CITY OF FRISCO LIBRARY SYSTEM

Pre-Design: Building Analysis & Recommendations Report

APRIL 2018

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EXECUTIVE SUMMARY

FRISCO LIBRARY EXECUTIVE SUMMARY

As outlined in the 2015 Growing City, *Growing Library Frisco Public Library Master Plan* the City of Frisco determined space needs of .55 square feet (SF) per capita for their growing population or a total of 142,800 square feet (SF) for the estimated population in 2025.

In December 2017, the City of Frisco identified the Beal Aerospace Building as a potential adaptive reuse for new library space. At approximately 114,500 square feet (SF) with space for mezzanines, this is a significant potential increase in library service and staff space for the City of Frisco. 720 design, a group of architects and engineers with library design experience, collaborated with the City and Library Board to evaluate the building for its suitability as a library, the condition of the spaces, utilities, and shell.

The team ultimately evaluated the value this building would present to the City if adapted for use as a library in comparison to building a new library. Following is a summary of findings and recommendations:

Architectural Summary

Site:
Located just south of the Town Square, this location is desirable and visible as the roads and access become more developed. The future Train Museum and existing Discovery Center, in conjunction with the potential of the library, enhance the area as a citywide cultural center. With 281 existing parking spaces the paved area is short the best practices and code required 370 parking spaces. However, there is adequate space for parking expansion on the site.

Exterior Construction: :
The exterior of the building is a concrete tilt wall and in good condition. The building system allows for cutting in windows at locations in the center of the panels as would be desired especially on the east side of the building. The tilt wall would need some aesthetic upgrades to meet the City of Frisco expectations and to re-image the building as a

library/civic piece of architecture and not a manufacturing space. Insulation will need to be added to the walls and roof to meet energy code requirements. The roof will need to be replaced and, in fact, has been on the City's maintenance list outside of this Needs Assessment.

Floor Slab:

Library's require a stronger slab to support the book stacks and in this case the strength of the slab far exceeds the needs. This poses a challenge for providing the required electrical service to the staff and public areas of the library but can be accomplished by installing a raised floor. There is further benefit of a raised floor in that it allows the library ultimate flexibility in locating and moving power and data/Wi-Fi and possibly supply air as library needs and layouts change and develop. In addition, the Americans with Disabilities Act requires elevators for mezzanine access and more extensive plumbing fixtures will be required based on the new occupancy – all complicated by the existing slab.

Ceiling:

The existing exposed deck is not insulated or acoustical. The structural system will need to be strengthened in order to provide acoustical ceiling features, suspended lights and any additional items that add weight to the roof.

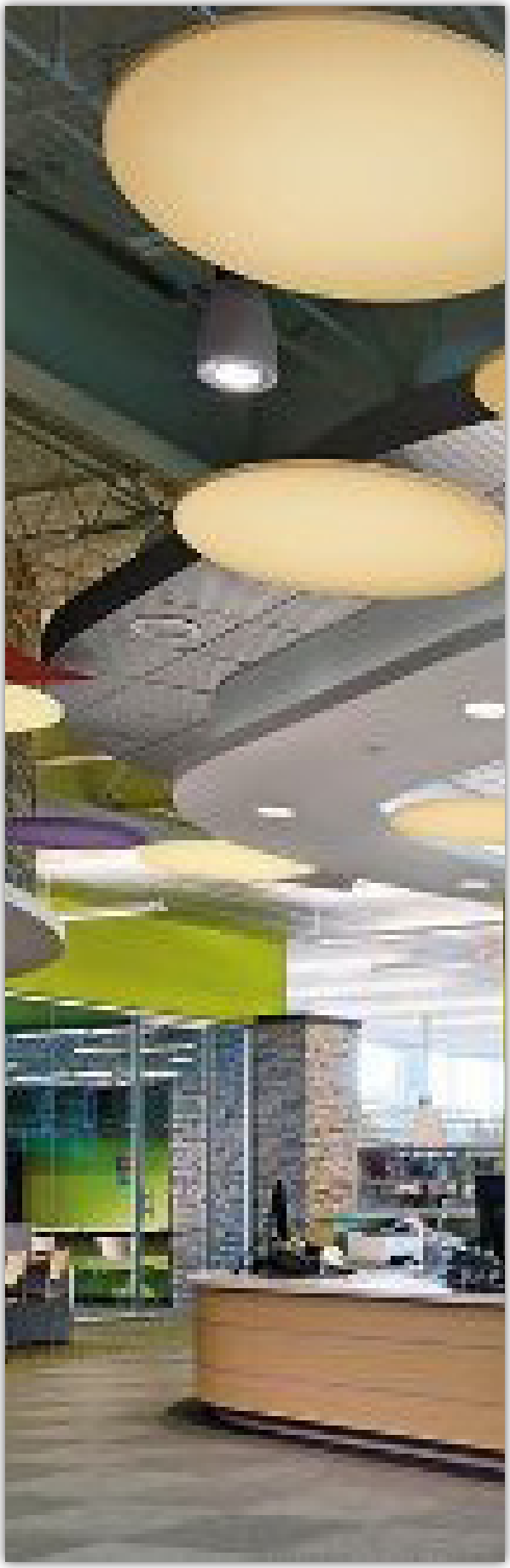
Mechanical, Electrical and Plumbing Summary

