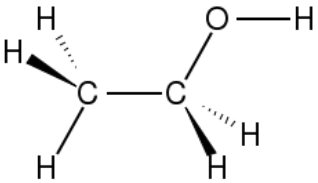

Utah Department of Alcoholic Beverage Control

Warehouse Expansion & Remodel Program

08.04.09
DFCM Project No. 0824-6030

Utah Department of Alcoholic Beverage Control
Warehouse Expansion & Remodel Program
DFCM Project No. 0824-6030
August 4, 2009

Review Signatures

We have reviewed the Warehouse Expansion & Remodel Program and warrant that it adequately represents our request for a facility to fulfill our mission and programmatic needs. All appropriate parties representing the Department have reviewed it for completeness and accuracy.

John Freeman, Deputy Director of Operations Date
DABC

Gregg Buxton, Director Date
DFCM

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August 4, 2009

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01 Executive Summary

Utah DABC Warehouse
Expansion & Remodel

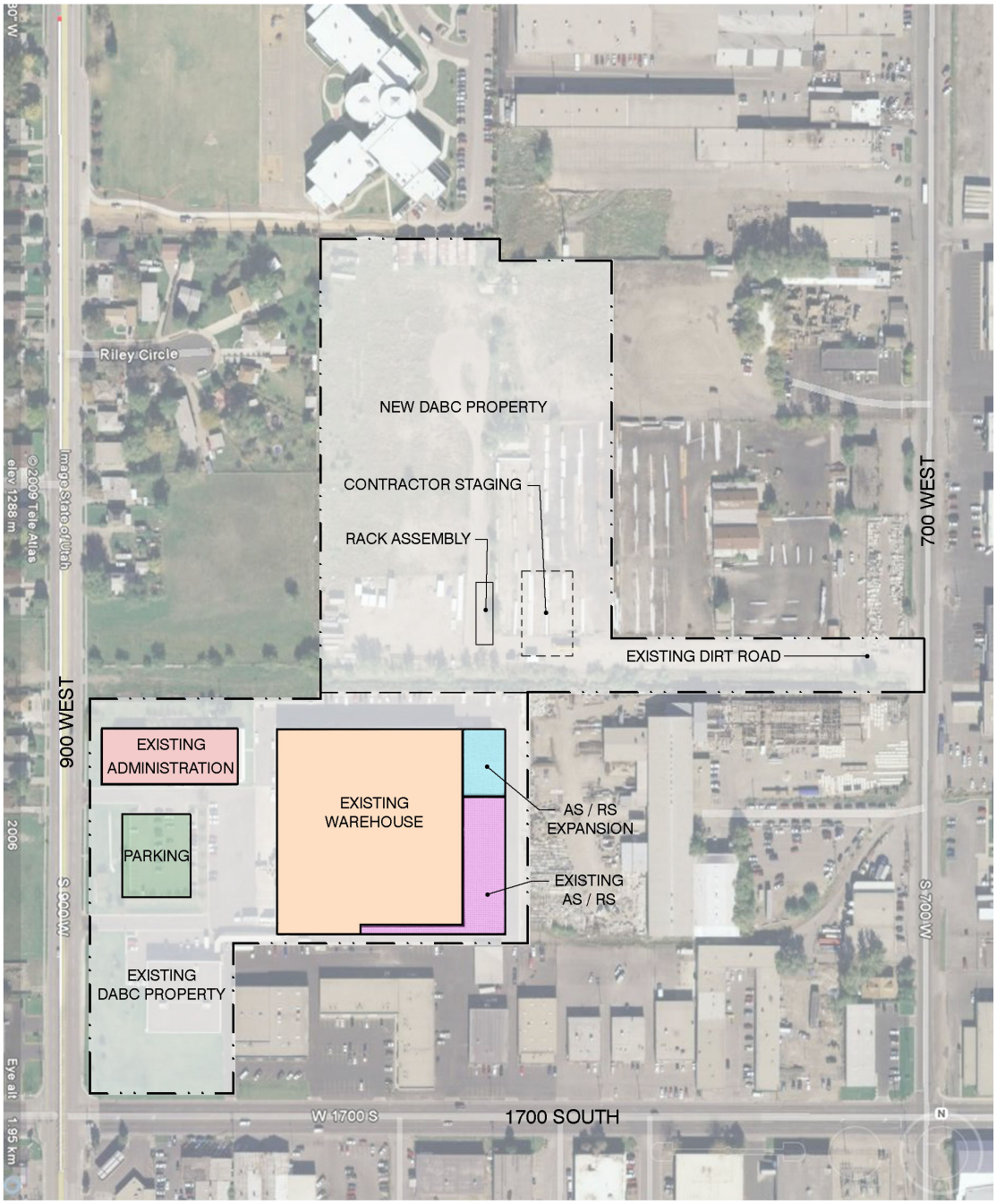
The State of Utah Department of Alcoholic Beverage Control (DABC) administrative offices and warehouse are located at 1625 South 900 West in Salt Lake City. In order to increase warehouse capacity and improve operational flow and efficiency, the DABC is planning to remodel portions of the warehouse and expand its automated storage system. This document contains the programmatic requirements for the remodel and expansion project. The opinion of probable cost for the project is:

Construction cost	$13.6 million
Total project cost	$19.1 million

Equipment and software needed to fully implement the project's storage systems enhancements will be contracted directly by the DABC and are not part of this project. The cost for these items is estimated by material handling equipment consultant Trommer & Associates, Inc. to be $3.4 million. This is included in the above total project cost.

The project will have a traditional design-bid-build delivery method. The preliminary project schedule is:

Design	Oct. 2009 – March 2010
Bidding	April 2010 – May 2010
Construction	June 2010 – June 2011



Site Plan showing existing and expanded DABC property and facilities.

Project Background

The DABC's administration building and original warehouse were constructed in 1992, at 21,700 GSF and 115,000 GSF respectively. The warehouse was built with a clear interior height of approximately 28 feet to house 4-unit high pallet racking.

The warehouse was designed for an expansion, which was constructed in 2003. The expansion was approximately 21,500 GSF, bringing the warehouse total square feet to approximately 136,500. The expansion consisted primarily of a 110' tall, 76' wide AS/RS (Automated Storage and Retrieval System) along the southern two-thirds of the warehouse's east side. A 16' wide extension along the southern edge of the warehouse was also constructed to house a conveyor system that is part of the AS/RS. The steel racking of the AS/RS provided the expansion's structural support system. To accommodate the heavy loading of the storage system, the expansion's foundation was a system of closely-spaced, 90' deep piles. The expansion's exterior skin was an insulated metal panel. The project included a snow awning extending about 14' over the original warehouse roof, along the connection between the original warehouse and the addition.

The 2003 AS/RS project required a staging area for on-site construction and assembly of the precisely-designed automated storage system. The staging area, east of the warehouse and north of the AS/RS area, is the location of the current AS/RS expansion project.

The DABC is in the process of buying 10 acres of property to the north of their existing site. The new property has a large rectangular area, as well as a 66' wide spur that extends east to 700 West. For the current project, the spur will provide contractor access from 700 West and a portion of the rectangular property will provide rack assembly and contractor staging space.

Project Scope

The project's elements are summarized below. They are described in further detail in other sections of the program document.

1. Extension of the existing automated storage system structure and racking to the north edge of the warehouse, an area of approximately 8,300 SF. The rail and the software for the automated storage system expansion will be proprietary to Daifuku/Eskay Corporation, the manufacturer and provider of the existing AS/RS system. All other portions of the AS/RS expansion must be identical to or compatible with the existing system so as to provide seamless, continuous operation of the expanded automated system, but will be competitively bid, rather than specified as proprietary elements. Expansion of the AS/RS will include extension of the existing snow awning that is part of the AS/RS exterior building structure.

2. Preparation of portions of newly-acquired DABC property to the north for contractor access and staging space.

3. Modifications to approximately 3,000 square feet of the warehouse receiving area for changing functional needs. Modifications include the construction of three new receiving docks with overhead doors.

4. Modifications to approximately 13,600 square feet of the northwest area of the warehouse, including demolition of two existing wine storage rooms and several smaller rooms, and reconfiguration of the space for other uses.

5. Modifications to existing receiving and shipping dock doors including replacement of existing receiving area dock door seals; replacement of existing shipping area overhead doors with new high-speed overhead doors with occupancy sensors; addition of truck locks and dock seals; removal of existing dock lift on Door #10 and replacement with dock leveler.

6. New roofing and R-30 insulation for entire original warehouse roof area. This includes the roof area underneath the existing snow awning.

7. Replacement of existing warehouse roof smoke exhaust hoods with combination skylight/ smoke exhaust units.

8. Replacement of the existing warehouse evaporative cooling system with a full HVAC system.

9. Replacement of existing warehouse light fixtures and the addition of an automatic lighting control system.

10. Reconfiguration of the warehouse and administration building power feeds.

11. Emergency electrical power generation for 100% of the warehouse operation.

12. Dispersal of battery charging stations throughout the warehouse.

13. Installation of storage racks above all west wall overhead doors.

14. Phased reorientation/relocation of the existing warehouse pallet racking, with required base plate modifications and replacement of damaged racking components.

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15. Upgrade to AS/RS control system for expansion.

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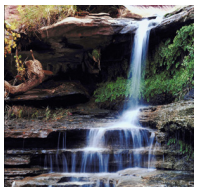
16. New central building management system.



02

Utah DABC Warehouse
Expansion & Remodel

Site

The DABC Administration Building and Warehouse occupy an existing site at 900 West and 1700 South. The State of Utah is in the process of purchasing approximately 10 acres to the north of the existing site, for use as contractor access and staging in the current warehouse expansion and remodel project, and for future expansion of warehouse operations.

This section contains information regarding the existing site, as well as the new property and its future use by the DABC. The appendix also contains site-related information:

A: Master plan studies for the new property
B: Geotechnical report
C: Site survey in 11 x 17 format

DABC Administration Building

AS/RS Expansion Site Preparation
As part of the existing project, the DABC warehouse AS/RS (automated storage and retrieval system) will be expanded to the north, in an area that served as the staging and assembly area in 2003 during construction of the existing AS/RS. The area is currently paved and is used for the storage of large items by the DABC.

The existing asphalt will need to be removed and the site prepared for construction of the AS/RS footing and foundation system. The existing AS/RS structure has a foundation system of closely-spaced, 90' deep piles, and it is likely that the expansion will require an extension of this system.

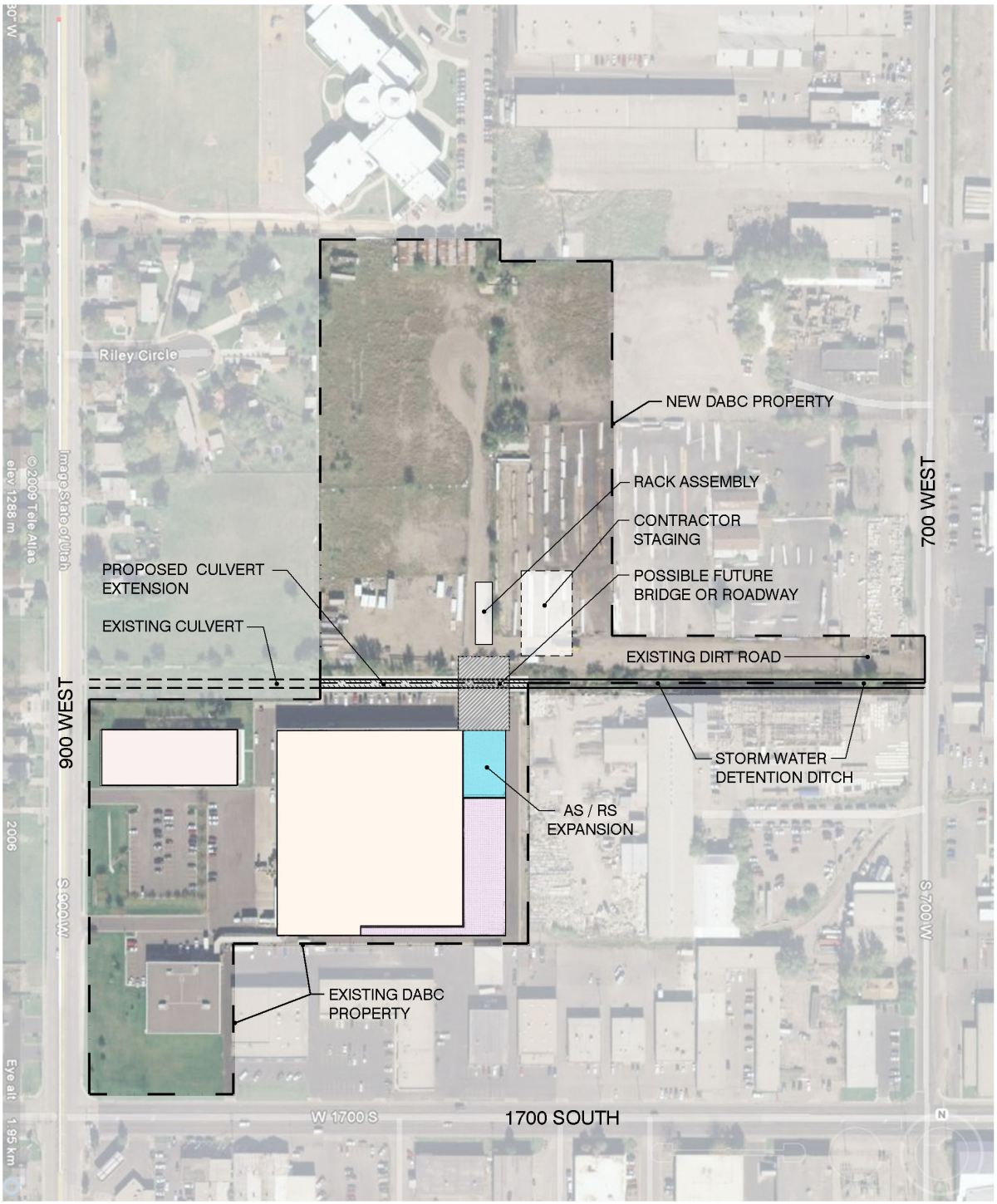
DABC New Property
The DABC is in the process of buying 10 acres of property to the north of their existing site. The new property has a large rectangular area oriented north-south, as well as a 66' wide spur that extends east to 700 West. The southern edge of the spur is the center of an east-west running storm water detention ditch. Parallel to the ditch, on the north side, there is an existing dirt road that is used for access to the land located between 700 and 900 West.

