

Client Background

Preventative Maintenance

Clinical Engineering (CE) services medical devices to manufacturer standards.

Project Support

Clinical Engineering assists departments in purchasing new devices.

Emergency Servicing

Staff refer broken devices to Clinical Engineering for repair.

Problem Definition

CE has space utilization issues and will expand staffing by 50%. The use of a memory-based Inventory management system (IMS) is taking a significant portion of available space. Current IMS properties lack physical facility locations and cannot be integrated with the ERP software DirectLine to track inventory.

Objectives



Recommend layouts to accommodate staff expansion and optimize operational space and storage



Recommend an IMS with defined locations linked to DirectLine



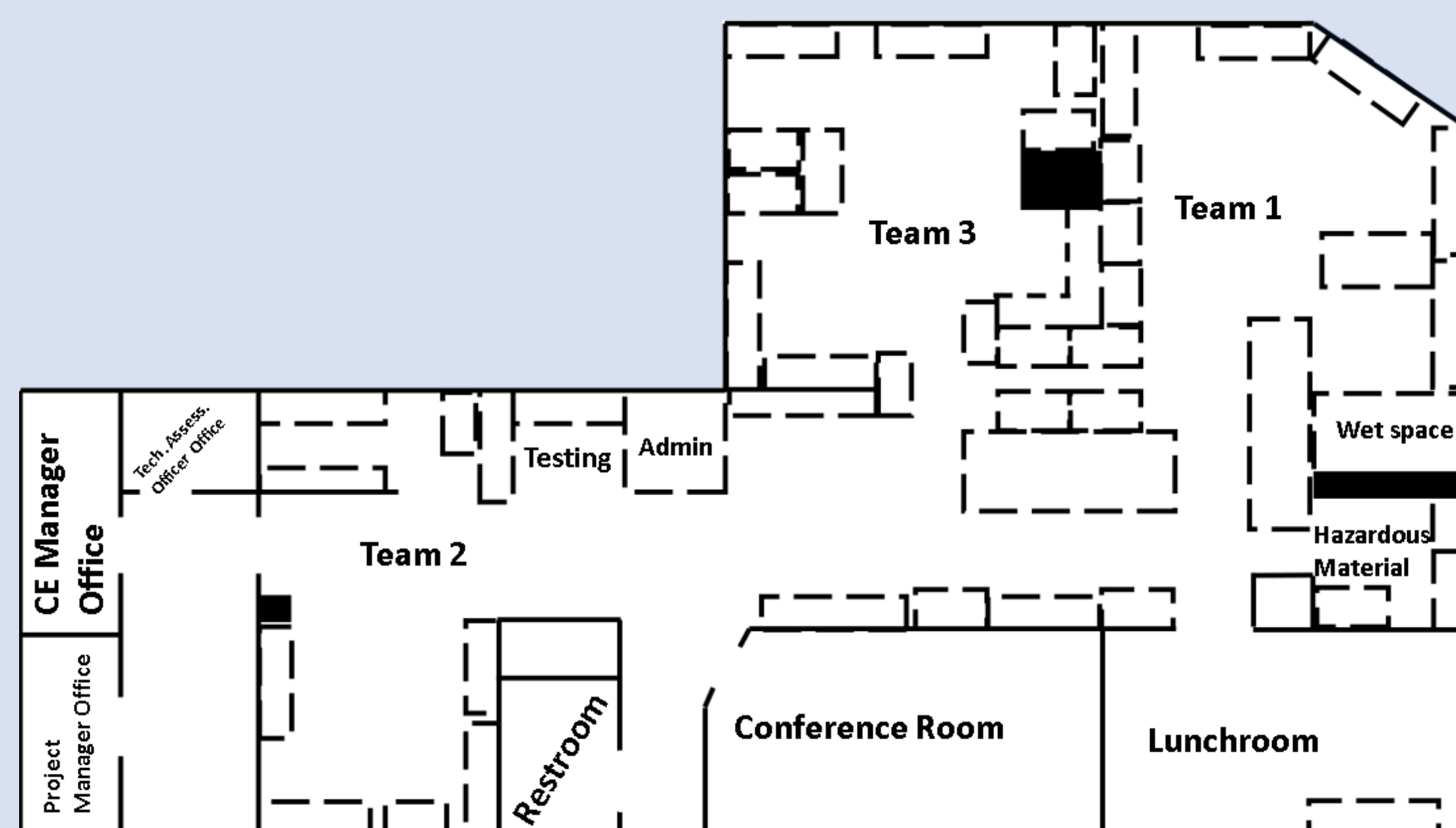
Create 5S supporting documentation and implement prototypes



