planning team

PLANNING AND ARCHITECTURE
Clark Huesemann LC
Steve Clark
Jane Huesemann
Steve Harrington
Blaine Gambrel

LABORATORY PLANNING
The Clark Enersen Partners
Chris Ertl
Andrew Borkon

LABORATORY M.E.P. ENGINEERING
The Clark Enersen Partners
James Beecher

LABORATORY STRUCTURAL ENGINEERING
Bob D. Campbell & Company
Clark Bashinger

LABORATORY M.E.P. ENGINEERING
The Clark Enersen Partners
James Beecher

MECHANICAL/ELECTRICAL/PLUMBING ENGINEERING
Latimer Sommers & Associates, PA
Bill Bassette

STRUCTURAL ENGINEERING
Professional Engineering Consultants
Dan Wethington

HISTORICAL CONSULTANT
Building Preservation, LLC
Deb Sheals

DEMOLITION CONSULTANT
Spirtas Wrecking Company
Stanley Lewandowski
# Table of Contents

01 Executive Summary ................................................................. 9

02 Existing Conditions Analysis
  Architectural ..................................................................................... 14
  Historical .......................................................................................... 17
  M.E.P. Systems .................................................................................. 21
  Structural .......................................................................................... 25

03 Program
  Training / Meeting ........................................................................... 28
  KdHe Laboratories ............................................................................ 30

04 Design Alternatives ....................................................................... 38

05 Building Recommendations
  Historical Approach ......................................................................... 56
  Code Approach .................................................................................. 60
  M.E.P. Systems .................................................................................. 62
  Energy Use Reduction ........................................................................ 67
  Demolition .......................................................................................... 70

06 Cost ................................................................................................. 74

07 Schedule ......................................................................................... 78

08 Appendix ........................................................................................ 82
01

executive summary
The Docking State Office Building represents a resource of 532,592 square feet of space including an underground central utility plant serving the multiple-building Capitol complex. Much of the building is fundamentally sound, providing the opportunity to make modifications to rehabilitate it into a modern building while providing needed office space for the State of Kansas.

In July of 2019, the planning team of Clark Huesemann was asked to analyze the Docking State Office Building and to provide feasible plans for the rehabilitation and reuse of the structure. The team thoroughly analyzed the building, reviewing previous studies, articles, reports, and original drawings, walking through the building visually assessing the conditions, and interviewing the maintenance staff currently housed there. The current conditions were analyzed alongside other conditions that we anticipated would need to be addressed in any rehabilitation or renovation solution.

The following considerations were examined and are addressed individually in the body of the report:

- architectural and site conditions
- historical significance and condition of the building
- structural condition
- mechanical, electrical, plumbing systems
- the existing building’s projected energy performance
- code compliance
- demolition & logistics
- hazardous materials identified remaining on site

In addition, the team worked to gain an understanding of the functional need for state space within the Capitol complex. Agency surveys, interviews with current and potential Docking user groups, and a review of current and renewing lease commitments were performed. The team first sought to determine if there were programs, agencies and other users that programmatically fit well housed within the Capitol complex and were compatible with those types of uses. This work included meeting with the Department of Administration, members of the Joint Building Committee, Docking Building Facilities Managers, the Kansas Historical Society, representatives from Human Resources Management and Training, the Capitol Police, and the Kansas Department of Health and Environment (KDHE) Administration and Laboratory Director.

There are a number of existing functions currently housed in Docking that make sense to be in a rehabilitated Docking:

- Central Power Plant
- Campus Facility Maintenance Operations
- Central Warehouse
- Capitol Police

The following functions represent a significant amount of space, are compatible with each other and Capitol complex space uses, and should be considered in some combination as future uses for Docking:

- Conference/Training Center
- State Agencies
- KDHE Laboratories
- Health Clinic and other State Service Agencies
- Shared Conference/Teleconference Rooms
- Wellness Support Rooms
- Grab and Go
- Interactive State Exhibit Commons
- Outdoor Event Space

The Docking planning team, in concert with a separate study being performed for KDHE to find a new location for their laboratories, worked with the KDHE consultants to determine the feasibility of a future lab location in the rehabilitated Docking. A central location for the KDHE labs is desirable and important to the success of the KDHE for the recruitment and retention of high-quality personnel. In Docking, the laboratories would be designed for specific activities and can provide laboratory personnel with a safe and pleasant work environment leading to increased productivity. Amenities such as the grab and go, shared conference and training rooms, and the location within the Capitol complex are all benefits of the Docking location.

This location would be similar to many labs located in urban settings across the country. For example, every major hospital includes diagnostic laboratories performing many of the same tests that the KDHE lab performs. The KDHE Laboratory is required to evaluate and ensure the effectiveness of their biosafety programs, the proficiency of their workers, and the capability of equipment, facilities and management practices and will follow requirements of the CDC’s Biosafety in Microbiological and Biomedical Laboratories (BMBL) and the NIH’s Design Requirements Manual (DRM).
In finding the best and highest use of Docking the planning team tested many office, training and meeting room, and laboratory uses and layouts in multiple configurations, sizes and demolition scenarios. Two options, A and B, were developed, both with and without the addition of the KDHE Labs for comparison purposes. Both make equipment and energy improvements to the central power plant and significantly improve the energy performance of Docking. Both make significant changes to the exterior envelope.

**Option A** plans for reuse and rehabilitation of the entire Docking Building. The curtain wall would be replaced, the exterior envelope would be cleaned, other non-window walls insulated, and new roofs would be installed with new insulation. The interior would be completely gutted to prepare for the new office space remodeling. Historical elements would be maintained, cleaned and repaired to the degree possible. New mechanical, electrical and plumbing systems would make the modern office space comfortable and effective space to work in. The central power plant would remain in operation throughout the construction.

**KEY CHARACTERISTICS OF OPTION A:**

- **Program Fit & Compatibility:** Provides needed space for state agencies. Allows for centralization and consolidation of currently separated agencies and in doing so capitalizes on efficiencies. In the option that includes the KDHE Laboratories, a renovated Docking will provide a safe and secure facility for the Laboratories and will place the agency in a location that addresses their recruitment and retention goals.

- **Architectural/Site:** The full renovation and modernization of this existing building represents an efficient use of State resources. Renovation costs are less than the cost of new construction.

- **Historical:** Rehabilitation of this historic structure preserves a State historic resource.

- **Energy/MEP:** The upgrades to the building infrastructure significantly improve energy performance, capitalizing on the existing central plant, and saving energy and operational costs into the future. The renovated building’s energy performance would rank within the top 3% of similar buildings that are located within the Topeka area.

- **Structural:** The building’s structure is in good condition and requires minimal change to accommodate the proposed solutions. In the option that includes the KDHE Laboratories, minor modifications are included.

- **Code Compliance:** The renovation will bring the building up to current fire, life safety, energy, and accessibility codes.

- **Demolition & Logistics:** The renovation uses conventional demolition techniques for replacement and upgrading of exterior skin and selective demolition of interior elements. A key component of the demolition includes recycling of many materials.

- **Hazardous Materials:** Some of the building’s aging components have been identified to contain hazardous materials which are planned to be removed and disposed of properly as a part of the renovation.

- **Schedule:** Design, documentation, and construction is estimated to take 30 months. In the Option A that includes the KDHE Laboratories, this would be 36 months.
**Option B** plans for reducing the building size by dismantling the upper floors of the building leaving three floors for reuse and making an addition of three floors on top and to the north and east sides. This new construction would allow for increased floor-to-floor heights, increased floor plate, and fewer columns. The remaining curtain wall would be replaced, the remaining exterior envelope would be cleaned, other existing non-window walls insulated, and new roofs would be installed with new insulation. The portions of the building that are additions would be designed with new energy efficient and compatible wall and window systems. The interior would be completely gutted to prepare for the new office space. Remaining historical elements would be maintained, cleaned and repaired in place and/or relocated and reused in the new design to the degree possible. New mechanical, electrical and plumbing systems would make the modern office space comfortable and effective space in which to work. The central power plant would remain in operation throughout the construction.

**KEY CHARACTERISTICS OF OPTION B:**

**Program Fit & Compatibility:** Provides needed space for state agencies. Allows for centralization and consolidation of currently separated agencies and in doing so capitalizes on efficiencies. In the option that includes the KDHE Laboratories a renovated Docking will provide a safe and secure facility for the Laboratories and will place the agency in a location that addresses their recruitment and retention goals.

**Architectural/Site:** Reuses portions of the existing building that are the most compatible with the intended uses, and replaces a portion of the building with new construction. As a combination of renovated and new square footage, this solution is less costly than new construction.

**Historical:** The entire building would be documented to meet the standards of the State Historical Society before any demolition takes place. Historical elements in the renovated portions of the building will be preserved, and other elements will be salvaged from the building and used in display and documentation.

**Energy/MEP:** The upgrades to the building infrastructure significantly improve energy performance, capitalizing on the existing central plant, and saving energy and operational costs into the future. The renovated building’s energy performance would rank within the top 3% of similar buildings that are located within the Topeka area.

**Structural:** Utilizes remaining existing structure that is sound and can be reused. New portions of the building capitalize on the larger spans and flexibility of new structure allowing for more efficient agency layouts.

**Code Compliance:** The renovation will bring the building up to current fire, life safety, energy, and accessibility codes.

**Demolition & Logistics:** Uses safe and specialized demolition techniques to dismantle a large portion of the existing building. The removal and remaining selective demolition will incorporate recycling of many materials.

**Hazardous Materials:** Some of the building’s aging components have been identified to contain hazardous materials which are planned to be removed and disposed of properly as a part of the renovation.

**Schedule:** Design, documentation, and construction is estimated to take 42 months. In the Option B that includes the KDHE Laboratories, this would be 43 months.
02

existing conditions analysis
The 532,592 gross square feet of space in the Docking State Office Building includes an existing underground central power plant serving the Capitol complex. Many parts of the building are fundamentally sound, providing the opportunity to make modifications to rehabilitate it into a modern building while providing needed office space for the State of Kansas.

The planning team thoroughly analyzed the building, reviewing previous studies, articles, reports, and original drawings, walking the building visually assessing the conditions, and interviewing the maintenance staff currently housed there.

The review included several reports and assessments that identify the potential hazardous materials present in the building. Some of these reports include the following:

- Lead-Based Paint Inspection (Apex Environmental Consultants, Inc.) 12/30/1999
- Asbestos Containing Materials Inspection (Apex Environmental Consultants, Inc.) 12/30/1999
- Limited Supplemental Asbestos Survey (Vann Companies) 11/15/2013
- Gray Window Glazing Asbestos Analysis (Dalrymple Consulting, Inc.) 7/11/2016
- Roofing and Upper Floor items Asbestos Analysis (SanAir for Associated Insulation) 9/10/2019
- DSOB Maintenance Area (SanAir for Associated Insulation) 2/26/2019

The information contained in these reports, along with other historical information has been used to prepare the anticipated removal scope of work, and the related cost analysis for removal of these items. All design solutions include the full removal of these items whether or not the space is planned for dismantling or for renovation.

As a companion to the visual observations of the building, a component analysis has been prepared. The building component analysis evaluates separately, the condition and “value” of all the primary systems of the building and results in a comprehensive picture of the building’s condition. The Building Component Analysis identifies the cost of replacement of each primary system as a percentage of the total cost of a similar new building. These percentages vary based on the function of the facility. For example, office buildings will require different types of construction systems than warehouses. Percentages of each system will also vary depending on the size and number of stories of each building. For example, multistory buildings must allocate cost to stairs and elevators that single story buildings do not. The components identified in the analysis are as follows:

- **Exterior Building Components**
- **Substructure**
- **Standard Foundations**
- **Special Foundations**
- **Slab on Grade**
- **Basement Excavation**
- **Basement Walls**
- **Superstructure**
- **Floor Construction**
- **Roof Construction**
- **Exterior Enclosure - Walls**
- **Exterior Enclosure – Doors and Windows**
- **Roofing**
- **Roof Coverings**
- **Roof Openings**

- **Interior Building**
- **Walls, Partitions and Doors**
- **Floors**
- **Ceilings**
- **Finishes, Fittings and Trim**
- **Stairs**

- **Engineered Systems**
- **Vertical Conveyance**
- **Plumbing**
- **Heating/Ventilation/AC**
- **Fire Protection & Life Safety**
- **Electrical and Lighting**

Each primary system’s condition was evaluated and given a value from excellent to unsalvageable. The resultant contribution of value of any system takes into account the condition and the percent of cost of a typical facility. The total resultant value then is an estimate of the percent of current value of an existing building, as it would compare to the replacement cost of the same facility if built new. In the case of Docking, an adjustment was made to account for the central power plant being in good condition and providing the hot and chilled water to the rest of the building. Therefore, the value recorded was higher than would be typical for the upper floors of the Docking that require all new equipment and distribution.
## Building Component Analysis

### State of Kansas

**Docking Office Building**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Unsalvageable</th>
<th>Resultant Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Exterior Building Components</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substructure</td>
<td>3.5%</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superstructure</td>
<td>9.1%</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior Enclosure - Walls</td>
<td>2.2%</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>0.7%</td>
<td></td>
</tr>
<tr>
<td>Exterior Enclosure - Windows and Doors</td>
<td>3.5%</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Roofing</td>
<td>2.0%</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Value</strong></td>
<td>20.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. Interior Building Components</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walls, Partitions and Doors</td>
<td>9.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Floors</td>
<td>3.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Ceilings</td>
<td>4.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Finishes, Fittings and Trim</td>
<td>7.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Stairs</td>
<td>2.4%</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>1.9%</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Value</strong></td>
<td>27.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C. Engineered Systems Components</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Conveyance</td>
<td>2.6%</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Plumbing</td>
<td>14.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Heating/Ventilation/AC</td>
<td>14.2%</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>4.5%</td>
<td></td>
</tr>
<tr>
<td>Fire Protection and Life Safety</td>
<td>2.6%</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>Electrical and Lighting</td>
<td>18.7%</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>6.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Value</strong></td>
<td>52.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Value</strong></td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Variation / Percent Allocation Adjustment:**

Overall Percent Condition: **24.4%**

Materials and finishes of lesser quality and showing wear

**Adjusted Percent Condition:** **24.4%**

### Overall Percent Condition - What does it mean?

- **Excellent (85-95):** New or near new condition as a result of recent installation, repair and/or replacement.
- **Good (70-84):** No obvious deficiencies in condition or performance, serviceable with basic maintenance.
- **Fair (50-69):** Need for minor repair and limited replacement of components based on age and/or performance.
- **Poor (30-49):** Failure of primary components and multiple systems evident; major repair or replacement required.
- **Unsalvageable (0-29):** Components or systems unusable, code deficient and/or not suited for current use; complete replacement required.
The Docking Building, which opened in 1957 as the Kansas State Office Building, is significant for its long association with Kansas state government. It was one of the first buildings in Kansas to be constructed specifically to serve as a state office building, and it was one of the largest office buildings of any kind in the state at the time. The new building had more than 366,000 square feet of office space. Office functions were supported by special features such as meeting rooms, a large cafeteria, a state of the art central telephone exchange, and a below-ground tunnel which led directly to the state Capitol. Planning for the building began at the close of WWII. When it opened in 1957, it housed some 3,000 state employees who had previously worked in what one state manual described as "substandard quarters scattered throughout the Capitol city and the state." It has served continually as a state office building since that time; it was the primary state-owned office building into the late 1980s, when the state began developing additional state office space in the area to address an ongoing shortage of state office space. In 1987, the Kansas State Office Building was renamed the Robert B. Docking Building.

The Docking Building is also significant as one of the most notable early examples of Modern Movement architectural styling in the state of Kansas. Although early design proposals for the building featured a restrained version of Classical Revival styling, state architect John A. Brown instead chose what was at the time cutting-edge architectural styling now known as the Modern Movement. As one recent historical analysis of the building noted, the new State Office Building "was a trailblazer for the Topeka community in terms of architectural thought." The Modern Movement in American architecture, which was popular from the end of WWII into the 1960s, eschewed the use of classically-derived ornamentation and instead featured clean lines, geometric forms and modern materials. The Docking Building was one of the first public buildings in Kansas constructed in the Modern Movement style. It appears today much as it did the day it was dedicated, and it provides an exemplary example of the Modern Movement in Kansas.

The period of significance for the Docking Building begins with its completion in 1957 and ends in 1970, the customary fifty-year cutoff point for evaluating historic significance.
EARLY DEVELOPMENT OF THE CAPITOL COMPLEX: 1866-1945

1866-1903
Kansas State Capitol constructed. The Capitol served as the sole seat of state government in the early twentieth century, housing all major state agencies as well as the state legislature. [Kansas Historic Resources Inventory Interactive Map, https://khri.kansasgis.org/accessed September 2019; and Frank J. Ryan, Directory and Interesting Facts Concerning Kansas 1945-1946 (Topeka: Kansas State Printing Department, 1946), 115.]

1905
Kansas State Printing Plant established, and a new building constructed at 10th and Jackson (201 W. 10th). It was expanded in 1919, and remained in use into the 1960s. Only a few printing related offices were located in the printing building. [Paul R. Shanahan, Directory and Interesting facts of Kansas 1955-1956 (Topeka: Fred Voiland, Jr., 1956), 98.]

1914
Memorial Building constructed by the state of Kansas. It was built with federal funds related to the civil war, as a war memorial and museum. The Kansas Historical Society and Department of Archives occupied the building when it was new, along with various veteran and historical organizations. The Historical Society remained in the building until at least 1980. [Directory and Interesting Facts of Kansas 1955-1956, 98.]

1920-1940s
As the number of state agencies increased, state offices, boards and commissions began occupying rented space. One of the earliest known supplemental office buildings in the government complex was a former school located at 801 Harrison, just west of the Capitol. Built in 1905 as the Manual Training School, the building was used by the Kansas Emergency Relief Committee during the Depression. It was housing state offices by 1937, when the department of Inspections and Registrations moved into rooms on the first floor there. [“Office Changes” Frankfort Index (Frankfort, KS) Jul. 16, 1937, 3.]

1945
By the mid-1940s, state office space was at a premium. City directory listings show that more than half of all state offices were located outside of the State Capitol by that time. In all, 45 state departments had offices in the Capitol and 49 were in located in nearby buildings. It appears that most of the offices outside the Capitol were in rented quarters, although the state did own 801 Harrison by that time. (The state demolished that building in 1977.) 801 Harrison was among the most common locations for state office in the 1940s, along with 800 Kansas, the New England Building, and the National Reserve Building. [Polk’s Topeka City Directory (Kansas City, MO: R. L. Polk & CO., 1946), 411-412; “Up Budget to Down Building,” Garden City Telegram, Mar. 17, 1977, 4.]

PLANNING AND BUILDING A NEW STATE OFFICE BUILDING: 1945-1957

1945

1949 January
The State Office Building Commission prepares a report on their activities to date. By that time, they had acquired the property now occupied by the Docking Building, and conducted a survey of state office needs. The report documented crowded conditions in many state offices, and noted that state offices were spread across some 19 different locations in downtown Topeka, which gave “some indication of the inconvenience involved with conducting business with these departments.” [Report of the State Office Building Commission to the Governor of Kansas and the Kansas State Legislature (Topeka: State Printing Office, 1949).]
1950s
Although the State Office Building Commission had gone so far as to develop preliminary architectural drawings for a new office building, the conservative design of that proposed building was not well received. One history of the building noted that there was “such considerable opposition to the first design that it was subsequently abandoned in favor of a new design style.” [David Griffin, “Docking State Office Building,” 6.]

That “new design style,” which State Architect John A. Brown utilized for the revised design, is now known as the Modern Movement. His revised design for the new building met with a more favorable reaction from the general public, and in June 1954 he and his team issued a full set of construction drawings for a new 12 story office building. A comparison of those plans and the current building shows that the final product is very close to the original design.

1954 October 26th
Groundbreaking ceremony for the Kansas State Office Building, led by Governor Edward Arn, who declared that the new building reflected “our great state’s growth and progress.” [David Griffin, “Docking State Office Building,” Kansas Preservation 33, no. 1 (2011), 5; Nugent and Rieke, 8.3.]

1955

1957 March
Construction of the State Office Building was completed, by Harmon Contractors, for a final cost of approximately $9 million. When it opened, the building was the largest office building in the state, and the tallest one in Topeka, except for the Capitol dome. [Nugent and Rieke, “Kansas State Office Building,” National Register of Historic Places Nomination Form, 8.]