Storm Water Detention Ditch
The storm water detention ditch that is on the new DABC property has a Salt Lake City access easement for maintenance purposes. The ditch enters a culvert at the DABC west property line. The DABC is interested in enclosing at least the west portion of the new property ditch in a culvert, in order to be able to easily travel between their existing property and the new property to the north. In preliminary meetings, Salt Lake City indicated that it would be acceptable to construct a continuation of the existing culvert east across the DABC new property. City representatives expressed the desire for the project to include minor improvements to the ditch, such as new plantings. During design, this should be explored.

If a culvert extension as described above is constructed, the contractor for the warehouse expansion project will likely construct a bridge or roadway above it, in order to be able to reach the existing DABC property from the 700 West access.

The contractor must be required to maintain the ditch in a clean and unobstructed condition during the project.

View to the north from roof of existing AS/RS, showing new DABC property and existing dirt roadway that extends east to 700 West



Site plan showing existing culvert and storm water detention ditch, and proposed culvert extension and possible future bridge/ roadway.

New Property Subdivision
The new DABC property will be configured from two complete parcels on the west side and portions of two additional parcels on the east side. The property will need to go through a Minor Subdivision process with Salt Lake City, with final approval from the Planning Commission, in order to attain legal status as a single piece of property. The property seller has initiated the Minor Subdivision process, which can take up to three months time. Salt Lake City Planning has indicated that there should not be any issues with the subdivision process or the final approval.

Contractor Access
For the current project, the east-west spur of the new property will provide contractor access from 700 West to the project site. The access roadway will be used for the delivery of construction and AS/RS fabrication materials in trucks that will be up to 60 feet in length. The roadway should be paved. Portions of the roadway that are not going to be modified in the near future for another use should be paved with concrete; otherwise, asphalt paving should be used.

Rack Assembly / Contractor Staging Areas
An area 30' wide x 90' long will be needed for rack module assembly. The module assembly area needs to be as close as possible to the AS/RS expansion area. The ideal location is directly north of the building site. The area should be paved. If, during design, it is determined that this area will need to be modified for a new use in the future, the paving should be asphalt. If the area will likely not be modified, the paving should be concrete.

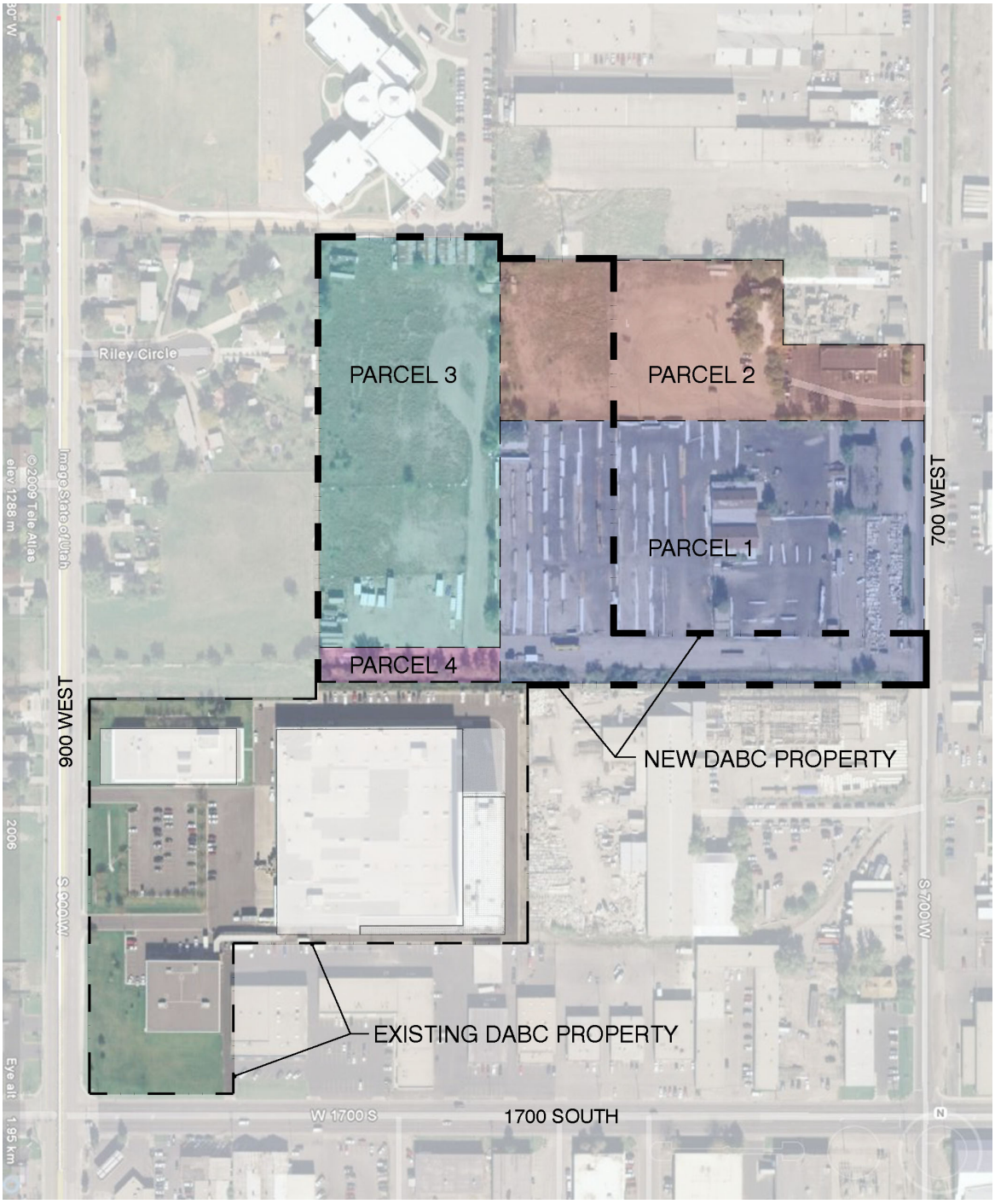
A second area, 90' wide x 150' long, will be needed for contractor staging. The exact location will be determined during design. This area will also be paved. As in the rack assembly area, if the contractor staging area will likely not be modified in the future, the paving should be concrete; otherwise, it should be asphalt.

Fire Department Access
Fire department vehicle access is required around the entire DABC warehouse during and after project construction. The vehicle access requirement is a 26 foot wide roadway with a 20 foot inside turning radius.

New Property Master Plan Studies
In order to determine whether the current warehouse expansion and remodel project is compatible with the likely future use of the new DABC property, the programming consultants developed several master plan options (contained in Appendix A). The options showed three possibilities for DABC's future use of the new property, and how facilities developed on the new property would function with the existing warehouse. DABC representatives reviewed the options and discussed the possibilities but did not select a direction. The project team concluded that the current project is compatible with future likely uses of the new property.

View to the north from roof of existing AS/RS.

View to northeast from roof of existing AS/RS, showing dirt road spur that extends to 700 West.



Site plan showing parcels that will form the DABC new property.

03

Utah DABC Warehouse
Expansion & Remodel

Building

This section describes the programmatic requirements and space needs for the non-storage system elements of the DABC warehouse project.

The greatest portion of the project is the expansion of the AS/RS. Another large project component is the re-orientation of the existing warehouse racking. These and other storage system related components are described in Section 4, Storage Systems.

Structural, mechanical and electrical system project components are described in Section 5, Building Systems.

State of Utah High-Performance Building Requirements

The DABC Warehouse Expansion and Remodel project should comply with the State of Utah High Performance Building Guidelines to the greatest extent possible (see Appendix E). Possible attainment of the Guidelines' LEED Silver rating should be strongly considered. Because the project is a remodel rather than new construction, the team will need to evaluate possibilities for compliance, using energy modeling or another form of life-cycle cost analysis.

Commissioning of the building's mechanical and electrical systems would be very beneficial and should be part of the project.

Other considerations that should be explored include:

- Is the addition of R30 insulation during re-roofing (as currently described in the program) the optimal amount from a cost benefit standpoint, or would another amount be preferable?
- Would there be a life-cycle cost benefit for adding insulation to the exterior wall envelope?
- Should Rocky Mountain Power incentives be pursued using a prescriptive method or through specific measures determined by energy modeling?
- What water-wise landscaping elements would be most beneficial to incorporate into the storm drainage ditch improvements?

The State of Utah has a goal of increasing energy efficiency by 20% across all sectors of the state by the year 2015. Ideally, all construction projects should contribute to that goal.

Although the DABC Warehouse Expansion and Remodel includes several elements that will reduce warehouse energy consumption, the project will lead to increased energy consumption because of the project's new HVAC system.

The DABC stored product must be maintained at a low, constant temperature. The programming process included evaluation of an option to enclose a portion of the warehouse to house the most temperature-sensitive products, which would allow the enclosed area to use conditioned air for cooling while the majority of the warehouse used a much more energy-efficient evaporative system. This direction was not pursued for these reasons:

- Limited flexibility in the amount and placement of warehouse products, particularly in consideration of product quantity changes over time.
- Loss of operational efficiency resulting from enclosed access for items that have a high rate of handling.
- Maintenance issues associated with the six high-speed roll-up doors that would be required for the enclosure.
- Difficulty in enclosing and sealing the conveyor belt that must service the area.
- High initial costs of constructing the enclosure.

Preliminary discussions with State energy representatives indicated that it will be acceptable to use an HVAC / cooling system that best supports the functional requirements of the warehouse, even if it is not the most energy-efficient.

Warehouse Building Programmatic Needs

The Warehouse Expansion and Remodel project includes the following elements, several of which are related to reduction of energy use:

1. **New Warehouse Roof.** The original warehouse area will receive a new roof. R-30 rigid insulation will be incorporated into the new roofing system. The new roofing system must extend underneath the existing snow awning.

Snow awning which extends over existing warehouse roof.

Existing roof and smoke exhaust hoods.

2. **Combination Skylight/Smoke Exhaust Units.** During the re-roofing of the warehouse, the existing smoke exhaust hoods will be replaced with combination skylight/smoke exhaust units. The purpose of this replacement is to increase daylighting in the warehouse, thereby reducing electrical lighting and energy usage. The skylight units must be insulated to optimize energy savings and the glazing must be translucent rather than transparent, as the warehouse product must not receive direct sunlight.

3. **Receiving Area Expansion.** The warehouse receiving area must be expanded by three dock bays with overhead doors. These must be adjacent to the existing receiving dock.

4. **Dock Door Upgrades.** Replace the existing receiving dock door seals with new seals. The three new receiving docks and doors described in No. 3 above should have same qualities and features as the existing receiving area doors.

   Replace the existing shipping area overhead doors with new high-speed overhead doors with occupancy sensors. Add truck locks and dock seals to each of these truck bays. Remove the dock lift on shipping door #10 and install a dock leveler in its place. All dock doors should have dock lights.

5. **AS/RS Exterior Skin.** The exterior metal skin of the 2003 AS/RS failed soon after installation, due to blistering which resulted from improper curing of the foam insulation. The manufacturer installed a new skin over the original, so the exterior wall has a double skin thickness. This must be considered in the design of the AS/RS expansion, which needs to have a flush, continuous exterior surface from the original AS/RS to the expansion.

6. **Building Management System.** The project will include a new central building management system that will oversee and coordinate other building controls such as mechanical and electrical. The system should be Convia or its equivalent with similar capabilities and features.

7. **Warehouse Floor Cleaning.** The project is to include a thorough cleaning of the warehouse floor, during the relocation of the existing warehouse racking. After dispersal of the battery charging stations throughout the warehouse, the floor in the existing Battery Charging Room is to be cleaned so that its condition is similar to that of surrounding areas.

Warehouse Space Needs

Since the construction of the original warehouse in 1992, the DABC's functional space needs have changed. Some of the original office and storage spaces are no longer being used for their original purposes and can be demolished. There are new functions in the warehouse, which should be allocated proper and suitable space.

The diagram at right shows areas in the warehouse that 1) should definitely be demolished for new uses and configurations; 2) can either retain their existing configuration for reuse or be modified per the recommendation of the future project design team, and 3) should remain in their existing configurations.

Revisions to the northwest corner of the warehouse will include the addition of a rack supported mezzanine that will improve the space use of this high bay area. The mezzanine and its installation will be part of the equipment purchased directly by DABC. It will not be part of the construction project scope. Use of its storage capacity for the functions described in this document will be determined by the material handling equipment consultant in conjunction with the project design team. Its installation will occur during the construction project and must be coordinated by the construction project general contractor.