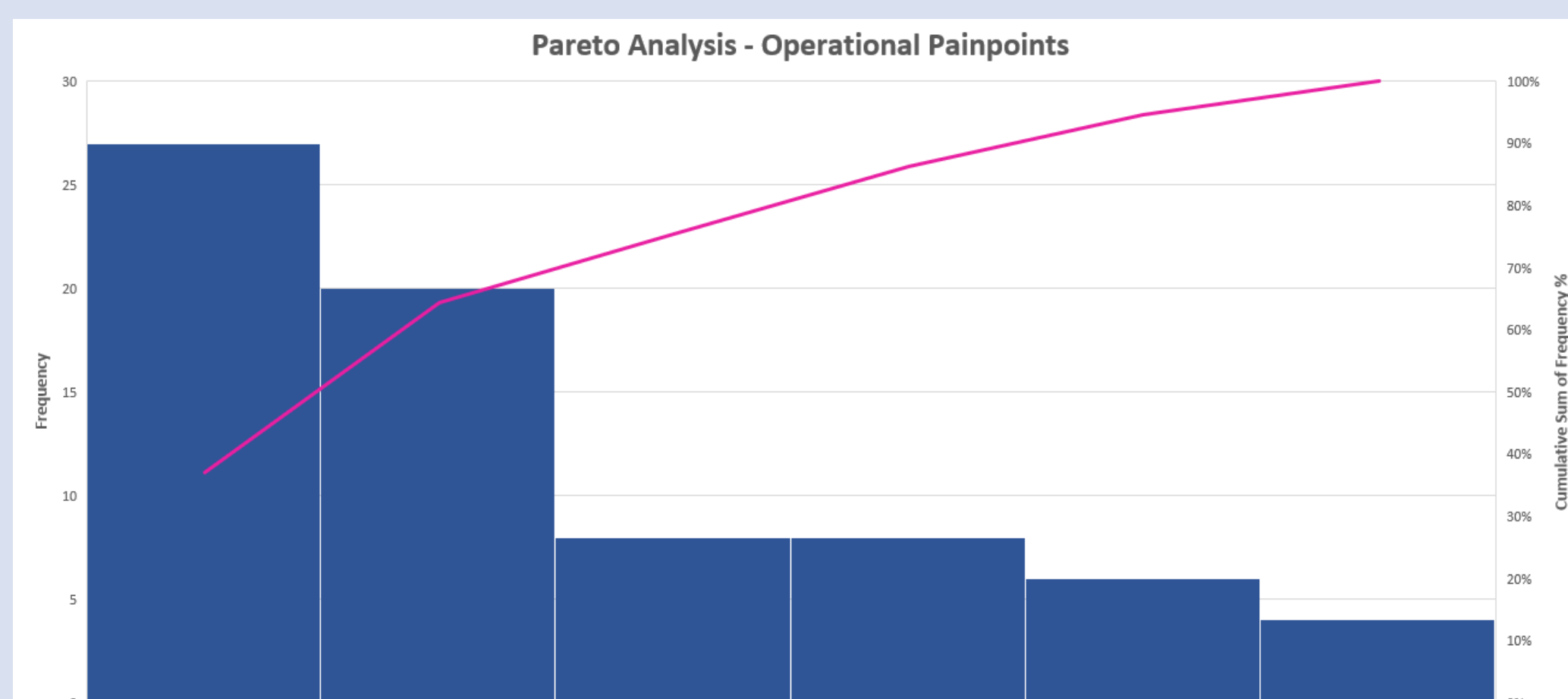
Implement new processes and provide recommendations for future work

