

## Top-Loading ASRS Pre-incident Planning

Due to the complexity of Top-Loading Automatic Storage and Retrieval Systems a comprehensive pre-incident plan is an essential tool in the successful management of a fire incident involving the system.

FM Global Property Loss Prevention Data Sheet 8-34 *Automatic Storage and Retrieval Systems* provides the following recommendations:

### *Final Extinguishment*

*Establish a pre-incident plan in cooperation with the local fire service and your local FM Global Engineering Operations Center to address a means of achieving final extinguishment of a fire originating within the ASRS storage array. See FM Global Property Loss Prevention Data Sheet (i.e., Data Sheet) 10-1, Pre-Incident and Emergency Response Planning, for general guidelines related to a pre-incident plan.*

*At a minimum, consider the following:*

- 1. How access will be achieved to a fire anywhere within the storage array*
- 2. How will the storage array be disassembled, if required, and what equipment will be needed to get to the seat of the fire*
- 3. How many storage containers may be removed from the storage array to get to the seat of the fire and where they will be placed during this process*
- 4. What resources will be needed and how they can be implemented for restoration of the storage array to minimize business interruption*
- 5. Identifying and providing operational guidance on the specialized firefighting equipment, such as hose station connections, fixed-in-place monitors, visible or infrared cameras, remote monitor nozzle steering mechanisms, etc., installed at the facility for protection of the ASRS storage array*

While pre-incident planning is a task that many departments assign to fire suppression companies that would typically respond to a property, the data collection and development of the plan for a facility housing a Top-Loading ASRS will be significantly more complex than a normal warehouse facility. Additional department resources may be required to complete the plan.

This handout provides the user with a detailed checklist that outlines the information that may be needed to develop the pre-incident plan as well as sample plans for facilities where open top solid walled and non-solid walled containers are utilized in the system.

These plans would be in addition to the typical pre-incident plan developed by fire companies for a facility. They are designed to provide an incident commander with detailed information regarding the Top-Loading ASRS and would be supplemented with additional site-specific information regarding the dismantling of the grid system.

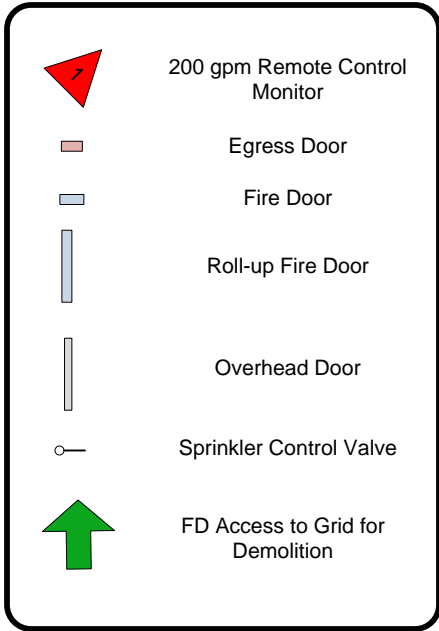
## Top-Loading ASRS Pre-incident Plan Information Checklist

- Does the facility have an emergency plan that addresses fire in the Top-Loading ASRS array?
- Is there a dismantling procedure available to the fire department in the event of a fire?
  - Availability of knowledgeable staff to support emergency dismantling of array. Names and contact information
- Does the facility maintain a trained ERT/Brigade that is knowledgeable of the system?
  - Training?
  - Available PPE including SCBA?
- Drawing of building layout showing the location of Top-Loading ASRS arrays:
  - Identify access points to facility and arrays.
  - Identify available areas to stage debris from dismantling operation on the exterior of the building.
  - Water supply for fire protection systems - secondary water source?
  - Location of FDC
- Top-Loading ASRS array details:
  - Typical contents of array
  - Dimensions including height
  - Number of robots
  - Robot staging locations
  - Are robots recalled to staging on fire alarm?
  - Is there access to the top of the array for manual fire fighting operations? If yes provide details.
- Fire protection provided to the array:
  - Automatic sprinklers - Location of control valves
  - Fixed master streams - Automatic or manual? Location of control valves and manual controls
  - Standpipe connections for handlines - location of control valves
- Is there equipment available on site to assist the fire department in suppression and dismantling operations? Lifts, fork trucks, skid-steer loader, backhoe
  - Who would operate this equipment?
- Does the facility have agreements in place to access additional equipment to support emergency dismantling operations?
  - Who would operate this equipment?
- If equipment is not available on site or through an arrangement with the facility, does the fire department have a source that would be available 24/7?