Functional space needs to be housed in the warehouse are described on the following pages.
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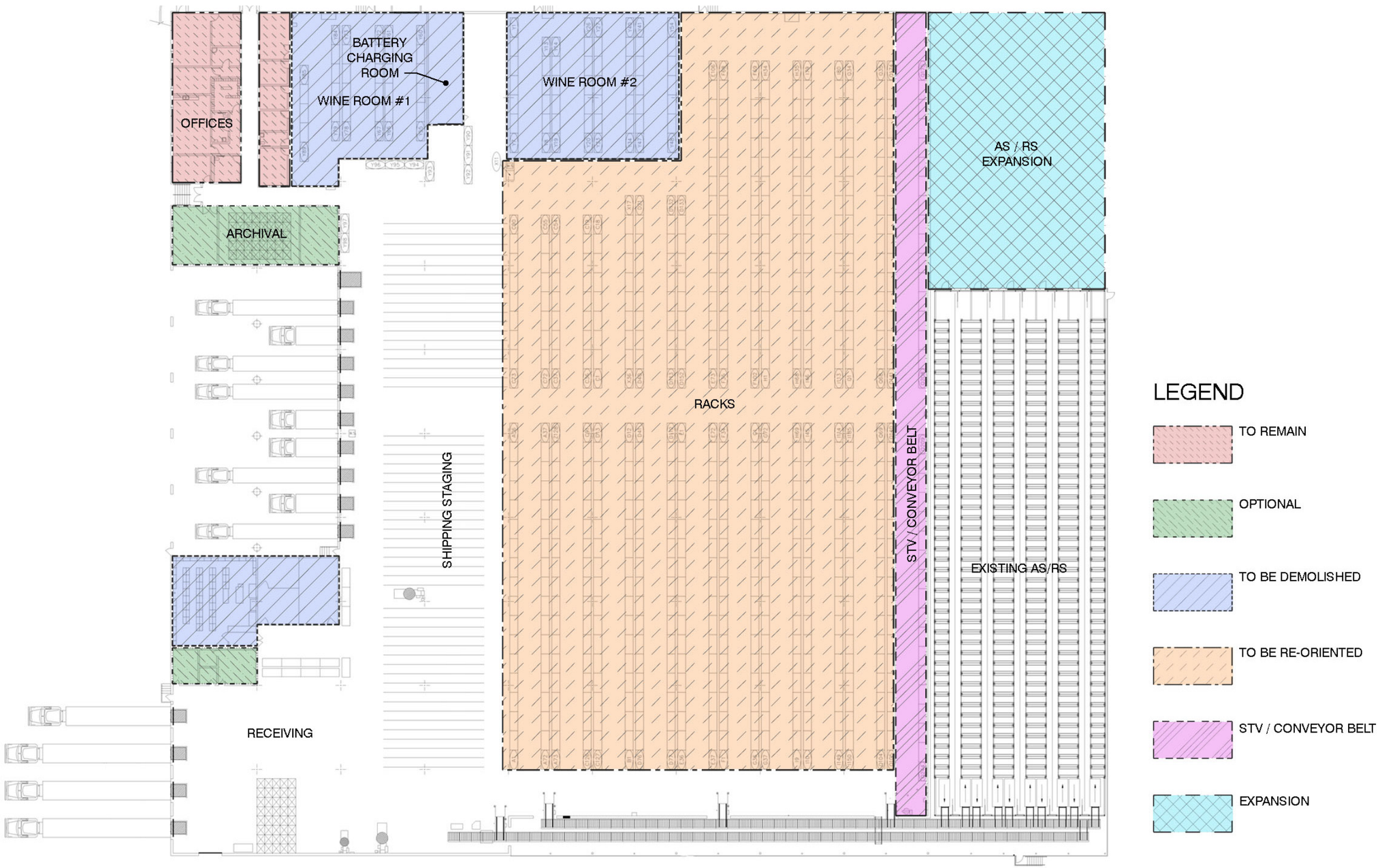
AS/RS Intake Desk

Overall Floor Plan

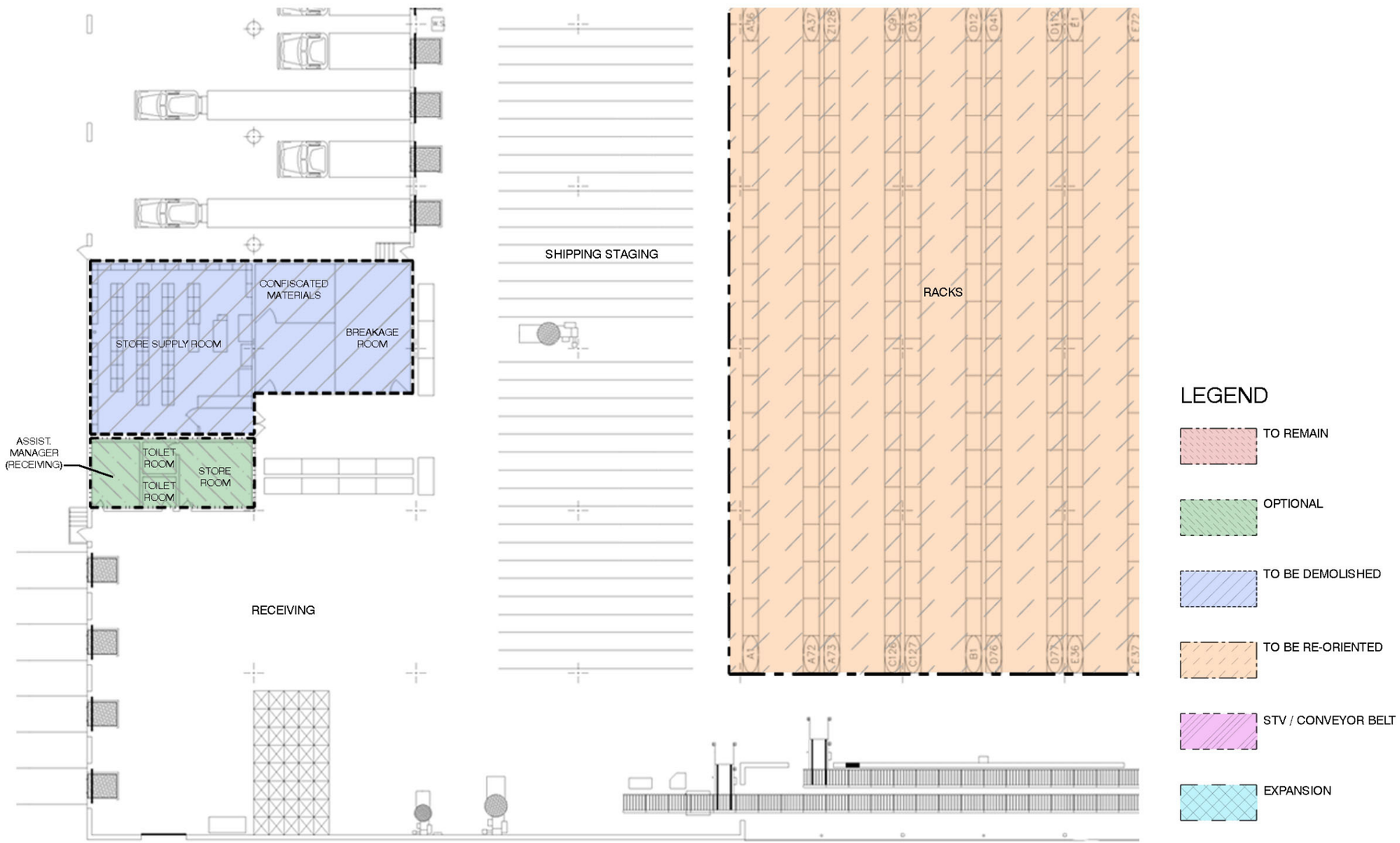


Area A Floor Plan

LEGEND

- TO REMAIN
- OPTIONAL
- TO BE DEMOLISHED
- TO BE RE-ORIENTED
- STV / CONVEYOR BELT
- EXPANSION

Area B Floor Plan



STORAGE SPACES

Stores Supply

Function: Storage of items used in State Liquor Stores (large items include shopping carts, wine racks, floor mats, packages of ice melt, etc.; smaller items include paper products, cleaning supplies, employee tee shirts, etc.). Items are stored in the warehouse and sent to individual stores on an as-needed basis. Will contain approximately 60 units of 3' wide x 7' high shelving in 16" and 24"depths; some secure storage (locking cabinets) for first aid supplies; five 8' wide warehouse racking units for larger items. The area must also contain a packaging work area, consisting of 24 lineal feet of 30-36" D work surface / table area, which will be used for packaging the materials that are being sent out to the stores. Will have a staff desk / work area with a computer and telephone. Must have double door access.

Size: 3,000 SF.

Location Needs: Near warehouse north receiving dock. Main floor location for large items; cartons of smaller items could be on the main level or on a mezzanine, accessed by a picker.

Environment: Sealed concrete flooring; wire mesh enclosure with locking gate; open upper structure.

Archive Storage

Function: Storage of archival records as required by law. Stored primarily in boxes, although some records are in file cabinets.

Size: Approximately 500 SF.

Location Needs: Remote location; does not need easy accessibility. Could be on a mezzanine with picker access.

Environment: Sealed concrete flooring; wire mesh enclosure with locking gate; open upper structure.

Confiscated Product

Function: Secure holding of illegal importation materials or items that are consumable but not salable (damaged labels, etc.)

Size: Approximately 200 SF.

Location Needs: Somewhat easily accessible.

Environment: Sealed concrete flooring; painted gypsum board or concrete block walls with locking door; open upper structure. Secure enclosure required.

PRODUCT HOLDING SPACES

Inter-Store Transfers

Function: Temporary holding of product that is being transferred from one liquor store to another.

Size: Approximately 500 SF.

Location Needs: Directly adjacent to Receiving and Shipping areas; highly labor-intensive function; could be incorporated into general warehouse storage.

Environment: Sealed concrete flooring; open upper structure. Sealed cases; no security necessary.

Special Orders

Function: Temporary holding of product ordered by individuals. Product is delivered to individual liquor stores for customer pick-up.

Size: Approximately 1,000 SF.

Location Needs: Directly adjacent to Receiving and Shipping areas; highly labor-intensive function; could be incorporated into general warehouse storage.

Environment: Sealed concrete flooring; open upper structure. Sealed cases; no security necessary.

Warehouse Interior

Receiving Area

PERSONNEL SPACES

Warehouse Manager (Wayne)
Function: Private office.

Size: 150-200 SF.

Location Needs: Could remain in existing location, or be relocated to another area with greater visibility to warehouse operations.

Environment: Carpet; painted gypsum board or concrete block walls with possible internal window into warehouse; locking door; lay-in ceiling. Sound separation.

Asst. Manager, Shipping (Justin)
Function: Private office. Current secondary use for daily morning briefings for warehouse staff.

Size: 150-200 SF.

Location Needs: Could remain in existing location, or be relocated to another area with greater visibility to warehouse / shipping area / operations.

Environment: Carpet; painted gypsum board or concrete block walls with possible internal window into warehouse; locking door; lay-in ceiling. Sound separation.

Note: Morning briefing function can take place either in Asst. Manager Office (current practice) or in new, separate meeting room of same approximate size.

Asst. Managers, Receiving & AS/RS (Bruce, Bonnie)
Function: Shared office for two people: two desks, each with a computer and telephone. Office requires an exterior window with direct visibility to truck receiving area. Also requires a 6' wide interior opening with counter, with an overhead coiling counter door at truckers' warehouse entry, for trucker verbal communication and paperwork.

Size: 150-200 SF.

Location Needs: Location which provides direct exterior visual access and connection with trucker entry area as described above.

Environment: Carpet; painted gypsum board or concrete block walls, locking door, lay-in ceiling. Sound separation from adjoining spaces.

AS/RS Intake Desk (Jimmy)
Function: Enclosure to protect desk from forklifts.

Size: Approximately 8' x 8'.

Location Needs: Existing location

Environment: Partial-height walls anchored to floor, with stainless steel corner guards or bollards to protect enclosure from forklift accidents.

MISCELLANEOUS

Single-User Toilet Rooms
Function: Single-user toilet room, one for men staff and truckers, one for women staff and truckers. Toilet; lavatory; toilet room accessories.

Size: Approximately 50 SF.

Location Needs: Near trucker entry door, in warehouse receiving area.

Environment: Sealed concrete flooring; painted gypsum board walls with locking door; painted gypsum board ceiling. Sound separation.

Scrubber/Sweeper Room
Function: Enclosed area for floor scrubber / sweeper that cleans broken product spills. Scrubber / sweeper uses water, so requires water source and a floor sink for emptying. Also requires a hose bibb for use in washing the scrubber / sweeper. Room could be used for storage of other warehouse scrubbers.

Size: Approximately 200 SF.

Location Needs: Easily accessed from Receiving and Shipping areas. Possible location: existing Paint Spray Booth Room.

Environment: Sealed concrete flooring; painted gypsum board walls; open upper structure; double door access.

Trash Compactor
Function: Direct access point from warehouse interior to exterior trash compactor, at warehouse southwest corner.

Size: Approximately 100 SF.

Location Needs: Interior space directly adjacent to exterior compactor location.

Environment: Sealed concrete flooring; open upper structure.

Generator Room
Existing generator in Generator Room in warehouse northwest corner should be removed as part of project. This space can be used for a different function.

04

Utah DABC Warehouse
Expansion & Remodel

Storage Systems

This section contains program information for the specialized storage systems that are part of the DABC Warehouse Expansion and Remodel project. The three storage systems and related information are:

A. AS/RS: Narrative description and preliminary specifications for the AS/RS expansion and the corresponding AS/RS Controls upgrade.

B. Warehouse Racking: Narrative description of required modifications to the existing warehouse racking.

C. Pallet Storage System: Description of requirements for the proposed new pallet storage system.

The section also contains two items for reference only:

D. Equipment outside Project Scope. A description of equipment that will be used in the remodeled warehouse, but that is outside the project scope.

E. Description of Operations. A description of operations for the AS/RS and general warehouse areas.

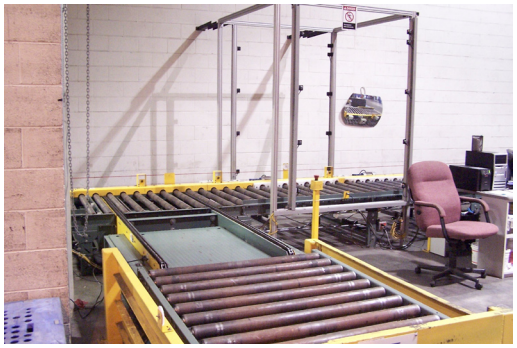
A. AS/RS

This project includes an expansion of the existing DABC AS/RS rack structure and storage system.

The existing AS/RS is a Daifuku system. It was installed in 2003 and provides storage capacity for approximately 6,000 pallets. This project will expand the system capacity by approximately 4,000 pallets, for a total system capacity of approximately 10,000 pallets.

This existing rack-supported structure is approximately 110′ tall and includes an AS/RS storage area of approximately 17,300 sq. ft. The expansion will provide an additional area of approximately 8,300 sq. ft.

The rack structure for the existing system was designed and manufactured by Nedcon (Netherlands and Czech Republic). The design tolerances for the rack system were specified by Daifuku. The design tolerances, as described in this document, must be held in order to ensure that system functionality is maintained.



AS/RS

Storage Systems

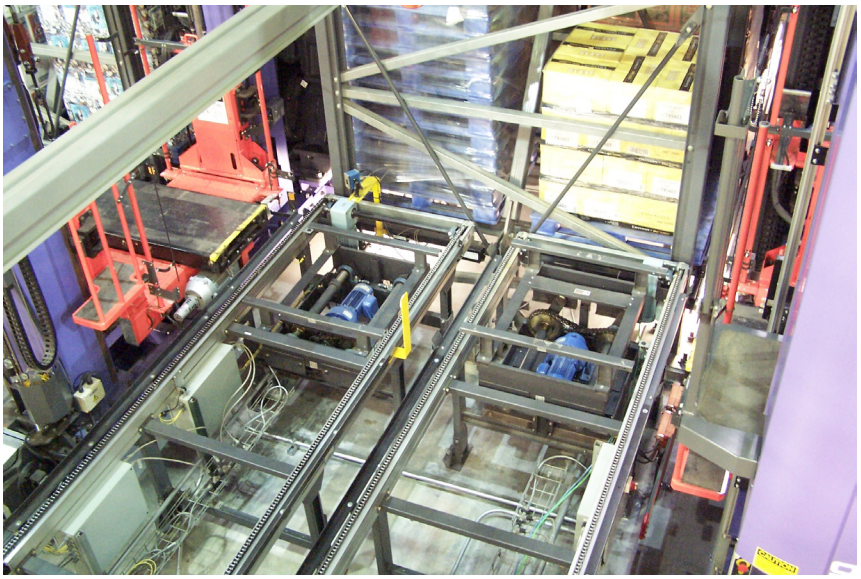
The rail and the software for the expansion of the automated storage system will be proprietary to Daifuku, to ensure full compatibility of those elements with the existing system. All other elements of the AS/RS expansion must be identical to or compatible with the existing system so as to provide seamless, continuous operation of the expanded automated system, but will be competitively bid.