Preliminary Analysis

Current State Layout



Risk and Root Cause Analysis



Category	Frequency
Physical Inventory	27
Digital Inventory	20
Procurement	8
Device Collection	8
Other	6
Workload Management	4

Solutions

Layout Optimization

Inputs	
Number of Departments	9
Partial Adjacency	1
Layout Score	82

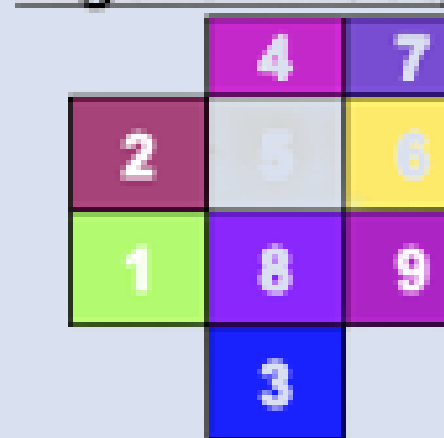
REL	Weight
A	16
E	8
I	4
O	2
U	1
X	-16

$$Z = \sum_{i=1}^m \sum_{j=1}^m f_{ij} x_{ij}$$

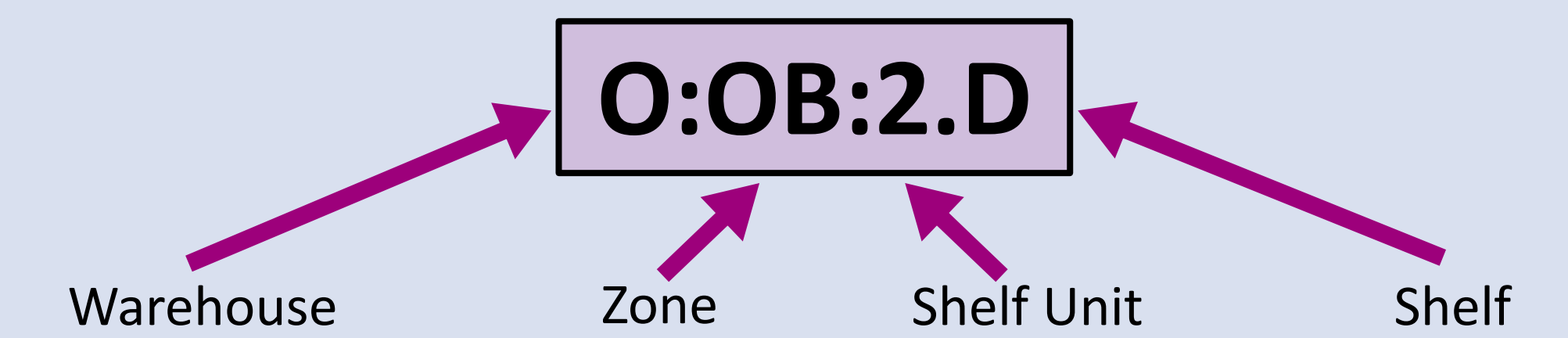
Relation Chart

	1	2	3	4	5	6	7	8	9	TCR	Order
1	0	I	O	O	O	O	I	I	O	22	7
2	I	0	U	I	I	X	O	U	O	34	5
3	O	U	0	O	O	X	U	I	O	30	9
4	O	I	O	0	I	O	I	I	O	24	6
5	O	I	O	I	0	A	I	I	O	38	2
6	O	X	X	O	A	0	O	U	O	57	1
7	I	O	U	I	I	O	0	X	O	35	4
8	I	U	I	I	I	U	X	0	O	36	3
9	O	O	O	O	O	O	O	O	0	16	8