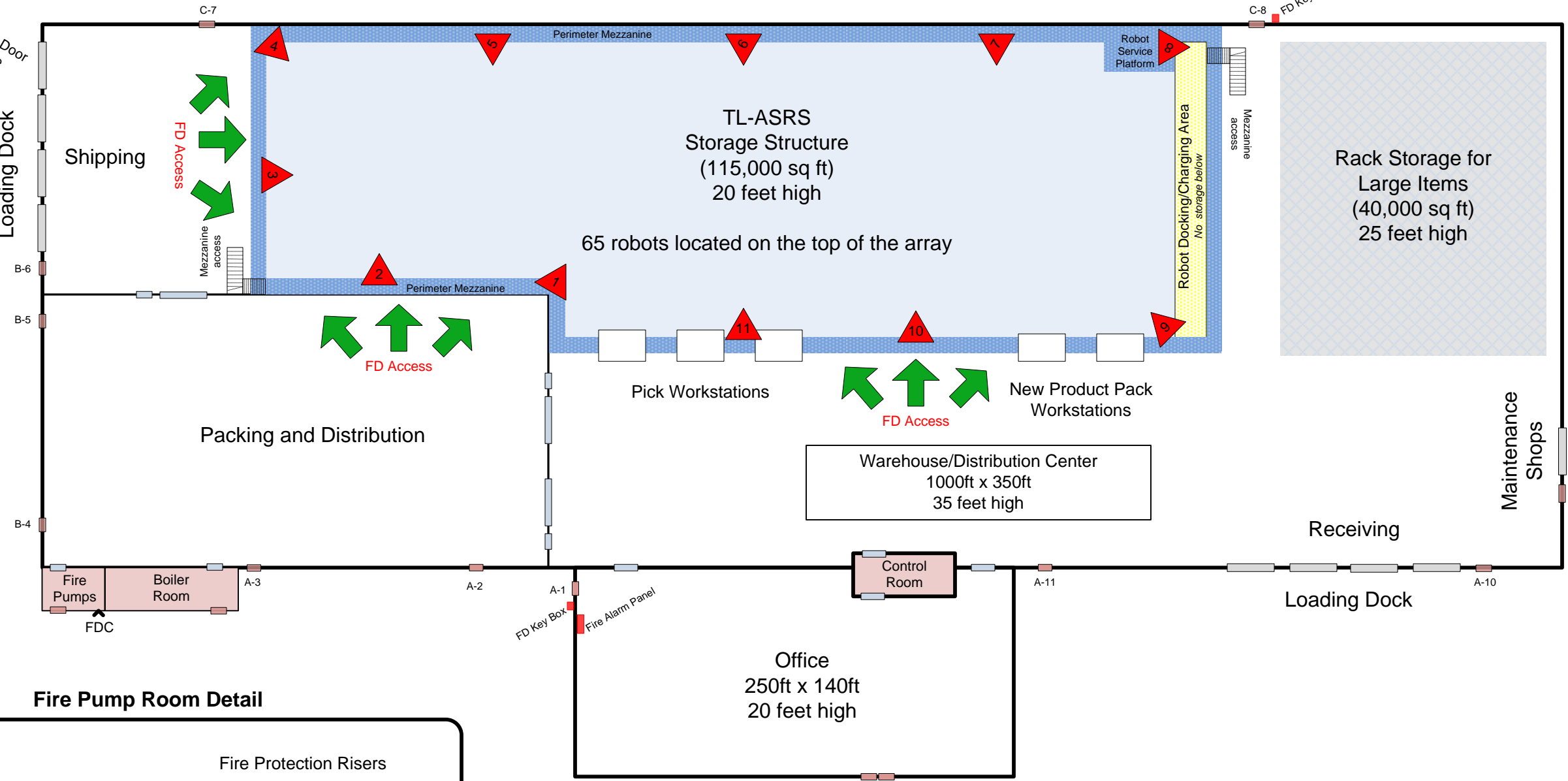
# Sample Plan - TL-ASRS Storage System Without Storage Aisles