The new rack structure shall be attached to the existing structure. No expansion joints will be allowed as a part of this expansion. The rack supplier for the proposed expansion shall accept full responsibility and liability for the functionality and reliability of the existing Daifuku and expanded AS/RS.

The present AS/RS induction chain transfer with lift(s) prior to loading the crane shuttles will be upgraded as part of this expansion project. There are maintenance issues with the existing feed conveyors at the SR Machine pallet pick up station.

The five (5) existing Daifuku cranes, one per aisle, will continue to service the existing and the expanded system. No cranes will be added to the system as part of this project.

Attachment of new racking system cannot void warranties on the existing racking system. The expanded rack structure design drawings, including tolerances, calculations and loading, will be reviewed by Daifuku for compliance with current warranties prior to release for fabrication.



AS/RS

AS/RS Load Specifications

Product
The AS/RS will store and retrieve palletized alcoholic products.

Dimensions
The maximum load dimensions for the AS/RS shall be as follows:
Width-50" – dimension in direction of shuttle travel
Length-42" – dimension in direction of S/R machine travel
Height-72" – load height, including pallet

This load must not overhang the pallet by more than 1" in any direction excluding load height. All loads must be stretch-wrapped prior to induction into the AS/RS.

Pallet Description:
Buckhorn Pallet #PU48400633
Plastic with steel reinforcement
Weight-70 pounds

Pallet size:
Width-48"
Length-40"
Height-5" maximum

Weight
The maximum load weight shall be 3,000 pounds, evenly distributed on the pallet.

AS/RS Loading

AS/RS Equipment Specification

Rack – Rack Supported Structure – Existing System

S/R Machines (SRM) –5 Daifuku Model H900 units
Rack Manufacturer – Nedcon
AS/RS Aisles – 5
AS/RS Bays – 44
AS/RS Tiers – 14
Total available locations – 6,158
Rack height – 31,471 mm – 103'-3"
Load size – 50"W x 42"L x 72"H (incl. pallet)
Load weight – 3,000 pounds
Present AS/RS Area is 17,300 sq. ft.

Rack – Rack Supported Structure – Expansion

S/R Machines: use existing – additional machines not required
Rack manufacturer: Nedcon or accepted equal
AS/RS Aisles: 5
AS/RS Bays: 27
AS/RS Tiers: 14
Total new locations: approximately 4,000 pallets, subject to the space requirements for the SRM Maintenance access area
Rack height: 31,471 mm – 103'-3"
Load size: 50"W x 42"L x 72"H (incl. pallet)
Load weight: 3,000 pounds
Proposed AS/RS expansion area: 8,300 sq. ft. (approximate)

Tolerances

Rack Tier Elevation: ± 1/8"
Rack Truss Straightness: ± 3/16"
Level of lower crane travel rail: ± 0.10" over entire length
Straightness of lower crane travel rail: ± 0.10" over entire length
Alignment between upper guide rail and lower crane travel rail: ± ½"
Rail joints: thermite welded, ground smooth
Rail Specifications: 85 lbs. per yard-meeting ASCE standards

Supplier Liabilities
The AS/RS Expansion project supplier shall accept total liability for the following:

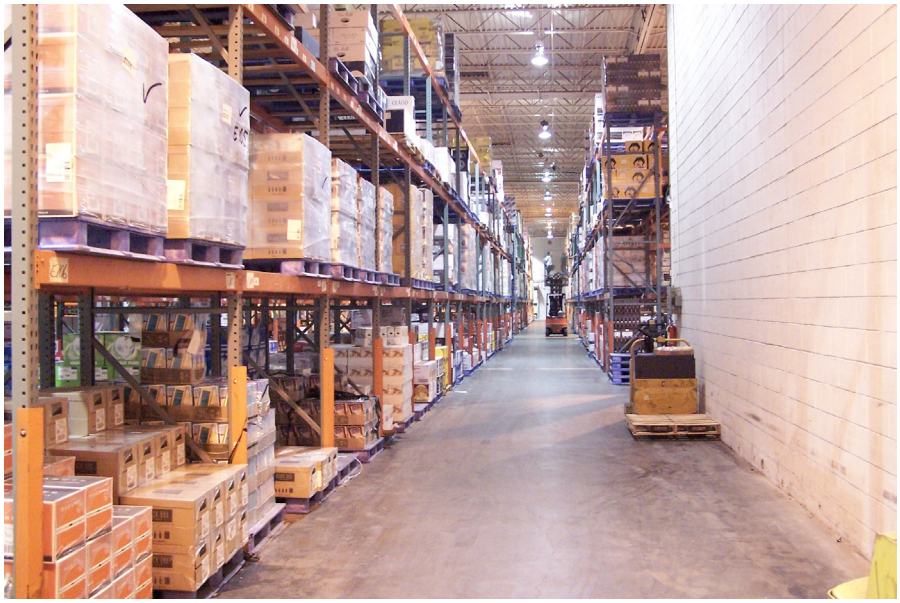
1. There will be no system downtime during the construction and equipment-installation phase of work .

2. DABC will have the capability to continue present daily distribution activities, maintaining store delivery services without interruption of the present schedule.

3. Major equipment change-over and control system updates will be completed during off hours, during periods of system scheduled shutdown, and/or on weekends.

4. The supplier will be required to coordinate the engineering and installation schedule and activation sequence to interface with other equipment installation, and building construction activation schedules. Bidder to insure attaining completion schedule as detailed herein. Any exception to the activation schedule is to be identified with proposal submitted.

5. The equipment supplier shall be totally responsible and accept full liability for the installation and operation of the present and expanded AS/RS and all related equipment being provided by the supplier as a part of this contract. This includes the total integration and operation of all hardware, software, control systems and total system operations as outlined within this documentation.



Existing Rack System

Maintenance Access
A crane maintenance area shall be provided at the north end of the AS/RS expansion area. This maintenance area shall be provided as part of the system and will provide access to each SRM. The crane maintenance area will provide safe maneuverable access for personnel to repair and maintain each SRM and related components.

This expansion project will also include the addition of maintenance access and walkways within the existing AS/RS induction area, located at the south end of the existing facility.

Signage
Operational and Personnel Safety signage will be provided and placed at strategic, visual locations throughout the systems. Signage shall be in compliance with the "Safety Standards for Conveyors and Related Equipment" ASME B20.1/ 2006. Signage shall also comply with State, Local and OSHA code requirements.

Sprinkler System
The sprinkler system within the existing AS/RS rack-supported structure will be expanded to support the new AS/RS expansion project.

The existing sprinkler system includes the following:

1. High Bay Ceiling Sprinklers
2. Low Bay Ceiling Sprinklers
3. In-Rack Longitudinal Sprinklers
4. High Bay Hose Station

The existing fire pump location will be retained. The Sprinkler System expansion shall be designed to meet NFPA, BOCA and ICBO codes. See Section 5 for mechanical and plumbing program requirements.

Shipping / Loading Docks

AS/RS System Test and Acceptance

Installation Check List
An installation check list will be utilized to ensure that all equipment has been installed in accordance with the engineering design drawings including all Architectural, Mechanical, Electrical and Civil Engineering details and documentation. The DABC project manager will assign project team members to conduct this phase of approval.

Functionality Test
The level of testing will demonstrate that each major component performs its intended function. The specific content of the tests will be determined by joint agreement between the contractor and the Material Handling Equipment Consultant. DABC will provide operating personnel to conduct the tests.

Tests will be conducted on a step by step demonstration of the functions provided. All major components must be functional. The contractor will notify the Material Handling Equipment Consultant to schedule these tests.

Punch List
As each test is demonstrated, it should be witnessed by the Material Handling Equipment Consultant and selected contractor representatives. At the completion of the function test, a written statement will be issued by the Material Handling Equipment Consultant defining all discrepancies and punch list items that must be corrected. The failure of any one test will not cause the entire test to be rerun, but rather a correction of the failed test.

Shipping Area

Throughput Verification Test
There will be a one hour demonstration of the peak throughput rates during this test.

Throughput tests will demonstrate that all equipment provided will function as a total system and meet the required sustained throughput agreed upon by the Material Handling Equipment Consultant. The final content of the performance test will be determined through mutual development between the Material Handling Equipment Consultant and DABC.

There are several prerequisites which should be completed before beginning these tests:

1. A test plan will be jointly designed in advance of execution and agreed to by the contractor and the Material Handling Equipment Consultant team.

2. The system must be fully operational and capable of performing all specified control and reporting functions.

3. The system must be under a normal load and set up to receive data transmissions.

4. Equipment must be running at contractor specified speeds. The computer hardware/software is to be free of all known problems.

The system must be capable of performing all specified handling functions. A quantity of typical loads will be made available for testing purposes. These loads will typify the distribution of parameters defined (max. & min. length, width, height and weight).

Training of operational and maintenance personnel should be complete.

Loads should be stored and retrieved at the required sustained rate/hour. Assume equal distribution of product across all AS/RS aisles for test purposes.

Test results will be calculated and summarized on an hourly basis and total test period basis. The following items will be measured:

1. Number of stores per individual AS/RS machine.

2. Number of retrievals per individual AS/RS machine.

3. Time/Storage: Each occurrence will be measured beginning with the time when the load is identified at the work station and ending when the load has been stored.

4. Time/Retrieval: Each occurrence will be measured beginning when a retrieval request has been received and ending when the load reaches the requesting delivery station.

5. Downtime/Fault: Each fault will be identified and the time for repair measured from point of detection until the point when normal operations are resumed.

Queues will be forced to operate under maximum and minimum conditions.

The performance test will be eight (8) consecutive hours in length. Throughput results by aisle, picking or replenishment station, conveyor, and related equipment, will be measured on an hourly basis and compared to the specification and to simulated hourly values.

The performance test will be passed when:

The specification-required sustained throughput is met or exceeded for six (6) or more of the eight (8) one-hour test periods. One one-hour period of results may be eliminated when test results are calculated.

Maintenance Manuals
The vendor shall furnish five (5) copies of the following manuals 30 days prior to start-up of the system:

1. Operating Manuals: (5 sets) This will include complete operating instructions and will be complete and separate from other data. Operating instructions will not require the operator to refer to various manufacturer's brochures, but will be compiled for a complete facility. All manuals shall be bound and identified with contract number.

2. Maintenance Manuals: (5 sets) This will include complete maintenance instruction including suggested preventive maintenance, suggested spare parts list, and a complete list of all parts. All manuals shall be bound and identified. The maintenance manuals will be separate and complete from other data.

3. Special Tools: A list of the special tools and test equipment needed for adequate maintenance. Complete schematic, logic, block and functional diagrams. Software documentation shall include, but not limited to:
   User's information
   User's operation narrative
   User's operating flow charts
   Computer system manuals
   Computer programming manuals
   Source listings
   Definitions of acronyms, variable and entity names
   Software security provisions
   Troubleshooting/problem determination

4. Final Documentation: All drawings and documentation shall depict final configuration at time of turnover.

User Training
The Equipment Supplier will provide classroom and hands-on training to personnel at the customer site for the complete System Installation. This training will be given to personnel prior to final acceptance of the system by DABC.

The training sessions will encompass, but not be limited to, the following areas:

1. Overview/Discussion of the AS/RS System regarding capabilities and limitations.

2. Overview/Discussion of total system operation procedures.

3. Lecture on Safety Orientation relative to the total system in all areas with emphasis on safety precautions and procedures.

4. Overview/Discussion of programming methods and procedures to follow in order to operate the system in the most efficient manner.

5. Overview/Discussion of the system's preventive maintenance program.

6. Overview/Discussion of Troubleshooting Methods and procedures of the system.

The Equipment Supplier's Project Manager, working in conjunction with the Material Handling Equipment Consultant, will schedule appropriate training sessions in three (3) basic areas which are:

1. Operator Personnel
2. Maintenance Personnel
3. Computer Control Personnel

The content/scope of Training sessions for the above three (3) basic areas are as follows:

1. Operator Personnel
   Operation Manuals will be provided at least one (1) week prior to beginning of training sessions.
   Contractor will provide in-depth and detailed training in all aspects of operating the system as installed at the DABC facility.
   Special attention will be covered in training sessions in regards to:

   Each Operator Control Device
   Each Safety Feature
   Emergency Procedure

2. Maintenance Personnel
   Operation Manuals will be provided at least one (1) week prior to beginning of the training sessions.
   Contractor will provide in-depth and detailed training in all aspects of maintenance for the system as installed at the DABC facility.
   Special attention will be covered in training sessions in regards to:

   Mechanical System
   Electrical System
   Control System
   Preventive Maintenance
   Schedules for Preventive Maintenance
   Adjustments
   Lubrication
   Parts Removal and Replacement
   Troubleshooting
   Safety Features and Interlocks
   Spare Parts List
   Working Drawings

3. Computer Control Personnel
   Functional Operation Operator Training
   Fixed Terminal Operation:

This training will provide all information required to operate the workstation fixed terminals. Personnel will receive and issue material, print reports, etc. Training will include use of CRT terminals, handheld bar code scanners and printers.

AS/RS Controls Upgrade

AS/RS Warehouse Control System (WCS)

The existing AS/RS Warehouse Control System (WCS) must be upgraded or replaced as part of the AS/RS expansion project. Current WCS functionality must be maintained and extended to the new AS/RS rack storage location. The WCS must include the following screens:

1. Login screen with operator and administrator password authorization.
2. Start-up / shut down screen.
3. Expected receipt screen used to store loads into the AS/RS.
4. Item and Location display screens; allow user to determine what is stored in AS/RS locations.
5. Order screens; allow manual order entry and modification of pending orders.
6. Log viewer screens.
7. User authorization screens to manage users.
8. System status screen.
9. Recovery screen.
10. Report screen.

The WCS must transfer messages to ESCALADE E1 (GERS) via an Oracle data base. ESCALADE E1 (GERS) will write messages to the data base that the WCS must read and the WCS will write messages to the data base that ESCALADE E1 (GERS) will read. The following messages need to be transferred between ESCALADE E1 (GERS) and the WCS.

