

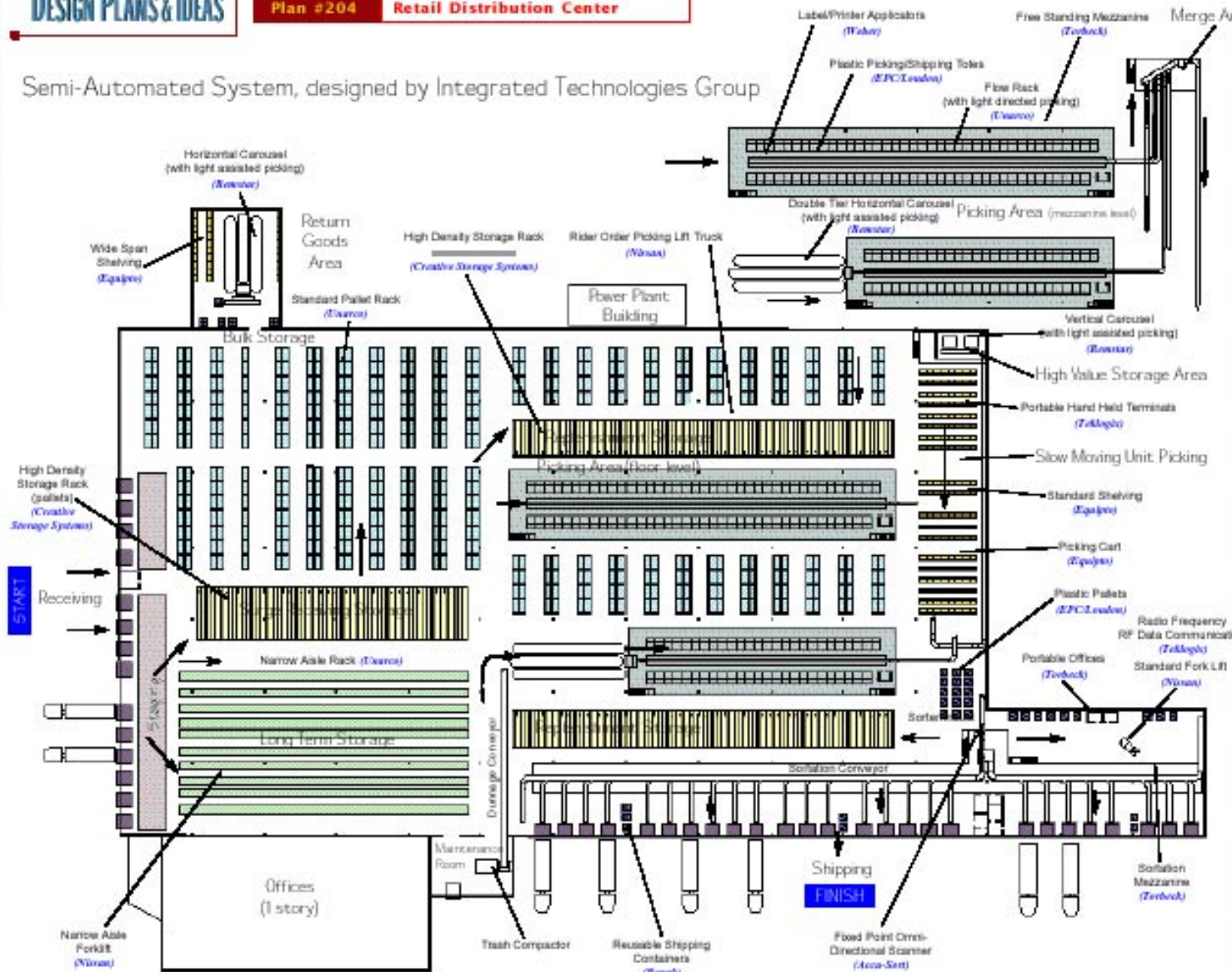
# Retail Chain Distribution

- E.g., Wal-Mart, K-Mart, etc.
- all products except clothes and tobacco
- batteries, CDs, brooms, screws, TP, cosmetics, etc.
- retail stores place order with DC each day
- pick in waves, zones, and sort to store
- WMS to control system
- everything is bar-coded and RF technology used