1957 March 16-17.
Two-day open house, with tours. The building was 95% occupied, with 2,600 state employees soon after it opened. The new building had an observation tower, a basement cafeteria that seated 500, and a tunnel to the Capitol. [Nugent and Rieke, “Kansas State Office Building,” National Register of Historic Places Nomination Form 8.]

1957
Kansas State Highway Commission moved in to the State Office Building in mid-June, “in time to use the air-conditioning comfort to the fullest extent.” The department occupied approximately one third of the available space in the new building. [“Highway Offices Cover 3 Floors,” The Maysville Advocate, September 19, 1957, 17.]

1960

1970
Traditional 50 year cut-off point for evaluation of historic integrity. End of the Period of Significance for the Docking Building.
CAPITOL COMPLEX: 1970-2019

1980
The State of Kansas had a population of more than two million and nearly 48,000 state workers. State agencies located in the Docking Building include the State Highway Patrol (1st Floor), the State Department of Revenue (2nd and 3rd), the State Corporation Commission (4th), the State Highway Commission (7th, 8th, and 9th), and the State Highway Construction and Planning Departments (8th). Other occupants include the Department of Social and Rehabilitative Services, the Insurance Department, and the State Board of Tax Appeals. [City Directories and Jack Brier, 1980 State of Kansas Biennial Report.]

1986, ca.
State of Kansas completed renovation work on the former Atchison, Topeka, and Santa Fe Railway Building (built in 1910), which reopened as the Landon State Office Building. [“Two Honored,” The Manhattan Mercury, December 2, 1986, 3; Kansas Historic Resources Inventory Interactive Map.]

1987 January 9
Then-Governor John Carlin renames the State Office Building the Docking Building, in honor of former governor Robert B. Docking. [Nugent and Rieke, “Kansas State Office Building,” National Register of Historic Places Nomination Form 8.] This was likely done in part to make the building more identifiable, since by that time there were several buildings housing state offices in the vicinity of the statehouse.

1987, ca.
Carpet and tile added to some floors of the Docking Building, some bathroom fixtures were replaced and office layouts had changed by then as well. [Nugent and Rieke, “Kansas State Office Building,” National Register of Historic Places Nomination Form 8.]

1995
Curtis State Office Building Constructed. [KHRI.]

2004
Department of Administration announces that the Docking Building needed to be “extensively refurbished.” [Emporis]

Upper floors of the building are gradually vacated.

2012
Chiller plant upgrades in basement and sub-basement

2014

2019
Feasibility study conducted for various treatment options for the Docking Building, ranging from historic rehabilitation to demolition of all above ground components.
HEATING VENTILATING AND AIR CONDITIONING

The original DSOb was built in 1954 and was renovated in 1979. The original HVAC system, however, is generally unchanged from the original construction.

The occupied spaces of the building are provided with perimeter unit ventilators.

Outside air is delivered to the units via perforations in the exterior building wall where the building skin consists of hollow metal frame with glass or infill panels or via louvers in walls or within the head of windows where the exterior building skin is limestone.

The interior of the building, referred to as the “core zone” of the building by facility maintenance personnel, is conditioned with central station air handling units. The configuration of the outside air being provided to these interior units is adequate to provide the code required ventilation; however, it is inadequate to allow outside air to be introduced to provide cooling during cool ambient conditions. This condition results in a requirement to provide mechanical cooling during times that the outside air could be introduced to accommodate space cooling.

Wind has a substantial effect on systems of this type whereby external wind pressure, that is exerted on the damper system that is provided in the base of the perimeter unit ventilators, results in an increase in the amount of outside air that is delivered to the space. This causes an increase in building energy usage and makes it difficult to maintain interior temperature control.

All HVAC equipment in the building is configured as a (2) pipe system. With this configuration the equipment is either heating or cooling. The building is zoned so that certain parts of the building, generally separated by exposure, can be in either heating or cooling as an entire zone. This configuration makes it difficult to achieve space comfort especially during “swing seasons” when temperatures are cool in the morning and warm in the afternoon.

The condition of the HVAC equipment in the occupied spaces is poor and is well beyond the end of its useful expected life.

CENTRAL CHILLED WATER-COOLING SYSTEM

The existing chillers and associated piping systems that are installed within the sub-basement of the Docking State Office Building (DSOB) make up a portion of an overall system that feeds the entire East Capitol Complex. There are (5) existing chillers in the Docking State Office Building plant which are incorporated into an overall system which includes two chillers in the Landon State Office Building (LSOB). This chiller plant provides cooling to the DSOb, the Kansas State House (KSH), the LSOB and the Memorial Building (MB).

A piping arrangement, which includes automatic control valves and associated controls, is in place that allows the chiller plant located in the DSOb to provide cooling, during appropriate ambient and internal building cooling load conditions, to the DSOb, KSH, LSOB and MB simultaneously or, again during appropriate cooling load conditions, for the chiller plant located in the LSOB to provide cooling to the LSOB, KSH, DSOb and MB. In addition, the DSOb chilled water plant can provide cooling to the DSOb or the DSOb and KSH simultaneously and the LSOB chilled water plant can provide cooling to the LSOB or the LSOB and MB or to the LSOB, MB and KSH simultaneously.

Two of the chillers, that were installed in the DSOb as a part of the chiller plant upgrade that occurred in 2011, are heat recovery chillers. Since the DSOb, in its current configuration, requires mechanical cooling during cold ambient conditions the heat that would normally be rejected to the remote cooling tower is recovered and used to heat the perimeter of the building.

It should be noted that the chillers, located in the LSOB basement that were incorporated into the East Capitol Complex, were replaced as a part of a project that occurred in 2010.

Three of the chillers existing in the DSOb were installed in 1987. These chillers are Trane Model CVHE 450 each with a nominal cooling capacity of 450 tons. These chillers originally utilized refrigerant R-11; however, they were retrofitted in 1996 to use refrigerant R-123. Refrigerant R-123 has a very low Ozone Depletion Potential and Global Warming Potential and an atmospheric life of less than 5 years. These characteristics make refrigerant R-123 much less damaging to the earth’s atmosphere, when compared to R-11, should a leak occur. These chillers are at the end of their expected useful life.
The two heat recovery chillers, installed in 2011, have much of their useful life remaining.

A new cooling tower was constructed in 2008. This tower is located on the west side of the DSOB and operates acceptably when four of the five chillers are operating.

Building maintenance operators have indicated that they typically operate the system using two of the chillers in the Docking State Office Building.

The existing boiler plant, for the East Capitol Complex, is located in the sub-basement of the Docking State Office Building. This plant contains four (4) scotch marine style boilers. Three (3) of these boilers have a capacity of 300 boiler Horsepower and one (1) of the boilers has capacity of 400 boiler horsepower.

The boiler plant was originally installed in the 1980s.

The boilers have recently been retrofitted with new high efficiency burners and combustion controls. A new surge tank, deaerator and feedwater system along with new feedwater pumps are scheduled to be installed in the spring of 2020.

Maintenance of these boilers and the associated equipment has been meticulous. It is anticipated that these boilers will continue to provide for the heating of the East Capitol Building Complex for many years.

The existing boiler flue is routed to the top of the Docking State Office Building via a chase that is exterior to the building and is located just outside of the inside corner of the building on the south side of the east wing of the building. The fact that this boiler flue extends from the ground up to the top of the building, in generally unconditioned space, has resulted in condensation of the flue gas within the vertical flue. This flue gas condensate is very aggressive and has caused the flue to deteriorate. The flue will need to be replaced and relocated to the interior of the building.

The existing buried tank that stores fuel oil for heating, should natural gas be interrupted, has a capacity of 8,000 gallons. Maintenance personnel have indicated that the tank needs to be upgraded. The recommendation would be for (2) 12,000-gallon tanks. These would more readily accommodate tanker truck deliveries.

The (2) 12,000-gallon double wall below grade storage tank installation would require an area of approximately 30’ x 30 ft. and could be located in the same general area as the existing below grade storage tanks.

This boiler plant provides steam for heating of all buildings in the East Capitol Building Complex to include the Docking State Office Building, the Kansas Statehouse, the Landon State Office Building, the Memorial Building, the Curtis State Office Building and the Kansas Judicial Center.

Steam to water heat exchangers are utilized in the Docking Building which generate heated water which is circulated throughout the building for heating during times that heated water generated by the heat recovery chillers is either not available or not adequate to handle the load.
PIPING SYSTEM

The piping associated with the central plant, located within the basement, is of the four-pipe design. This means that both chilled water for cooling and hot water for heating is available simultaneously; however, the piping within the occupied portions of the building is of the two-pipe design. This means that either hot water or chilled water is circulated through the piping depending on a need for either heating or cooling. It is felt that the piping in the central portion of the plant is in acceptable condition. The piping above the basement level is suspect. Maintenance personnel have indicated that leaks have been problematic.

A project to drain down the currently unused portions of this piping system, to minimize the potential for leaks, is pending.

UTILITY TUNNELS

A project to construct new utility tunnels and new steam and chilled water piping systems within the tunnels connecting the main steam and chilled water plants that are located in the sub-basement of the Docking building to the other buildings of the East Capitol Building Complex was completed in 2010. The tunnels connect the KSH to the LSOB, the MB to the Curtis Building and the Curtis building to the Kansas Judicial Center. Steam piping between the Landon State Office Building and the Memorial Building is routed through a courtyard that exists between the two buildings. An existing utility tunnel, connecting the DSOB to the Kansas Statehouse, was incorporated into this tunnel system. Piping was configured in these projects to facilitate connection of the chilled water plants in each the DSOB and the LSOB together.

ELECTRICAL POWER DISTRIBUTION

The original electrical power distribution system within the Docking State Office Building was designed to distribute electrical power at a primary voltage of 13,200 volts. This configuration is unique. Maintenance personnel are not generally trained to work with electrical systems that operate at this elevated electrical voltage. The Power Company generally maintains the main switchgear and has expressed concern with its condition. The facility maintenance personnel, however, are required to maintain the distribution from the load side of the main distribution switchgear to the transformers that are located within the building that transform this voltage into a voltage configuration that is appropriate for the occupied spaces.

A project was recently completed in 2011 which installed a new service entrance to the building along with transformers and main distribution equipment. This new system operates at a more common electrical configuration of 480 Y277 volt 3 phase 4 wire. The new service is connected to two of the power company’s primary circuits and is configured to allow the building to operate from either one or the other of these primary circuits or to operate with a part of the building being connected to each circuit. The intention was to systematically off load the primary distribution system within the building, transferring the loads onto this new distribution system. This work on floors above the basement is on hold until a determination is made concerning the building.

A new 500 kW generator was recently installed in one of the south areaways of the building. This generator became operational in 2017. The generator was configured for a voltage of 208Y120 3 phase 4 wire so as to match up to the existing emergency loads within the building. This generator will need to be reconfigured to 480Y277 volt 3 phase 4 wire to integrate into the new distribution system.

LIGHTING

The existing lighting system within the building is old and has outlived its useful life. However, in some areas of the basement, in which maintenance staff have completed upgrades for new maintenance offices and shops, new state of the art lighting which utilizes LED lamp technology has been installed.

PLUMBING

The plumbing systems within the building are original and as such dated. Maintenance staff have indicated that underground waste piping is in such poor condition that any required cleaning processes often damage the pipe.

Waste piping above ground is cast iron. The condition of this pipe is unknown. The above ground domestic water piping is copper. The piping appears to be in good condition; however, jointing methods in buildings of this age utilized solder which contained lead.
The structural system of the Docking State Office Building is comprised of structural steel. Roofs and floors, including the first floor, are either a cast-in-place concrete slab or concrete fill on a cellular metal deck. Floor and roof slabs are supported by steel beams at approximately 10'-0" spacing. Columns are spaced at approximately 20'-0" both ways. Steel girders span 20' between columns. Selected beams and columns are concrete encased. We believe encasement is for fire-protection and not for structural capacity, however all other steel structure elements are plaster-encased for fire protection. The basement and sub-basement appear to be cast-in-place concrete. The building’s lateral system appears to be a combination of concrete shear walls (stair towers and elevator shafts) and steel moment-resisting frames. Structural plans indicate the building is founded on cast-in-place concrete piers socketed into bedrock. We did not observe any major settlement issues during our walk-through of the building.

Existing structural plans indicate that the first floor is designed for a live load of 100 psf. All floors above are designed for a live load of 80 psf. Live load reduction is allowed by the building code and plans indicate that live load reduction was used for column design, up to a limit of 50% of the live load. Our initial analysis regarding how many floors can be added; what column spacing can be accommodated; and what the design live load for the new floors could be is based solely on the trade-off of “load removed” versus “load added”. A comprehensive analysis of the actual implications of building modifications is yet to be done. This includes an analysis of vertical and lateral load.
03
program
The planning team worked to gain an understanding of the functional need for state space within the Capitol complex. Agency surveys, interviews with current and potential Docking user groups, and a review of current and renewing lease commitments were performed. The team first sought to determine if there were programs, agencies and other users that programmatically fit well housed within the Capitol complex and were compatible with those types of uses.

This work included meeting with the Department of Administration, members of the Joint Building Committee, Docking Building Facilities Managers, the Kansas Historical Society, representatives from Human Resources Management and Training, the Capitol Police, and the KDHE Administration and Laboratory Director.

There are a number of existing functions currently housed in Docking that make sense to be in a rehabilitated Docking. These are:

- Central Power Plant
- Campus Facility Maintenance Operations
- Central Warehouse
- Capitol Police

The following functions represent a significant amount of space, are compatible with each other and typical Capitol complex space use, and should be considered, in some combination, as future uses for Docking:

- Conference/Training Center
- State Agencies
- KDHE Laboratories
- Health Clinic and other State Service Agencies
- Shared Conference/Teleconference Rooms
- Wellness Support Rooms
- Grab and Go
- Interactive State Exhibit Commons
- Outdoor Event Space

A renovated Docking provides the opportunity for state agencies to gain in efficiency and effectiveness by relocating sections of individual agencies that are currently located in different buildings and different parts of Topeka thereby improving communication, coordination and collaboration within the agency itself. This results in improved outcomes and service for the public and enables the agency to operate at higher efficiency and lower cost.

In addition, Docking provides a large amount of space that would house multiple agencies. This allows for these agencies, most of which provide their own meeting and training rooms, break rooms, work rooms, vending, restrooms, etc. that they currently lease to share these resulting in reducing the total amount of this type of space the state needs to provide overall.

The specific interest in providing a central location for the KDHE labs is to provide them an improved setting for the recruitment and retention of high-quality personnel. In Docking, the laboratories would be designed for specific laboratory activities and can provide laboratory personnel with a safe and pleasant work environment that would lead to increased productivity. Amenities such as the grab and go, shared conference and training rooms, and the location within the Capitol complex and to nearby services are all positive features of the Docking location.

The location in Docking would be similar to many labs located in urban settings across the country. For example, every major hospital includes diagnostic laboratories performing many of the same tests that the KDHE lab performs. The KDHE Laboratory is required to evaluate and ensure the effectiveness of their biosafety programs, the proficiency of their workers, and the capability of equipment, facilities and management practices and will follow requirements of the CDC’s Biosafety in Microbiological and Biomedical Laboratories (BMBL) and the NIH’s Design Requirements Manual (DRM).
PROGRAMMATIC GOALS AND OBJECTIVES

The goal of the KDHE Laboratories is to provide state-of-the-art testing laboratories to enhance and maintain its position as the source for Health and Environmental testing in the State of Kansas. The laboratory planning process has involved users, lab managers, and KDHE leadership to address user needs, future growth, building circulation, mechanical, electrical and plumbing systems, and all aspects of safety. Guidelines for the design are based on good laboratory design principals, the CDC’s Biosafety in Microbiological and Biomedical Laboratories (BMBL) and the NIH’s Design Requirements Manual (DRM).

QUALITY OF LIFE

The laboratories should be designed for people who do laboratory activities and shall provide them with a safe and pleasant work environment that leads to increased productivity, higher retention rates, and easier recruitment of new staff. Direct natural light and views to the exterior, adequate work space, appropriate color, a coordinated and well-organized layout, attractive and functional casework, and amenities such as exercise facilities, cafeterias, and location to nearby services are some of the features that will enhance the quality of life.

Natural Light: Provide all occupied laboratory space with the opportunity for natural light and views to the outside as long as they do not conflict with functional requirements. Control of glare to computer screens and bench work areas must be provided as well as appropriate temperature control.

Lighting: Laboratories require high-quality lighting for the close work that is performed. Lighting shall be uniform and shadow-free at the work surface.

Noise: Noise levels shall be controlled to meet NC-45. Planning should isolate noise-sensitive areas from noise sources wherever possible.

Vibration: Laboratory environments are designed to minimize foot-fall and other vibration sources. The lab should be designed to meet Vibration Criteria A (VC-A) of 2,000 micro-inches per second. Structural dampening to minimize vibration at the labs will be required in the Docking Building. Some pieces of equipment may require additional enhancements such as being placed on a special vibration-dampening table or be located near a column.

Interaction: Exchange of ideas is fostered through formal and informal communication, interaction and collaboration among the staff. The layout should be provided in a way that promotes informal encounters among all occupants. Careful design of the circulation patterns and corridor spaces should consider these interactions.

Efficiency: Efficiency is a key goal to the success of the KDHE laboratory facility. Circulation of samples, personnel, waste, as well as functional relationships and adjacencies have been developed to increase the efficient use of available space.

Graphics/Signage: Graphics and signage will help employees and visitors find their way through the laboratory facility. It should be functional and in harmony with the architecture of the building. Signs are required for the identification of biohazard level and chemicals within the laboratory rooms.

LABORATORY SPACE

Recruitment and retention of high-quality personnel is important to the success of the KDHE Labs. Adequate laboratory work space should be provided to safely meet the needs for areas of laboratory components such as chemical fume hoods, biological safety cabinets, laboratory benches, equipment, storage and desk space. The space must be adequate to provide a safe working area, including access to and around equipment, containment devices, and benchtop areas, and to meet the current accessibility requirements for individuals with disabilities.

LABORATORY OFFICE SPACE

Laboratory staff should be provided with desk space that is physically separated from the laboratory. Administrative offices areas should be outside the laboratory, in a quiet, aesthetic environment sized appropriately. Ancillary spaces such as conference rooms and break rooms are very important to the overall function of the facility as it provides opportunities for interaction and exchange of ideas.

URBAN LABORATORIES

Are they safe – in a word – YES!

There are hundreds of labs located in urban settings across the country. Every major hospital will include diagnostic laboratories performing many of the same tests that the KDHE lab performs.

Examples of Urban Laboratories include the following:
STATE OF MISSOURI PUBLIC HEALTH LABORATORY
JEFFERSON CITY, MO
- Taller than adjacent buildings
- BSL-3 Lab (13,200 SF)
- 117,400 SF
- Wind modeling study performed

J. MEHSEN JOSEPH PUBLIC HEALTH LABORATORY
BALTIMORE, MD
- A catalyst for Urban Revitalization
- 234,000 SF
- BSL2 & BSL-3 Laboratory
- 212 employees – six divisions
- 10 million tests annually
- Gallery, training space, & public functions on main floor
- Wind modeling study

NATIONAL EMERGING INFECTIOUS DISEASES LABORATORY
BOSTON, MA
- BSL-2, BSL-3 and BSL-4 Laboratory in the heart of Boston (Ebola and Marburg)
- Seven-stories; 192,000 SF
- Designed in accordance with Level 5 NIH Security
- Public outreach – over 200 tours to public officials, media and community members
- Wind modeling study

SMILOW RESEARCH CENTER
NEW YORK, NY
- Dedicated to translations research (BSL-2 & BSL-3)
- 230,000 SF
- 13-story
- 40 research teams
- Wind modeling study
The KDHE Laboratory will follow requirements of the CDC’s Biosafety in Microbiological and Biomedical Laboratories (BMBL) and the NIH’s Design Requirements Manual (DRM) which address items such as:

- The code of practice for biosafety
- Containment and Risk Assessment
- Protect
  - Laboratory workers
  - Environment
  - Public
- Fundamentals of Containment
- Microbiological practices (Employee training)
- Proper training of all lab staff
- Enforcement of all institutional policies
- Sterilization and disinfection protocols
- Wash hands
- No Food in labs
- Safety Equipment (Primary Barriers)
  - Biosafety Cabinets that are HEPA Filtered and properly maintained
  - Protective laboratory coats, etc. to be worn only in the laboratory
  - Eye/face protection
  - Any microbiological or viral work performed shall be in a containment hood
- Facility Safeguards (Secondary Barriers)
  - Secure access to the laboratory
  - 100% exhausted laboratory air
  - Laboratory rooms are negative pressure to adjacent non-lab spaces
  - Air quality monitoring devices
  - 6-15 air changes in labs per hour
  - Autoclaves for decontamination
  - No operable windows in the laboratories
  - Design of laboratories with zones from “clean to dirty”
  - Sinks for hand washing
  - Safety showers and eye washes
  - Non-porous materials
  - Bag-in-bag-out HEPA filters
  - BSL-3 lab to be validated prior to operation and re-evaluated annually

The KDHE Laboratory is approximately 60,000 NSF majority BSL-2 Laboratory facility with a small (2,000 SF) BSL-3 laboratory. It is required to evaluate and ensure the effectiveness of their biosafety programs, the proficiency of their workers, and the capability of equipment, facilities and management practices.