1. ESCALADE E1 (GERS) enters load ID, item CSC code and quantity that will be entered into the AS/RS. The WCS reads and deletes these entries.

2. The WCS writes a store complete message for every load that is stored in the AS/RS including the load ID, item CSC code and quantity. ESCALADE E1 (GERS) reads and deletes the message.

3. ESCALADE E1 (GERS) enters order ID, item CSC code and quantity for loads that are to be retrieved from the AS/RS. The WCS reads and deletes these entries.

4. The WCS writes a retrieve complete message for every load delivered from the AS/RS to the output station. The message includes order ID, CSC code and quantity. ESCALADE E1 (GERS) reads and deletes these messages.

The WCS must maintain logs of all communications, errors and system transactions. Screens must allow viewing of logs.

The WCS sends store and retrieve commands to the SRM controller. The WCS maintains an inventory of all loads stored in the AS/RS and tracks empty locations. Store and retrieve commands sent to the SRM controller must include the AS/RS rack address where loads are to be stored or retrieved. Error conditions reported by the SRM controller must be received by the WCS and displayed to operators with a description of the error.

The updated WCS must be tested and proven reliable before installation on the live system at DABC. Installation and testing of the WCS must be complete between 3:00 pm Friday afternoon and 3:00 am Monday morning. The weekend of WCS installation and testing will be approved by DABC after offline testing of the WCS is complete. The updated WCS must maintain all existing inventory in the rack, communicate correctly with ESCALADE E1 (GERS) and control new AS/RS rack locations without impacting DABC shipping and receiving operations.

Equipment Control System

Existing equipment controls include the SRM controllers and Think and Do soft PLC controllers of the conveyors, load sizing and Bar Code Reader (BCR). The upgraded or new control system must control pallet input conveyor, AS/RS input and output conveyors, pallet output conveyor, load sizing, BCR's and new output delivery system. The equipment control system must be provided with a Human-Machine Interface (HMI) that allows operators to do the following:

1. Start, stop or reset the pallet delivery system.
2. Start, stop or reset individual components of the pallet delivery system.
3. Run individual components in manual mode.
4. View control network and component status.
5. Inspect individual equipment I/O.
6. Monitor external communication logs.

The control system must include fork truck detection sensors at every fork truck interface location. Input locations must automatically receive loads and index loads forward on the conveyor after the fork truck sensor is clear. The fork truck operator shall not be required to leave the fork truck or transmit a load deposit signal. If the fork truck sensor is blocked, the load in the fork truck deposit zone shall not move.

Loads that are input into the system must pass through a sizing station. The equipment control system must monitor the status of the sizing photo eyes and route loads that fail sizing to the reject station. The pallet also passes a bar code scanner. If the bar code is not scanned successfully the equipment control system must route the load to the reject station. When a load is routed to the reject station, the equipment control system must turn on a light indicating the nature of the error.

At the fork truck pick up locations, the control system must stop movement of loads if the fork truck sensor is blocked. Once the load is removed and the fork truck sensor is clear, loads can be conveyed into position for fork truck access. No completion message is required from the fork truck operator.

Currently all five aisles have a bar code reader to identify loads that arrive. The five bar code readers will be removed and one bar code reader will be installed at the point where loads transfer to the AS/RS mainline conveyor. The control system must receive the bar code information and send a store request to the WCS. The WCS will assign the load to an aisle. The equipment control system must track loads from the bar code reader to the assigned AS/RS aisle. Pallets will be assigned to an aisle in round robin fashion. If an aisle is full or offline, the WCS will assign the load to the next available aisle. In the event the bar code label is not read, the equipment control system must turn on an error light and report an error condition on the HMI.

When ESCALADE E1 (GERS) issues a pallet retrieve command, the command will include the delivery zone for the load. The WCS will pass the delivery zone to the equipment control system. The equipment control system must send a retrieve command to the SRM controller and track the outbound load to the correct delivery zone. Upon delivery to the correct zone, the equipment control system must pass a delivery complete message to the WCS which will pass the message to ESCALADE E1 (GERS).

The SRM controller needs to be upgraded or replaced to include the expanded rack locations. The upgraded or new SRM controller needs to provide the following functions:

1. A rack mapping function that commands the SRM to measure each rack post location at every tier elevation. The mapping function must be automated. The SRM controller must store the location of every rack location in memory and use the mapped location to control movement of the SRM to each specific location. The mapping function shall be configurable to allow mapping at every tier or at various tiers as determined by the operator.

2. The SRM controller must accept store and retrieve commands from the equipment controller. The SRM controller shall execute commands in the order received. Store and retrieve commands shall be executed alternately allowing for a combined store and retrieve cycle when possible.

3. The SRM controller shall monitor the status of the input and output conveyor stations. Retrieve commands shall not be initiated until the output conveyor location is empty and ready to receive a load. Store commands shall not be initiated until the input aisle conveyor has a load in position for pick up.

4. The SRM controller shall monitor SRM error conditions and send error code messages to the WCS.

5. The SRM controller shall monitor safety interlocks on the access gates, manual operator controller and escorter controller. Automated operation shall be prevented when any safety interlock is not in the safe position.

6. The SRM controller shall report a location occupied error to the WCS if the SRM is commanded to store a load in a location that is occupied. The SRM controller shall wait for an alternate store location from the equipment controller and then store the load.

7. The SRM controller shall send a location empty error to the equipment controller if the SRM is commanded to retrieve a load from a rack location that is empty. After sending the location empty error code, the SRM controller shall execute the next command.

8. The SRM controller shall monitor the status of sensors, communications and SRM operation. When operation of the SRM is stopped, the SRM controller shall send a coded error message that describes the error condition.

9. The upgraded or replaced SRM controller must allow access to all new and existing rack locations in an aisle. The SRM controller must be placed on line over a single weekend with no impact to DABC shipping and receiving activities.

Delivery Staging Area

B. Warehouse Racking

The existing Warehouse Racking System will be modified in order to improve the flow of product from the AS/RS Reserve Storage Area into the Pallet Rack Staging and Picking Area.

The Warehouse Racking Area is utilized as the Forward Pick Area. These racks are replenished by Lift Truck. Full cases or full pallets are picked from this Forward Pick Area.

Racking Relocation
The existing Warehouse Racking System aisles flow north and south. The rack will be relocated and rotated 90 degrees, resulting in an east and west aisle flow. It is estimated that the relocation will reuse the 740 existing pallet rack sections, but the exact number in the new layout may vary slightly depending upon new HVAC or other utility clearance requirements.

Wire Mesh Decking / Storage Levels
The relocated Warehouse Racking Area will include an area for L-Items (limited inventory). This area will include high-end wine and beer Stock Keeping Units (SKU).
New wire mesh decking will be provided at all beam levels of the L-Items area. This will allow the storage of cases of product, in addition to full pallets. The decking will be installed during the racking relocation.

Storage Configuration Summary:

- The L-Item racks will include three decked levels for case goods and one level for full pallets.
- The General racks will provide 4 levels of full pallet storage.
- Provide wire mesh decking at all pallet positions.
- Provide one additional level of load beams for the floor level of all L-Item Racks.

Racking Base Plate Modification
The racking relocation will likely require modification of the size of the existing rack base plates, in order to properly distribute the rack loads on the existing concrete slab. Base plate resizing will be analyzed by the structural engineer during project design.

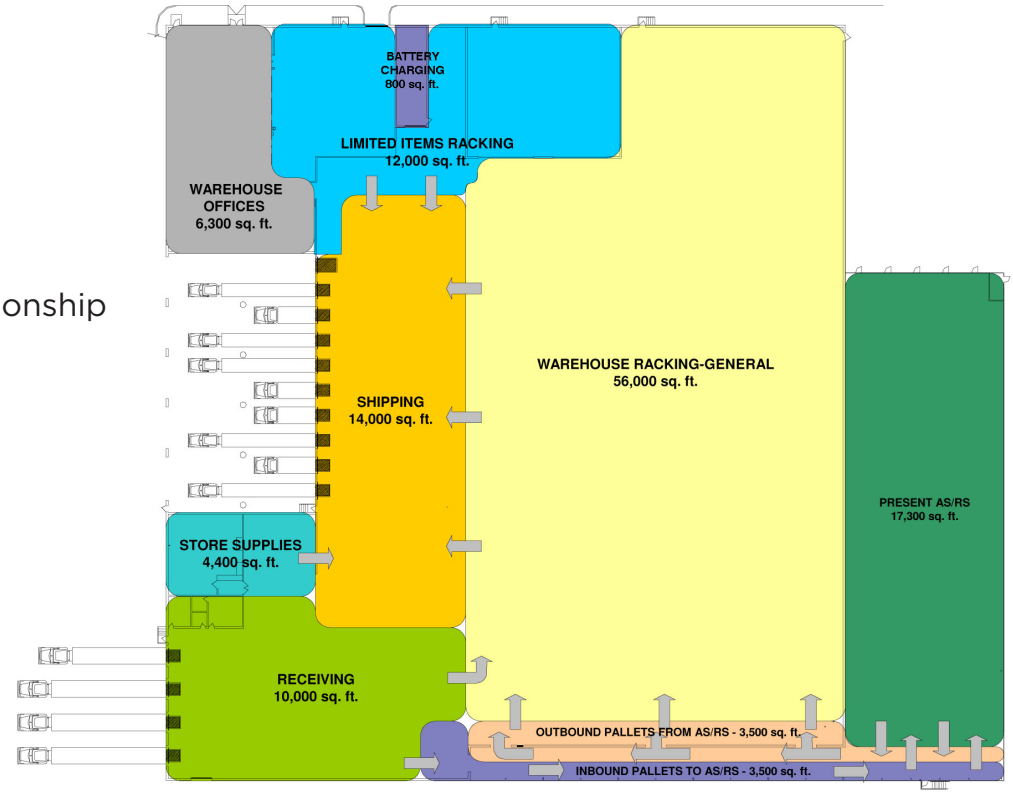
Replacement of Damaged Rack Components
There are damaged uprights and beams within the present Pallet Rack areas, estimated by the Material Handling Equipment Consultant to be 15% of the existing components. The existing system will require a review by the Material Handling Equipment Consultant during project design, in order to identify those components that will require replacement.

Code Compliance
To ensure that the revised rack configuration meets current code requirements, an evaluation must be completed by a Registered Professional Engineer. This evaluation will include seismic calculations and RMI Code compliance as well as any other local code requirements.

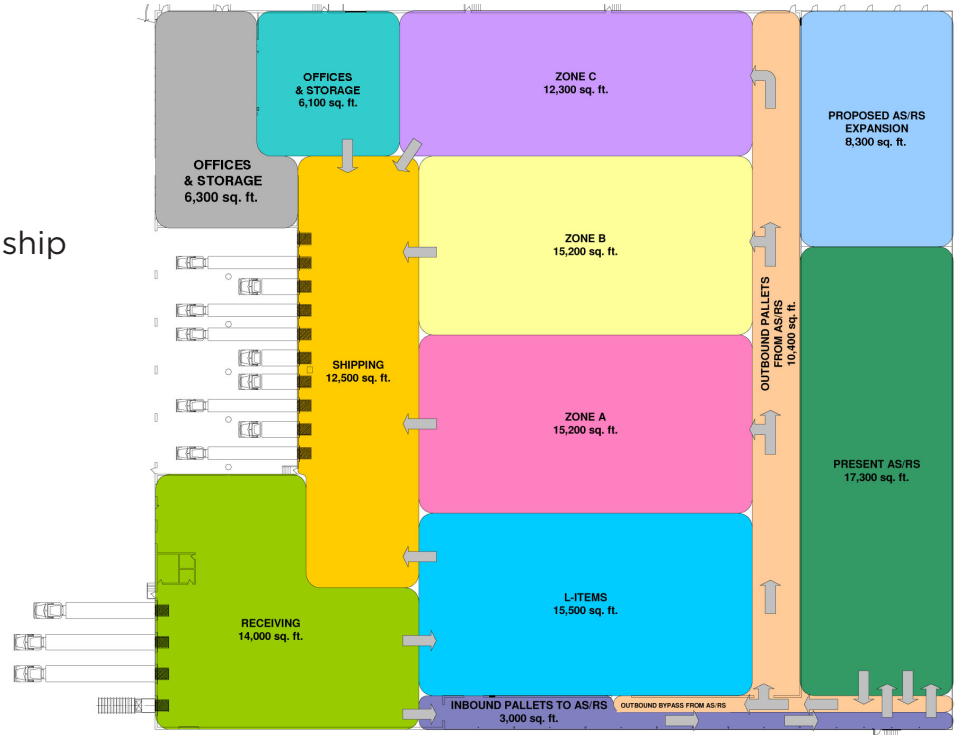
Racking Relocation Schedule
The racking relocation work will take place after remodeling of the northwest portion of the warehouse, which will include the demolition of the existing Wine Storage and Battery Charging rooms.

A relocation schedule will be developed by the Material Handling Equipment consultant to ensure that the rearrangement and relocation of the pallet racks will not interfere with the daily warehousing activities. Daily store delivery services cannot be interrupted during the implementation period.

Area Relationship Existing



Area Relationship Proposed



Warehouse Racking Structure

Existing Pallet Rack Layout
There are 740 Pallet Rack Sections within the existing warehouse configuration.

These racks are located as follows:

Wine Room #1	35 sections
Wine Room #2	54 sections
General Warehouse	622 sections
Miscellaneous	29 sections
Total	740 sections

Existing Rack size and configurations:
- Nominal 42"D x 99"c/c x 18'-0"H
- Store 4 loads high – floor plus 3 levels
- Pallet Load – 3,000 pounds maximum
- Racking provide case and pallet storage capability

Proposed Pallet Rack Layout
The proposed layout will provide approximately 740 Pallet Rack Sections.

The racks will be relocated as follows:

Zone A	200 sections
Zone B	200 sections
Zone C	160 sections
L-Items	180 sections
Total	740 sections

Relocated rack size and configuration:
- Nominal 42"D x 99"c/c x 18'-0"H
- Store 4 loads high

Pallet Storage System Similar to that Proposed for the DABC Warehouse.

C. Pallet Storage System

In order to consolidate storage space for empty (blue) pallets within the facility, storage racks for the pallets will be installed above the truck dock door openings.

The racks must be kept clear of the doors in the open position, as well as associated hardware.

It is likely that structural modifications to the building will be necessary to support the rack system. During the design phase of the project, the structural engineer will need to analyze what modifications, including possible floor-mounted columns, will be required.

