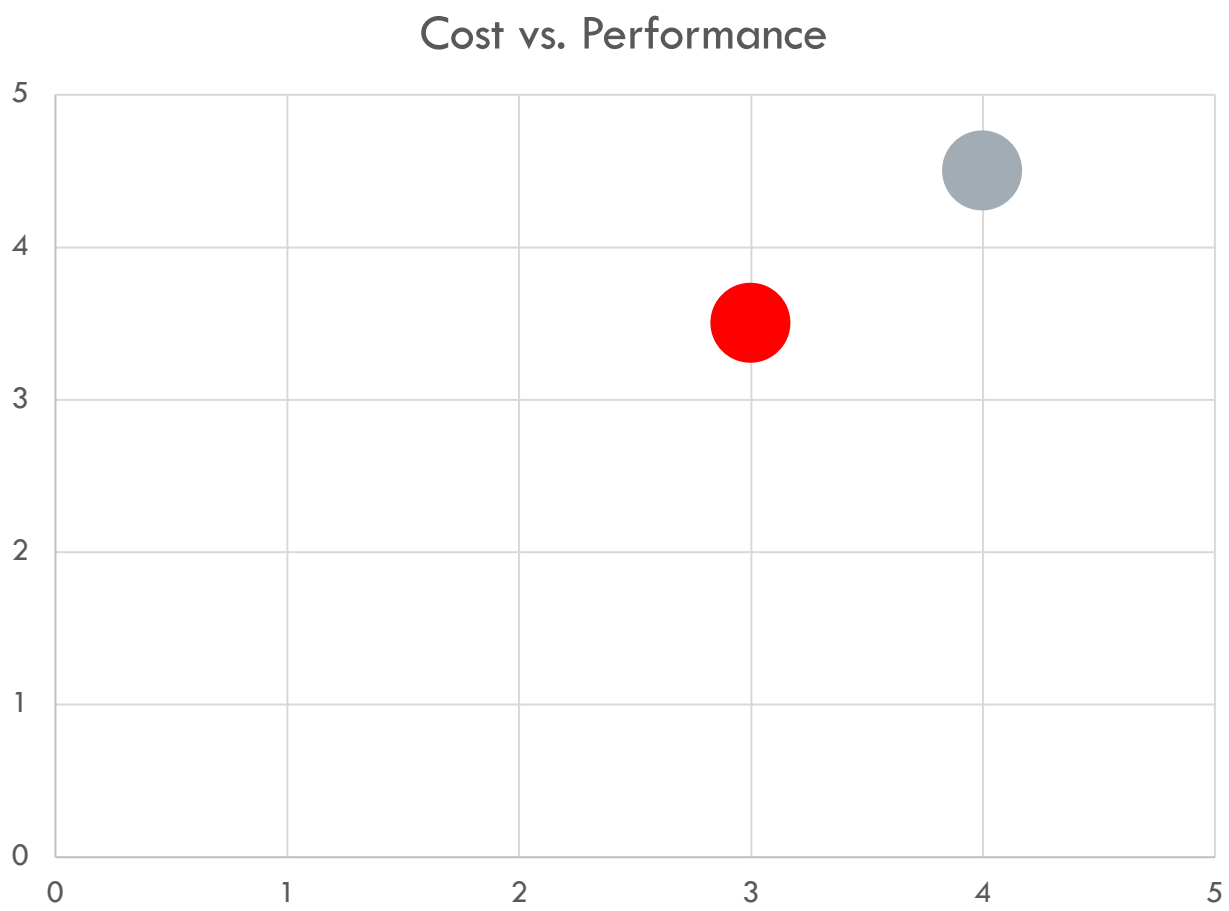
Proposal 1

- Pros
  - Space for Expansion
  - Bridge Crane Length: 418ft
- Cons
  - Final Assembly far from Warehouse
  - Compact Space for Equipment
  - Throughput 2,482 finished goods per 20hrs

Proposal 2

- Pros
  - Final Assembly close from Warehouse
  - Expanded Space for Equipment
  - Throughput 2,516 finished goods per 20hrs
- Cons
  - No Space for Expansion
  - Bridge Crane Length: 566ft

AFFORDABILITY ANALYSIS CONT.