RECOMMENDATIONS FOR THE TOPEKA DOWNTOWN SITE:

- Meet guidelines of the CDC BMBL and NIH DRM
- Utilize high-plume exhaust fans (up to 350 feet) to dilute lab air and provide an effective stack height sufficient to penetrate the building boundary layer and safely disperse into the free air stream.
- Conduct a wind modeling study to assist in design of the exhaust fans
- Investigate using air scrubbers on the lab exhaust fans (a last resort seldom used)

LABORATORY MODULES

The proposed KDHE Laboratory shall be a highly successful analytical testing facility intended to foster efficient sample, personnel and material flows. The Laboratory shall be designed as a secured flexible space with enhanced utilities to support multiple groups and continue to accommodate health and environmental testing into the future.

A laboratory planning module has been developed that will provide a common yet highly adaptable planning unit for multiple lab types. Using a consistent planning module will allow for fully adaptable lab spaces that will support the unique laboratory needs with minimal retrofit as these needs evolve in the future. In conjunction with the planning module, all MEP services and utilities will be distributed to the open lab space that consists of such elements as Heating Ventilation and Air-Conditioning Systems (HVAC), point exhaust, power/data, cylinder gas piping, and other lab utilities. with shut-off valving in the corridor space.
LABORATORY CONCEPTS

The basic laboratory module has been designed as 11’-0” x 33’-0” (363 ASF), which is based on the most efficient and flexible space plan for the testing lab functions at KDHE. In Option A, the existing structural grid spacing of 20’-0” x 20’-0” does not lend itself to abiding by this module. Within this option, a 10’-6” module width will be maintained while avoiding columns that encroach more than one foot into the lab aisle space. In Option B, the 11’-0” module width is able to be maintained with some extensive variety on the depth of the module.

Lab support equipment such as vacuum pumps, chillers and power supplies can be located in adjacent Lab Support or the Lab Equipment Alcoves, providing more control of the lab environment by removing these heat and noise sources from the main lab environment.

The key design issues are the environmental parameters: temperature, lighting, vibration, acoustics, as well as the physical requirements of the research equipment, such as ceiling heights, plumbed utility and electrical loads. Flexibility in use and systems is a critical need of the vision statement to allow for the evolution of programs and development of diverse program needs.

HOUSE SYSTEMS DISTRIBUTION

Power will be uniformly distributed to all laboratories.

House utilities include:

• Clean Dry Air at 100 psi (CDA)
• Natural Gas (NG)
• Industrial Cold and Hot Water (ICW/IHW)
• Emergency Shower/Eyewash Tempered Water (ES/EW)

Piped Utilities from the cylinder room include:

• Nitrogen (N2)
• Hydrogen (H2)
• Argon (Ar)
• Helium (He)

Specialty Gas (SG) from cylinder tanks will be provided by the lab users including any special cylinder cabinets, manifolds, piping and valves.

While the general laboratories do not need to meet specific cleanliness levels or certified clean rooms, cleanliness is important for the performance of the testing conducted. Therefore, filtration will be provided in the air handling units supporting the labs. See mechanical section for more information.

Many of the individual laboratory environments are predicated upon the needs of specific pieces of equipment. Lab lighting will be provided by LED-light sources with Option A as recessed units and Option B as direct/indirect pendants. Luminaires will have a user controllable dimming in order to tailor light levels to the use of the room. In addition to the dimming of white light, the ability to provide low-level illumination for light sensitive experiments will also be provided in the lab areas.

SPECIALIZED LABORATORY AREAS

There are several unique laboratory functions in the KDHE that will need to be provided with special attention and consideration. A couple of these are mentioned below for purposes of this report.

Autoclave/Sterilizer Room: An autoclave is an industrial appliance that uses pressured steam to sterilize laboratory instruments, glassware and other materials and to decontaminate infectious waste. There are several autoclaves in the KDHE laboratory. These areas will require overhead exhaust, floor drains, power, hot/cold water, steam and condensate return lines, heating, ventilating and air conditioning, drain, waste and vent. The autoclaves will be medium sized and will have some which are pass-thru varieties. The decontamination autoclaves will have adjacent waste storage space. Glassware autoclaves will have associated marshaling and glassware storage areas nearby. All finishes must be moisture resistant. Doors to the room must accommodate large equipment sizes.

Cold Rooms: A cold room is an environmentally controlled prefabricated unit operated at 4 degrees C. The room will have wire shelving, mechanical ventilation, be lockable, and all mechanical components serviceable from outside the room. A high and low temperature monitoring and alarm system shall be connected to a central equipment alarm system.
Radioactive Work Area: This space provides for isolated radiation work. It will have access to chemical fume hoods and an emergency shower. Space will have a sink, eyewash and flammable solvent storage cabinets. Storage for wet and dry radioactive samples/waste is also required.

BSL3 Lab: All laboratories at the KDHE are to be designed at a minimum to meet the requirements of biosafety level 2 (BSL-2) containment requirements. There are a couple of areas which require BSL2+ such as the Outbreak Laboratory and the TB Laboratory. A BSL-3 Laboratory Suite has been provided in the facility which has specific environmental, functional and accessibility requirements.

BSL-3 LABORATORIES:

Containment Requirements: BSL-3 laboratories require all of the design considerations for BSL-2 laboratories plus specific requirements for the additional containment of those biohazardous materials used in the laboratory. No compromise of the integrity of the BSL-3 laboratory is allowed.

Restricted Access: BSL-3 laboratories shall be separated from areas with unrestricted traffic flow by passage through two sets of self-closing doors. A ventilated airlock shall be designed to separate the common corridor from the containment laboratory. These doors shall be interlocked to prevent simultaneous opening of both doors. A manual override shall be provided in case of emergency egress.
**Interior Surfaces:** Walls, floor and ceilings shall be water resistant (e.g. epoxy paint, caulking, etc.), gas tight, and easily cleanable. Ceilings shall be smooth, sealed and any access to mechanical equipment shall be outside the BSL-3 lab space.

**Airflow:** Ventilation shall be single-pass air and be kept negative with respect to outside corridors and laboratories. Exhaust ducts shall be under negative pressure until the air is discharged outside the building. HEPA filtration may be required. All utilities shall be installed to minimize exposed surfaces.

**Laboratory Furniture:** All lab casework shall easily be able to facilitate cleaning around and under the furniture. Movable casework shall be considered for this purpose. Material shall be stainless steel or phenolic for ease of cleaning.
design alternatives
alternatives studied

In finding the best and highest use of Docking the planning team explored many different configurations of space, demolition scenarios and renovation/addition arrangements. Within each of those options, multiple office, training and meeting room, and laboratory uses and layouts were drawn to evaluate the functionality and program fit. From options that preserve the entire existing building, to options that dismantle all above-grade floors, each alternative was systematically evaluated.

This thorough evaluation of each alternative resulted in two viable scenarios (Options A and B, following), each of which accommodates the potential incorporation of the KDHE Laboratories, should this be a desired program component. In the event that the KDHE Laboratories are not selected to occupy the building, the space would be occupied by other State Agencies. In the following diagrams, yellow hatching indicates the potential location of the KDHE laboratory space.
option A
utilize entire building & renovate
**Option A** plans for reuse and rehabilitation of the entire Docking Building. This option provides the most square footage for state agencies, utilizes the most of a current state resource, and rehabilitates a State and Capitol complex historic structure.

The curtain wall would be replaced, the exterior envelope would be cleaned, other non-window walls insulated, and new roofs would be installed with new insulation. The interior would be completely gutted to prepare for the new office space remodeling. Historical elements would be maintained, cleaned and repaired to the degree possible. New mechanical, electrical and plumbing systems would make the modern office space comfortable and effective space to work in. The central power plant would remain in operation throughout the construction.

**KEY CHARACTERISTICS OF OPTION A:**

**Program Fit & Compatibility:** Provides needed space for state agencies. Allows for centralization and consolidation of currently separated agencies and in doing so capitalizes on efficiencies. In the option that includes the KDHE Laboratories a renovated Docking will provide a safe and secure facility for the Laboratories and will place the agency in a location that addresses their recruitment and retention goals.

**Architectural/Site:** The full renovation and modernization of this existing building represents an efficient use of State resources. Renovation costs are less than the cost of new construction.

**Historical:** Rehabilitation of this historic structure preserves a State historic resource.

**Energy/MEP:** The upgrades to the building infrastructure significantly improve energy performance, capitalizing on the existing central plant, and saving energy and operational costs into the future. The renovated building’s energy performance would rank within the top 3% of similar buildings that are located within the Topeka area.

**Structural:** The building’s structure is in good condition and requires minimal change to accommodate the proposed solutions. In the option that includes the KDHE Laboratories minor modifications are included.

**Code Compliance:** The renovation will bring the building up to current fire, life safety, energy, and accessibility codes.

**Demolition & Logistics:** The renovation uses conventional demolition techniques for replacement and upgrading of exterior skin and selective demolition of interior elements. A key component of the demolition includes recycling of many materials.

**Hazardous Materials:** Some of the building’s aging components have been identified to contain hazardous materials which are planned to be removed and disposed of properly as a part of the renovation.

**Schedule:** Design, documentation, and construction is estimated to take 30 months. In the Option A that includes the KDHE Laboratories, this would be 36 months.
OPTION A FLOOR PLANS

NET SQUARE FOOTAGES:

CAPITOL POLICE: 6,940
GRAB & GO: 1,187
STATE AGENCY: 268,948
TRAINING/MEETING: 20,758
TOTAL NSF: 298,633

(see enlarged plan in appendix)
option A + KDHE labs
utilize entire building & renovate
OPTION A + KDHE LABS FLOOR PLANS

NET SQUARE FOOTAGES:

CAPITOL POLICE: 6,940
GRAB & GO: 1,187
KDHE LAB: 83,813
STATE AGENCY: 186,243
TRAINING/MEETING: 18,668
TOTAL NSF: 296,851

(see enlarged plan in appendix)
option B
utilize first 3 floors & add 3 floors
Option B plans for reducing the building size by dismantling the upper floors of the building leaving three floors for reuse and making an addition of three floors on top and to the north and east sides. This option reuses a significant portion of the existing structure and combines that reuse with new space that capitalize on longer span and more flexible structure to maximize the functionality of space for laboratories and meeting and training spaces.

The remaining curtain wall would be replaced, the remaining exterior envelope would be cleaned, other existing non-window walls insulated, and new roofs would be installed with new insulation. The portions of the building that are additions would be designed with new energy efficient and compatible wall and window systems. The interior would be completely gutted to prepare for the new office space. Remaining historical elements would be maintained, cleaned and repaired in place and/or relocated and reused in the new design to the degree possible. New mechanical, electrical and plumbing systems would make the modern office space comfortable and effective space to work in. The central power plant would remain in operation throughout the construction.

**KEY CHARACTERISTICS OF OPTION B ARE:**

**Program Fit & Compatibility:** Provides needed space for state agencies. Allows for centralization and consolidation of currently separated agencies and in doing so capitalizes on efficiencies. In the option that includes the KDHE Laboratories a renovated Docking will provide a safe and secure facility for the Laboratories and will place the agency in a location that addresses their recruitment and retention goals.

**Architectural/Site:** Reuses portions of the existing building that are the most compatible with the intended uses, and replaces a portion of the building with new construction. As a combination of renovated and new square footage, this solution is less costly than new construction.

**Historical:** Full building documentation completed prior to partial demolition. Historic elements in the renovated portions of the building will be preserved, and other elements will be salvaged from the building and used in display and documentation.

**Energy/MEP:** The upgrades to the building infrastructure significantly improve energy performance, capitalizing on the existing central plant, and saving energy and operational costs into the future. The renovated building’s energy performance would rank within the top 3% of similar buildings that are located within the Topeka area.

**Structural:** Utilizes remaining existing structure that is sound and can be reused. New portions of the building capitalize on the larger spans and flexibility of new structure allowing for more efficient agency layouts.

**Code Compliance:** The renovation will bring the building up to current fire, life safety, energy, and accessibility codes.

**Demolition & Logistics:** Uses safe and specialized demolition techniques to dismantle a large portion of the existing building. The removal and remaining selective demolition will incorporate recycling of many materials.

**Hazardous Materials:** Some of the building’s aging components have been identified to contain hazardous materials which are planned to be removed and disposed of properly as a part of the renovation.

**Schedule:** Design, documentation, and construction is estimated to take 42 months. In the Option B that includes the KDHE Laboratories, this would be 43 months.
**OPTION B FLOOR PLANS**

**NET SQUARE FOOTAGES:**

- **CAPITOL POLICE:** 6,940
- **GRAB & GO:** 1,187
- **STATE AGENCY:** 188,527
- **TRAINING/MEETING:** 20,758
- **TOTAL NSF:** 217,412

(see enlarged plan in appendix)
option B + KDHE labs
utilize first 3 floors & add 3 floors
OPTION B + KDHE LABS FLOOR PLANS

NET SQUARE FOOTAGES:

CAPITOL POLICE: 6,940
GRAB & GO: 1,187
KDHE LAB: 73,813
STATE AGENCY: 119,514
TRAINING/MEETING: 20,758
TOTAL NSF: 222,212

(see enlarged plan in appendix)
OPTION A interior sketch at upper floor offices

OPTION B interior sketch at upper floor offices
OPTION A interior sketch at 1st floor training center

OPTION B interior sketch at 6th floor training center
building recommendations
IMPACT ON NATIONAL REGISTER ELIGIBILITY

Historically sensitive rehabilitation of this building will restore functionality and most likely retain its eligibility for inclusion in the National Register of Historic Places. Should it be necessary to replace the curtain wall system, great care should be taken to replicate the existing sight lines of the curtain wall. Nominating the building for significance in the area of Politics/Government rather than Architecture would provide the best chance of Register designation.

CHARACTER DEFINING FEATURES

The following identification of the most important historic features of the Docking Building has been prepared to assist in the preparation of treatment options for the building. The character-defining features of the Docking Building are listed below in order of importance.

Level 1: Critical character-defining features that should be preserved or carefully replicated to retain the historic character of the building.

• Exterior building form and patterns of fenestration.
• Exterior limestone wall cladding, especially the reliefs.
• Exterior curtain wall, including Vermont greenstone spandrel panels.
• First floor spaces, including most existing rooms and finishes. Important finishes include:
  • Vermont greenstone flooring.
  • Stone on walls.
  • Elevator doors and surrounds.
  • Perforated metal ceiling panels and recessed light fixtures.
  • First floor wall clock.
• Upper floor elevator lobbies and circulation spaces. Historic finishes include stone wall cladding, as well as some perforated metal ceiling panels and recessed light fixtures. (Flooring in the elevator lobbies is newer and has no historic significance.)
• Observation deck, including current plan and existing wall and ceiling finishes. (Flooring may be newer.)

Level 2: Elements with secondary impact upon historic integrity. Where possible, they should be retained or replaced in-kind, but their loss will not do major damage to the historic character of the spaces. All of these elements are interior features.

• Perforated metal ceiling panels and recessed light fixtures in areas other than elevator lobbies.
• Open floor plates of upper floors and general volumes of the rooms. E.g. ceiling height, number of partitions.
• Vault doors in basement.
• Tunnel to Capitol.
• Plaster walls and ceiling finishes.
• Small scale features: Mail chutes, exit signs, directory menu boards.
• Staircases, balustrades, treads and risers.

Level 3: Elements that can be removed or altered with minimal impact on the overall historic integrity of the building. All of these elements are interior features.

• Finishes in secondary spaces, e.g. walls, carpet and tile.
• Flooring in elevator lobbies of the upper floors and basement.
• Restroom finishes.
• Sub-basement finishes.
• Any interior walls added since 1960.

REHABILITATION

It is important to note that, with proper planning, it is entirely possible to bring a historic building into compliance with modern building codes and technical standards without destroying the individual features that embody its important place in state history. That treatment option, which is commonly referred to as rehabilitation, stresses the retention of character-defining features, but allows for changes that are needed to make the property historical approach
functional and comfortable for future occupants. Rehabilitation is one of four nationally recognized standards for the treatment of historic properties.

**HISTORIC REHABILITATION GUIDELINES FOR DOCKING**

**Site:** The building occupies its original one block site. The site should be kept open, and the approaches to the east and west entrances should be left much as they are. Construction of new buildings or large structures on the lot should be avoided, but modest changes to existing driveways and other sidewalks are acceptable.

**General building form:** The geometrical massing and planar surfaces of the walls are major character-defining features of the building and should be retained. There should be no major additions or other changes to the footprint of the building. The existing covered drive and walkways should also be retained; modest additions to the building within the overhang of the driveway could be achieved without undue impact.

**Curtain walls, including greenstone panels:** The curtain walls are among the most prominent individual features of the building. If they must be replaced, great care should be taken to replace them in-kind, using new materials that are very similar in size, shape, color, and finish. (Interior finishes are less critical than those on the exterior.) The existing Vermont greenstone spandrels should be reused if at all possible. If that is not possible, replacement spandrels should have the same color and surface texture as the existing stone. All new glass should have very similar color and reflective qualities.

**Exterior stone, including relief sculptures:** Like the curtain walls, the exterior wall cladding is a very important historic feature. Exterior stonework of note includes polished marble columns and cladding on the first floor, as well as the limestone cladding of the upper walls. The relief sculptures of the east, west and south walls are important original features that should be retained. The limestone of the building in particular is in need of cleaning. Abrasive cleaning methods should not be used on any exterior stonework, and any sealants used should be formulated specifically for the individual type of stone to which they are applied.

**Exterior signs and lighting:** There is currently a modest building identification sign near each of the east and west entrances. Although not original, those signs are historically appropriate. Any new signage should be freestanding or painted on glass doors if possible, to avoid damaging historic masonry units with wiring and attachment points. It would also be best to keep any new lighting fixtures off of the historic exterior walls to avoid damage and visual intrusions.

**Interior plans:** The interior layout of the building is organized around original centrally-located elevator lobbies and circulation spaces. The remainder of the spaces on floors 1-12 have generally open floor plates, which is also an original condition. (Original office furnishings included movable steel partitions for maximum flexibility of space planning.) The basement and sub-basement also have original elevator lobbies and the basement level include access to a historic tunnel to the Capitol building. Secondary spaces below-grade have seen numerous alterations over the years and they retain little historic integrity. The observation deck on the top floor is highly intact.

Primary spaces, such as the elevator lobbies, central circulation spaces, and the observation deck, should see few changes. Corridors located away from the front of the elevators can be shortened or modified without undue loss of integrity. Particular attention should be given to the first floor, which is one of the most intact interior spaces in the building.

Secondary spaces on the upper floors can see more changes, including a moderate number of new partitions, without a significant loss of integrity. Those floors should be left as open as possible however, especially along perimeter walls. No new walls should cover existing window openings. Perimeter walls can be furred out to make room for insulation and new mechanical elements.

Aside from elevator lobbies, the plans of the below-grade spaces can be altered with little loss of integrity.

**Interior Finishes:** The central elevator lobbies and many original circulation spaces retain a good deal of important historic finishes. It would not be appropriate to make changes in any primary or secondary space that would create a less finished appearance than the building had.
when it was new. Inappropriate actions would include removing plaster to expose structural systems that were not exposed to begin with, or removing floor coverings to create exposed concrete floors.