The empty pallet storage racks will be located on the west wall as follows:

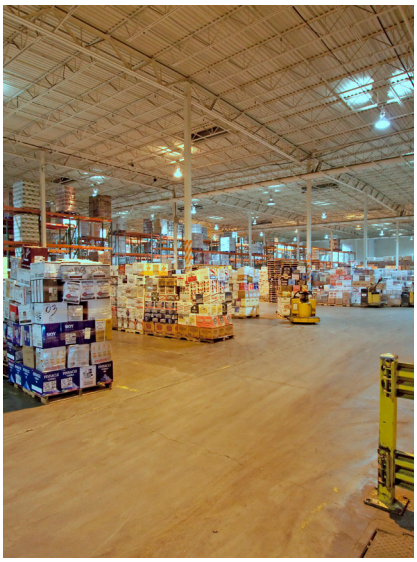
- Racks extend from Col. Line #9 through Col. Line #12
  Approximate length of 64' – (approx. 16 pallet stacks @ 4' W)

- Racks extend from Col. Line #4 through Col. Line #7
  Approximate length of 108' – (approx. 27 pallet stacks @ 4' W)

- Racks adjacent to Col. Line #8
  Approximate length of 36' (approx. 9 pallet stacks @ 4' W)

Pallet Description:
Buckhorn Pallet #PU48400633
Plastic with steel reinforcement
48" W x 40" L x 5" H
Weight-70 pounds

Pallet stacks will be approximately 30 pallets high.



D. Equipment outside Project Scope (for Reference Only)

The equipment listed in this section will be used in the remodeled warehouse but is outside the project scope. The DABC will purchase and install the equipment directly. This information is provided for coordination purposes only. Electical requirements for the lift truck chargers (number 4 below) are in Section 5.c.

1. Automated Depalletize – Palletize Stations utilized to transfer loads from wood pallets or slip sheets onto AS/RS (blue) pallets.

2. Chain driven, live roller, Induction Conveyor upgrade including hardware and controls.

3. Retrieval Conveyor upgrade and transfer to the new retrieval Conveyor System. Base system shall be a chain driven live roller Sortation System with an alternate option to include ATV's, AGV's or other equipment that will meet and support present and projected throughput requirements.

4. Lift Trucks, including batteries and opportunity charging equipment.

Type	**Qty.**
Man-Up Order Picker Trucks With Wire Guidance Battery & Charger for each Lift Truck Capacity – 3,000 lbs. @ 200" Lift Height @ 24" Load Center Volts – 24 volts Top Storage Shelf – 216" Mast Type – 3 Stage Overall Collapsed Height – 107"	8
Narrow Aisle Reach Trucks Battery & Charger for each Lift Truck Minimum Requirements: Capacity – 3,000 lbs. @ 231" Lift Height @ 24" Load Center Volts – 24 volts Top Storage Shelf – 216" Mast Type – 3 Stage Overall Collapsed Height – 100"	4
Counter Balanced Fork Trucks (Sit Down) Battery & Charger for each Lift Truck Minimum Requirements: Capacity – 3,000 lbs. @ 228" Lift Height @ 24" Load Center Volts – 36 volts Top Storage Shelf – 216" Mast Type – 3 Stage Overall Collapsed Height – 84"	3
Walkie-Rider Pallet Trucks Battery & Charger for each Pallet Truck Minimum Requirements: Capacity – 6,000 lbs. @ 24" Load Centers Volts – 24 volts Fork Length – 48" Fork Lift Height – 6" End Rider, with Stepless Acceleration	10

5. Order Picker Truck wire guidance system and controls.

   Wire Guidance System With Line Driver 1
   For Man-up Order Picker Truck
   Approximately 7,600 linear feet of wire

6. Pick to Voice Picking System, including hardware and software.

7. Equipment supported mezzanine, approximately 6,100 sq. ft. to be utilized for Store Transfers and Store supplies, including a spiral delivery conveyor from the mezzanine level to the main floor.

Examples of Rider/Lift Trucks to be Used in Warehouse.

E. Description of Operations (for Reference Only)

Receiving Dock
Product is unloaded from Receiving trailers in either full pallet or individual carton quantities.

The ESCALADE E1 (GERS) (General Electric Retail System) determines the number of pallets that are to be stored in the AS/RS (overstock) or in the General Warehouse pallet rack (home) location.

Pallets for the AS/RS will meet the following requirements:

1. One SKU per pallet
2. Palletize on AS/RS (blue) pallets only
3. Maximum loaded pallet size-50"W x 42"L x 72"H
4. All pallets to be uniformly stretch-wrapped
5. Partial pallet loads are acceptable
6. Maximum pallet load weight – 3,000 pounds

Product is normally received into the facility on wood pallets or slip sheets. A pallet load may be a single SKU or multiple SKU's.

Loads requiring special handling, such as mixed pallets, would be processed at an off-line manual work station. L-Items (limited wines) would be processed and moved into the pallet rack area from special handling.

Oversize pallet loads that are intended for the AS/RS will be re-palletized at the off-line, manual work station prior to processing for induction. These re-palletized loads will be re-directed to the AS/RS upon completion.

Solid SKU pallets (one SKU per pallet) will be moved to an automatic de-palletize / palletize work station. At this station, loads will be automatically removed from the wood pallets or slip sheets and placed onto the AS/RS (blue) pallets. Two (2) of these stations will be provided to meet peak receiving periods.

Product that has been re-palletized and sized for the AS/RS will be moved to the AS/RS Induction Conveyor system.

Loaded pallets index on the conveyor to the ESCALADE E1 (GERS) induction station. A load ID label and home location label is printed and attached to each pallet. Pallets travel via conveyor through a pallet sizing station to verify proper size and ensure there are no load interferences. Any pallet load not meeting the specified size criteria will be diverted to a reject spur for rework

Properly sized loads travel to the AS/RS induction area via the pallet conveyor. The existing pallet conveyor does not allow for accumulation of pallets and will be required to be replaced. The proposed upgrade of the inbound conveyor will provide approximately 180'-0" of pallet accumulation with approximately 5'-0" accumulation zones.

Inbound AS/RS
As loads travel via the conveyor, each pallet is assigned in round robin order to one of five put-away SR Machines (SRM) for put-away in the AS/RS racking systems. Each pallet load ID Label is scanned prior to the point where loads transfer to the AS/RS mainline conveyor and is utilized to identify and control location and movement of the pallet throughout the AS/RS put-away process.

The ESCALADE E1 (GERS) receives information about each pallet that is put into inventory and the SRM stores each pallet in the AS/RS rack based on the information sent to the ESCALADE E1 (GERS) system. The Warehouse Rx server and the Daifuku Think & Do Control Systems communicate with ESCALADE E1 (GERS) throughout the induction, put-away and record generation process. The Warehouse Rx assigns a storage location and issues a store command the AS/RS cranes.

The SRM picks up a pallet and stores the pallet in the AS/RS rack system.

Outbound AS/RS
When store orders are released to be picked, the ESCALADE E1 (GERS) generates retrieval requirements and transmits the retrieval task to the Oracle Database. These transactions are used by Warehouse Rx to poll the database for new orders in the order header table. Order allocations are based on (FIFO) First in, First out rules. Orders are rounded down to the nearest whole pallet quantity or rounded up to one full pallet quantity. A Retrieval command is issued and the SRM retrieves loads and deposits them on the outbound conveyor.

The AS/RS conveyor system will deliver pallets to the sortation conveyor system. Each load will be identified to the proper zone to be released to. The sortation conveyor will deliver replenishment pallets to any one of three (3) forward General product pick zones.

Zone A	Fast moving SKU's
Zone B	Medium moving SKU's
Zone C	Slow moving SKU's

Pallet loads will be diverted from the sortation conveyor onto one of three accumulation spurs (one spur for each zone). Each spur will have capacity to queue 8 pallets. Each load will be transferred to these areas and will wait for pick-up by a replenisher working in that zone.

The sortation conveyor will provide maximum pallet load accumulation capability. The equipment supplier may submit an alternate solution (ATV, AGV or other) for pallet delivery from the sortation conveyor to the zone accumulation spur area.

The proposal shall include a cost for the conveyor system (base bid) and a cost for the recommended alternate solution, for review by the DABC project team.

Full pallets are transferred to the proper Pick Zone spur for movement via lift truck to the Home Location.

Pallet Replenishment
A Reach Truck will be used to remove full pallets from each Pick Spur. Each zone will have a dedicated lift truck operator for replenishments. The operator will identify the pallet load and will store the pallet in the proper location for this product. This process will continue for each of the zones until all loads have been properly stored for picking.

Order Picking
Order Picker trucks will be utilized to pull less than full pallet loads from the Pallet Rack Storage Areas. Store orders are currently picked by RF terminal. During the picking process, each operator will be directed to the next location. Upon completion of all required inventory picks, an operator will move the completed pallet to one of six stretch wrapping machines located on the shipping dock. When the pallet load has been placed on a stretch wrapping machine, the picker will be available to start the next store order.

Each of the four zones in the general warehouse will be properly manned. If an emergency replenishment is required, only one picker will take the responsibility to complete this task. Upon completion of the emergency replenishment, this operator will be available to begin picking store orders.

The Order Picker Trucks will include wire guidance controls. A Wire Guidance system will be furnished and installed throughout all four (4) pick zones, including:

L-Items
Zone A
Zone B
Zone C

Recommendations for improvements in the pick operations are:

- Implement a Voice Directed Pick System.
- Provide Wire Guided order picking trucks to all pickers.
- Dedicate a second shift for picking all store orders the night before.
- More frequent deliveries to each store throughout the week.
- Eliminate DABC-owned delivery trucks.
- Select Old Dominion or LTL as primary carrier to handle all store deliveries.
- Selected LTL Carrier to provide dropped trailer for staging orders during picking shift.

Shipping
Based on the recommendation that has been made to improve the picking process, the following would be a possible suggestion for handling store shipments.

As pallet loads are stretch wrapped, dock operators utilizing power pallet jacks will move them from the stretch wrapper to the proper staged LTL truck for delivery. By wrapping each load as it completes the picking process and power jack loading trailers, the dock area would be used as a transition area instead of an area for the staging of orders.

Warehouse Operating Hours:
Monday – Thursday 5:00 AM to 3:00 PM
Receiving, AS/RS Outbound, Replenishing, Picking & Shipping

Monday – Thursday 2:30 PM to 10:00 PM
AS/RS Inbound & Replenishing

Friday – 5:00 AM to 3:00 PM
Lite Receiving, AS/RS Outbound, Replenishing, Picking & Shipping

System Optimization
Machine optimization rules are intended to maximize SRM utilization activity. Under present conditions, SRM activity is based upon the following:

1. AS/RS Inbound period - 11:30 AM to 10:00 PM Monday - Thursday
2. AS/RS Inbound-Peak period - 12:00 PM to 2:00 PM Monday - Thursday

3. AS/RS Outbound period – 5:00 AM to 3:00 PM Monday - Friday
4. AS/RS Outbound-Peak period – 5:00 AM to 7:00 AM Monday - Friday

Refer to Section F. – System Transition Criteria

AS/RS System Guidelines

System Transaction Criteria (10% increase per year)

YEAR	AS/RS Inbound Transactions		AS/RS Outbound Transactions	
	Average/Day	Peak/Hr.	Average/Day	Peak/Hr.
2008	123	121	120	43
2009	135	133	132	47
2010	148	147	145	52
2011	163	162	159	57
2012	180	178	175	63
2013	197	195	193	69

Based on a 9.5 hour work day.

Receiving Dock Area

05 Utah DABC Warehouse Expansion & Remodel
Building Systems

This section contains information prepared by the programming engineering consultants regarding the building systems:

A. Structural. General design criteria; AS/RS expansion considerations; possible warehouse roofing and wall modifications; and requirements for the new pallet storage racking and the reorientation of the existing warehouse racking.

B. Mechanical. Existing HVAC system modifications; smoke vent replacement; dock door enhancements; AS/RS expansion HVAC considerations; plumbing requirements; and fire protection system requirements.

C. Electrical. Electrical codes, standards and design objectives; electrical utility feed recommendations; electrical distribution considerations; emergency power requirements; power quality recommendations; lighting replacement and controls requirements; and fire alarm, security/access control, and voice/data and communications systems requirements.

Structural

Project Overview

This programming information is related to the structural implications of the expansion of the Automated Storage and Retrieval System (AS/RS) and modifications to the existing warehouse facility to accommodate a new and improved workflow.

General Structural Design Criteria Considered

- Governing Building Code: 2006 International Building Code (IBC)

- Roof Live Loading:
  - Roof Live Load: ——————————————————20 psf
  - Roof Snow Load: ——————————————————30 psf + Drift per IBC
    - Ground Snow Load, P_g: ——————————————43 psf
    - Importance Factor, I_s: ——————————————1.00

- Seismic Design Criteria and Parameters:
  - Occupancy Category: ——————————————————Category II
  - Basic Seismic-Force-Resisting System: ——————————Masonry Shear Walls
  - Importance Factor, I_E: ——————————————————1.00

- Wind Design Criteria:
  - Basic Wind Speed (3-second gust): ——————————90 mph
  - Importance Factor, I_w: ——————————————————1.00
  - Exposure Category: ——————————————————C-Open Terrain

AS/RS Addition

- It is proposed that a new AS/RS system be placed directly to the north of the existing AS/RS system. It is intended that the new facility will be an independent structure similar to the existing. Depending on rack system manufacturer's recommendations, it is likely that a seismic separation joint will not be required, as the new racks will tie directly into the existing racks, thus making the entire AS/RS system a single facility.

- Addition of the new AS/RS facility will require similar construction to that of the existing. Foundations that support the rack system will likely be a deep foundation/pile system. The building-supported rack system is to be designed by the manufacturer.

Existing Warehouse Modifications

- The existing evaporative cooler units currently placed on the roof will be removed and replaced with new air conditioning/air-handler units. These units will add weight to the existing roof structure, which will require reinforcing of the existing open web steel joists and girders. It is recommended that these new units be placed as close to an existing column as possible, with the long side of the unit running in a north-south direction to help distribute the load over as many structural roof elements as possible, thus minimizing the amount of reinforcing.

- It is proposed to add new rigid insulation while replacing the roof. This new insulation adds approximately 5-8 pounds per square foot to the existing roof loads. It appears from preliminary analysis that the roof system has adequate capacity to carry the additional loads imposed by the insulation, and thus no reinforcing is required.

- Three new dock doors are proposed to be installed at the southwest end of the existing loading dock area. The new openings in the existing masonry wall will likely need to be reinforced. During the design process, the seismic implications from placing new openings in existing perimeter/shear walls will need to be thoroughly investigated.