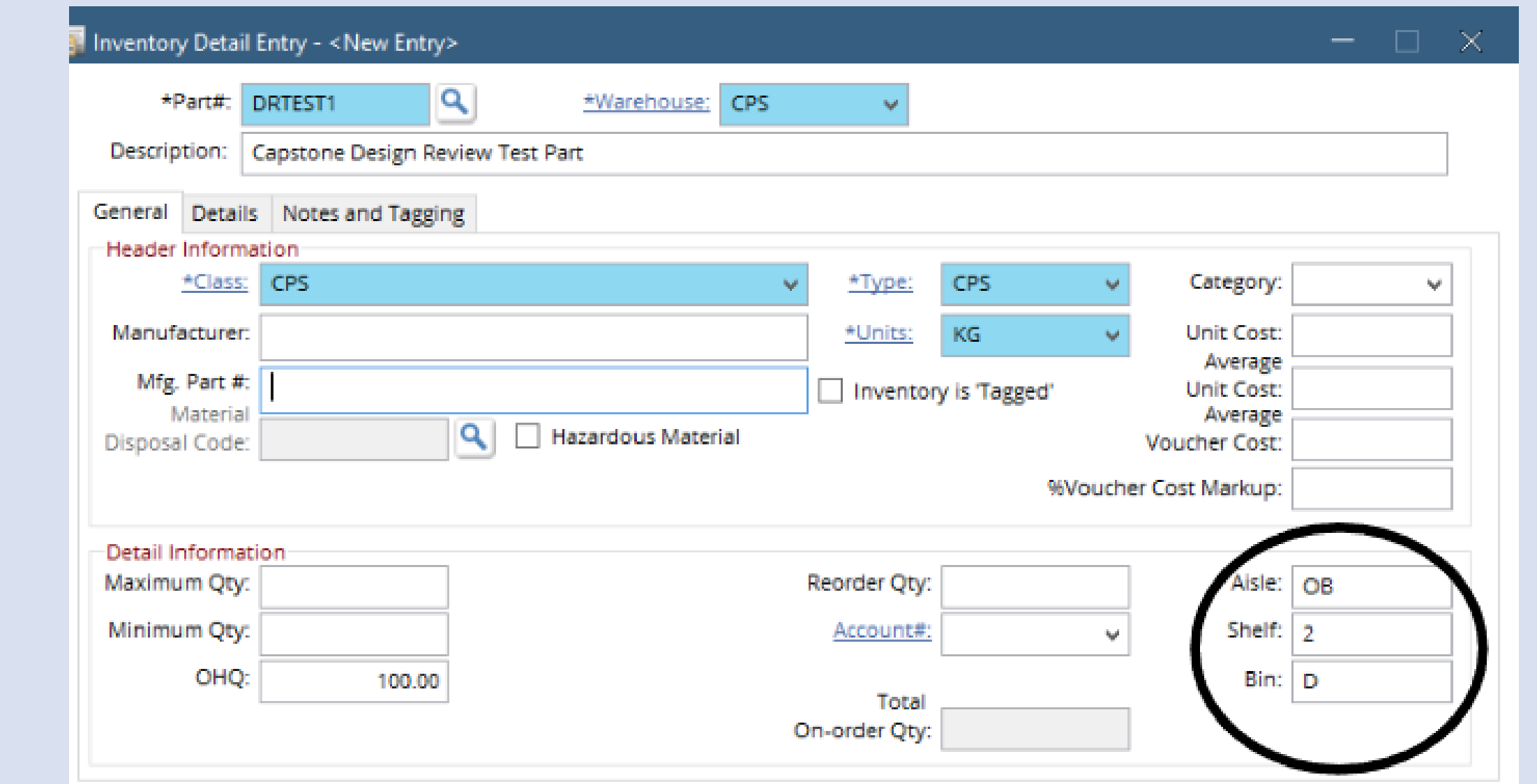
Algorithm Output



IMS Location System

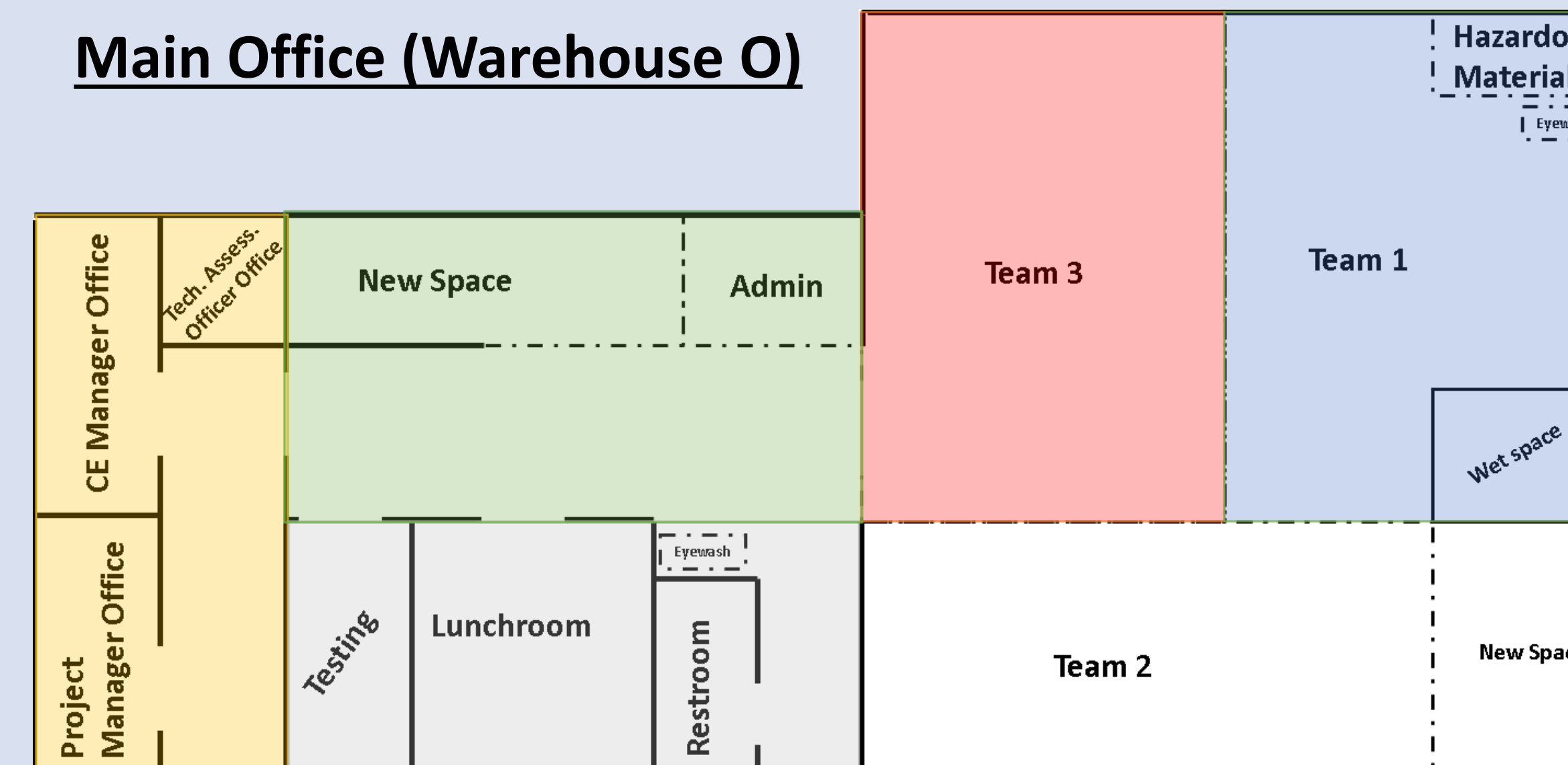