# Retail Distribution Center

- **Semi-automated facility**
- 40 acre complex
- Facility:
  - 148,000 sq. ft. (~100 yds by 100 yds)
  - Max # of SKUs 24,000
  - Max Tput 98,600 units picked/shift

Semi-Automated System, designed by Integrated Technologies Group



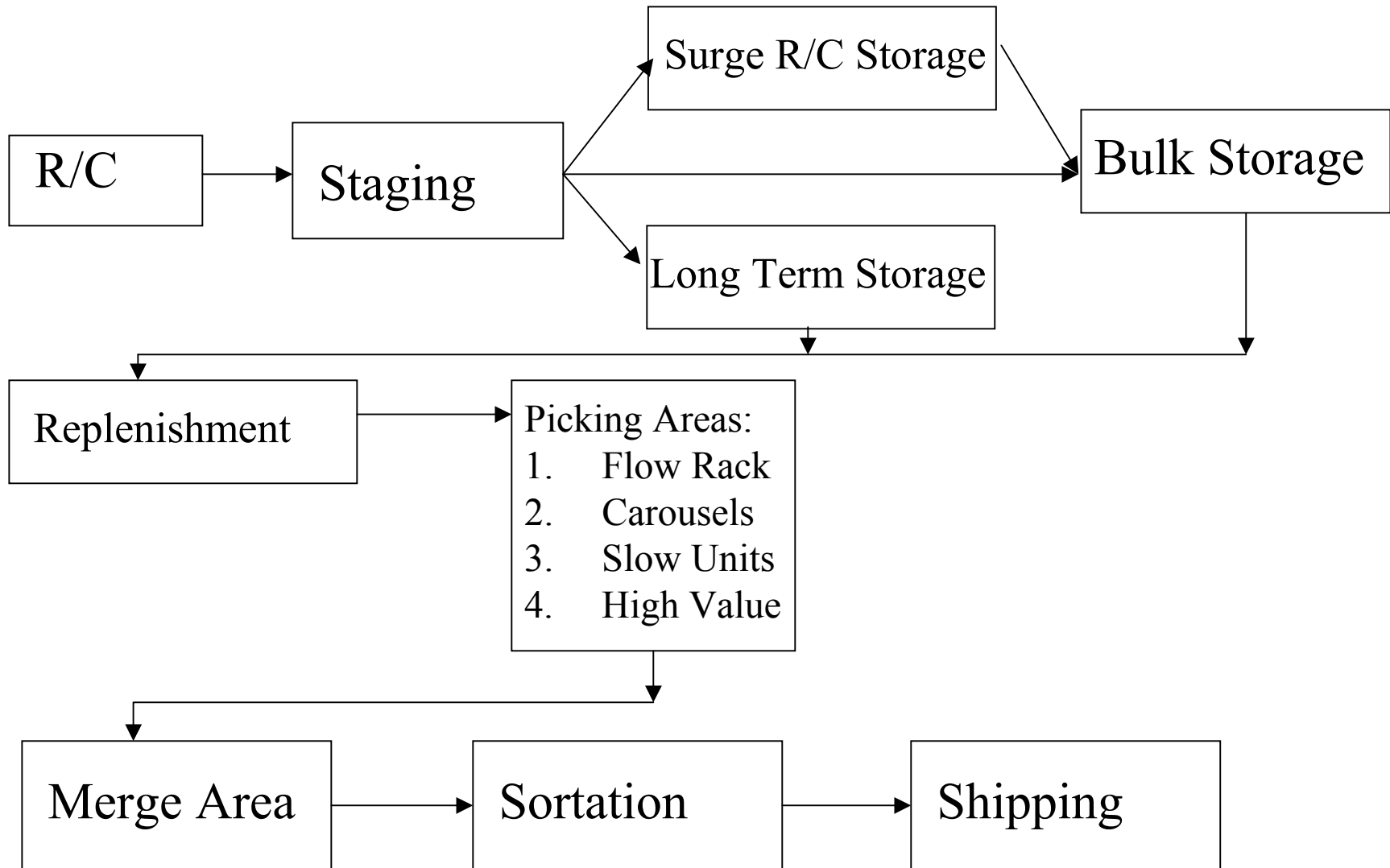
materials handling equipment

IN THIS LAYOUT\*

- Bar Code Label Printers/ Applicators
- Carton Flow Rack with Pick-to-Light Order Picking System
- Fixed Point Omni Directional Scanners
- Free Standing Mezzanine
- Gravity Conveyor
- High Density Storage Rack (Pallets, Cartons, Totes)
- Horizontal Carousel (with Light Assisted Picking)
- Lift Truck-Narrow Aisle (Electric)
- Lift Truck-Rider Order Picking (Electric)
- Lift Truck-Standard Fork (Electric)
- Meter/Brake Belt Conveyor
- Narrow Aisle Pallet Rack
- Plastic Reusable Pallets
- Plastic Totes
- Pop-up Roller-Live Roller Sortation Conveyor
- Portable (Hand Held) Scanners
- Portable Offices
- Portable Picking Carts
- Powered Belt Transportation Conveyor
- Powered Roller Accumulation Conveyor (Zero-Pressure)
- Re-usable Plastic Shipping Containers
- RF (Radio Frequency) Communications Stations & Hardware
- Saw Tooth Roller Merge Conveyor
- Simulation Software (Entire System)
- Standard Pallet Rack
- Standard Shelving
- Trash Compactor
- Vertical Carousel (with Light Assisted Picking)
- Warehouse Management Software (Standard Modules)
- Wide Span Shelving