Overall the existing electrical and plumbing infrastructure of the building is of sufficient size and in good condition for the renovation of the building. Overview of electrical and plumbing infrastructure includes:

- Electrical power distribution is large enough to handle the renovation.
- The natural gas meter and distribution system is of sufficient size.
- The domestic cold-water main has enough capacity without having to be reworked from the City tap.
- The sanitary sewer size can support the new plumbing fixture load.

By having the above infrastructure in place, the owner will save on the cost that would be incurred by having to provide new power, natural gas, and domestic water service and site utilities that would be necessary for a completely new building.

The entire existing mechanical system for the building, which include exhaust fans, rooftop unit and splits



systems are not in good shape and have outlived their life expectancy. These systems would need to be completely removed and all new mechanical systems would have to be provided for the renovation of the space. The proposed mechanical system would be designed to heat and cool only the breathing zone adding additional efficiency. Otherwise the system would be tasked with the entire open two-story space.

Structural Summary

The original foundation plan is not available; however, the structural notes on sheet S2.1 indicate that the floor structure is designed for a live load of 400 psf. The existing floor structure has reserve capacity; however, without the existing foundation plan, the actual location of the beams and piers are unknown. The reinforcement in the slab is likely to be very dense. Also, it is anticipated that reinforcement is especially congested over the pier supports. Trenching or cutting the existing slab is not recommended as it compromises the existing structure and is very costly to repair. The interior grade beams also seem to indicate the top bars located within the slab depth, thus the grade beams may be designed as flange section ("tee-shaped"). There are many unknowns related to the existing slab reinforcement, slab spans, location of grade beams and their associated reinforcement which would be negatively impacted by trenching the slab. Ground penetrating radar (GPR) is an option to field locate the existing grade beams and piers. The actual location of the concealed foundation elements will play a significant role in determining the layout of future elevators, bathrooms, plumbing, and architectural spaces. In addition, the mezzanine columns must be located over the existing piers.

The roof structure currently supports rooftop units at both ends bays, 75 feet and 100 feet respectively. The original drawings indicate the rooftop unit locations and it appears that the load was likely accounted for in the design of those specific joists. The size and depth of the joists are unknown as well, since the roof framing plan is not available. The existing long-span roof joists were likely not designed for additional load, thus the addition of new roof top loading and suspended loading (such as ceilings, ductwork, etc.) will likely require strengthening of most, if not all, of the long-span joists. In order to limit the amount of joist strengthening, the new loading of the existing roof structure must be minimal as to not exceed the reserve capacity (if any) and place new mechanical equipment on new mezzanine platforms. Ceilings and suspended acoustic treatments could possibly hang from a framing grid system which posts up from the mezzanine rather

than suspended from the roof joists above. Currently the existing warehouse does not have a ceiling and has minimal suspended mechanical ductwork. The joists are also not suitable for any rooftop deck, thus complete removal and reframing of the proposed roof deck area should be anticipated.