Finishes in primary spaces, such as the elevator lobbies, central circulation spaces, and the observation deck, should see few changes. Particular attention should be given to the finishes on the first floor, which is one of the most intact interior spaces in the building. Historic finishes of particular importance include greenstone flooring in the first-floor hallways, and marble wall finishes in most elevator lobbies. It would also be best to keep the perforated metal ceiling systems and recessed light fixtures in the elevator lobbies.

Secondary spaces on the upper floors can see more finish changes, including new gypboard walls and ceilings, newer floor coverings, and new lighting systems. Suspended tile ceilings were used when the building was new, and it would be appropriate to install new suspended ceiling systems, preferably at the same height as the originals. New ceiling grids should be comparable to the historic units.

Changing finishes in below-grade spaces would have little to no historic impact.

Mechanical Systems: Mechanical systems are not considered to be character-defining features and need not be retained as part of the rehabilitation process. All or most new HVAC, plumbing, data and electrical components should be concealed, especially in elevator lobbies and high traffic areas. HVAC ducts should be located above new ceilings where possible, and no new ducts or soffits should cross in front of, or otherwise obscure, windows and historic doorways.

Option B Specific Considerations

Impact on National Register Eligibility

Removing anything beyond a very minor part of the Docking Building will destroy its historic integrity, and it will not be eligible for inclusion in the National Register. A change as radical as that proposed in Option B will reduce the amount of visible historic character to the point that the Docking Building will no longer reflect its original design or historic association with Kansas state government. It will not be considered a historic building, and historic rehabilitation standards will no longer be relevant. Buildings can be listed in the National Register only if they are intact. Designation would not be possible if Option B is chosen. It is important in any event to minimize the effect of the project upon the overall historic integrity of the Capitol complex, with particular attention to the impact it will have on the viewshed of the Capitol.

Reuse of Historic Materials

Because Option B will effectively destroy historic integrity, there is no real need to follow preservation or rehabilitation guidelines. One of two approaches could be taken—the lower floors could be left much as they are today, or the surviving parts of the buildings could be modified to fit the new use. Since this option involves going to considerable trouble to retain the lower floors of the building, it seems to make sense to leave historic features of the surviving parts of the building in place as well.

The best way to treat important individual elements of the building is to leave them in place on an intact building. If that proves to be impossible to do, selective salvage and reuse of some historic materials could be considered. Historic elements of the Docking Building that appear to have the potential for adaptive reuse include:

- All of the stone reliefs located on the exterior of the building; these are works of art as well as part of the historic architecture and they should be salvaged if the building is destroyed. Reinstallation in or near a new building on the site would be an appropriate reuse. Interpretive signage that states the origin of the panels is recommended.
- Exterior stone, including limestone cladding on the upper floors and granite columns and wall cladding of the first floor.
- Vermont greenstone slabs from the curtain wall and the flooring of the ground floor.
- Polished marble wall panels used in elevator lobbies and first floor corridors.
- Ornamental elevator doors of the first floor.

Care should be taken to avoid “false history” by reusing elements in a way that implies they are part of a historic building. Anything built on the property under this option will be a 21st century building; trying to make it look like its predecessor would likely do a disservice to both buildings. Salvaged materials can be reused, but they should be not be used to recreate lost parts of the original Docking Building.
MITIGATING THE LOSS

Although in the end, it is impossible to significantly mitigate the loss of this historic building, it is possible to partly offset the loss of a historic resource through actions that will provide a public benefit in the area of historic preservation. (Mitigation is not required unless federal monies are used for the project; this information is given to identify best preservation practices only). Determining ways to mitigate the loss of the building can be modeled after the federal Section 106 process, which guides the impact of federal funds upon recognized historic properties. The Kansas Historical Society should be consulted throughout the mitigation process to ensure that the end products offer an appropriate record and enhanced understanding of historic resources. Two approaches are commonly used for this type of mitigation; data recovery and public benefit projects.

DATA RECOVERY

The data recovery approach is used to document the property before it is destroyed or severely altered. As noted in federal guidelines, “When an undertaking will diminish the historic property’s integrity by destroying all or part of it, information contained in the property will be lost. Data recovery preserves at least some of that information...some agreed-upon level of data recovery, analysis, curation, and reporting is appropriate in order to preserve that important information for the benefit of future generations.” Data recovery for the Docking Building should include:

- Thorough photographic documentation of the building and its surroundings.
- Architectural drawings of existing conditions to document the building as it looked before it was altered or demolished.
- Collection and analysis of data about the history of the building and its role in Kansas state government.

The resulting photos, drawing files and written report should be submitted to the Kansas Historical Society for analysis and long term storage.

PUBLIC BENEFIT PROJECT

The loss of an important historic resource can also be offset to an extent by actions that will encourage the preservation of related historic properties. A public benefit mitigation project should enhance knowledge and protection of historic properties. In this case, the public benefit project should be associated with the significance of the Docking Building, which includes distinctive architectural design and its role in state government. Possibilities for a public benefit project include:

- A study and possible National Register nomination of the many buildings that have housed Kansas state government over the years. This would establish the Docking Building’s place in state history and increase awareness and understanding of other historic buildings that have played a role in the management of the state of Kansas over the years. The study should also provide a good overview of the important services provided by state government.
- An architectural and historical survey of surviving examples of Modern Movement architecture. This could include only Topeka or be expanded to cover other major cities in the state. The survey would include identification and evaluation of the remaining resources and the general impact of the Modern Movement on architectural design in Kansas.
- Development of treatment guidelines for other state-owned historic resources. This would establish best practices for the management of state-owned historic resources.
- Creation of an exhibit, walking tour, and/or other type of project to make the information gathered readily accessible to the general public.

Final copies of information and other materials related to the public benefit project should be submitted to the Kansas Historical Society for analysis and curation.
With the proposed renovations to the Docking building, it is anticipated that the building will be brought into code compliance. Improvements including fire alarm, fire sprinkling, protected exiting, and protected structure have been included in the design solution. It is assumed that adding these protections will allow the 14th floor to be re-opened as an observation deck in Option A. In Option B, less challenges exist to bring the building into compliance. Below is a description of the basic code analysis for the full renovation option, Option B would have a similar but less restrictive set of conditions.

**CODES UTILIZED IN THE DESIGN:**

  a. Chapter 11, Accessibility, is deleted
- The Life Safety Code (NFPA 101)
- International Existing Building Code (IEBC), 2018 Edition
- Kansas Fire Prevention Code
- Kansas State Boiler Code

**OCCUPANCY/STRUCTURAL CLASSIFICATION:**

Occupancy Group B with Accessory Group A-3

The building is comprised of steel columns and steel deck, some encased in concrete. Fire protection would be added to create a compliant level of protection.
BUILDING ALLOWABLE AREA AND HEIGHT CALCULATIONS (TABLE 503):

Actual Height and Stories: 180'-9"/14
Actual Area: 532,592 sf

Floor Areas:
14th 4,870sf 6th 31,304sf
13th 4,856sf 5th 31,304sf
12th 15,585sf 4th 31,304sf
11th 31,304sf 3rd 54,918sf
10th 31,304sf 2nd 54,918sf
9th 31,304sf 1st 43,964sf
8th 31,304sf Bsmt 57,909sf
7th 31,304sf Sub-Bsmt 45,140sf

OCCUPANT LOAD FACTORS (TABLE 1004.1.1):

Office Areas (OF): 150 sf/person
Conference Rooms (CR): 15 sf/person
Storage (SR): 300 sf/person
Mechanical (ME): 300 sf/person
Break Rooms (BR): 15 sf/person

EGRESS WIDTH FACTORS (TABLE 1005.1):

Stairways: 0.3 in per person
Other egress components (doors): 0.2 inches per person

PLUMBING COUNT

Occupant Loads by floor are in the neighborhood of 200 for each of the typical floors. Loads increase for the floor with the assembly (Training Center) space. This additional load is approximately 1,000 additional occupants by code.

Plumbing counts based on the above occupant loads result in an average of 3 WC & 3 Lavs per gender per floor, with an increased quantity of fixtures required on the Training Center floor due to the assembly occupancy.
There are numerous alternatives available to provide heating, ventilating and air conditioning to the building. Energy efficiency and space comfort for any system is of paramount concern.

Since the building contains the central heating and cooling plants for the East Capitol Building Complex, it is an obvious choice to utilize this equipment to satisfy the central heating and cooling requirements of the Docking State Office Building.

**VENTILATION**

Current building codes require a certain amount of outdoor air to be provided to any occupied space. Further, these codes require that air be exhausted from any spaces containing toilet facilities and other similar spaces. This air is required to be exhausted from the building and thus not recirculated to occupied spaces.

In order to satisfy these requirements, and at the same time minimize the energy associated with conditioning the required outside ventilation air, we recommend that a dedicated outside air unit (DOAS) be provided. This unit will be provided with a fan to exhaust air from the toilet spaces and will be provided with a fan to supply the required outside ventilation air to the space. This unit will also be provided with a heat exchanger that will transfer energy from the exhaust air to the outside ventilation air.

This unit will, in addition, provide heating, cooling and dehumidification of the outside ventilation air that is delivered to the space.

Since dehumidification during summer operating conditions could require some reheating of the ventilation air, this unit may be provided with a heat source that is independent of the central heating plant.

**SPACE CONDITIONING**

The alternatives considered for the heating and cooling of the space, if the central heating and cooling plant is utilized, include a system of piped fan coil style terminal units that are located in the various spaces of the building or a system using heated and/or cooled air which circulated to zones within the building from more centrally located air handling units.

The floor to floor height within the building, on floors above the first floor of the building, limit alternatives for the distribution of heating, ventilating and cooling to the space.

**FAN COIL SYSTEM ALTERNATIVE**

The fan coil alternative requires minimal ceiling space; however, with this alternative, a separate system of ducted air from the dedicated outside air unit would be required. This ductwork would be relatively small as the quantities of air required to satisfy code required ventilation rates are small in comparison to the quantity of air required to condition the space.

The fan coil alternative does not provide the ability to utilize outside air to cool the space during cool ambient conditions during which internal loads would require cooling. It should be noted that unit ventilators (a unit ventilator is a unit that is similar to a fan coil except that it has a connection to outside air via a louver in the exterior wall, ductwork to connect the louver to the unit and dampers to control the amount of outside air delivered to the unit and thus the space) would provide the ability to cool using outside air; however, as previously stated, the damper system within this type of equipment has not proven to work effectively and, therefore, would not be our recommendation.

With the fan coil alternative, one fan coil unit would be required for each zone of control. Each fan coil would have control for fan operation and for heating and cooling coil control and each fan coil unit would have a filter. This system requires a substantial maintenance effort simply for filter changes. This filter change operation would require maintenance personnel to access occupies spaces within the building.

**CENTRAL STATION AIR HANDLING SYSTEM ALTERNATIVE**

The central station air handling unit option involves air handling units that would be located in distributed mechanical rooms. Each air handling unit would be connected to a louver in the exterior wall with ductwork connecting the louver to the air handling unit. Return air from the space and ventilation air from the dedicated outside air unit would mix with air being introduced from the outdoors via the
louver and associated ductwork. A damper in each the outdoor air intake, the ventilation air duct and return air ducts would mix the air to maintain a minimum required quantity of outdoor ventilation air during times when outside air is warm or in quantities to maintain a mixed air temperature of 55 degrees so as to provide “free cooling” to the space when ambient temperatures would allow the outside air to cool the space. The louver and associated ductwork would be sized to allow adequate quantities of outdoor air to be supplied, during times of “free cooling”, by the air handling unit.

A system of ductwork and controls will be provided to allow the quantity of air equal to that being introduced to the building during times of “free cooling”, to be relieved from the building. Thus, preventing the building from becoming over pressurized.

The air handling units should be located in mechanical rooms that are on the perimeter of the building so as to allow the connection to the outdoor air louver.

We recommend a mechanical room in each wing of the building. This will reduce the quantity of air required to be delivered by the respective air handling unit which will reduce the required size of the ductwork and thus allow ceiling heights to be as high as is practicable.

There are multiple system alternatives that utilize a central station air handling unit. These include:

**Single Zone Air Handling System:** Used for areas where one air handling unit serves a large open space.

**Variable Air Volume System with Terminal Reheat:** Used when the air handling system serves large areas as well as areas that are divided into smaller offices, conference rooms or other similar type spaces. This system also allows flexibility for future space reconfigurations. This system provides for individual space temperature control.

**Active Chilled Beam:** Like the Variable Air Volume System, this system serves large areas as well as areas that are divided into smaller offices, conference rooms or other similar type spaces. This system allows flexibility for future space reconfigurations. This system utilizes terminal units that are designed to induce air flow within the space therefore, the amount of air supplied via the central air handling unit is reduced and thus the size of the ductwork that feeds the space conditioning terminal units is reduced. With this system, there is a cooling and heating coil in each terminal unit. Individual space temperature control is provided with this system. Unlike the variable air flow system, airflow remains constant.

With this type of system, the vapor level of the ventilation air that is delivered to the space via the dedicated outdoor system, during times of high ambient humidity levels, must be lowered. This is done by cooling the air to a relatively low dew point temperature and then reheating it back up so as to prevent sub-cooling of the space. This air with low vapor content mixes with the room air to result in a conditioned space with acceptable room humidity levels.

The heat loss through the skin of the building in its current configuration is relatively high. If this is not addressed, a perimeter heating system such as hot water fin tube radiation will be recommended. With each of the central station air handling unit options, the ventilation air that is delivered to the building by the dedicated outside air unit will be ducted directly to the central station air handling unit. If the central station air handling unit option is selected, there will likely be a combination of systems provided. It is likely that the conference center would utilize a variable air volume system and the offices and associated conference rooms an active chilled beam system.

**ELECTRICAL DISTRIBUTION SYSTEM**

As previously stated, a new electrical service and associated main switchgear was recently installed within the sub-basement of the building. This new electrical service provides electrical power to the building at a voltage configuration of 480Y277 3 phase 4 wire. New electrical distribution within the building will utilize this new service with electrical bus ducts extending vertically through the building. The 480Y277 volt service will be utilized for mechanical equipment, other large point loads and lighting loads within the building.

This new service will also feed dry type transformers which will step this voltage down to a voltage configuration of 208Y120 3 phase 4 wire which will be used for convenience receptacle loads and other similar loads within the building.
The original primary distribution system within the building will be removed.

An emergency electrical distribution system will be provided to furnish electrical power from the generator to required emergency loads, within the building, during times when the normal utility power is interrupted.

The existing generator will need to be reconfigured to 480Y277 volt 3 phase 4 wire. New automatic transfer switches, one for the emergency electrical branch and one for the standby electrical branch will be provided as well as emergency distribution switchgear to feed anticipated emergency and stand by loads within the building.

The original building was constructed with an in floor electrical duct system that provided wire raceways that connect local panelboards to the respective floor area. This system allowed for flexibility in shifting branch circuit loads around the floor as the space was reconfigured or as the user needs changed.

We anticipate refurbishing this electrical raceway system so as to allow it to continue to be utilized.

**LIGHTING**

The existing old antiquated lighting system will be removed and replaced with a new system that utilizes LED lamp technology.

This new system will be designed to utilize motion sensing control. Daylighting control will also be provided to automatically dim interior lighting fixtures when ambient daylight is available to illuminate a respective space.

**EARLY WARNING FIRE ALARM**

A new early warning fire alarm system that includes voice notification will be provided. This system provides rapid notification to building occupants in the case of a fire. This system will also allow for mass voice notification so that specific direction, originating from a central security location, can be given to building occupants during a fire or other security event.

**TELECOMMUNICATIONS**

Telecommunications closets will be distributed throughout the building in order to provide the required infrastructure to support the telecommunications needs of the building users.

These closets will be stacked so as to facilitate a vertical “backbone” cable management system. A system of horizontal cable trays will be provided to facilitate tele data cable distribution to the building occupant workstations. The cable tray system will accommodate future changing cable infrastructure needs.

**FIRE PROTECTION**

Current building codes require that this building be protected by a wet fire protection sprinkler system. The existing building is not sprinkled. A new wet sprinkler system will be provided.

**ENERGY CONSERVATION ALTERNATIVES**

The building design will incorporate systems that maximize energy efficiency and minimize the required utility costs.

The plumbing system will be designed using state of the art plumbing fixtures that minimize water consumption.

The HVAC system will be designed using state of the art systems that provide individual space control and the ability to set space temperatures up in summer or down in winter when unoccupied for predetermined time periods.

Lighting systems will be designed using low wattage state of the art fixtures designed to deliver light to the space at very low lumen per watt ratings. This lighting system will utilize occupancy controls to turn lighting off when spaces are not occupied and will utilize controls to dim fixtures in various areas as daylight, entering the building, provides all or a part of the light required in a specific area.

Three of the five chillers in the district chilled water plant are old and are inefficient in comparison to similar chillers that are currently available. These will be replaced with new chillers; however, the number of chillers to be provided and the size of the replacement chillers will depend on the size and configuration of the building.
ELECTRICAL UTILITY COSTS

The building electrical service rate structure, as defined by the electrical utility company is a “Large General Service” with this service, the utility bill is calculated based on the electrical usage plus an amount for the peak electrical usage which is calculated as follows:

The billing demand shall be the greatest of:
1. 1,000 kW
2. The average kW load supplied during the 15-minute period of maximum use during the month, adjusted for excessive lagging power factor
3. 85% of the highest Billing Demand, as adjusted for power factor, established during the previous billing months of June, July, August, or September, within the most recent 11 months, or
4. The minimum demand specified in the Electrical Service Agreement.

A reduction in the peak electrical demand will result in a reduction in the electrical utility cost.

One protocol available to reduce the cost for power is to generate ice, using specially configured chillers, during times when the building is unoccupied and then to use the ice to cool the building during times of peak cooling / electrical demand. By so doing, the peak energy usage is reduced which then reduces the demand cost portion of the utility bill. This reduction would also reduce the demand charge portion of the utility bill for the remaining months of the year.

This protocol actually increases the total energy consumption of the building because the energy required to build the ice bank, which is then used to cool the water that is circulated to cool the building, is increased by a factor of approximately 1.5 x the energy required to simply cool the chilled water that is circulated to the cooling equipment in the building. This is because the ice building chiller must operate at much colder temperatures with a glycol water mixture to prevent the heat transfer fluid from freezing. The colder the water chilled, the more energy it takes to chill the water. The glycol water mixture is a less efficient heat transfer fluid and it is more viscous than water which increases the pump energy required to circulate the fluid.

A very large percentage of the electrical utility bill for this building is the demand charge. The utility charges for the energy usage portion of the bill is the same during occupied hours and during unoccupied hours. Typically, ice storage makes sense when the demand charges are high and when the electrical rate is variable and lower during unoccupied times. In cases where the electrical rate is lower during times that the ice bank is being built the energy cost to build that ice bank is also reduced. One part of the analysis in the case of lower off hours electrical usage charges, is to determine if the lower electrical usage charge offsets the decrease in the efficiency of the chiller that is used to build the ice plant.

Our initial analysis into this alternative reveal that the simple payback for the installation of the ice storage system will be quite long; however, additional study will be required, and the result may depend on the final size of the building.

BASEMENT AND SUB-BASEMENT UPGRADES

Two projects are currently progressing in the basement and sub-basement of the building. One is to drain down the building (note that this project has been put on hold) and the second is for ventilation of the basement toilet space.

A project has been explored to provide a new air handling unit that will be located at the south end of the basement. This unit will provide heating, cooling, and ventilation of areas not currently conditioned by a unit that is located at the north end of the basement of the building. This work would eliminate the need for the units located in the mechanical room located in the center of the floor.

CHILLER PLANT

There are three (3) existing chillers that are at the end of their useful life. If the building is renovated in its entirety, all three would be replaced.

The size of the replacement chillers will be determined once the size and configuration of the building is determined.

BOILER PLANT

The central boiler plant would require some additional upgrades, these include replacement of the existing flue / chimney and replacement of the buried fuel storage tanks.
The proposed infrastructure upgrades for the building with some modifications will serve the needs of the KDHE Labs. These modifications include the following:

**ELECTRICAL SERVICE**

The Lab Designers have indicated a need for a 2500-amp service at an electrical characteristic of 480Y277 volt 3 phase 4 wire. This is a load of approximately 2,700 kW. The existing electrical switchgear is “double ended” with each of the two services provided with a 3,750-kW transformer and an associated 5,000-amp. Switchgear. The switchgear is set up with “main – tie – main” configuration with a 5,000-amp tie circuit breaker. The switchgear has electrical characteristics of 480Y277 volt 3 phase 4 wire.