- As an option to add more natural light to the existing facility, it was proposed that existing roof smoke vents be replaced with combination skylight-smoke exhaust vent units. If the new skylights remain the same size as the existing vents, no additional structural reinforcing or work will be needed.

- A new storage rack above the existing west loading dock area will be used to store empty pallets. This new storage rack system will incorporate new steel columns placed between each dock door opening, and will run from floor to roof level. Any existing columns that will support this new rack system will need to be reinforced. It is not anticipated that a new footing will be required under the new columns, as they likely will connect directly to the floor.

- As part of the equipment provided directly by DABC, a new mezzanine will be constructed east of the existing restroom area in the northwest corner of the warehouse. The existing warehouse may have been designed to accommodate a future mezzanine in this area. The existing structural drawings do not appear to have any notes, or definitive information regarding its capacity to carry a new mezzanine. From field observations and existing structural layout, it appears possible to lay out a new mezzanine in this area. During the design phase, the structural engineer will need to determine the capacity of the existing elements, and the necessary reinforcing (gravity and lateral) that may be required.

- The existing rack system layout is being re-configured to run perpendicular to the existing aisles. By relocating these racks, a portion of them become supported by a thinner concrete slab on grade. A previous investigation and design was completed for DABC with recommendation from Structural Design Studio, Inc. to modify the base plate size of the existing racks to distribute the load out on the thinner slab.

Mechanical

Warehouse HVAC System

The existing warehouse is cooled by two large direct evaporative cooling air handlers located on the roof. These units are near the end of their useful life and will need to be demolished as a part of the Warehouse upgrade.

The DABC has determined that the product in the warehouse must be maintained at a nearly constant temperature in order to meet the product quality criteria and shelf life requirements of the product suppliers. Therefore, the upgraded warehouse will include new DX cooling- gas heating, rooftop equipment to maintain the space temperature at 68°F±5°F measured at 4 foot intervals from floor to the roof on a continuous basis. These conditions shall be maintained with outside ambient conditions between 6°F and 97/62°F.

The L-items and beer are currently sorted in the closed-off rooms along the west wall and are cooled by DX rooftop units. These units can be demolished when the rooms are demolished. The Owner may wish to leave the rooftop units in place and cap the ducts inside the building in case there is some future need to reactivate the units to supplement the new DX cooling system.

The new rooftop air conditioning units shall be located near existing columns to reduce the impact on the existing roof structure. The unit shall operate with a minimum outside damper position of 10% to maintain a positive air pressure in the warehouse while providing ventilation air to the occupants. The air distribution ducts for the new rooftop units should be sized to create enough air velocity to mix the warehouse air rapidly to provide an even temperature through the warehouse.

The warehouse upgrade will include the replacement of existing smoke vents in the warehouse roof with translucent skylights to provide some day-lighting as well as replacement of the existing lighting system. The roof insulation will also be increased so the new loads will need to account for these modifications to the existing conditions.

Occupancy sensors should be installed on the wall outside and above truck dock doors to open/close the doors when trucks arrive/leave to reduce infiltration.

AS/RS HVAC System

The HVAC system for the expanded AS/RS building will require the addition of another large packaged rooftop unit located on the high roof along with circulation fans and ducted in a similar fashion to the existing AS/RS HVAC system.

The proposed mechanical system is primarily an air-turnover system with rooftop units providing conditioning injection and depends upon air momentum, stagnation pressure and displacement ventilation to provide conditioning of the space. The air-turnover propeller fans and rooftop units work in a parallel fashion. The air-turnover propeller fans should operate continuously to combat stratification in the storage area. The rooftop units should start and stop to provide heating and cooling as required. All equipment should be located above the roof to minimize conflict with rack storage and allow maintenance access.

The air-turnover portion should be located along the longitudinal centerline of the project. Return air should be drawn from near the quarter point of this axis on the north and south ends. Return air is ducted from this point, over the roof, through the air-turnover propeller fan, blown past the mixing chamber to the supply duct. The supply duct terminated 20'-0" below the roof, approximately on fifth elevation of the building.

The discharge velocity during turnover operation should be a minimum of 2100 FPM, and during conditioning a minimum of 2800 FPM. The proper function of the system depends upon an unrestricted throw to the floor where the velocity pressure will stagnate and cause a pressure increase at the floor level and utilize the space between the end of the racks and the exterior walls to distribute the air. This air will then be forced through the racks and aisles. Natural ventilation will cause even temperature distribution throughout the storage space.

The new temperature control system shall be fully integrated with the existing DDC system by TAC and shall have an open proto-call interface (BACNet or LON) with the Convia lighting control system.

AS/RS Plumbing System

A new sump and submersible sump pump is required to remove water from the ASRS warehouse floor should there be a leak in the fire sprinkler system. This sump pump will need to discharge to the nearest sanitary sewer. Locate the sump just north of the existing AS/RS in the new floor of the AS/RS additional.

New floor drains should be installed in the new AS/RS floor and piped to this new sump to facilitate drainage.

AS/RS Fire Protection System

The existing fire sprinkler system will need to be expanded into the new AS/RS area utilizing the same ESFR sprinkler heads and fire pump that serve the existing AS/RS area.

Design and construction of the new system will be to be accomplished in a way that allows the existing AS/RS fire protection system to be maintained in an operational state except during the tie-in.

Electrical

Codes and Standards

Codes which are applicable to the design of the electrical systems are listed below. Comply with each of the latest adopted publications.

ASHRAE 90.1 Energy Code
DFCM, Division of Facilities Construction and Management, Design Criteria
IBC, International Building Code
IESNA, Illuminating Engineering Society of North America
NFPA, National Fire Protection Association (applicable sections including but not limited to):
NFPA 70, National Electrical Code
NFPA 72, National Fire Alarm Code
UL, Underwriter's Laboratories
Utah State Fire Marshal Laws, Rules and Regulations

Electrical Design Objective

The electrical systems design shall coordinate with architectural, mechanical, product distribution planning and other design elements to provide electrical service to design elements. Electrical design shall concentrate on the following objectives: energy efficiency, comply with all applicable codes and standards, fulfill the electrical functional requirements of the project, allow for future expansion and provide systems that will be easily maintainable.

Electrical Site Utility Systems

The serving electrical utility company to the existing facility is Rocky Mountain Power (RMP). Existing electrical service to the warehouse consists of three services: (1) a 1600 Amp, 480 V, 3 phase service at the northwest corner of the building, (2) a 1200 Amp, 480 Volt, 3 phase service at the southeast corner and (3) a 200 Amp, 480 Volt, 3 phase service at the southeast corner of the building for an existing fire pump. Service 1 serves the main body of the warehouse, service 2 serves the existing automated storage and retrieval system (ASRS) on the east side of the building and as noted service 3 serves only a fire pump for the existing ASRS area.

Electrical design shall eliminate the 1600 Amp service at the northeast corner of the building. This service is fed from a transformer that is shared with the DABC Administration building but shall be re-fed from and expanded service at the southeast corner of the building. Replace the existing 1200 Amp service equipment at the southeast corner of the building with larger rated service equipment sized to re-feed the main body of the warehouse (including new equipment and HVAC loads) and to continue feeding the existing and expanded ASRS area. The exiting service for the fire pump shall remain unchanged unless it is determined that the fire pump needs to be changed in size or location.

Currently the warehouse and administration buildings are served from overhead Rocky Mountain Power lines along the current north property line. This overhead line extends from the northeast corner of the current property line to approximately the northeast corner of the administration building with 15kV nominal underground drops to utility transformers at the southeast corner of the warehouse and at the north side of the administration building. This overhead line will conflict with the ASRS expansion and future buildings. Coordinate with Rocky Mountain Power to have the overhead line removed and replaced with an underground line or to re-feed the administration building from 900 West.

Normal Power Distribution

Power shall be distributed throughout the facility from the expanded 277/480V -3Ph-4W service entrance at the southeast corner of the warehouse. In general lighting, HVAC equipment, miscellaneous motors and heating loads shall be served at 277/480V. New general purpose receptacles shall be served from 120/208V-3Ph-4W panelboards via dry type transformers.

Metering shall be installed in all new 277/480V and 120/208V distribution switchboards and distribution panelboards. Metering shall be digital type with demand and energy functions. Provide capability for interfacing the meters with the building management system.

New distribution panels and power panels shall be circuit breaker-type and shall be sized to accommodate the actual load as well as a projected additional 25% spare capacity. Loads on existing distribution and branch circuit panelboards shall be calculated and limited to 80% of panelboard capacity. New lighting and power branch panels shall be commercial-type with bolt-on circuit breakers. Branch panels shall have a master-keyed flush tumbler latch and hinged trim to allow entire front cover to swing open for easy maintenance. Overcurrent protection devices shall be selectively coordinated with supply side overcurrent protective devices. Selective coordination studies shall be performed by licensed professional engineers. Circuit breakers shall be fully rated except that series rated devices may be used for branch breakers and an upstream main within the same panel or switchboard. Bussing shall be copper.

New transformers shall be standard high efficiency, NEMA TP1 dry-type rated for 115° C rise. Windings shall be copper. K-rated transformers shall be utilized in areas where loads predominately consist of "non-linear" loads. Transformers rated 75 kVA or smaller may be wall or floor-mounted. Transformers rated 112.5 kVA or greater shall be floor-mounted.

Transient voltage surge suppression (TVSS) shall be provided at the new service equipment and on the load side of each new step-down transformer in the facility. TVSS units may be integral to the panel-board or switchboard, or individually mounted stand-alone units. However, if individual units are used, they shall be placed immediately adjacent to the panelboard or switchboard to minimize the effects of increasing clamping voltages due to excessive lead lengths.

Wiring devices shall be 20-ampere minimum. Disconnect switches shall be heavy-duty type. Exterior switches shall be rain-tight. Disconnect switches for packaged HVAC equipment shall be fusible.

HVAC equipment shall be controlled by VFD's, individual motor starters and motor starters mounted in motor control centers per the mechanical program. VFD's shall include factory-mounted harmonic filtering within the enclosure to limit the total input current harmonic distortion to 15% or less. Motor starters shall be NEMA rated. Each magnetic motor starter shall include a hand-off-auto (H-O-A) switch, auxiliary contacts, a control power transformer, and a motor running pilot light. Each starter shall have a minimum inrush rating of 140% of that for a standard motor to meet the NEC requirement for use with energy efficient motors.

Branch circuits shall be loaded to no more than 80% of what is allowed by NFPA 70. Where outlets are intended for a specific piece of equipment, the load of the outlet shall be based on the equipment nameplate. Otherwise, allow no more than 6 convenience outlets per. Outlets with dedicated branch circuits (one outlet per circuit) are required for vending machines, copy machines, break room counters, and other locations likely to have equipment requiring dedicated circuits. Each branch circuit homerun shall have no more than 3 circuits per raceway. All 120V branch circuits serving harmonic producing equipment shall be provided with an oversized neutral.

The electrical power distribution system shall be grounded in accordance with the NEC. The ground bus at the main service equipment shall be connected to the water service, a concrete-encased electrode, and building steel. The grounding system shall be installed in strict accordance with NEC article 250. All transformers shall have the neutral of the derived system bonded to building steel, the nearest metal water pipe, and the transformer case. An insulated equipment grounding conductor shall be installed with feeders and branch circuits. Metal raceways, boxes, equipment, receptacles, and light fixtures shall be bonded to the equipment grounding system. All grounding systems shall be bonded together per NEC requirements.

All conductors shall be copper. Conductors for branch circuits shall be minimum size of # 12 and sized to prevent voltage drop exceeding 3% at the farthest load. The total voltage drop on both feeders and branch circuits shall not exceed 5%. When calculating the voltage drop, the load shall be assumed to be 80% of the ampacity of the branch circuit and feeder conductors. Insulation shall be THWN-2 or XHHW rated for 90° C; however, design shall be based on the 60°C rating for conductors #1 AWG and smaller and the 75°C rating for #0 AWG and larger. Four-wire feeders, where neutral is considered a current-carrying conductor, shall have an additional 80% derating. All conductors, including neutrals and grounding conductors, shall be color-coded.

All wiring shall be in raceways, minimum 3/4" conduit for power and minimum 1" conduit for communications. Galvanized rigid steel conduit (GRC) or intermediate metal conduit (IMC) shall be used for exposed exterior work where subject to damage.

A fault current and coordination study shall be performed by a licensed electrical engineer to indicate available fault current at all points in the building distribution systems and shall address fault interruption ratings of existing equipment. Equipment shall be adequately rated for the amount of available fault current. System coordination shall be studied, and fuses or breakers selected to ensure minimum system outage due to overloads or fault currents. Breakers with adjustable long time, short time, instantaneous and/or ground fault settings shall be set at levels for optimum system coordination.

Emergency Power Distribution

An existing emergency generator is located adjacent the existing main electrical room near the northeast corner of the warehouse. It shall be removed and salvaged to owner. A new outdoor diesel-driven generator shall be provided to accommodate emergency power. It shall be sized to include egress and exit lighting and standby power for 100% of building electrical load including all new equipment and HVAC loads (shall not include the fire pump). Separate automatic transfer switches shall be provided for Emergency Standby and Optional Standby loads.

The generator shall be 277/480, 3phase, 4 wire and shall be located outside in a sound attenuated, weatherproof enclosure with a critical silencer. The fuel tank shall be skid-mounted, dual-wall in accordance with EPA guidelines and sized for a capacity of 12 hours of fuel consumption at 100% load. Generator exhaust shall meet current EPA exhaust requirements for non-road engines.

The emergency systems shall be designed in accordance with the NEC. The emergency system shall be divided into at least two branches: Emergency and Optional Standby branches both on generator back up.

The Emergency Branch shall consist of loads including egress lighting and exit signs, fire alarm, and automatic doors required for egress.

The Optional Standby Branch shall serve all other building power and lighting systems and equipment desired to be on generator back up.

Uninterruptible Power Supplies, where needed, shall be provided by the Owner or end users for a particular space or piece of equipment.

Power Quality

A power quality study shall be performed by a licensed professional engineer specifically for power serving the ASRS system. There is a history of some power quality problems leading to CPU failure on the ASRS controllers. Design filters and make changes to existing power distribution system as necessary to correct existing power quality issues.

Lighting

Existing warehouse lighting shall be replaces with new energy efficient luminaries. Rocky Mountain Power incentives for energy efficient fixture replacement shall be pursued. Fluorescent lighting units shall be used for general warehouse lighting and shall use T5 28W lamps with narrow distribution for aisles and broad distribution for open areas. ASRS lighting for maintenance shall match existing ASRS maintenance lighting.