If roof framing plans cannot be acquired, the existing joists may have joist tags near the ends of the joists which would give information regarding the steel joist supplier, job number, mark number and plant location. The joist tags are more than 30 feet above the ground floor, thus a lift will be needed to locate tags if they haven't already been removed.

Cost Summary

Construction Cost Summary:

HLM Construction Management was hired by the City to provide a probable cost estimate for the adaptive reuse of the Beal Aerospace Building. The team provided the following cost estimates:

1. Renovate the existing 114,500 SF only.
2. Include a 31,000 SF mezzanine that would closely meet the .55 SF per capita based on 2025 population estimates.
3. An alternate cost for including a 2,000 SF roof deck programming and event space.
4. Cost for a new 146,000 SF library.

Construction Cost #1:
Renovate the existing 114,500 SF space only

Total Estimated Construction Cost:	$24,226,220
Cost per SF:	$211.58/SF

Construction Cost #2:
Renovate existing space + include 31,000 SF mezzanine

Total Estimated Construction Cost:	$35,553,416
Cost per SF:	$243.52/SF

Alternate Cost:
Add a 2,000 SF roof deck programming and event space

Estimated Construction Cost:	$1,062,234

The construction cost for the alternate would be similar for each listed scenario with an estimated $330,000 in soft costs associated. An additional alternate to consider would be to "notch" the east edge of the building and create a

mezzanine level courtyard. This would save on vertical circulation costs by not adding a third level/stop for the elevator or the added structural costs to strengthen the roof joists.

Please reference the **Appendix** for detailed cost estimates.

New 146,000 SF Building Construction Cost: For comparison, construction costs (not including soft costs) for a new 146,000 SF library @ $450/SF = **$65,700,000**.

New 114,500 SF Building Construction Cost: For comparison, construction costs (not including soft costs) for a new 146,000 SF library @ $450/SF = **$51,525,000**.

Soft Cost Summary:

Soft Costs: A total project cost is more than construction costs for the city and the planning process should include these costs to avoid surprises later in the process. Soft costs include the furniture, fixtures and equipment, interior wayfinding, architectural and engineering fees, technology, audio visual, staff and public computers, move costs, data wiring, book security, automated materials handling/self-check/RFID equipment, building security, materials and soil testing. In addition, a 5% owner contingency is included for unknown conditions discovered during renovations.

Estimated soft costs for a 114,500 SF renovation of the existing Beal Building:

$10,308,701

Estimated soft costs for a 146,000 SF renovation of the existing Beal Building:

$13,664,861

Estimated soft costs for a 146,000 SF new building:
$18,088,999
(Note: This does not include site acquisition costs)

Estimated soft costs for a 114,500 SF new building:
$15,001,999
(Note: This does not include site acquisition costs)

Please reference the **Appendix** for detailed soft cost estimates.

The 720 design team was contracted by the City of Frisco City Manager's Office and Library to determine the feasibility and value to the city to adapt the existing Beal Building to a library.

THE TEAM INCLUDED:

City Staff:
Jason L. Cooley, PhD
Interim Intergovernmental Relations Manager
City Manager's Office

Shelley Holley
City of Frisco Library Director

720 design Team:
Maureen Arndt, AIA, IIDA, LEED GA
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Aaron Morken, CPD, LEED AP
Project Manager
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Chris Baker, PE, LEED AP
Associate/Senior Project Manager
JQ Engineering