This electrical service should have adequate capacity to support the KDHE labs as well as the office and conference center that occupies the remainder of the building.

**EMERGENCY / STANDBY GENERATOR**

The Lab Designers have indicated a requirement of 750 kW for the lab. Taking into account the remainder of the building, we recommend the existing 500-kW generator be replaced by a 1,000-kW diesel engine driven generator. The cost for this generator and associated transfer switches is estimated to be $650,000. This is in lieu of the $150,000 cost for upgrades and transfer switches for the existing 500 kW generator.

**CENTRAL CHILLED WATER PLANT**

The Lab Designers have indicated a need for 1,000 GPM of chilled water. This equates to a cooling load of approximately 525 tons. This total cooling tonnage will be considered with the upgrades proposed for the central plant.

**CENTRAL STEAM PLANT**

The central steam plant operates at a steam delivery pressure of 85 psig, the Lab Designers have indicated that the lab will utilize both medium pressure steam +/-40 psig and steam at low pressure, +/- 15 psig. There should be ample capacity to handle the additional anticipated steam loads. The plant currently operates only during heating seasons.

**DOMESTIC WATER**

The Lab Designers have indicated a requirement for a 4” domestic cold-water line feeding the lab portion of the building. This line will feed both potable loads and non-potable loads. The potable loads within the building will be protected from contamination by the non-potable loads by a backflow preventer that will be installed in the main lab mechanical room.

The domestic hot water loads will be served by a domestic hot water heating system that will be located in the sub-basement of the building. The Lab Designers have indicated a domestic hot water load of approximately 26 gallons per minute which results in a demand of approximately 2,000 gallons of hot water per hour. A domestic hot water storage tank and heat exchanger will be provided in the sub-basement.

**SANITARY DRAINAGE**

A chemical/acid waste system and a parallel sanitary waste system will be provided. An acid neutralization tank will be provided to neutralize the chemical/acid in the acid waste system so that this waste can be conveyed to the city sewer system. The neutralization tank will be located in the sub-basement of the building.

**HEATING, VENTILATING AND AIR CONDITIONING**

The Heating, ventilating and air conditioning for the lab portion of the space will be a variable air volume system with hot water terminal units. Lab air valves will be provided to control lab hood exhaust, lab room exhaust and lab room supply air volumes so as to maintain required specific air flow rates and pressure relationships within the lab portion of the building. A central lab hood exhaust system will be provided with high volume up blast fume hood exhaust fans. In traditional office spaces and associated conference rooms, the active chilled beam system will be provided.
ENERGY CONDITIONS

The following study describes the findings from the preliminary energy study performed for the remodel/renovation of the Docking State Office Building as compared to the existing energy consumption described within the “Docking State Office Building: Gibson” report.

The existing building is comprised of a three-level base, with nine subsequent levels of “tower” above, with an additional elevator machine level and penthouse level on top. Two floors of underground mechanical space house boilers and chillers providing heating and cooling for six other major buildings in the Capitol complex as well as maintenance offices and support space which is located in the basement.

The following improvements are presented to illustrate the energy savings potential for the Docking building.

• Replacement of all glazing and curtain wall systems with improved glass efficiency and better-insulated spandrel panels.
• Installation of additional wall insulation to bring it up to bring it in line with the ASHRAE 90.1 minimums.
• Improved wall systems will result in reductions in infiltration rates.
• Replacement of the buildings HVAC system with a combination of variable air volume with terminal reheat and Active Chilled Beam systems to provide space conditioning to traditional office space. A Dedicated Outside Air Unit (DOAS) is proposed to provide conditioning of the required ventilation air to each space. Energy will be recovered from air that is exhausted from the building and will be utilized to pre-condition the required outside ventilation air.
• Lighting and controls will be replaced throughout the building. LED luminaires will be provided with occupancy controls and controls to allow for daylight harvesting.

The energy use for the occupiable spaces within Docking State Office Building, in its proposed upgraded configuration, was evaluated using the “HAP 4.9” building modeling software. The areas and volumes of each floor’s envelope were input into the program to define spaces and loads. Information obtained from Clark Huesemann was used to fill out floor occupancy numbers, wall construction improvements, glazing improvements, and roof construction improvements.

Within the energy model, the Active Chilled Beam (ACB) was selected with a centralized DOAS to provide the required ventilation rates for the building. Both systems are supplied with hot and chilled water provided by the existing shared boiler and chiller plant that resides within the sub-basement of Docking State Office Building. Assumptions within the model were made to reflect energy usage from the plant that would only pertain to the load of the building and not energy distributed to other buildings.

Additional configurations for the model included equipment/plug loads of 100W/person during occupied hours and 40W/person during the unoccupied hours. The occupancy/usage schedules are based on a normal occupied time schedule of 8am to 6pm, Monday through Friday. These define lighting loads, HVAC setback schedules and equipment/plug loads.

An Energy Use Intensity (EUI) of 122.5 in annual energy units per square foot of floor area, provided by the Gibson report, documented the existing building with no major modifications. This is a “site energy” consumption. The “source energy” consumption, that energy required to generate the respective utility at the source (main power plant) for the existing building is estimated at and EUI of 232 kBtu/sq ft/yr.

The HAP model estimates a site energy consumption EUI for the reconfigured building of 49.6 kBtu/sq ft/yr. The source energy consumption for the reconfigured building is estimated to be 94 kBtu/sq ft/yr.
The Federal "Energy Star" rates buildings within a specific geographic area. A building with an Energy Star score of 50 within the Topeka zip code would be representative of a "median property", of similar occupancy, in the Topeka area. Energy Star identifies the median property site energy EUI of 150 kBtu/sq ft/yr and a source energy EUI of 286 kBtu/sq ft/yr.

The following summarizes site and source energy EUI for the existing Docking State Office Building, the repurposed Docking State Office Building and a median property in the Topeka, Kansas Area

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>SITE ENERGY IN EUI</th>
<th>SOURCE ENERGY IN EUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing DSOB (per Gibson)</td>
<td>122 kBtu/sq ft/yr</td>
<td>232 kBtu/sq ft/yr</td>
</tr>
<tr>
<td>Repurposed DSOB</td>
<td>49.6 kBtu/sq ft/yr</td>
<td>94 kBtu/sq ft/yr</td>
</tr>
<tr>
<td>Median Similar Property</td>
<td>150 kBtu/sq ft/yr</td>
<td>286 kBtu/sq ft/yr</td>
</tr>
</tbody>
</table>

If the repurposed DSOB is entered into the Energy Star rating software program, it would be scored at 97. This means that, when considering energy usage, it would rank within the top 3% of similar buildings that are located within the Topeka area.
Renovation of office space, in the whole building format or to address any portion of a building, is a routine marketplace event in construction. A project of this size will certainly generate market interest.

Planning for the renovation with the building in the substantially vacant condition should have a positive effect on cost and schedule options, and also offers the opportunity for various activities to overlap. It is advisable for asbestos abatement/regulated materials handling to be scheduled to proceed concurrently with other interior demolition activities to optimize potential cost and schedule efficiencies.

An important scope decision to be made regarding Option A is whether the lath-supported cementitious fireproofing plaster system will need to be removed as part of the renovations. If the fireproofing system is to stay in place, its presence may have some complicating effects towards the other demolition work, particularly in regard to the removal of column enclosures and the curtain wall. This will require follow-up evaluation if it is determined that the renovation scheme includes maintaining the current fireproofing system.

Removal of the existing curtain wall is a less common demolition operation, but there are plenty of examples of renovation projects, particularly of full-building renovation projects, that have successfully integrated curtain wall removal (and ultimate replacement) within a reasonable schedule. It is viewed as essential that the curtain wall removal (and removal of the non-curtain window walls as well) be scheduled to overlap with the interior removals, as part of best addressing work along the building perimeter (such as having the perimeter HVAC components removed prior to the curtain wall removal) and to foster best temporary weatherproofing practices.

We assess, at the time of this writing, that the curtain wall removal may be completed by personnel positioned on each floor, with the procedures involving “folding in” curtain wall components at each floor level, but personnel fitted with suitable fall protection equipment.

**SPECIFIC CONSIDERATIONS:**

Safety issues posed by lower level building occupancy during Option A demolition are considered minimal, however we would definitely plan for temporary protective installations (such as selective enclosed scaffolding) for ‘dropped objects’ protection to address active access/egress and circulation locations around the site.

Although property logistics associated with Option A are less demanding that for the other Options, we do recommend that substantially all of the entire city block be isolated by construction fencing for the duration of work.

In the preliminary cost figures, we have contemplated the asbestos abatement contractor/subcontractor will also handle “other regulated materials” (“ORMS”) such as mercury-bearing lamps and appliances, potentially PCB-bearing light ballasts, and similar ORMs often encountered in building of this vintage. The asbestos abatement and ORM scope contemplates complete abatement from the First Floor to roof, as well as selective removals in the basement/subbasement to support HVAC/MEP isolations/modifications. Issues related to the management of lead-based paint (LBP) as part of any option being considered are considered discrete. Note that we do assess that the currently concealed structural steel is likely to bear LBP primer, and worker safety during torch work (for all Options, for both demolition and reconstruction, will need to be planned).

It may be advisable to perform some additional survey activities to supplement the existing asbestos survey data; more detail on this matter will be provided in future text.

Allowing for more than one existing elevator to be available for use during the construction work is advisable as a matter of logistical flexibility.

The interior renovation project will include removal of some materials that have scrap value, particularly the copper-bearing piping, but also aluminum from the curtain walls, and to a lesser extend other ferrous components. Scrap value has been accounted for in developing next costs. At the time of this writing, the scrap markets, particularly the ferrous scrap market, has been in an unfavorable position, so it more likely than not that the current estimates are conservative relative to “scrap give back” in bidders’ cost development.
The demolition operations associated with Option B are far more logistically complicated than with Option A, and require far more schedule as well as logistical planning. Many of the previously described considerations will also be applicable to Option B, for the portion of the building that is planned to remain and be renovated. Additional considerations for the dismantling of the upper floors are described below.

**SPECIFIC CONSIDERATIONS:**

Isolation of substantially the entire city block for use during the construction is considered essential.

We understand that the structural system of the building includes a steel framing supporting corrugated steel decking supporting poured concrete flooring. Therefore, we assess that the dismantlement method will include the use of cranes to hoist off steel members and some other larger building components, while the structural decking is broken and dropped to the floor level below and handled from there. These two operations would follow in a tandem, overlapping fashion. Small equipment such as skid steers and mini-excavators, possibly including some robotic equipment, could be hoisted to different floor levels to assist in this process.

We currently foresee that the optimum crane application will include use of a tower crane to be positioned to the east of the building in the vicinity of the mid-point of the building's N-S axis. Additional smaller mobile cranes may be used for the lower floor work.

We are currently considering that the predominate slab removal method will include the inter-bay slab on each floor being broken out bay-by-bay around its perimeter, while allowing the debris to fold down and/or otherwise fall to the deck below. We believe that one edge of each deck may be severed with a load maintained on the deck, but that then the given bay will need to be vacated of live load, because of the progressive weakening that will occur. We would want to avoid the use of temporary undershoring on each floor level if possible, because of its cost to the project. This matter will receive additional consideration to best support the cost estimates to be finalized.

Safety issues posed by lower level building occupancy during Option B demolition are considered significant. We will need to plan for temporary protective installations (such as selective enclosed scaffolding) for ‘dropped objects’ protection to address active access/egress and circulation locations around the Site, as well as to provide debris shielding/dropped object and weatherproofing protection to either the basement or the existing fourth floor deck. Also, the Client should plan to work with both its consultants and the contracting team to establish a program of communication and monitoring between the stakeholders to support occupant safety during the entire project.

As with the metals that would be associated with the interior demolition and the curtain wall removal, the metals arising from the structural dismantling (the structural beams and columns, and to a lesser value extent the decking and reinforcing bar) may be recycled; we have considered the net potential value of scrap metals to the demolition contractor in developing the preliminary cost estimates. (Note the comment about current scrap market conditions offered in the Option A section).

Option B will generate a significant amount of concrete waste. Most or all of this concrete will be recyclable, and although there will be cost related to the transport and acceptance of this waste by a concrete recycler, the cost of such concrete handling will be far less than that associated with landfilling of the concrete as C&D waste. If the State or an affiliate has use for the concrete as fill or for some other purpose at a nearby location, transport of the concrete waste for that purpose may offer a cost savings to the Client. That being said, it is often difficult to assure such arrangements for purposes of bid solicitations.
06 costs
Cost analysis

Cost information has been gathered from a variety of sources and is specific to this building’s unique conditions. A systems approach to the estimate has been taken in order to account for some detailed strategies that are necessary in each design solution, in combination with planning-level budgeting for many aspects of the design, which is necessary at this stage in the process. Costs have been developed by the design team in consultation with construction management firms, reference standards, and professional cost estimating firms. This cost data is preliminary and should be considered an overall order of magnitude view of the alternative designs. Costs included for the building improvements have been based on the drawings and narratives provided in this report, which identify specific renovations necessary in the existing basement and sub-basement separately from the general renovations planned for the upper floors. Full descriptions of each category of work can be found in the detailed portion of the cost narrative in the appendix.

Construction costs include all items planned to be completed by a Contractor selected to perform the construction. Included in this number is a design and estimating contingency of 15% due to the preliminary nature of the design drawings. The line item costs are based on today’s market conditions and therefore escalation has been added to account for the actual anticipated cost at the time of bidding. Escalation is calculated at 5% per year, to the mid-point of the construction period. Each design alternative carries a different overall escalation percentage due to the different construction durations. Soft Costs have been included to address typical items such as furniture, fixtures and equipment that is provided by the Owner for common spaces only, design team fees, permitting fees, Owner contingencies, and other project requirements. Not included in these costs are unknowns such as move management, lease costs, market studies or real estate fees, or legal costs. The combination of the Construction Cost line item and the Soft Cost line item results in the overall Project Cost that is shown for each design alternative. A specific description of each of the cost categories follows:

Demolition costs (including removal of hazardous materials) have been calculated to include removal of all items noted as potentially hazardous, full curtain wall removal, interior plaster removal to facilitate building-wide improvements, interior walls and finishes removal (except for items selectively preserved for historic reasons), and partial building dismantlement in the “B” options. The cost of demolition includes safety protections necessary during renovation and/or partial dismantlement.

Renovation costs include the cost of all architectural and mechanical/electrical/plumbing/fire protection to complete the main lobby/exhibit spaces, the training/meeting center, the grab and go, and the viewing platform/event space, in addition to public lobbies on each floor including restrooms, wellness rooms, and shared meeting rooms. Agency space indicated throughout the building is estimated to include flooring, perimeter walls with power and data, ceilings, hvac, fire protection, and lighting.

Renovation costs associated with specific tenant fit-out have been included for limited portions of the building given the fact that only a few tenants have been specifically identified. Renovation costs for the completion of the Capitol Police space have been included so that this space may serve as a first-floor building security location. In two of the four options the cost to fit out Labs for KDHE have been included. Costs for movable equipment and furnishings in these spaces are not included, but all costs for items “built-in” have been included.

Infrastructure upgrades are itemized for building-wide items and components that need to be replaced. The existing building systems (fire protection, hvac, electrical, plumbing, communications) have been reviewed for their current serviceability and costs have been allocated for necessary replacements and upgrades. Narratives included elsewhere in this report specifically regarding MEP systems should be referenced for additional detail on what is included in the pricing of these scopes of work, and these estimates have accounted for deferred maintenance issues related to the building central plant which serves the Capitol complex in addition to the Docking Building. This cost category includes the full replacement of exterior curtain wall systems, roofing, replacement of all elevators, restoration of historic building interior elements and exterior stone, fireproofing of the building structure, mechanical unit upgrades to serve new building loading, insulation at the building exterior walls to improve energy efficiency, and upgrades to all building stairwells. This category of costs also includes upgrades needed in the facilities support areas of the basement and sub-basement. HVAC improvements, plumbing and electrical upgrades, drainage improvements, fire protection, and energy efficient lighting upgrades have been included to bring the existing lower levels into code compliance.

New construction has been estimated for each option. In the options A, the only required new construction includes the enclosing
of an existing basement exit stair that is currently open-air. The options B, include new construction of 3 levels. This construction cost line item includes all necessary structure, enclosure, and interior finishing to create this additional square footage. The finishing out of the floors is estimated the same as on options A.

Situwork has been included to address specific improvements that are desired, including widening of the existing loading dock entrance, the creation of a dedicated parking area for the Capitol Police, and the addition of a grade-level entry and drop off area to serve the main level of the building independent of the loading dock. Other site costs that have been included address deferred maintenance items such as the waterproofing of below grade spaces, and repairs to the overall site due to construction operations. Option A also includes a grade level plaza to support the training/meeting center and food service areas on the first floor.

An enclosed connecting link spanning across 10th street has also been included in the estimates to address pedestrian circulation from the lot 4 parking area. This link is estimated to be enclosed, conditioned, and tie into the existing 3rd floor of the Docking building. At the lot 4 end of the bridge, a stair and elevator would be provided.

The construction cost figures presented for each option include a design and estimating contingency that is necessary at this stage of the process, since actual design solutions and construction information is not yet available for pricing. Escalation of costs is also included based on the proposed schedule for construction that is stated elsewhere in this report. Soft costs (costs in addition to the general construction cost such as furniture, equipment, design fees, permit costs, construction testing, owner contingency) have been estimated at a typical percentage for a building of this size and type.

<table>
<thead>
<tr>
<th>Building Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (full renovation)</td>
</tr>
<tr>
<td>14 stores above grade</td>
</tr>
<tr>
<td>$32,592 GSF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Construction Cost</strong></td>
</tr>
<tr>
<td>Demolition Costs</td>
</tr>
<tr>
<td>Renovation Costs (White Box + Shared)</td>
</tr>
<tr>
<td>Infrastructure Upgrades</td>
</tr>
<tr>
<td>New Construction Cost</td>
</tr>
<tr>
<td>Sitework</td>
</tr>
<tr>
<td>Covered link to Parking Lot</td>
</tr>
<tr>
<td>Construction Escalation*</td>
</tr>
<tr>
<td>cost per sf</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soft Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Estimated Owner Costs including:</strong></td>
</tr>
<tr>
<td>Fees</td>
</tr>
<tr>
<td>Contingency</td>
</tr>
<tr>
<td>Phasing</td>
</tr>
<tr>
<td>Furniture, Fixtures, &amp; Equipment</td>
</tr>
<tr>
<td>Escalation on Soft Costs*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>$114,142,834</strong></td>
</tr>
</tbody>
</table>

*Escalation of 5% per year to construction midpoint
construction start date early fall 2021
see cost narrative for further detail
07

schedule
An anticipated schedule for the design and construction phases of each proposed option is included for reference. The timeline that is illustrated is based on a normal progression of project decision-making and the involvement of a Construction Management firm for pre-construction services. During the design phases the Construction Manager would provide additional input relative to the schedule, in addition to working closely with the project team to fine tune site logistics, cost budgeting, etc. There are some opportunities to accelerate a portion of the demolition and renovation work prior to completion of the full construction documents. This opportunity should be evaluated by the CM to determine overall cost/benefits.
08

appendix

- enlarged plans by option
- detailed cost descriptions
- capitol complex map
- historical supplemental diagrams
- kdhe electrical narrative
- kdhe mechanical narrative
- kdhe structural review
enlarged plans - option a
enlarged plans - option a + kdhe labs
enlarged plans - option a + kdhe labs
enlarged plans - option b
enlarged plans - option b
enlarged plans - option b + kdhe labs
enlarged plans - option b + kdhe labs
enlarged plans - option b + kdhe labs
EXTERIOR CLOSURE:

Remove existing curtainwall system including greenstone spandrel panels and insulated glazing units, individual glazed window openings in masonry, and glazed entrance systems. Salvage existing stone spandrel panels for reinstallation. Provide new thermally broken curtainwall framing and insulated glazing in configuration to match existing. Insulate all non-glazed portions of the exterior walls with minimum R-20 assemblies finished on the interior with gypsum board.

Provide new modified bitumen roofing system with avg. R-30 insulation. May require full removal of all existing roofing systems. All flashing and related work is assumed to be new. Roof drains will be new (piping included in MEP scope).

Inspect all existing stone cladding and tuckpoint, clean, and seal. Replace cracked or broken units with stone to match existing (less than 1% currently appear to be damaged).