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KEY



Overhead Door @ Grade  
Debris Staging

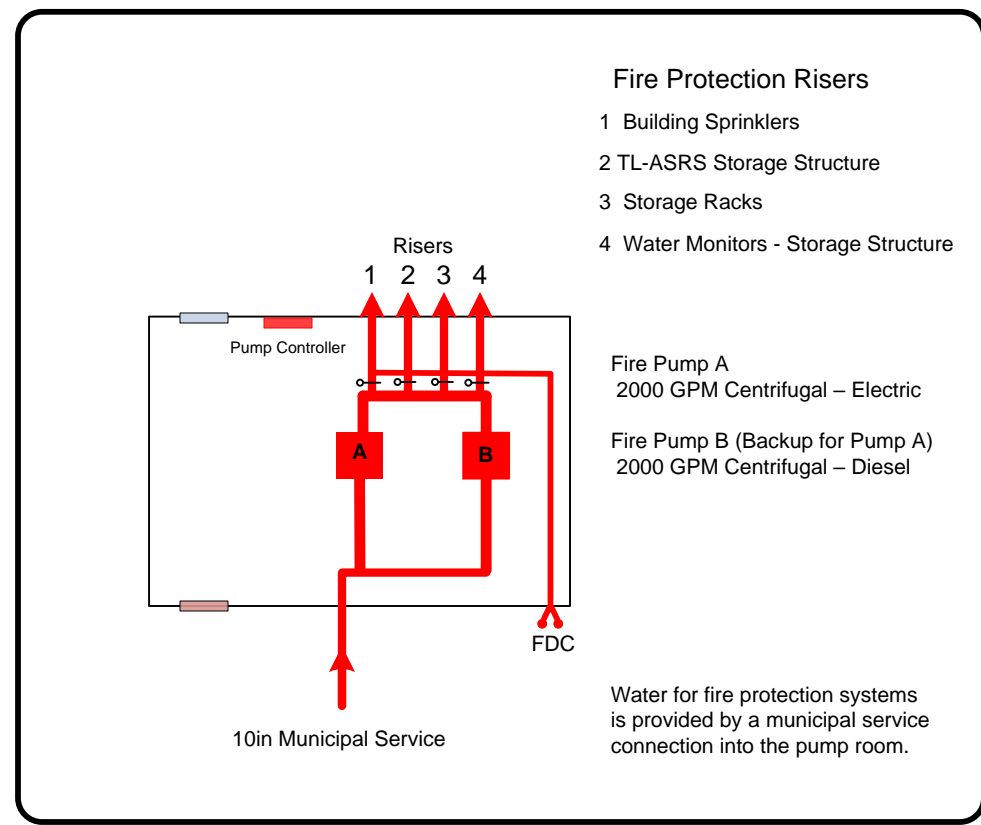


B

D

Overhead Door @ Grade  
Debris Staging

## Fire Pump Room Detail



## ASRS Fire Protection

- Detection in the ASRS area**
- Ceiling level smoke detectors over the array.
  - Alarms are monitored by the building fire alarm system and transmitted to the fire department.
  - On activation this system automatically recalls the robots to the docking station.
- Robot Charging Station Detection**
- Smoke detectors in the area of the charging station.
  - Alarms are monitored by the building fire alarm system and transmitted to the fire department.
  - On activation this system automatically deactivates the charging stations.
  - Deactivates the robots operating on the storage grid.
- TL-ASRS Sprinkler System**
- Sprinklers are provided at ceiling level above the storage array.
  - Coverage extends 10 feet beyond the array walls.
  - Coverage is provided below mezzanines.
  - This system is monitored and water flow activates the bld. fire alarm system.
  - The sprinkler control valve for the system is located in the Fire Pump Room.
- Fixed Monitor Nozzles**
- 200 gpm Monitor nozzles provided on the perimeter of the array at the mezzanine level
  - Each monitor can be remotely activated and directed from control room. Monitors can be manually operated from the mezzanine.
  - Infrared cameras with feed to control room provided to assist in positioning.
  - Control valve for the Monitor riser is located in the Fire Pump Room.