ERP Software



Layouts and Zoning System

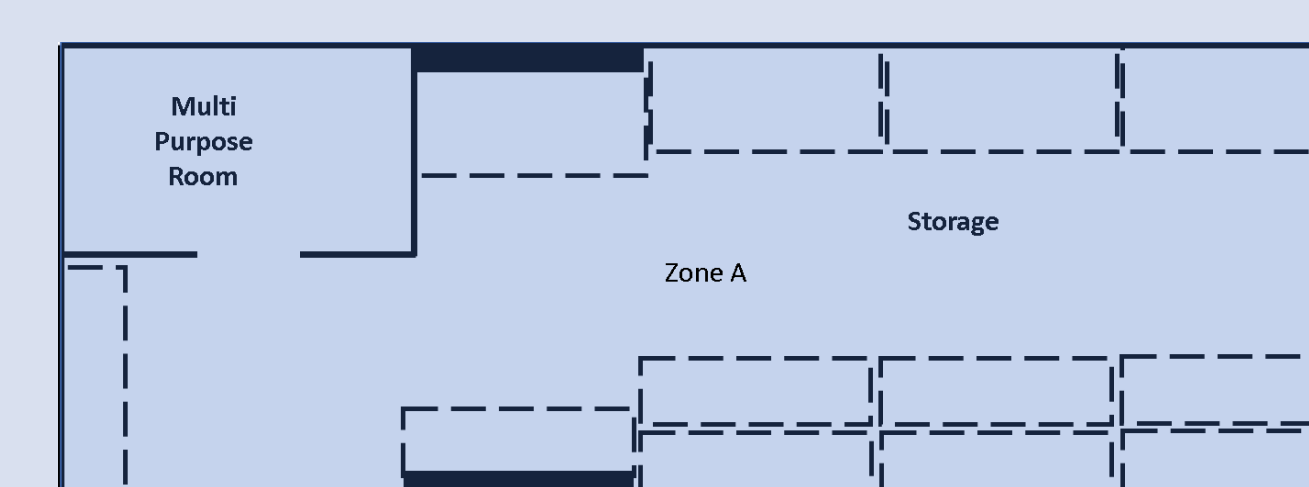