All required egress and exit lighting shall be connected to the emergency generator. New LED exit signs shall be used for all exit signage.

The lighting system design shall consider occupant needs, visual tasks to be performed, the desired appearance of the respective space and energy / economic constraints. The lighting design shall comply with the Recommended Practices of the IES North America and energy codes. Foot candle levels must be sufficient for tasks performed by warehouse employees, especially in the aisles and receiving and shipping dock areas.

A new lighting control system shall be included in the design and shall be a microprocessor based programmable relay system. The lighting control system shall communicate with the new central building management system. Control schedules and operation stations shall be coordinated with the owner during design development.

Daylight harvesting controls shall be provided in areas where skylights are being added.

Current warehouse lighting levels as measured by the Material Handling Equipment consultant in 2008:

Foot Candles: 13 FC Lower
Foot Candles: 33 FC High

Aisle Foot Candles: 16 FC Low
Aisle Foot Candles: 22 FC High

Fire Alarm System

The existing facility fire alarm system shall be replaced with an intelligent microprocessor-based, addressable fire alarm system complete with addressable control relays. The system shall have sensitivity monitoring and adjustment of all smoke detectors.

Addressable manual stations shall be provided at each exit from the building. Smoke detectors shall be provided for HVAC system control and other areas required by code.

Audible/visual evacuation signals shall be visible in the evacuation path. Signals shall be located per NFPA and other applicable codes. Signals shall also be installed in toilets and common use areas. An additional signal shall be located on the exterior of the building.

HVAC systems shall be provided with duct detectors as required by code. Relays shall be provided to shut down each air handling unit in response to an alarm generated by its associated detector. Circuits for fire dampers shall be controlled by the fire alarm panel so dampers close upon smoke detection at the serving air handling unit or in the space served.

Fire sprinkler system shall be monitored for flow and valve position. The fire pump controller shall be monitored for power availability, pump run status, and trouble conditions. All fire alarm wiring shall be installed in raceways.

Security/Access Control System

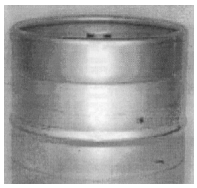
Security and access control systems will be designed and installed under the direction of the Owner. Empty raceway shall be provided in this contract for security and access control systems.

Voice/Data and Communications System

Voice/data systems will be designed and installed under the direction of the Owner. Empty raceway shall be provided in this contract for security and access control systems.

Estimate for New Material Handling Equipment Power Requirements

Lift Truck Equipment		
Order Pickers 36 Volt		
Order Picker Trucks with Wire Guidance (Qty. 8)		
Battery and Charger (Qty.8)	required per charger	480 Volt / 3 PH / 30 Amps
Wire Guidance System with Line Drivers		120 Volt / 20 Amp Service
Narrow Aisle Reach Truck 36 Volt		
Narrow Aisle Reach Truck (4) (W/Side Shift)		
Battery and Charger (4)	required per charger	480 Volt / 3 PH / 30 Amp
Counterbalance Fork Truck (Stand Up) 36 Volt		
Counterbalance Fork Truck (3)		
Battery and Charger (3)	required per charger	480 Volt / 3 PH / 30 Amp
Walkie / Rider Pallet Truck 24 Volt		
Walkie / Rider Pall Truck (10)		
Battery and Charger (10)	required per charger	480 Volt / 3 PH / 30 Amp
Pallet Transfer Station		480 Volt / 3 PH / 200 Amps
W/(2) In Line Stretch Wrapping Machines		
Inbound AS/RS Pallet Conveyor Upgrade and Extension		
Inbound Conveyor Loads		480 Volt / 3 PH / 30 Amps
Outbound Convery Loads		480 Volt / 3 PH / 60 Amps
STV and Outbound Conveyor Systems (Daifuku Solutions)		90 kVA
New Shipping Dock Stretch Wrapping Machine		115 Volt / 20 Amps



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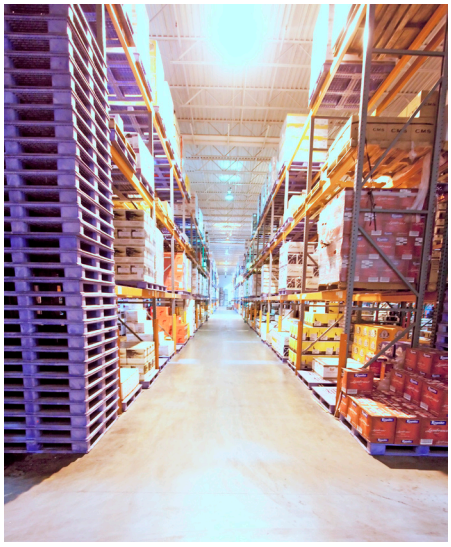
Utah DABC Warehouse
Expansion & Remodel

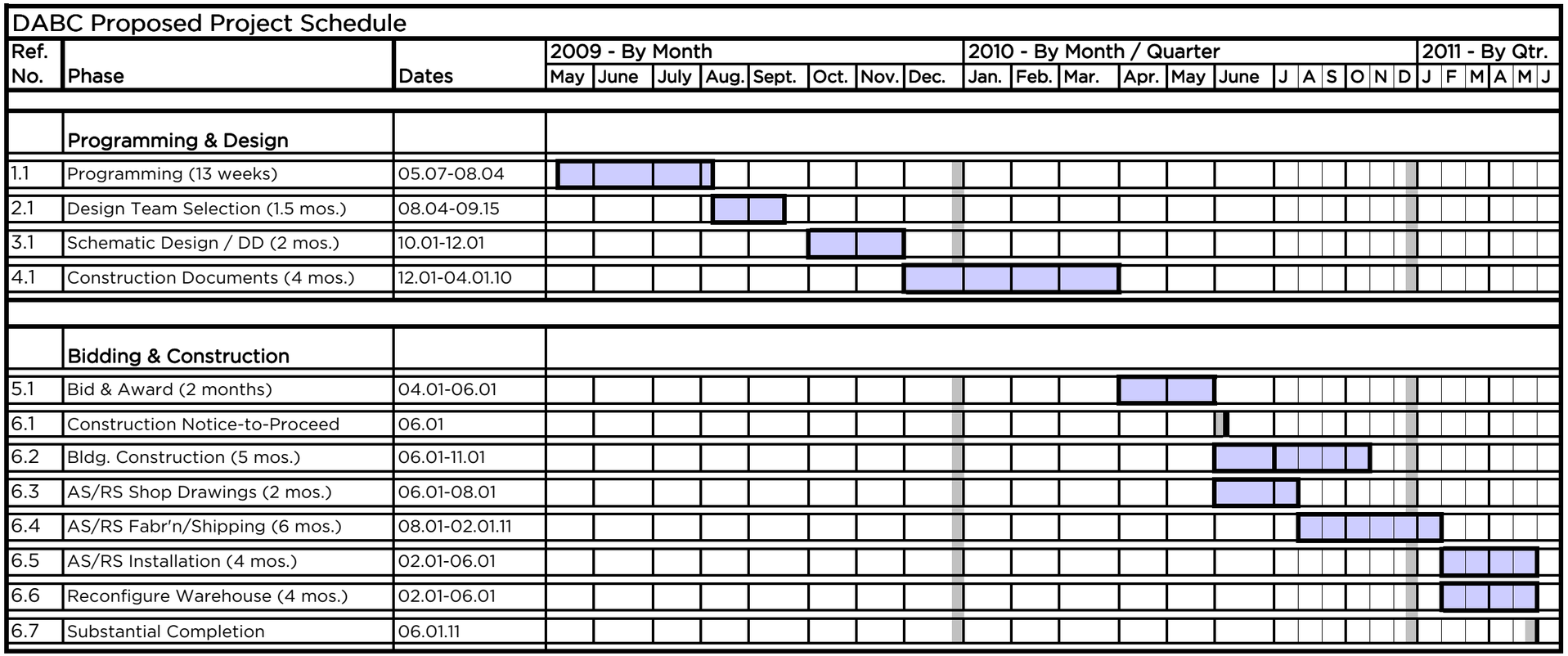
Schedule



Schedule

DABC Proposed Project Schedule

Ref. No.	Phase	Dates
	Programming & Design	
1.1	Programming (13 weeks)	05.07-08.04
2.1	Design Team Selection (1.5 mos.)	08.04-09.15
3.1	Schematic Design / DD (2 mos.)	10.01-12.01
4.1	Construction Documents (4 mos.)	12.01-04.01.10
	Bidding & Construction	
5.1	Bid & Award (2 months)	04.01-06.01
6.1	Construction Notice-to-Proceed	06.01
6.2	Bldg. Construction (5 mos.)	06.01-11.01
6.3	AS/RS Shop Drawings (2 mos.)	06.01-08.01
6.4	AS/RS Fabr'n/Shipping (6 mos.)	08.01-02.01.11
6.5	AS/RS Installation (4 mos.)	02.01-06.01
6.6	Reconfigure Warehouse (4 mos.)	02.01-06.01
6.7	Substantial Completion	06.01.11



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Utah DABC Warehouse
Expansion & Remodel

Appendix

Contents

a Master Plan Studies

b Geotechnical Report

c Site Survey

d Water Flow Analysis

e DFCM High Performance Building Rating System (2009)

5.0 HIGH PERFORMANCE BUILDING RATING SYSTEM (2009)

5.1 General

A. This section defines a High Performance Building Rating System for Buildings.

B. If required by contract, a building shall comply with the High Performance Requirements in this section.

5.2 Definitions

"Agency" is any state agency, board, commission, department, or division.

"Designer" is the architect(s), engineer(s), and other professionals responsible for the building design.

"Institution" means the University of Utah, Utah State University, Southern Utah University, Weber State University, Snow College, Dixie State College of Utah, College of Eastern Utah, Utah Valley State College, Salt Lake Community College, Utah College of Applied Technology, and any other university or college which may be established and maintained by the state.

"Life-cycle costs" means the sum of the present values of investment costs, capital costs, installation costs, energy costs, operating costs, maintenance costs, and disposal costs, over the lifetime of the project, product, or measure.

"Life-cycle cost-effective" means the life-cycle costs of a product, project, or measure are estimated to be equal to or less than the base case (i.e., current or standard practice or product).

5.3 Referenced Standards and Codes.

The design shall comply with all applicable Standards and Codes at the time submitted to the State Building Official, including but not limited to:

ANSI/ASHRAE Standard 52.2, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*

ANSI/ASHRAE Standard 55, *Thermal Environmental Conditions for Human Occupancy*

ANSI/ASHRAE Standard 62, *Ventilation for Acceptable Indoor Air Quality.*

ANSI/ASHRAE/IESNA Standard 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, including Appendix G.

Illuminating Engineering Society of North America, *IESNA Lighting Handbook.*

U.S. Green Building Council, *Leadership in Energy & Environmental Design for New & Major Renovations* (LEED-NC).

DFCM High Performance Building Rating System (2009)

5.4 Requirements

A. The project must meet all DFCM Design Standards.

B. The project must achieve a LEED Silver certification.

C. The project must specifically achieve the following credits in the LEED rating system unless otherwise excepted by the Director:

(1) WE Credit 1.1: Water Efficient Landscaping: Reduce by 50%

(2) EA Credit 3 Enhanced Commissioning

(3) EQ Credit 3.1 Construction IAQ Management Plan: During Construction

(4) EQ Credit 4.1: Low-Emitting Materials: Adhesives and Sealants

(5) EQ Credit 4.2: Low-Emitting Materials: Paints and Coatings

D. The project team must hold a sustainability charrette that is at minimum approximately 3 hours of dedicated time. The charrette shall be completed during the Schematic Document Phase if the project is a CMGC or Design/Bid/Build delivery. The charrette shall be completed during the programming phase and incorporated into the program documents if there is any chance that it shall be a Design-Build delivery. The charrette must attended by the following team members at minimum:

(1) DFCM Project Manger

(2) DFCM Energy Program Director

(3) Architect team

(4) Mechanical and Electrical Engineering team

(5) Energy Consultant team

(6) User Group Member or Building Occupants

(7) General Contractor (if hired)

(8) Commissioning Agent (if hired)

(9) Facility Management Personnel

DFCM High Performance Building Rating System (2009)

E. The Charrette shall cover the following topics at minimum:

(1) Targets and strategies for reducing energy consumption via building orientation and envelope, and via occupant behavior, and building systems

(2) Site analysis as it relates to ecological impact to surrounding areas

(3) Target for an overall building EUI (Energy Use Index)

(4) Strategies for reducing water consumption

(5) Spaces and activities most benefited from daylighting and daylighting controls

(6) Methods for reducing single occupant car commuting to the building

(7) Methods for building processes to reduce consumption and waste of resources during and after construction.

F. The project must model the building systems to analyze and make selections based on life-cycle cost. High Performance Buildings are to be built to a 50 year life-cycle. Analysis should include the following costs:

(1) Initial Costs—Purchase, Acquisition,

(2) Construction Costs

(3) Fuel Costs and Energy costs

(4) Operation, Maintenance, and Repair Costs

(5) Replacement Costs

(6) Residual Values—Resale or Salvage Values or Disposal Cost

(7) Finance Charges—Loan Interest Payments if applicable

(8) Non-Monetary Benefits or Cost

Life Cycle cost can be calculated by using the Building Life-Cycle Cost Program that is available for download from the Federal Energy Management Program (http://www1.eere.energy.gov/femp/information/download_blcc.html) or by following equation: LCC = I + Repl — Res + E + W + OM&R + O

Where:
LCC = Total LCC in present-value (PV) dollars of a given alternative
I = PV investment costs (if incurred at base date, they need not be discounted)
Repl = PV capital replacement costs
Res = PV residual value (resale value, salvage value) less disposal costs
E = PV of energy costs
W = PV of water costs
OM&R = PV of non-fuel operating, maintenance and repair costs
O = PV of other costs (e.g., contract costs for ESPCs or UESCs)

G. An energy model shall be completed to demonstrate the building design performance relative to a code compliant building. Methods for modeling shall follow those outlined by the LEED reference guide. Unless otherwise approved by the Director, the energy model must include an analysis of evaporative cooling technology and the model must include an analysis of daylighting control technology. It must also give the modeled EUI in Kbtu/sf.

H. The facility must be equipped with meters or submeters to measure the individual facility's energy consumption on an ongoing basis in a format that allows the consumption data to be entered into the Energy Star Portfolio Manager Program.

5.5 Submittals

A. Design team shall submit the Charrette Summary, Life Cycle Cost Analysis, LEED submittals and Submittal Comments, Commissioning Report, and the Energy Analysis to document compliance with these High Performance Building Requirements.