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### Distribution Center Details

- The facility is an auto parts distribution center serving the regions 24 retail stores
- The facility operates 16 hours per day, 7 days a week with two shifts.
- A minimum of 2 maintenance personnel are on duty 24 hours per day.
- A minimum of 2 contract security personnel are assigned to the facility on a 24 hour basis.
- The facility maintains an emergency action plan.
- A system manual that details the dismantling process is provided in the FD Key Box located at DOOR A-1 and in the system control room.
- The facility does NOT maintain a trained emergency response team and no SCBA is provided.
- During operating hours there is a shift supervisor available to coordinate with the fire department in the event of an emergency.
- On duty maintenance personnel will coordinate with FD during off shifts.
- Supervisors and all maintenance staff are trained and knowledgeable of the TL-ASRS system, operation of remote monitors and array dismantling procedures.

### Storage System Details

- The storage structure is constructed with lightweight metal framing to create a grid to house open top plastic containers.
- The exterior of the storage structure is covers with lightweight plastic panels that are easily removed if access to the grid is required.
- Fire department access points into storage grid are clearly indicated on the panels.
- Storage containers hold prepackaged auto parts and accessories. There are NO ignitable liquids or aerosol products stored in the structure.
- 65 remotely operated robots are provided to retrieve containers and transport them to and from the five workstations at the front of the structure.
- Robots are battery operated and charged as required at the docking/charging area on the D side of the storage structure,
- Robots weigh approximately 300 lbs each.

### On Site Equipment

- 2 - 38 ft scissor lifts. All maintenance personnel are certified in their operation.
- 6 - propane operated forklifts. All maintenance personnel are certified in their operation.
- 2 - 30 ft wheeled elevated platforms – 600 lb capacity.

### Availability of Specialized Equipment

- The facility maintains an agreement with XYZ Equipment Rental to supply scissor lifts, skid-steers, and a back-hoe 24/7/365. Approximate delivery time is 2 hours from request.
- Heavy equipment (front end loader, excavator, etc.), may be available from the City DPW. Response time approximately 2 hours.
- Regional Technical Rescue Team can provide manpower and specialized expertise and equipment for shoring. Approximate response time is 60 to 90 minutes from request.

### Emergency Contact Information

	Home	Cell
• Plant Manager	(XXX) XXX-XXXX	(XXX) XXX-XXXX
• Maintenance Manager	(XXX) XXX-XXXX	(XXX) XXX-XXXX
• Facility Safety Manager	(XXX) XXX-XXXX	(XXX) XXX-XXXX
• Facility Security Manager	(XXX) XXX-XXXX	(XXX) XXX-XXXX
• XYZ Equipment Rental	24 hour contact # (XXX) XXX-XXXX	
• City DPW	24 hour contact # (XXX) XXX-XXXX	
• Regional Tech Rescue – Request via dispatch center		



Robot Track



Dust Curtain

Clear plastic panels

Opaque panels around storage grid



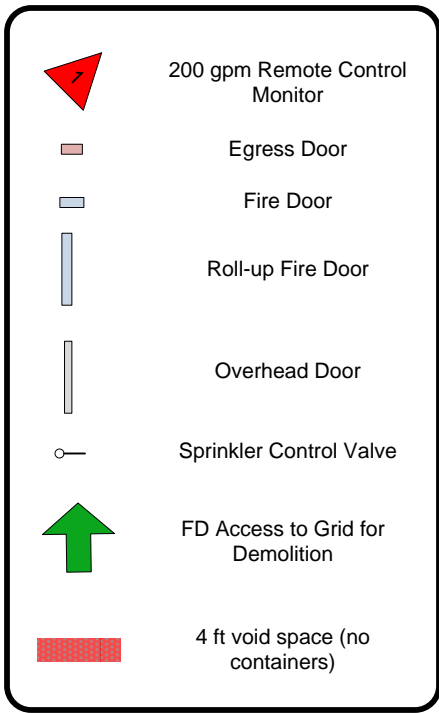
## Storage Array Detail



- Opaque plastic panels surround the storage grid. These panels are removed without special tools.
- Metal columns that make up the storage grid are friction fit. They can be removed without special tools.
- Robots move on tracks at the top of the grid.
- Prior to removal of columns verify that there are no robots above the area that will be removed. (each robot weighs over 300 lbs)
- Each grid within the storage area holds a stack of containers
- Open top containers within the grid being removed may be filled with water from operating fire suppression systems. Use caution!
- As tunneling proceeds monitor the integrity of the grid system. Shore as necessary for stability.