Main Office (Warehouse O)



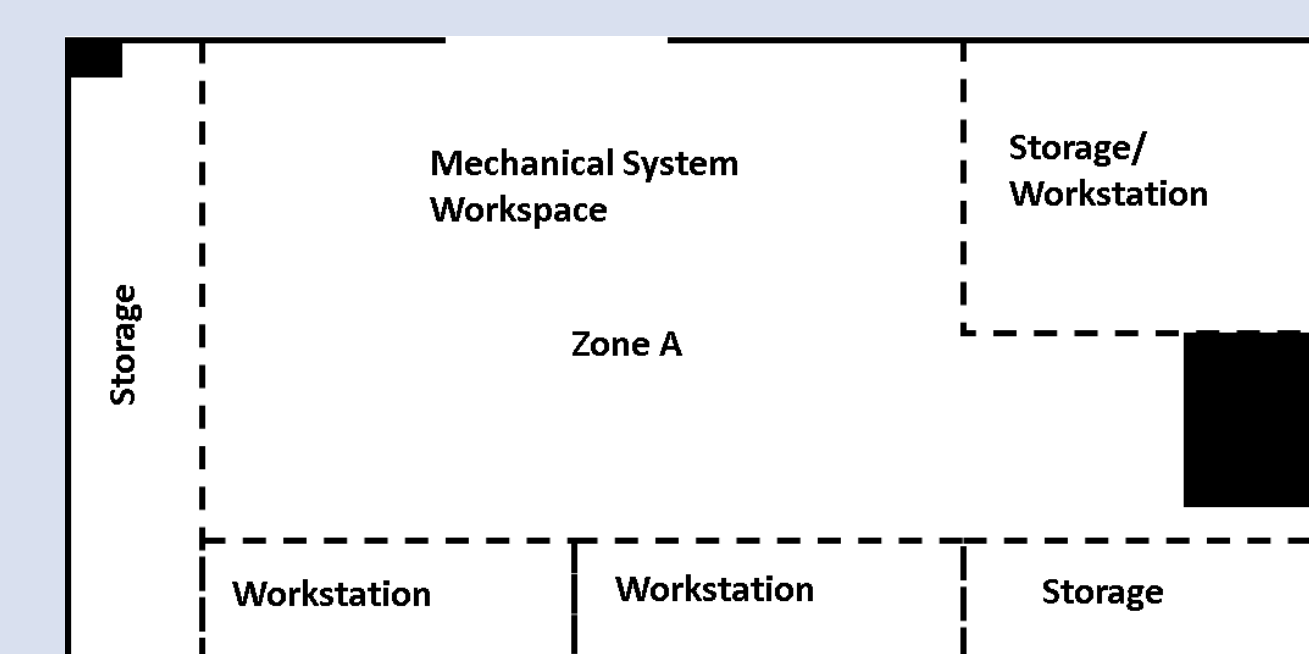
Warehouse Zones



Basement Storage (Warehouse S)