Legend

Proposal 1

- Cost: 3
- Performance: 3.5

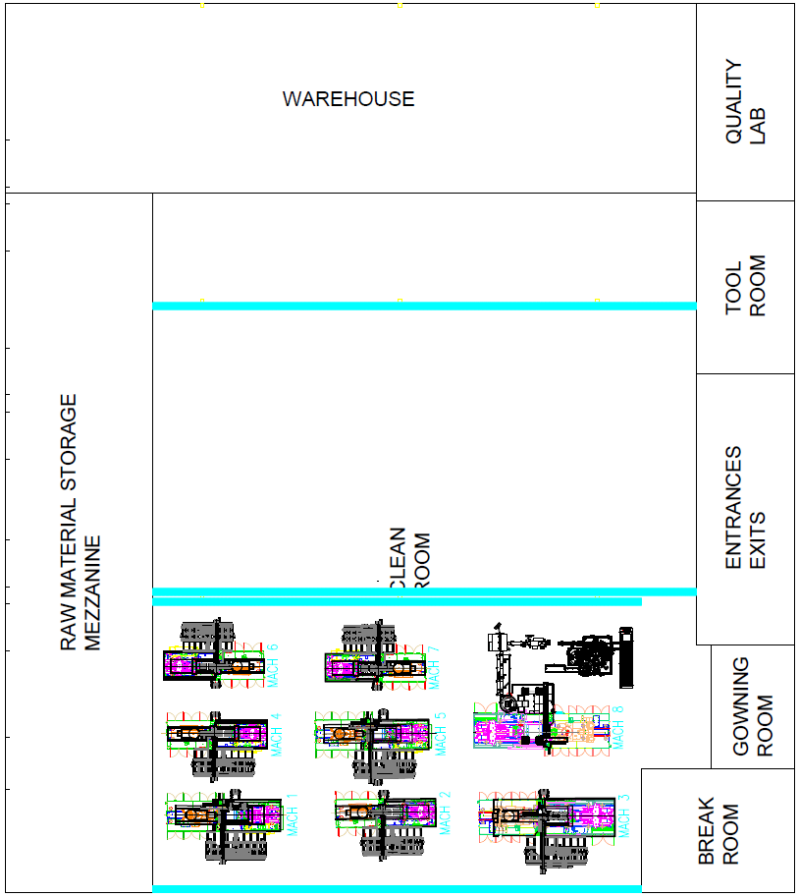
Proposal 2

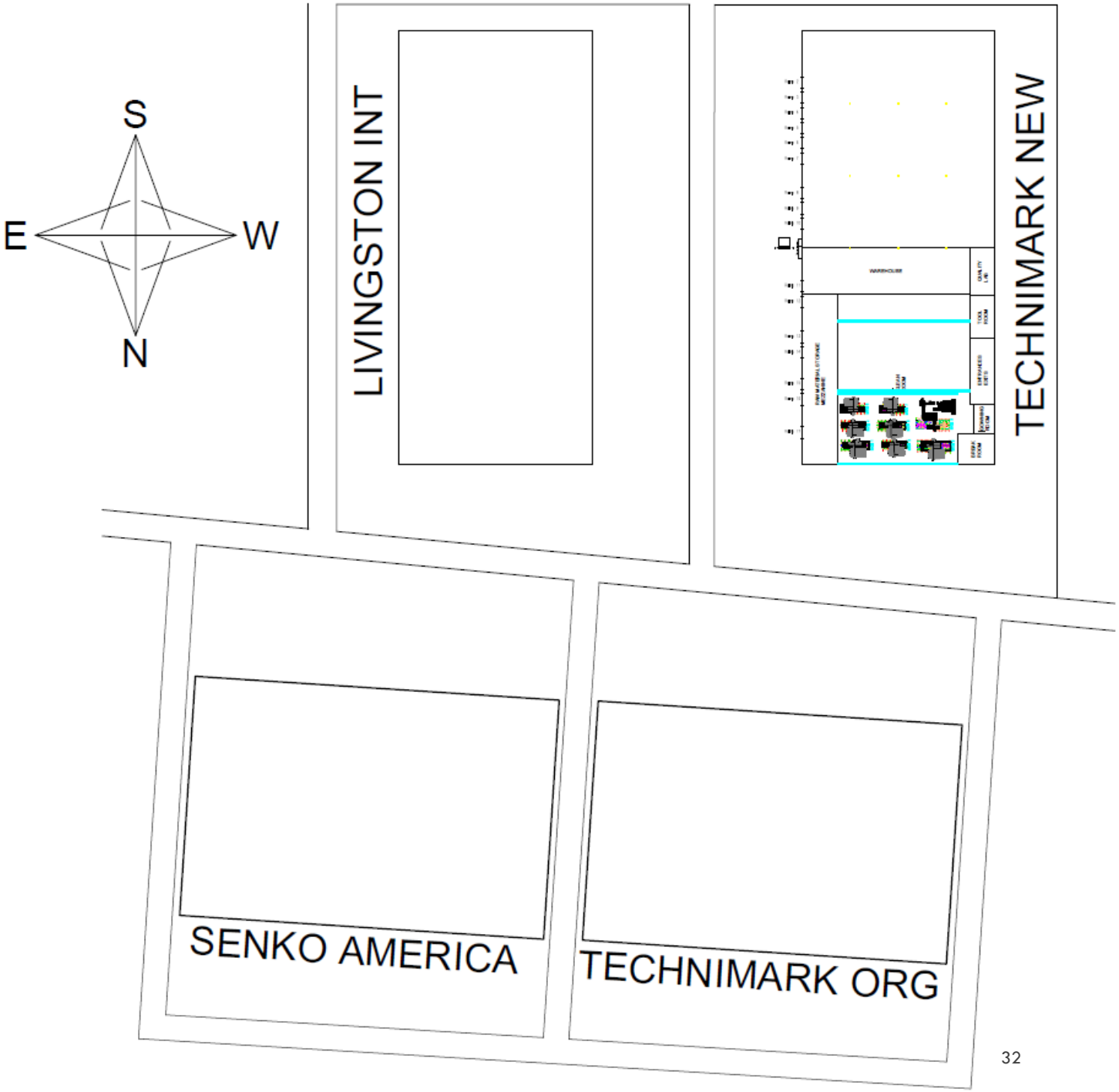
- Cost: 4
- Performance: 4.5

Recommended Solution

Proposal 1 is recommended as it aligns to the business plans of Technimark, future expansion. It maximizes space while being cost effective.

RECOMMENDED SOLUTION





THANK YOU