# Sample Plan - TL-ASRS Storage System Storage Aisles

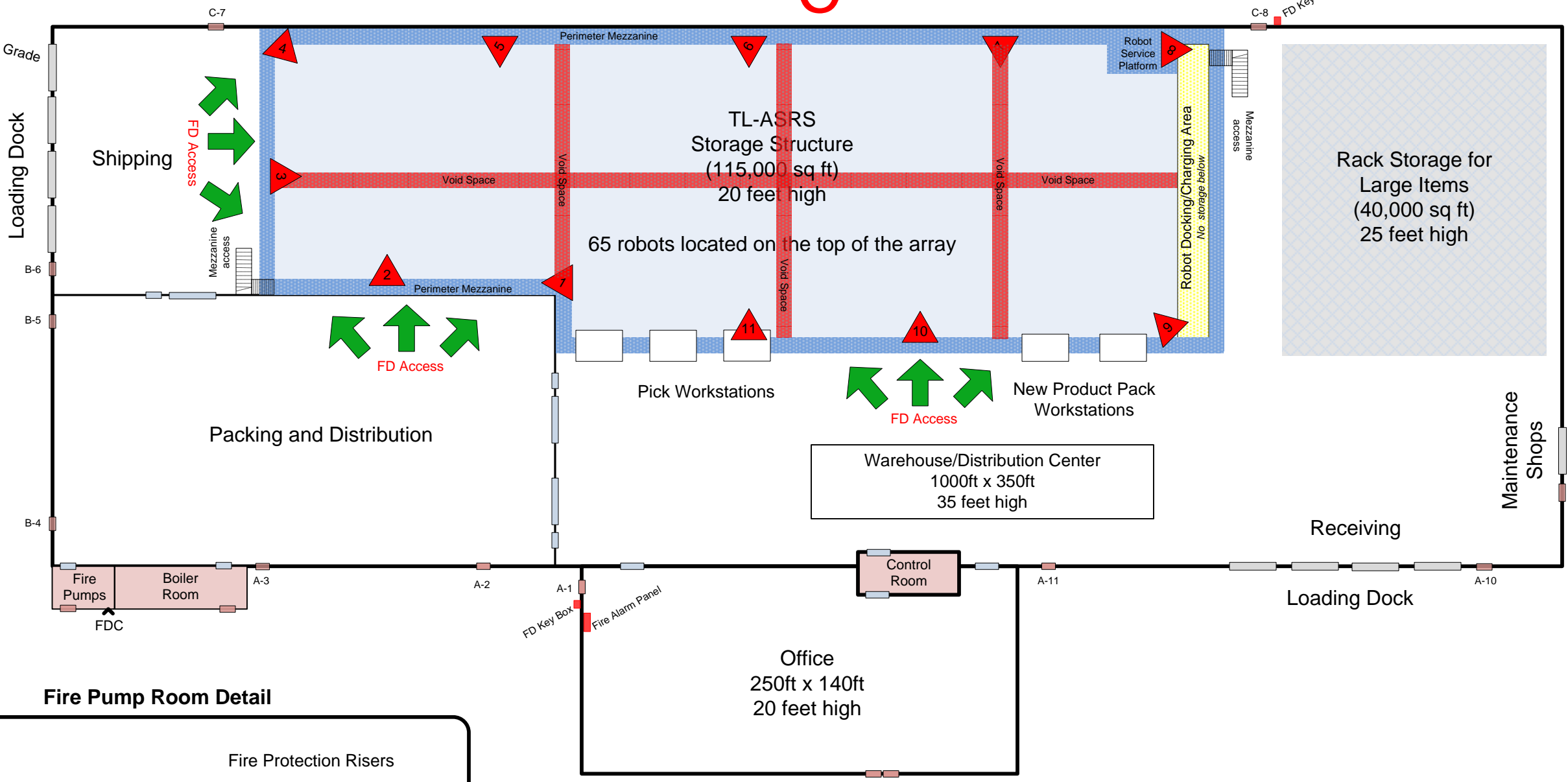
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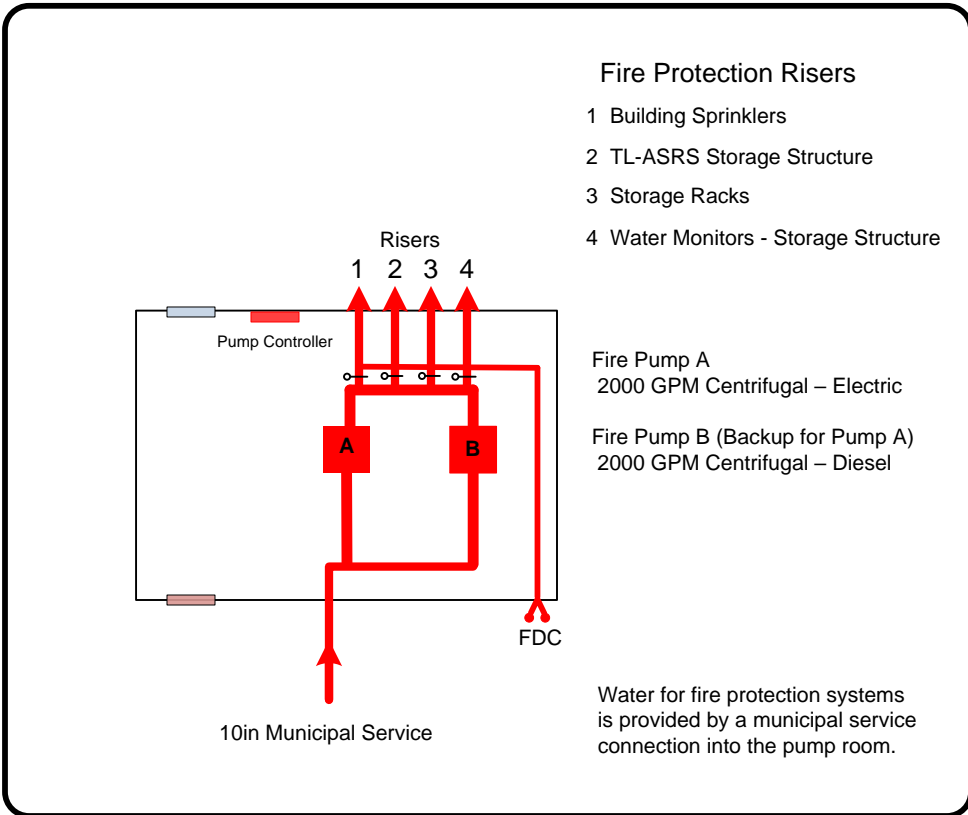
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### Fire Pump Room Detail



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- During operating hours there is a shift supervisor available to coordinate with the fire department in the event of an emergency.
- On duty maintenance personnel will coordinate with FD during off shifts.
- Supervisors and all maintenance staff are trained and knowledgeable of the TL-ASRS system, operation of remote monitors and array dismantling procedures.

### Storage System Details

- The storage structure is constructed with lightweight metal framing to create a grid to house non-solid walled containers.
- 4 ft wide spaces with no container storage are provided within the grid system to reduce horizontal fire spread.
- The exterior of the storage structure is covers with lightweight plastic panels that are easily removed if access to the grid is required.
- Fire department access points into storage grid are clearly indicated on the panels.
- Storage containers hold prepackaged auto parts and accessories. There are NO ignitable liquids or aerosol products stored in the structure.
- 65 remotely operated robots are provided to retrieve containers and transport them to and from the five workstations at the front of the structure.
- Robots are battery operated and charged as required at the docking/charging area on the D side of the storage structure,
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