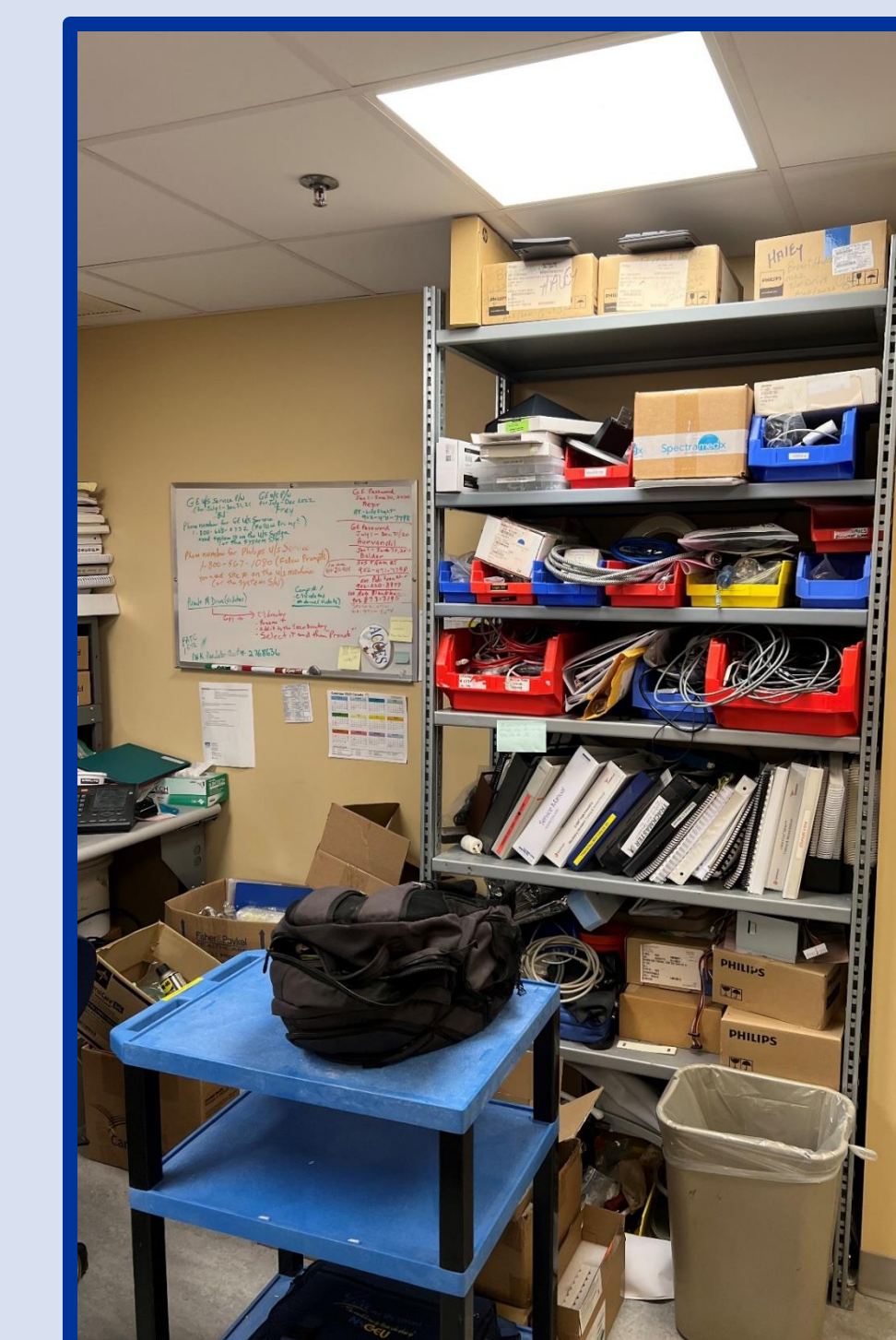


Mech. Room (Warehouse M)