PLAN 204 TOOLKIT

# Process Flow



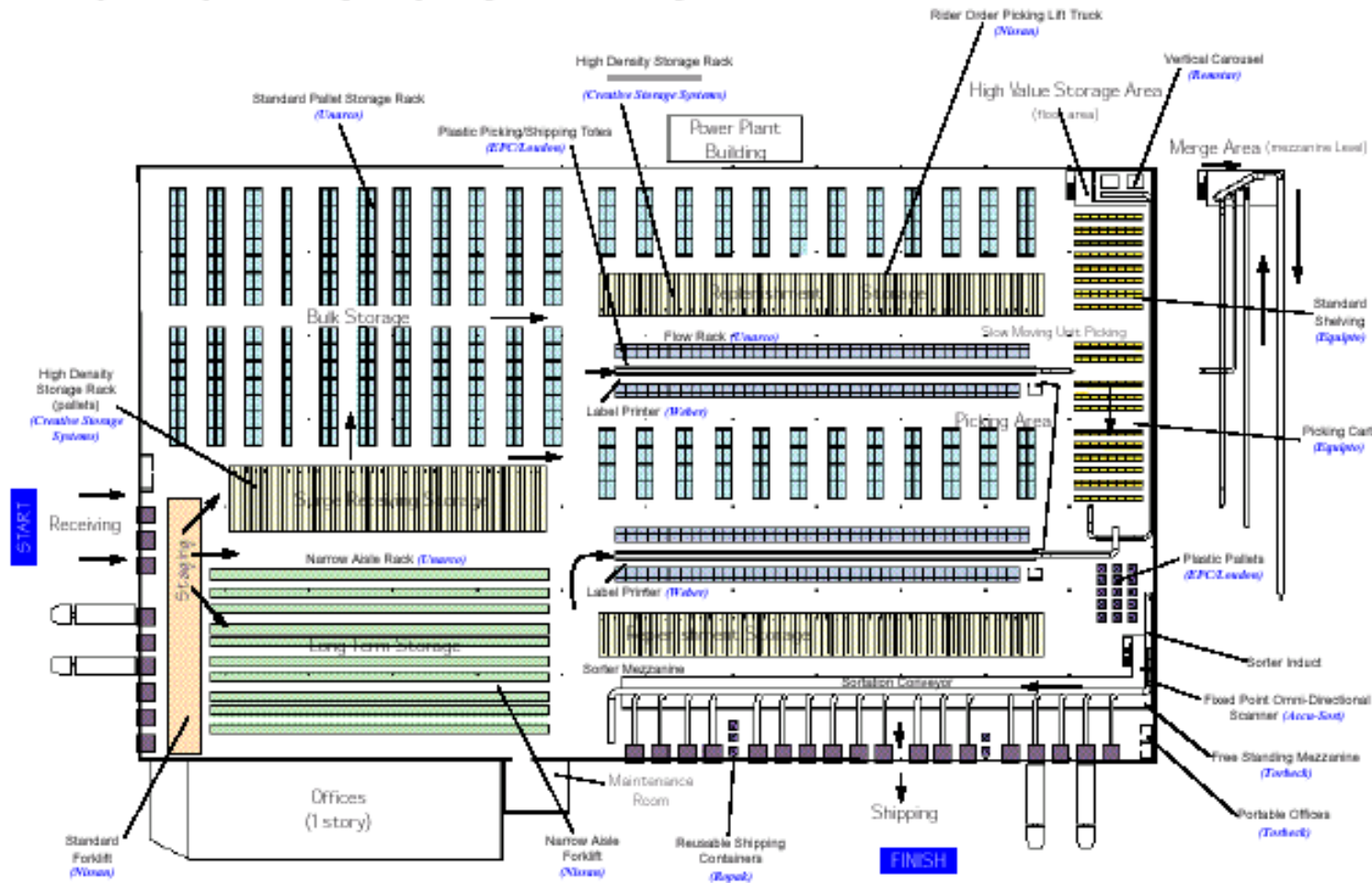
# Estimate System Costs

1. Building Units (DC, offices, land, etc.)
2. Pallet Jacks
3. Walkie Stackers
4. CB Lift Trucks
5. NA Trucks
6. Rider OP Trucks
7. Picking Carts
8. Conveyors
9. Pallet Rack
10. Picking Racks & Carousels

# Retail Distribution Center

- **Manual facility**
- 40 acre complex
- Facility:
  - 135,000 sq. ft.
  - Max # of SKUs 18,000
  - Max Tput 50,000 units picked/shift

Entry-Level System, designed by Integrated Technologies



materials handling equipment

IN THIS LAYOUT\*

- Carton Flow Rack
- Computer Simulation (Overall System Only)
- Fixed Point Omni-Directional Scanners
- Free Standing Mezzanine
- Gravity Conveyor
- Hi-Density Storage Rack (Pallets, Totes, and Cartons)
- Label Printers
- Lift Truck-Narrow Aisle (Electric)
- Lift Truck-Rider Order Picking (Electric)
- Lift Truck-Standard Fork (Electric)
- Meter/Brake Belt Conveyors
- Narrow Aisle Pallet Rack
- Plastic Pallets
- Plastic Totes
- Pop-up Wheel Belt Sortation Conveyor
- Portable Offices
- Portable Picking Carts
- Powered Belt Transportation Conveyor
- Powered Roller Accumulation Conveyor (Zero Pressure)
- Re-usable Plastic Shipping Containers
- Saw Tooth Roller Merge Conveyor
- Standard Pallet Rack
- Standard Shelving
- Trash Compactor
- Vertical Carousel

- PLAN 204 TOOLKIT

# Design Comparison

- The cost estimated by the designer of the **manual system** was: \$3.2M (excluding land, building).
- The designer estimated the number of employees at 92 (76 R/C & picking; 16 loading & shipping).
- The designer estimated the order accuracy at 87%.



# Side-by-Side Comparison

- **Manual:**

- 135,000 square feet
- \$3.2M installed MH
- 18,000 max SKUs
- 50,000 picked/shift
- 92 employees
- 87% order accuracy

- **Semi-Automated:**

- 148,000 square feet
- \$5.8M installed MH
- 24,000 max SKUs
- 98,600 picked/shift
- 134 employees
- 96% order accuracy