Provide new aluminum panel soffits at exposed soffits and overhang areas (first floor).

SITEWORK:

Rework retaining walls at entrance to loading dock area to provide a wider entrance, including new heavy weight concrete paving at the enlarged area.

Provide a new parking and drop off area on the north end of the site utilizing heavy weight asphalt paving, concrete curb/gutter, and concrete entrance aprons. Provide a new on-grade service and delivery drop off location on the west side of the building near the center lobby.

Repair sidewalks and rework landscaping on entire site due to anticipated damage during renovation. Provide a new exterior stone paved patio including landscaping and security bollards at perimeter, for event usage. Enclose the existing exterior stair extending from the site to the basement level to protect it for security and maintainability.

Provide new below grade horizontal waterproofing and below grade flashing to protect existing occupied below grade subbasement rooms that extend out beyond footprint of first floor. Excavation, waterproofing, regrading and sod for landscaping this area will be needed. Replacement of two below grade fuel tanks will also require excavation and regrading/repair to site (tanks included in MEP scope).

An enclosed, conditioned, and fire protected 12 foot wide walkway over 10th street to connect pedestrians to the building at the third floor is provided. This link connects to grade on the south side of 10th street with a stair and elevator.

INTERIOR ARCHITECTURAL SCOPE:

Each floor area shall be finished in a “white box” as part of the base project cost. The white box space includes flooring, ceilings, lighting, hvac, finished walls at the perimeter with power/data, and lockable doors entering the suite from the lobby. Tenant Fit Out for areas indicated as State Agency space is not currently included in the base costs. Data and electrical closets will be provided for future expansion of tenant distribution needs.

Existing stairwells should have new textured rubber stair treads, risers, stringers, and landings installed over existing concrete. New aluminum guardrails at the center and handrails at the perimeter will be installed to replace existing. New acoustic tile ceilings and painting of existing plaster walls is also required. New rated wood doors will be required at each stair entrance and new rated HM doors will be required at exterior exits.

Existing elevators will be replaced with new, ADA compliant elevators with standard finishes. It is assumed that the existing shaft sizes are adequate. The existing freight elevator will be replaced in the existing shaft.
Restrooms on each floor will receive all new plumbing fixtures and accessories and will be brought up to ADA compliance. (fixtures and piping is included in MEP scope). Full height porcelain wall tile, porcelain floor tile, and solid surface countertops will be provided in addition to increased-privacy style toilet partitions, mirrors, etc. Single-user restrooms and personal health rooms are included on each floor.

First floor lobby finishes and all upper elevator lobby finishes shall remain and be protected during construction. Existing greenstone flooring will be stripped, cleaned and re-polished. Existing marble wall panels will be cleaned and re-caulked, new perforated aluminum panel ceilings will be provided to match existing mid-century style ceilings. A grab and go food venue is included for use by building tenants as well as other users, a building security location, and the completed renovation of office spaces used by the Capitol police are also included in the base costs. Each floor for tenant use includes shared meeting rooms that are outfitted in the base building costs.

A new Training/Meeting center is included to serve a variety of needs for meetings and groups. Rooms will include A/V presentation capabilities as well as moveable partition walls, flexible furnishings for meeting in various configurations, and open reception spaces.

A stair will be extended up to the 14th floor from the 12th floor to provide a second exit from the 14th floor, as will one of the elevators to allow for public use of the observation floor.

**MEP/FP AND OTHER INFRASTRUCTURE:**

Refer to the MEP report as well as the Demolition report for additional detail on the scopes of work for these divisions.

The building will be fire sprinkled, and the structural frame will be fire-proofed to 3-hr rated, with the floor structure being 2-hr rated to bring the building into code compliance. (included in MEP scope)

Chases will be added to provide ventilation vertically from new DOAS units located on the roof. Penthouse screening will be required at new mechanical equipment on the roof. (equipment included in MEP scope).

Subbasement and Basement improvements include upgrading hvac systems to meet current ventilation and distribution requirements, improvements to restrooms, and various mechanical, plumbing, electrical, and lighting improvements described in the MEP report.
DEMOLITION/REMOVAL:

Refer to specific scope of dismantling described in Demolition report.

EXTERIOR CLOSURE:

Remove existing curtainwall system remaining on lower floors including greenstone spandrel panels and insulated glazing units, individual glazed window openings in masonry, and glazed entrance systems. Salvage existing stone spandrel panels for reinstallation. Provide new thermally broken curtainwall framing and insulated glazing in configuration to match existing. Insulate all non-glazed portions of the exterior walls with minimum R-20 assemblies finished on the interior with gypsum board. New exterior wall shall be of matching construction.

Provide new modified bitumen roofing system with avg. R-30 insulation. All new flashing and related work including roof drains connected to storm sewer and a fully enclosed penthouse. A paved roof deck with perimeter guardrail for event usage is also included.

Inspect all existing stone cladding and tuckpoint, clean, and seal. Replace cracked or broken units with stone to match existing.

Provide new aluminum panel soffits at exposed soffits and overhang areas (first floor).

SITEWORK:

Rework retaining walls at entrance to loading dock area to provide a wider entrance, including new heavy weight concrete paving at the enlarged area.

Provide a new parking and drop off area on the north end of the site utilizing heavy weight asphalt paving, concrete curb/gutter, and concrete entrance aprons. Provide a new on-grade service and delivery drop off location on the west side of the building near the center lobby.

Repair sidewalks and rework landscaping on entire site due to anticipated damage during renovation. Provide a new exterior stone paved patio including landscaping and security bollards at perimeter. Enclose the existing exterior stair extending from the site to the basement level to protect it for security and maintainability.

Provide new below grade horizontal waterproofing and below grade flashing to protect existing occupied below grade subbasement rooms that extend out beyond footprint of first floor. Excavation, waterproofing, regrading and sod for landscaping this area will be needed. Replacement of two below grade fuel tanks will also require excavation and regrading/repair to site (tanks included in MEP scope).

An enclosed, conditioned, and fire protected 12 foot wide walkway over 10th street to connect pedestrians to the building at the third floor is provided. This link connects to grade on the south side of 10th street with a stair and elevator.

INTERIOR ARCHITECTURAL SCOPE:

Each floor area shall be finished in a “white box” as part of the base project cost. The white box space includes flooring, ceilings, lighting, hvac, finished walls at the perimeter with power/data, and lockable doors entering the suite from the lobby. Tenant Fit Out for areas indicated as State Agency space is not currently included in the base costs. Data and electrical closets will be provided for future expansion of tenant distribution needs.

Existing stairwells should have new textured rubber stair treads, risers, stringers, and landings installed over existing concrete. New aluminum guardrails at the center and handrails at the perimeter will be installed to replace existing. New acoustic tile ceilings and painting of existing plaster walls is also required. New rated wood doors will be required at each stair entrance and new rated HM doors will be required at exterior exits. Existing stairwells will be extended upward into the new construction and carry similar finishes throughout.

Existing elevators will be replaced with new, ADA compliant elevators with standard finishes. It is assumed that the existing shaft sizes are adequate. The existing freight elevator will be replaced in the existing shaft. (3) of the existing 6 elevators will be removed and this space captured for other uses.
Restrooms on each floor will receive all new plumbing fixtures and accessories and will be brought up to ADA compliance. (fixtures and piping is included in MEP scope). Full height porcelain wall tile, porcelain floor tile, and solid surface countertops will be provided in addition to increased-privacy style toilet partitions, mirrors, etc. Single-user restrooms and personal health rooms are included on each floor.

First floor lobby finishes and all existing elevator lobby finishes shall remain and be protected during construction. Existing greenstone flooring will be stripped, cleaned and re-polished. Existing marble wall panels will be cleaned and re-caulked, new perforated aluminum panel ceilings will be provided to match existing mid-century style ceilings. A grab and go food venue is included for use by building tenants as well as other users, a building security location, and the completed renovation of office spaces used by the Capitol police are also included in the base costs. Upper lobbies in new construction will have updated finishes consistent with the level of quality of the lower levels. Each floor for tenant use includes shared meeting rooms that are outfitted in the base building costs.

A new Training/Meeting center is included on the upper level to serve a variety of needs for meetings and groups. Rooms will include A/V presentation capabilities as well as moveable partition walls, flexible furnishings for meeting in various configurations, and open reception spaces.

**MEP/FP AND OTHER INFRASTRUCTURE:**

Refer to the MEP report as well as the Demolition report for additional detail on the scopes of work for these divisions.

The building will be fire sprinkled, and constructed to comply with current code requirements.

Chases will be added to provide ventilation vertically from new DOAS units located on the roof. An enclosed penthouse is required at new mechanical equipment on the roof. (equipment included in MEP scope).

Subbasement and Basement improvements include upgrading hvac systems to meet current ventilation and distribution requirements, improvements to restrooms, and various mechanical, plumbing, electrical, and lighting improvements described in the MEP report.
historical supplemental - character defining features

Notes from Deb Sheets
10/06/2019

sub-basement
historical supplemental - character defining features

basement
historical supplemental - character defining features

Floor pierce should be left relatively open, especially at the perimeter walls.
historical supplemental - character defining features

Floors 2-3

Floor plates should be left relatively open, especially along the perimeter walls.
historical supplemental - character defining features

Floors 4-11

Floor plates should be left relatively open, especially at the perimeter walls.
Floor plates should be left relatively open, especially at the perimeter walls.
historical supplemental - character defining features

floor 14
SITE: Docking Building - OPTION A & B

GENERAL REQUIREMENTS

The electrical design for this project will include the following:

- Extension of electrical distribution systems throughout the KDHE spaces within the building.
- LED Lighting systems.
- Standby generator system to supply back-up power to life safety, legally required, and optional standby loads.
- A central Uninterruptible power supply (UPS) system and associated electrical distribution.
- Receptacle layouts to support computer/office equipment, laboratory equipment, and any additional general-purpose/laboratory needs throughout the KDHE spaces.
- Outlet boxes and raceway distribution systems to support voice and data needs.
- Necessary electrical service to HVAC equipment.
- Electrical rough-ins to support access control systems, video surveillance security systems, audio visual systems and any other special systems.
- Connection to and extension of the building fire alarm system with voice evacuation capabilities.
- Energy saving technologies will be provided as required in order to meet the applicable adopted energy code. Those technologies will be investigated in order to provide the most cost effective and reliable solution. These technologies include, but may not be limited, to occupancy/vacancy sensors, lighting relay panels, -dimming, multi-zone lighting control, plug load controls, and daylight harvesting control systems. Additionally, highly efficient LED fixtures will be used throughout the project in order to not exceed maximum allowable lighting power densities.

Electrical Distribution System

The main electrical distribution system voltage will be 480Y/277 volt, 3-phase, 4-wire and will be brought to each floor containing KDHE space. 480Y/277 volt, 3-phase, 4-wire main distribution panels will be provided on each floor in a dedicated, lockable electrical room. Dry type transformers and panelboards will be provided as required to support the necessary 208Y/120 volt, 3-phase, 4-wire distribution system. 208Y/120V branch panelboards will be located as close to the loads being served as possible in order to provide quick access for maintenance personnel and to limit the distance of all branch circuits. In general, HVAC equipment, and other large equipment loads will be served at 480 volts, 3-phase. LED lighting throughout the KDHE spaces will be served at 277 volts, single phase. Laboratory, office, and computer equipment, as well as general-purpose receptacle circuits will be served at 120 volts, single phase. All other equipment and devices will be served by the appropriate distribution system voltage.

Additional electrical distribution system details for the new facility include the following:

- Surge Suppression Device (SPD) equipment will be provided for the main distribution panel on each KDHE floor and all building life safety panels.
- Copper bussing will be provided for all electrical distribution system equipment.
- Separate panelboards will be used to support facility lighting, general-purpose electrical requirements, and mechanical equipment.

Emergency/Back-Up Power Systems

An existing generator located within an area well on site currently provides back up power to the Docking Building. The existing generator is fairly new and in good working condition. Additional investigation will be required to determine if this existing generator will be able to utilized to provide the necessary back-up power for the KDHE spaces. If it is not adequate in size, then a new diesel generator will be provided to serve the KDHE spaces. Either the existing or new generator will be used to supply life safety, legally required, and optional standby loads within the KDHE spaces. 4-pole automatic transfer switches (with bypass isolation) dedicated to the KDHE and corresponding emergency/standby distribution panelboards will be provided to serve standby and emergency loads. All Level 1 EPS5 emergency distribution equipment, including the automatic transfer switches, will be installed within a physically separated electrical room from the main (normal power) electrical service equipment. An NEC 700.3(F) compliant generator docking station with NEMA 3R enclosure and integral manual transfer switch will be located adjacent to the new generator.

Additionally, a central Uninterruptible Power Supply (UPS) system will be provided. The main unit will be installed in a dedicated UPS room within the KDHE space and shall be dedicated for serving the KDHE’s electrical loads requiring uninterruptible power. The UPS shall be provided with a Maintenance Bypass Panel or Switch to allow for continuation of power during required maintenance on the UPS cabinet/UPS batteries. The UPS system shall be fed from the optional standby branch of the generator system.

Lighting Systems

Lighting systems throughout the KDHE spaces will be designed in accordance with IES recommendations and applicable energy codes. All spaces will be rendered and light levels calculated utilizing lighting calculation software. Lighting power densities will be minimized by using highly efficient fixtures throughout the facility and site. Occupancy/vacancy sensors will be used throughout many spaces to provide automatic off of lighting loads during unoccupied times. In addition, where daylighting opportunities exist, the use of daylight harvesting control systems will be implemented. An astronomic timeclock-based control system will be investigated for large volume public spaces. In general, lighting systems will be as follows:

- Laboratory Lighting: For laboratories it is critical to provide appropriate illumination levels.
Electrical Criteria

- Office Space Lighting: All light fixtures will be controlled by dual technology vacancy sensors. Photosensor control of fixtures in the daylight zone will be incorporated where applicable. Fixtures will be equipped with 0-10V dimming in order to provide a variety of light levels.

- Corridor Lighting: A portion of these fixtures will be fed from the life safety branch in order to provide Code required emergency egress lighting and night lighting. Occupancy-based control, timeclock-based control and photosensor controls will all be investigated and applied where appropriate.

- Mechanical Room, Electrical Room, Telecommunication Room, Custodial Room and Storage Area Lighting: A portion of the fixtures located in these spaces will be fed from the emergency generator system. Room vacancy sensors or digital timer switches will be used to control fixtures in these spaces.

- Restroom Lighting: A portion of the fixtures will be connected to the emergency generator system and will be used as night-lights. Room occupancy sensors will be used to control all other fixtures.

Power/Receptacle Layouts

Receptacle layouts to support computer/office equipment, laboratory equipment, and any additional general-purpose/laboratory needs throughout the KDHE spaces will be provided. Dedicated receptacles and circuits will be provided as required to support specific equipment locations. Floorbox/pokethru devices will be provided to serve portions of large conference rooms/meeting rooms, large laboratories, and other spaces where power/low voltage is required and cannot be fed from a nearby wall. Strategies to minimize the number of floorbox/pokethru devices while still maintaining functionality and future flexibility will be employed. Two or three channel surface metal raceway systems will be provided along the wall in laboratories to support the distribution of power, telecommunications and instrumentation cabling to computer and laboratory equipment. Duplex receptacles will be installed in surface metal raceway systems at intervals coordinate with building users. Receptacles in raceway systems will be connected to alternate 20-amp branch circuits. Mobile casework in the middle of the labs will be fed from devices installed in ceiling mounted lab service panels. A portion of the laboratory power devices will be fed from the optional standby branch of the new generator system. Select receptacles in the labs will be fed from the central UPS system.

All electrical devices will be labeled with the panel source and circuit number. All receptacle branch circuits will be provided with equipment ground conductors. All branch circuit wiring will be copper and will be installed in concealed raceway systems. Ground fault interrupting type receptacles will be provided in all Code required locations, and in all designated "wet" locations throughout the facility.

Electrical Service to Mechanical Equipment

Electrical service to all mechanical equipment will be provided, as required. All necessary starters, disconnect switches, control devices and VFD connections will be provided to ensure a complete and functional system installation. All feeder and branch circuit wiring to mechanical equipment will be copper and will be routed in conduit. Conduits will be routed concealed wherever possible. A portion of the mechanical equipment will be fed from the optional standby branch of the new generator system.

Telecommunications

Fiber/telephone service will be extended from the building's telecom main distribution frame (MDF) room to each floor containing KDHE spaces. Dedicated KDHE telecommunications equipment rooms and closets (intermediate distribution frame rooms - IDF) will be provided on each floor to support the installation of the telecommunications equipment and cabling. Each IDF...
Electrical Criteria

will have a grounding busbar installed on the wall and connected to the building’s grounding system. The rooms and closets will be located so as to allow for distribution of telecommunications cabling to all KDHE spaces in the facility given the inherent limitations of telecom cabling lengths. Telecom system requirements will be fully coordinated with the owner. Telecommunications outlets will be provided at locations directed by KDHE personnel. Additionally, all electrical rough-ins, including necessary receptacles and circuits will be provided to support the installation of the telecommunication system. All telecommunication system power will be fed from the central UPS system.

Security Systems

A video surveillance system will be provided for the new facility. Cameras will be located to view all exterior doors and building access points. In addition, interior cameras will be provided at locations directed by KDHE personnel. A card access or biometric type access control system will be provided for the facility. System will control and monitor access into the facility, limit access to each KDHE floor, and will be used to restrict access to some locations within the KDHE spaces. System details will be coordinated with KDHE personnel. All Card Access and Security Camera System power will be fed from the optional standby branch of the new generator system.

Fire Alarm System

Extension of the building’s digital, addressable type, fire alarm control system with voice evacuation capabilities to the KDHE spaces will be provided to satisfy all Life Safety and Code requirements. The system will be designed in accordance with all current Codes and standards and will also satisfy all current accessibility guidelines.

BSL3 Laboratory Electrical Requirements

The electrical design for Bio-Safety Level 3 (BSL3) spaces will include, but will not be limited to, the following containment/safety room design practices:

- Access to the whole facility as well as the BSL3 suite will be restricted to authorized personnel through the use of a card access or biometric type security system. Additionally, critical individual pieces of lab equipment including fridges, freezers, and incubators in the BSL3 suite will be fitted with card access/biometric devices so only authorized personnel are granted permission to the contents and also so that access can be recorded/tracked.
- A video surveillance system will be provided to monitor all access to the facility and BSL3 suite.
- Access to containment areas will be controlled by the use of electrically interlocked sets of doors at airlock locations.

- All electrical penetrations into containment areas will be adequately sealed to ensure containment within the space, and to allow for decontamination. Seals will be included around conduit penetrations and around cabling within raceway systems.
- An intercom system will be provided for communication from inside the BSL3 suite to an area outside of the containment barrier.
- Light fixtures in containment areas will be triple sealed, gasketed, and a minimum of IP65 listed. Fixture lenses will be installed with the smooth surface out to provide an easily cleanable surface.
- The emergency generator system will serve all life safety loads in the suite including egress lighting, BSL3 room lighting, and fire alarm system. Additionally, the following loads be fed from the generator: all supply and exhaust systems, pumps to support building heating and cooling systems, HVAC controls, all receptacles in the lab, power to equipment including refrigerators and freezers in lab areas, and any other critical loads as required per the facility users/director. UPS power will be provided to select pieces of equipment and receptacles as coordinated with facility director and published standards for BSL3 lab design.
**SITE: DOCKING BUILDING - OPTION A**

**GENERAL REQUIREMENTS**

The mechanical design for this project will include the following:

- Air handling systems
- Exhaust systems
- Airside energy recovery systems
- Supply and exhaust air distribution systems
- Chilled and heating water generation systems
- Energy management and control system (EMCS)
- Plumbing systems
- Fire suppression systems

**Air Handling Systems**

**Office/Administrative Spaces**

For the general use areas, two system approaches will be evaluated for implementation based on available plenum space, energy usage, and first costs.

**Approach 1** – Variable Air Volume System with Terminal Reheat: Recirculating, modular-type central air handling unit(s) AHU(s) will be installed and used to provide heating, cooling, and ventilation to variable air volume (VAV) boxes for each thermal zone.

**Approach 2** – Active Chilled Beams w/ Dedicated Outdoor Air System: A dedicated outdoor air system (DOAS) unit will be installed on the 3rd floor mechanical room and will be used to provide primary air to active chilled beams located in each thermal zone.