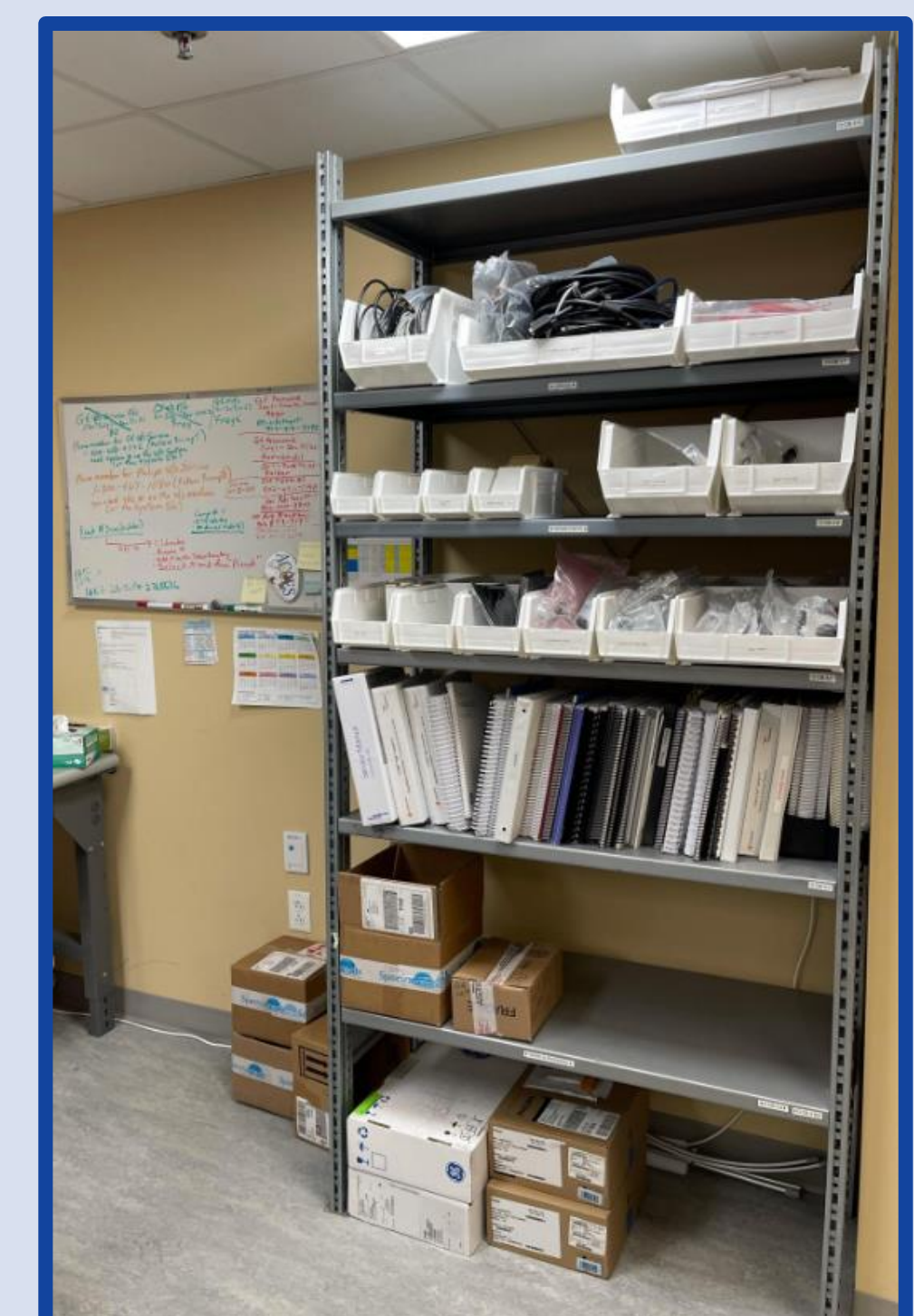


5S

Before



After



5S System

- Policy, Resources, Maintenance Documents, Education

Results and Recommendations

Quantitative Metrics

	Time	Cost	Space	Flow
5S	-	-	43%	-
IMS	87%	-	-	-
Layout	-	28%	10%	49%

Qualitative Metrics

Improved	Reduced	Created
Staff Acceptance	Operational Footprint	Lunchroom Access
Visual Management	Drop-Off Interruptions	Trackable Inventory
Staff Collaboration	Testing Distractions	Part Locations