The systems described above will either be used building-wide for non-laboratory spaces or will have systems dedicated to serve the non-laboratory spaces associated with KDHE. If dedicated to KDHE, then the systems will be installed in the 3rd floor mechanical room. Outdoor air will be provided to the central air handling units (AHUs and/or DOAS) through wall-mounted louvers in the exterior wall of the mechanical room or by way of intake hoods on the roof above. Relief/exhaust air will be routed back to the central air handling units and discharged through a hood mounted on the 3rd floor roof.

**Laboratory Spaces**

100% dedicated air AHU(s) will be provided to serve the BSL-2 and BSL-3 laboratory spaces and will be located in the 3rd floor mechanical room space. The BSL-2 AHU will operate in a variable volume (VAV) mode and the BSL-3 AHU will operate in a constant volume (CV) mode.

**Mechanical Criteria**

Outside air will be introduced to all AHUs through a louver in the exterior wall of the 3rd floor mechanical room.

**Exhaust Systems**

**Laboratory Spaces (Non BSL-3)**

Mixed flow, high plume exhaust fans, sized for N+1 redundancy, will be provided on the roof of the 12th floor to serve the new BSL-2 laboratory spaces. A stainless-steel duct main riser will run up the tower to connect the exhaust fans to the exhaust distribution ductwork on the 2nd floor. The exhaust fans will operate in a constant volume fashion to maintain an effective exhaust plume height. Bypass dampers will be utilized to allow for VAV operation of air terminal units within the building and will be controlled to maintain a system static pressure setpoint. VFDs will be provided to allow for soft starting of the fans. In general, exhaust discharge from the building will be located as far as feasible from fresh air intakes. A wind study will need to be conducted in the subsequent design phase to minimize the potential entrainment of contaminated air within the facility and adjacent buildings through fresh air openings.

The radioisotope laboratory fume hood will be connected to a dedicated exhaust duct system provided with filter racks that can accommodate a pre-filter and HEPA filter adjacent to the discharge of the hood.

**BSL-3 Laboratory Spaces**

Centrifugal exhaust fans will be provided on the roof of the 12th floor to serve the new BSL-3 suite on the 2nd floor. An inline bag-in/bag-out HEPA filter bank, with gas-tight isolation dampers, decontamination ports, and other accessories, will be provided upstream of the new exhaust fans either on the 12th floor roof or in the mechanical space on the 3rd floor. The exhaust fans will use VFDs to maintain proper airflow as the HEPA filter loads over time. The exhaust fans and AHU serving the BSL-3 suite will be interlocked to prevent the suite from being positively pressurized in the event of an equipment failure. In general, exhaust discharge from the building will be located as far as feasible from fresh air intakes. Bypass dampers may be utilized on the exhaust system to increase the effective plume height if recommended by the wind study.

**Airside Energy Recovery Systems**

Glycol runaround loop heat recovery systems will be provided to transfer sensible energy between the exhaust air and outside air streams for the two separate laboratory air handling systems. For the BSL-3 systems, the exhaust air coil banks will be located downstream of the HEPA filters, but upstream of the exhaust fans. For the BSL-2 systems, the exhaust air coil banks will be located downstream of
kdhe mechanical narrative - option a

Mechanical Criteria

MERV 8 filters, but upstream of the exhaust fans. All heat recovery system components will be located in either the 3rd floor mechanical room or on the roof above the 12th floor.

Supply and Exhaust Air Distribution Systems

Office/Administrative Spaces -

Approach 1:
A variable volume (VAV) supply air distribution system will be utilized to maintain proper temperature and ventilation control. Each control zone will be served by a supply VAV box with an integral reheat coil. The VAV box will modulate its damper position to maintain the required airflow (for code-required ventilation airflow and temperature control) as system pressure fluctuates. Upon a call for heat, a heating water 2-way control valve will modulate water flow to the reheat coil to maintain desired zone temperature conditions. All supply ductwork will be of galvanized-construction and shall be insulated to comply with the energy code.

The return air system will generally consist of transfer ducts and return air plenum. Return air airflow-measuring dampers will be used near the return air duct main to control the air volume for each floor. All supply ductwork will be of galvanized-construction.

Wall-mounted carbon dioxide (CO2) sensors will be provided in densely occupied spaces to increase supply airflow when CO2 levels exceed optimum conditions.

Approach 2:
Active chilled beams (ACBs) will be utilized to maintain proper temperature and ventilation control. Generally, most ACBs will be four pipe design with an integral heating and cooling coil. Each ACB will be ducted to a primary air duct that is served by the DOAS units noted in the Air Handling Systems section above. Upon a call for heat or cooling, a 2-way control valve will modulate water flow to the respective coil to maintain desired zone temperature conditions. The primary air duct will be sized to provide code required ventilation or airflow required for proper induction.

The return air system will generally consist of transfer ducts and open return air plenum. Return air airflow-measuring dampers will be used near the return air duct main to control the air volume for each floor. All supply ductwork will be of galvanized-construction.

Laboratory Spaces (Non BSL-3) -

A variable air volume (VAV) air distribution system will be utilized for all occupied areas. Each control zone will be served by a supply VAV box with an integral hot water reheat coil, while each laboratory temperature control zone that contains fume hoods will be served by a high-speed air valve and hot water reheat coil. A heating water 2-way control valve will modulate water flow to the reheat coils to maintain desired zone temperature conditions. All supply ductwork will be of galvanized-construction and shall be insulated to comply with the energy code.

The exhaust system will operate in a VAV mode similar to the supply air system. Each laboratory temperature control zone in the will be served by an exhaust VAV box or air valve. The airflow will "track" the airflow of the corresponding zone supply air flow to ensure proper space pressurization is maintained. Where a fume hood is installed, a dedicated hood air valve will be used to provide proper fume hood face velocity and a general exhaust air valve will modulate to provide proper room pressurization and minimum ventilation rates. Exhaust ductwork downstream of a fume hood or supporting equipment with high latent-laden exhaust will be of stainless-steel construction. All other exhaust ductwork will be of galvanized construction.

Canopy hoods and snorkel exhaust arms will be utilized as needed to capture exhaust from equipment.

BSL-3 Laboratory Spaces -

In order to maintain proper pressurization of spaces and temperature control, a constant volume (CV) air distribution system will be utilized. Each control zone will be served by a supply air valve with an integral reheat coil. The air valve will provide required airflow to maintain the room setpoint temperature while simultaneously maintaining proper pressurization relationships.

The exhaust system will operate in a CV mode similar to the supply air system. Each control zone will be served by a corresponding exhaust air valve. The airflow of the exhaust air valve will "track" the airflow of the corresponding supply air valve to guarantee proper space pressurization is maintained. Exposed areas of the exhaust terminals will be stainless steel or epoxy coated.

High-speed airflow actuators will be used to ensure that proper cascading pressurization is maintained to all spaces. A 0.05" w.g. differential pressure goal will be used for each space. Differential pressure monitors will be provided at each room in the BSL-3 suite.

A stainless-steel canopy hood will be provided on the dirty side of the autoclaves to provide capture of moist air released from the chamber. The dirty side canopy exhaust will be tied in to the containment exhaust system.

Chilled Water System
kdhe mechanical narrative - option a

Mechanical Criteria

New chilled water piping will be routed from the main risers in the building to chilled water coils in the AHUs and terminal units (ACBs, FCUs, etc.). All chilled water control valves will be pressure-independent type.

Heating Water System

New heating water piping will be routed from the main risers in the building to heating water coils in the AHUs and terminal units (ACBs, FCUs, etc.). All AHU heating water control valves will be pressure-independent type.

Energy Management Control System

New direct digital controls (DDC) use for control, alarming, and energy management purposes will be installed throughout and will connect into the main building automation system (BMS). The new system will utilize a BACnet networking protocol compliant with ANSI/ASHRAE standard 135-2016.

Plumbing Systems

Sanitary / Laboratory Drainage and Venting Systems

New sanitary and laboratory waste mains will be routed throughout the facility and will include a cast iron system for domestic waste and a polypropylene/PVDF system for the laboratory waste. A neutralization basin will be installed either outside the building or in the sub-basement area to pretreat the laboratory waste prior to being manifolded in with the domestic waste and discharged into the city main.

Domestic Water Systems

Domestic hot and cold-water mains will be routed to each floor and used to support the domestic and laboratory water needs of KDHE.

A new thermal mixing valve and recirculating pump will be installed in the 2nd floor mechanical space to create a circulating tepid water system that will be used for emergency fixtures (i.e. safety showers, eye washes) in the laboratory spaces.

Reduced-pressure backflow preventers will be installed in the 3rd floor mechanical room as necessary to meet code requirements for HVAC make-up water and other isolated, higher-risk systems.

Laboratory Water Systems

Reduced pressure zone assembly type backflow preventers will be installed in the 2nd floor mechanical room to isolate and protect the domestic water system from the laboratory cold and hot water systems. A new high-efficiency laboratory water heater will be installed in the mechanical room to support the laboratory hot water demand. A recirculating pump and piping will be installed on the laboratory hot water system to ensure continuous hot water supply at each point of use. Hot and cold laboratory water will be piped to all laboratory fixtures and equipment; including laboratory sinks and process equipment.

A new high purity water system (DI) will be installed in the 2nd floor mechanical room. Type 2 (1 megaohm) water will be circulated through the building to all laboratories requiring high purity water at water faucets and other point of use outlets.

Specialty Gas Systems

Laboratory Vacuum: A medical grade vacuum system will be provided for the laboratory spaces in the building. The pump will be located in the 3rd floor mechanical room. An oil sealed medical grade vacuum pump will be used. Exhaust from the laboratory vacuum system will be piped through the 3rd floor roof.

Laboratory Compressed Air: A laboratory compressed air system will be provided for the building. The laboratory compressed air pump will be located in the 3rd floor mechanical room.

Bulk Gases: Bulk gases including Argon and Liquid Nitrogen will be mounted on an exterior concrete pad and piped into the building for laboratory use. Final location will be identified in future design phases, but could be located in close proximity to the existing cooling towers or northwest of the tower.

Other Specialty Gases: Gas cylinders shall be housed in cylinder storage rooms adjacent to Customer Service on the first floor. Piping from gas cylinder racks to point of use will be provided. Piping, valve outlets, and connections shall be of type and material suitable for the specified gas.

Fire Suppression Systems

The new wet-pipe sprinkler system will be extended to provide full coverage for the KDHE spaces. Quick-response sprinklers shall be used throughout the facility. High temperature sprinklers shall be used in autoclave areas, mechanical/electrical/IT rooms, and any other areas in which high temperatures are routinely experienced. Offices will be classified as light hazard. All laboratory work areas will be classified as Ordinary Hazard Group 2. Storage rooms, custodial closets, and mechanical rooms will be classified as Ordinary Hazard, Group 1 or Group 2, depending on specific requirements. Special hazard areas requiring higher hazard classifications shall be protected in accordance with NFPA 13.
kdhe mechanical narrative - option a

Mechanical Criteria

Code-required fire dampers, smoke dampers, and fire/smoke dampers will be installed as necessary.
Design of the fire protection systems is subject to review by the Authority Having Jurisdiction (AHJ) and may require modifications in subsequent design phases.
Mechanical Criteria

SITE: DOCKING BUILDING - OPTION B

GENERAL REQUIREMENTS

The mechanical design for this project will include the following:

- Air handling systems
- Exhaust systems
- Airside energy recovery systems
- Supply and exhaust air distribution systems
- Chilled and heating water generation systems
- Energy management and control system (EMCS)
- Plumbing systems
- Fire suppression systems

Air Handling Systems

Office/Administrative Spaces - Approach 1 - Variable Air Volume System with Terminal Reheat: Recirculating, modular-type central air handling units (AHUs) will be installed and used to provide heating, cooling, and ventilation to variable air volume (VAV) boxes for each thermal zone.

Approach 2 - Active Chilled Beams w/ Dedicated Outdoor Air System: A dedicated outdoor air system (DOAS) unit will be installed on the 3rd floor mechanical room and will be used to provide primary air to active chilled beams located in each thermal zone.

The systems described above will either be used building wide for non-laboratory spaces or will have systems dedicated to serve the non-laboratory spaces associated with KDHE. If dedicated to KDHE, then the systems will be installed in the penthouse. Outdoor air will be provided to the central air handling units (AHUs and/or DOAS) through wall-mounted louvers in the exterior wall of the penthouse or by way of intake hoods on the roof above. Relief/exhaust air will be routed back to the central air handling units and discharged through a louver or hood mounted on the penthouse roof.

Laboratory Spaces - 100% dedicated air AHU(s) will be provided to serve the BSL-2 and BSL-3 laboratory spaces and will be located in the penthouse space. The BSL-2 AHU will operate in a variable volume (VAV) mode and the BSL-3 AHU will operate in a constant volume (CV) mode.

Exhaust Systems

Laboratory Spaces (Non BSL-3) - Mixed flow, high plume exhaust fans, sized for N+1 redundancy, will be provided on the roof of the 6th floor to serve the new BSL-2 laboratory spaces. A stainless-steel duct main will connect the exhaust fans to the exhaust distribution ductwork on the 4th and 5th floors. The exhaust fans will operate in a constant volume fashion to maintain an effective exhaust plume height. Bypass dampers will be utilized to allow for VAV operation of air terminal units within the building and will be controlled maintain a system static pressure setpoint. VFDS will be provided to allow for soft starting of the fans. In general, exhaust discharge from the building will be located as far as feasible from fresh air intakes. A wind study will need to be conducted in the subsequent design phase to minimize the potential entrainment of contaminated air within the facility and adjacent buildings through fresh air openings.

The radioisotope laboratory fume hood will be connected to a dedicated exhaust duct system provided with filter racks that can accommodate a pre-filter and HEPA filter adjacent to the discharge of the hood.

BSL-3 Laboratory Spaces - Centrifugal exhaust fans will be provided on the roof of the 6th floor to serve the new BSL-3 suite on the 4th floor. An inline bag-in/bag-out HEPA filter bank, with gas-tight isolation dampers, decontamination ports, and other accessories, will be provided upstream of the new exhaust fans on the roof of the 6th floor. The exhaust fans will use VFDS to maintain proper airflow as the HEPA filter loads over time. The exhaust fans and AHU serving the BSL-3 suite will be interlocked to prevent the suite from being positively pressurized in the event of an equipment failure. In general, exhaust discharge from the building will be located as far as feasible from fresh air intakes. Bypass dampers may be utilized on the exhaust system to increase the effective plume height if recommended by the wind study.

Airside Energy Recovery Systems

Glycol runaround loop heat recovery systems will be provided to transfer sensible energy between the exhaust air and outside air streams for the two separate laboratory air handling systems. The BSL-3 systems, the exhaust air coil banks will be located downstream of the HEPA filters, but upstream of the exhaust fans. For the BSL-2 systems, the exhaust air coil banks will be located downstream of MERV 8 filters, but upstream of the exhaust fans. All heat recovery system components will be located in the mechanical penthouse.
Mechanical Criteria

Supply and Exhaust Air Distribution Systems

Office/Administrative Spaces -

Approach 1:
A variable volume (VAV) supply air distribution system will be utilized to maintain proper temperature and ventilation control. Each control zone will be served by a supply VAV box with an integral reheat coil. The VAV box will modulate its damper position to maintain the required airflow (for code-required ventilation airflow and temperature control) as system pressure fluctuates. Upon a call for heat, a heating water 2-way control valve will modulate water flow to the reheat coil to maintain desired zone temperature conditions. All supply ductwork will be of galvanized-construction and shall be insulated to comply with the energy code.

The return air system will generally consist of transfer ducts and return air plenum. Return air airflow-measuring dampers will be used near the return air duct main to control the air volume for each floor. All supply ductwork will be of galvanized-construction.

Wall-mounted carbon dioxide (CO2) sensors will be provided in densely occupied spaces to increase supply airflow when CO2 levels exceed optimum conditions.

Approach 2:
Active chilled beams (ACBs) will be utilized to maintain proper temperature and ventilation control. Generally, most ACBs will be four pipe design with an integral heating and cooling coil. Each ACB will be ducted to a primary air duct that is served by the DOAS units noted in the Air Handling Systems section above. Upon a call for heat or cooling, a 2-way control valve will modulate water flow to the respective coil to maintain desired zone temperature conditions. The primary air duct will be sized to provide code required ventilation or airflow required for proper induction.

The return air system will generally consist of transfer ducts and open return air plenum. Return air airflow-measuring dampers will be used near the return air duct main to control the air volume for each floor. All supply ductwork will be of galvanized-construction.

Laboratory Spaces (Non BSL-3) -

A variable air volume (VAV) air distribution system will be utilized for all occupied areas. Each control zone will be served by a supply VAV box with an integral hot water reheat coil, while each laboratory temperature control zone that contains fume hoods will be served by a high-speed air valve and hot water reheat coil. A heating water 2-way control valve will modulate water flow to the reheat coils to maintain desired zone temperature conditions. All supply ductwork will be of galvanized-construction and shall be insulated to comply with the energy code.

The exhaust system will operate in a VAV mode similar to the supply air system. Each laboratory temperature control zone will be served by an exhaust VAV box or air valve. The airflow will "track" the airflow of the corresponding zone supply air flow to ensure proper space pressurization is maintained. Where a fume hood is installed, a dedicated hood air valve will be used to provide proper fume hood face velocity and a general exhaust air valve will modulate to provide proper room pressurization and minimum ventilation rates. Exhaust ductwork downstream of a fume hood or supporting equipment with high latent-laden exhaust will be of stainless-steel construction. All other exhaust ductwork will be of galvanized construction.

Canopy hoods and snorkel exhaust arms will be utilized as needed to capture exhaust from equipment.

BSL-3 Laboratory Spaces -

In order to maintain proper pressurization of spaces and temperature control, a constant volume (CV) air distribution system will be utilized. Each control zone will be served by a supply air valve with an integral reheat coil. The air valve will provide required airflow to maintain the room setpoint temperature while simultaneously maintaining proper pressurization relationships.

The exhaust system will operate in a CV mode similar to the supply air system. Each control zone will be served by a corresponding exhaust air valve. The airflow of the exhaust air valve will "track" the airflow of the corresponding supply air valve to guarantee proper space pressurization is maintained. Exposed areas of the exhaust terminals will be stainless steel or epoxy coated.

High-speed airflow actuators will be used to ensure that proper cascading pressurization is maintained to all spaces. A 0.05" w.g. differential pressure goal will be used for each space. Differential pressure monitors will be provided at each room in the BSL-3 suite.

A stainless-steel canopy hood will be provided on the dirty side of the autoclaves to provide capture of moist air released from the chamber. The dirty side canopy exhaust will be tied in to the containment exhaust system.

Chilled Water System

New chilled water piping will be routed from the main risers in the building to chilled water coils in the AHUs and terminal units (ACBs, FCUs, etc.). All chilled water control valves will be pressure-independent type.
kdhe mechanical narrative - option b

Mechanical Criteria

Heating Water System
New heating water piping will be routed from the main risers in the building to heating water coils in the AHUs and terminal units (ACBs, FCUs, etc.). All AHU heating water control valves will be pressure-independent type.

Energy Management Control System
New direct digital controls (DDC) use for control, alarming, and energy management purposes will be installed throughout and will connect into the main building automation system (BMS). The new system will utilize a BACnet networking protocol compliant with ANSI/ASHRAE standard 135-2016.

Plumbing Systems
Sanitary / Laboratory Drainage and Venting Systems
New sanitary and laboratory waste mains will be routed throughout the facility and will include a cast iron system for domestic waste and a polypropylene/PVDF system for the laboratory waste. A neutralization basin will be installed either outside the building or in the sub-basement area to pretreat the laboratory waste prior to being manifolded in with the domestic waste and discharged into the city main.

Domestic Water Systems
Domestic hot and cold-water mains will be routed to each floor and used to support the domestic and laboratory water needs of KDHE.

A new thermal mixing valve and recirculating pump will be installed in the 4th floor mechanical space to create a circulating tepid water system that will be used for emergency fixtures (i.e. safety showers, eye washes) in the laboratory spaces.

Reduced-pressure backflow preventers will be installed in the 4th floor mechanical room as necessary to meet code requirements for HVAC make-up water and other isolated, higher-risk systems.

Laboratory Water Systems
Reduced pressure zone assembly type backflow preventers will be installed in the 4th floor mechanical room to isolate and protect the domestic water system from the laboratory cold and hot water systems. A new high-efficiency laboratory water heater will be installed in the mechanical room to support the laboratory hot water demand. A recirculating pump and piping will be installed on the laboratory hot water system to ensure continuous hot water supply at each point of use. Hot and cold laboratory water will be piped to all laboratory fixtures and equipment; including laboratory sinks and process equipment.

A new high purity water system (D1) will be installed in the 4th floor mechanical room. Type 2 (1 megaohm) water will be circulated through the building to all laboratories requiring high purity water at water faucets and other point of use outlets.

Specialty Gas Systems
Laboratory Vacuum: A medical grade vacuum system will be provided for the laboratory spaces in the building. The pump will be located in the 4th floor mechanical room. An oil sealed medical grade vacuum pump will be used. Exhaust from the laboratory vacuum system will be piped through the 6th floor roof or through the sidewall of the mechanical room on the 4th floor.

Laboratory Compressed Air: A laboratory compressed air system will be provided for the building. The laboratory compressed air pump will be located in the 4th floor mechanical room.

Bulk Gases: Bulk gases including Argon and Liquid Nitrogen will be mounted on an exterior concrete pad and piped into the building for laboratory use. Final location will be identified in future design phases, but could be located in close proximity to the existing cooling towers or northwest of the building core.

Other Specialty Gases: Gas cylinders shall be housed in cylinder storage rooms adjacent to Customer Service in the sub-basement in close proximity to the dock. Piping from gas cylinder racks to point of use will be provided. Piping, valve outlets, and connections shall be of type and material suitable for the specified gas.

Fire Suppression Systems
The new wet-pipe sprinkler system will be extended to provide full coverage for the KDHE spaces. Quick-response sprinklers will be used throughout the facility. High temperature sprinklers shall be used in autoclave areas, mechanical/electrical/IT rooms, and any other areas in which high temperatures are routinely experienced.

Offices will be classified as light hazard. All laboratory work areas will be classified as Ordinary Hazard Group 2. Storage rooms, custodial closets, and mechanical rooms will be classified as Ordinary Hazard, Group 1 or Group 2, depending on specific requirements. Special hazard areas requiring higher hazard classifications shall be protected in accordance with NFPA 13. Code-required fire dampers, smoke dampers, and fire/smoke dampers will be installed as necessary.

Design of the fire protection systems is subject to review by the Authority Having Jurisdiction (AHJ) and may require modifications in subsequent design phases.
structural narrative for lab modifications

Andrew Borkon
The Clark Enersen Partners
2020 Baltimore Avenue, Suite 300
Kansas City, MO 64108-1914

Re: The Docking Building
KHDE Structural Feasibility Study

Dear Mr. Borkon,

As requested, we have completed our analysis and review for the feasibility of two different KHDE occupancy layouts in the existing Docking Building in Topeka, Kansas. To assist in our review, we received a PDF copy of the original 1954 construction documents. Original project specifications were requested but not able to be obtained. The existing structure consists of concrete slab on metal deck atop conventional structural steel framing. The structure is fourteen stories above grade and two stories below grade. The foundation consists of foundation wall and spread footings bearing on 20ksf capacity rock. The building lateral load resisting system is comprised of steel moment frames in each orthogonal direction.

Our review was based on the following structural criteria:

- 2015 International Building Code
- ASCE 7-10 Minimum Design Loads for Building and Other Structures with Supplement No. 1
- ACI 318-14 Building code Requirements for Structural Concrete
- AISC 360-10 Specification for Structural Steel Buildings
- Laboratory spaces are designed for 125 unreducible Live Load
- AISC Steel Design Guide Series 11- Floor Vibrations Due to Human Activity

The KHDE occupancy options and the associated structural implications follow. The schematic KHDE space planning used in our review is attached to the end of this report.

Option A

Option A is to house the KHDE space at floors one through four. Floors two and three would have spaces designated for laboratories. We have found the existing structure is capacity of safely supporting the planned occupancies with the exception of laboratory spaces and mechanical spaces which are required to support 125psf live load. The slab and steel framing in the footprint of these spaces will require reinforcement. A schematic drawing of this additional reinforcement is included as Reference “A” at the end of this report. Additionally, existing floor system has been reviewed for vibrations in accordance with AISC Steel Design Guide 11- Floor Vibrations Due to Human Activity. We understand the laboratory equipment in the planned space to be classified as “Class B” per Table 6.1 of the design guide. The vibration velocity of the structural for this class of equipment is to be limited to 1,000 (µ in.sec). We find the structural even with the addition of the reinforcement for structural loading does not meet this criterion. To prevent floor vibrations transmitting to sensitive equipment it is recommended such equipment be set on isolation tables, such as Precision-Aire ISO Tab-L by Fabreeka (see Reference “B” at the end of this report. To limit the vibration to the specified maximum additional structural steel reinforcing of either the existing beams, girders, or a combination thereof would be required.

The construction cost for structural reinforcement is included at the end of this report as Reference “D”.

Option B

Option B is to demolish the existing structure down to floor three and build five new stories to house KHDE (new floors at level four, five and six, mechanical penthouse at level 7, and penthouse roof framing at level 8) atop the remaining existing structure. Laboratory functions would be housed at floor four and five. The floor to floor height of the new floors was assumed to be 16'-0". For pricing and review of existing structure the new floor was assumed to be a 7 ½” concrete slab on 3” metal composite deck (7 ½” total thickness), supported by a steel wide flange beams spaced approximately 10'-0" on center. The column layout was assumed to match the existing column locations to minimize the need for transfer girders and to work with the existing building lateral load system (moment frames in each orthogonal direction). We have found the addition of this new construction on top of the existing structure to remain does not result in the need to reinforce structure.

Conceptual framing plans are attached to the end of this report as Reference “C”. The associated construction cost estimate of this conceptual framing is attached as Reference “D”. The cost of demolition of the existing structure is not included in this cost estimate. A general contractor should be consulted to review this scope of work and provide cost estimates.

If you have any questions or concerns please contact our office.

Sincerely,

BOB D. CAMPBELL & CO.
Structural Engineers

Clark A. Basinger, P.E., Principal

cc: File /CEP1901
structural narrative for lab modifications

Option A
structural narrative for lab modifications

Option A
structural narrative for lab modifications

Precision-Aire™ Tabletop Platforms & Isolation Tables

Precision-Aire™
Tabletop Platforms & Isolation Tables

Applications

- Microscopy
  - Video/Optical
  - Atomic Force
  - Scanning Probe
  - Electron
- Biomedical
  - Cell Injection/Manipulation
  - In Vitro Fertilization
  - Electrophysiology
  - Neuro Analysis
- Semiconductor
  - Micropositioning
  - X-Y Stages
  - Mask Aligners
  - Wafer Probers
  - Optical Inspection
- Metrology
  - Form/Contour Measurement
  - Roughness/Roundness
  - Profilometers
  - CD Metrology

REFERENCE B

Precision-Aire™ Pneumatic Isolation Tables

The Precision-Aire™ series table provides a self-leveling work surface and low frequency isolation in laboratories, cleanrooms and inspection areas where footfall and structural vibration can decrease performance, reliability and accuracy.

The tables are designed to support payloads of 400 to 2,500 pounds. A range of sizes and work surface options are available. The tables require a continuous air supply of no more than 100 psig (7 bar).

The work surface is isolated by four pneumatic isolators which have a vertical and horizontal natural frequency of 1.3 Hz. Leveling valves provide accurate, repeatable leveling of the work surface.

The pneumatic isolators utilize laminar flow damping which improves settling after movement and stability for varying load conditions.
structural narrative for lab modifications

Table Tops
Work surface options include stainless steel, plastic laminate and stainless steel breadboard with mounting holes. The plastic laminate and stainless steel surface construction includes a highly damped epoxy to reduce “ringing” of the steel support plate. These tops are available in 1” (25mm) and 2” (50mm) thicknesses. The breadboard work surface is 2” (50mm) thick and features sealed 1/4-20 (M6) mounting holes on 1” (25mm) centers. All table tops can be supplied with custom hole patterns and camera/laser ports for OEM applications.

Accessories
Accessories available with the isolation tables are listed on the opposite page. Tables can be supplied with arm rest pads, sliding shelves, enclosures, casters and front and rear lean bars. Front and rear lean bars are required for use with sliding shelves and enclosures.

Environmental enclosures are made of black or clear acrylic within a sturdy aluminum frame, which mounts directly to the lean bars. Hinged doors and/or cable ports are provided for equipment access. Light-tight enclosures are available upon request.

Faraday cages shield 60 Hz (50 Hz) unwanted electromagnetic interference (EMI) radiating from lab instrument sources. Design features include easily removable panels, hinged front panels, cable access holes, a 48 inch (1219 mm) height and a 30 x 30 copper wire mesh. Special sizes are available upon request.

<table>
<thead>
<tr>
<th>Optional Sliding Shelf</th>
<th>Lean Bar</th>
<th>Breadboard Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Equipment Shelf</td>
<td>Leveling Feet</td>
<td>Rugged Frame Weldment</td>
</tr>
<tr>
<td>Filter/Regulator Unit for Supply Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless Steel Top</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precision Levelling Valve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultra-Quiet Air Compressor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Padded Arm Rest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**General Specifications**

<table>
<thead>
<tr>
<th>Natural Frequency</th>
<th>Damping:</th>
<th>Finish:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical 1.5 Hz</td>
<td>Vertical 9%</td>
<td>Black Textured</td>
</tr>
<tr>
<td>Horizontal 1.5 Hz</td>
<td>Horizontal 9%</td>
<td>Paint</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table Size</th>
<th>Standard Models</th>
<th>High Capacity Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>30” x 30”</td>
<td>30” x 36” 30” x 48” 30” x 60”</td>
<td></td>
</tr>
</tbody>
</table>

**REFERENCE B**

<table>
<thead>
<tr>
<th>Work Surface:</th>
<th>Max. Payload* lbs [Kg]</th>
<th>Max. Payload* lbs [Kg]</th>
<th>Work Surface:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1” Stainless Steel</td>
<td>4000-11 4000-12 4000-13 4000-14</td>
<td>2600-11 2600-12 2600-13 2600-14</td>
<td>1” Stainless Steel</td>
</tr>
<tr>
<td>2” Stainless Steel</td>
<td>4001-11 4001-12 4001-13 4001-14</td>
<td>2600-11 2600-12 2600-13 2600-14</td>
<td>2” Stainless Steel</td>
</tr>
<tr>
<td>1” Plastic Laminate</td>
<td>4002-11 4002-12 4002-13 4002-14</td>
<td>2500-11 2500-12 2500-13 2500-14</td>
<td>1” Plastic Laminate</td>
</tr>
<tr>
<td>2” Plastic Laminate</td>
<td>4003-11 4003-12 4003-13 4003-14</td>
<td>2400-11 2400-12 2400-13 2400-14</td>
<td>2” Plastic Laminate</td>
</tr>
<tr>
<td>2” Breadboard with sealed mounting holes</td>
<td>4004-11 4004-12 4004-13 4004-14</td>
<td>2400-11 2400-12 2400-13 2400-14</td>
<td>2” Breadboard with sealed mounting holes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Options and Accessories</th>
<th>48&quot; High Faraday Cage</th>
<th>48&quot; High Acrylic Enclosure</th>
<th>Armrest for Lean Bar</th>
<th>Caster (Set of 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4021</td>
<td>4005</td>
<td>8037</td>
<td>8038</td>
<td>8039</td>
</tr>
</tbody>
</table>

*Note: Maximum payload @100 psig using 1” thick work surface. Consult Fabreeka for tabletop thickness based on equipment weight, center of gravity and stability requirements.
ISO Tab-L Series

ISO Tab-L tabletop platforms are ideal for desktops in laboratories and Q.C. rooms, where they effectively isolate structural and floor vibration. Isolation is provided in the vertical and horizontal axes by pneumatic isolators located beneath the work surface. A protective shroud is supplied with all models which is isolated from the working surface and protects the system from accidental jarring.

The compact design of the ISO Tab-L enables a working height of 3 to 3.75 inches and will support and isolate precision instruments weighing between 50 lbs (22 Kg) and 900 lbs (405 Kg). Each model ISO Tab-L requires an air supply of no more than 60 psi (4 bar), and access to inflate/deflate the isolators is provided by convenient ports located on the side of each system.

Isolation is provided in the vertical and horizontal axes by pneumatic isolators located beneath the work surface. A protective shroud is supplied with all models which is isolated from the working surface and protects the system from accidental jarring.

The pressure at each isolator can be adjusted manually to accommodate changes in load distribution. Leveling of the table surface is performed via the regulator control. The pressure at each isolator can be adjusted manually to accommodate changes in load distribution. Leveling of the table surface is performed via the regulator control units with air supplied from a manual pump or a dedicated source. The pressure at each isolator can be adjusted manually to accommodate changes in load distribution.

Work surfaces available include polished granite, polished stainless steel and black anodized aluminum. The ISO Tab-L’s are available in four sizes.
structural narrative for lab modifications
structural narrative for lab modifications
structural narrative for lab modifications

REFERENCE "C"

OPTION B 6TH FLOOR
structural narrative for lab modifications

REFERENCE "C"

OPTION B MECHANICAL PENTHOUSE
structural narrative for lab modifications
## Structural Narrative for Lab Modifications

**Construction Cost Estimation (Structural Divisions Only)**
**Docking Building - Option A**
12/11/2019
Bob D. Campbell & Company

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Units</th>
<th>Unit Cost</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Pads</td>
<td>1440</td>
<td>SF</td>
<td>$20.46</td>
<td>$29,462</td>
</tr>
<tr>
<td><strong>051200- Structural Steel Framing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing Column Reinforcement</td>
<td>0</td>
<td>tons</td>
<td>$6,000.00</td>
<td>-</td>
</tr>
<tr>
<td>Existing Floor Beam Reinforcement</td>
<td>33.3</td>
<td>tons</td>
<td>$12,000.00</td>
<td>$399,360</td>
</tr>
<tr>
<td>New Opening Framing</td>
<td>5.4</td>
<td>tons</td>
<td>$12,000.00</td>
<td>$64,800</td>
</tr>
<tr>
<td>Elevator Rail Support &amp; Hoist Beam</td>
<td>0.3</td>
<td>tons</td>
<td>$12,000.00</td>
<td>$3,552</td>
</tr>
<tr>
<td><strong>052100- Steel Joist Framing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel Joists</td>
<td>0</td>
<td>tons</td>
<td>$2,500.00</td>
<td>-</td>
</tr>
<tr>
<td><strong>053100- Steel Decking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite Decking</td>
<td>0</td>
<td>SF</td>
<td>$4.00</td>
<td>-</td>
</tr>
<tr>
<td>Roof Decking</td>
<td>0</td>
<td>SF</td>
<td>$3.00</td>
<td>-</td>
</tr>
<tr>
<td><strong>Specialty</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Fiber Wrap Reinforcement</td>
<td>53200</td>
<td>SF</td>
<td>$5.50</td>
<td>$292,600</td>
</tr>
<tr>
<td>Vibration Isolation Tables</td>
<td>100</td>
<td>#</td>
<td>$3,000.00</td>
<td>$300,000</td>
</tr>
</tbody>
</table>

**Total Structural Construction Cost Estimation** $1,089,774

---

**Construction Cost Estimation (Structural Divisions Only)**
**Docking Building - Option B**
12/11/2019
Bob D. Campbell & Company

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Units</th>
<th>Unit Cost</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Pads</td>
<td>1440</td>
<td>SF</td>
<td>$20.46</td>
<td>$29,462</td>
</tr>
<tr>
<td>Composite Slabs</td>
<td>140656</td>
<td>SF</td>
<td>$7.00</td>
<td>$984,592</td>
</tr>
<tr>
<td><strong>051200- Structural Steel Framing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing Column Reinforcement</td>
<td>0.0</td>
<td>tons</td>
<td>$12,000.00</td>
<td>-</td>
</tr>
<tr>
<td>Existing Floor Beam Reinforcement</td>
<td>0.0</td>
<td>tons</td>
<td>$12,000.00</td>
<td>-</td>
</tr>
<tr>
<td>New Opening Framing</td>
<td>5.4</td>
<td>tons</td>
<td>$12,000.00</td>
<td>$64,800</td>
</tr>
<tr>
<td>Elevator Rail Support &amp; Hoist Beam</td>
<td>0.3</td>
<td>tons</td>
<td>$12,000.00</td>
<td>$3,552</td>
</tr>
<tr>
<td>New Addition Floor Framing</td>
<td>252.5</td>
<td>tons</td>
<td>$4,000.00</td>
<td>$1,010,102</td>
</tr>
<tr>
<td>New Addition Roof Framing</td>
<td>18.5</td>
<td>tons</td>
<td>$4,000.00</td>
<td>$77,888</td>
</tr>
<tr>
<td><strong>052100- Steel Joist Framing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel Joists</td>
<td>39.9085</td>
<td>tons</td>
<td>$2,500.00</td>
<td>$99,771</td>
</tr>
<tr>
<td><strong>053100- Steel Decking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite Decking</td>
<td>140656</td>
<td>SF</td>
<td>$4.00</td>
<td>$562,624</td>
</tr>
<tr>
<td>Roof Decking</td>
<td>53964</td>
<td>SF</td>
<td>$3.00</td>
<td>$161,892</td>
</tr>
<tr>
<td><strong>Specialty- Carbon Fiber Wrap</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing Floor Slab Reinforcement</td>
<td>0</td>
<td>SF</td>
<td>$9.17</td>
<td>-</td>
</tr>
</tbody>
</table>

**Total Structural Construction Cost Estimation** $2,994,684
<table>
<thead>
<tr>
<th></th>
<th>Cost 1</th>
<th>Cost 2</th>
<th>Cost 3</th>
<th>Cost 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demolition Costs</strong></td>
<td>$5,566,000</td>
<td>$5,566,000</td>
<td>$9,173,046</td>
<td>$9,173,046</td>
</tr>
<tr>
<td><strong>Renovation Costs (White Box + Shared)</strong></td>
<td>$36,013,087</td>
<td>$35,648,783</td>
<td>$26,675,876</td>
<td>$26,635,866</td>
</tr>
<tr>
<td><strong>Renovation Costs (Partial Tenant Fit Out)</strong></td>
<td>$231,768</td>
<td>$25,831,129</td>
<td>$231,768</td>
<td>$23,649,828</td>
</tr>
<tr>
<td><strong>Infrastructure Upgrades</strong></td>
<td>$29,853,089</td>
<td>$31,488,102</td>
<td>$15,422,665</td>
<td>$18,097,128</td>
</tr>
<tr>
<td><strong>New Construction Cost</strong></td>
<td>$72,358</td>
<td>$72,358</td>
<td>$11,333,566</td>
<td>$11,333,566</td>
</tr>
<tr>
<td><strong>Sitework</strong></td>
<td>$1,137,569</td>
<td>$1,137,569</td>
<td>$896,492</td>
<td>$896,492</td>
</tr>
<tr>
<td><strong>Covered link to Parking Lot</strong></td>
<td>$2,003,760</td>
<td>$2,003,760</td>
<td>$2,003,760</td>
<td>$2,003,760</td>
</tr>
<tr>
<td><strong>Construction Escalation</strong></td>
<td>$9,738,772</td>
<td>$13,233,560</td>
<td>$8,549,941</td>
<td>$11,938,396</td>
</tr>
<tr>
<td><strong>Cost per sf</strong></td>
<td>$158.88</td>
<td>$215.89</td>
<td>$204.06</td>
<td>$284.94</td>
</tr>
</tbody>
</table>

**Soft Costs Estimated Owner Costs:**

<table>
<thead>
<tr>
<th></th>
<th>Cost 1</th>
<th>Cost 2</th>
<th>Cost 3</th>
<th>Cost 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fees</strong></td>
<td>$229,552,443</td>
<td>$339,557,255</td>
<td>$226,001,889</td>
<td>$335,776,001</td>
</tr>
<tr>
<td><strong>Contingency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phasing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Furniture, Fixtures, &amp; Equipment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Escalation on Soft Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Escalation of 55% per year to construction midpoint construction start date early fall 2021**

<table>
<thead>
<tr>
<th></th>
<th>Cost 1</th>
<th>Cost 2</th>
<th>Cost 3</th>
<th>Cost 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Total Cost</strong></td>
<td>$114,114,834</td>
<td>$155,445,656</td>
<td>$100,266,092</td>
<td>$133,995,070</td>
</tr>
</tbody>
</table>