Cost Estimator:
GEA

01. ARCHITECTURAL ANALYSIS

BEAL BUILDING ANALYSIS FAST FACTS		
Total Existing SF:	First Floor Total (Includes First Floor Office):	101,544 SQFT
	First Floor Office:	15,566 SQFT
	Second Floor Total (Includes Balcony):	16,330 SQFT
	Total Area:	**117,874 SQFT**
Existing Parking:	281 Spaces Seven (7) Accessible Spaces	
Code for Library:	Three (3) per 1000 SF + 10 @120,000 SF = 370 Parking Spaces Required Eight (8) Accessible Spaces per TDLR Need Bus Parking Spaces for Library and Discovery Center (5)	
Design Building Code:	Designed Under 1994 UBC 2015 International Building Code with Local Amendments	
Current Building Code:	2015 International Building Code with Local Amendments	
Construction Type:	II N Fully Sprinkled (Unprotected Noncombustible)	
Exterior Construction:	Tilt up 7.25" Thick Concrete with Brick Veneer Not Insulated	
Current City of Frisco Non-Residential Development Standards:	100% Masonry is Required for Façade Secondary Materials May Account for Less Than 10% of the Façade (Aluminum, Metal, Tilt Wall or Other Approved Materials)	
Inside Wall Construction:		
OFFICE AREA	Lower Level is Load Bearing CMU with Poured in Place Concrete Slab Upper Level is Drywall	
OTHER AREAS	Mainly Drywall, Some CMU	
Expansion Joint:	Floor, Wall and Roof	
Estimated Occupant Load:	To Be Based on Library and Assembly Occupancy and Master Plan Division of Space	
Plumbing Requirements:	Preliminary Occupancy Estimates Indicate (12) Men and (20) Women, (6) Drinking Fountains	
Elevator Requirements:	No Elevator Existing (One [1] Required for Public + One [1] for Staff/Service)	
Floor Condition:	Concrete Floor with Grates/Drains in Some Locations Structured Slab to Support 400 PSI	
Ceiling Condition:	Exposed Metal Deck, No Insulation	
Window Condition:	1" Insulated Glass	
Roof Condition:	Modified Bitumen Construction at the End of Life Expectancy. When Replaced Consideration Should Be Given to Drainage and Future Use/Possible Roof Deck Garden Space.	

INVESTIGATION PROCESS:

This feasibility study is the first phase of four phased project including Pre-Design to provide an analysis of the Beal Building, *Stage 1: Building Space Programming, Stage 2: Site Analysis and Floor Plan Development and Stage 3: Schematic Design*. This report represents the Pre-Design Stage.

The overall goals of this stage of the process are:

1. Determine the value to the city to adapt the Beal Building to a library.

2. Work with the City of Frisco preferred construction vendor to determine what will it cost to adapt the building for use as a library.

3. Develop a determination if the building engineering systems, location, layout, flood plains and site configuration (in conjunction with the City Parks/Landscape Architect) is viable for use as a public library including adequate parking, access and book return drive.

The team visited the Beal Building on December 20th with a tour conducted by the current tenant of the building. The tour included the office work areas, open warehouse/manufacturing area and access was given to the team for the roof. As-built drawings and the original design/construction documents were available for the team's review.

LIBRARY NEEDS:

In 2015 the 720 design consulting team completed the *Growing City, Growing Library Frisco Public Library Master Plan 2015-2025* that detailed the City, Public and Library needs and expectations for library services and space as the City of Frisco grows. The plan took into account recognized state and national library standards for collection, technology and space, rules of thumb for staff work area and support space sizes all based on city population growth projections. As such, it was determined based on needs, public expectations and state standards that the correct goal for overall space size for Frisco Library services should be based on .55 square feet per capita. The City population growth expectations have been revised and updated each year since the Master Plan and thus require updating to the overall space needs for collection, seating and overall space.

POPULATION - SF @ 0.55		
374,800	206,140	Build in the year 2035
259,636	142,800	2025
244,940	134,717	2024
231,075	127,091	2023
217,996	119,898	2022
205,656	113,111	2021
194,015	106,708	2020
183,033	100,668	2019
172,673	94,970	January 2018
240,000	132,000	2025

During the master planning process, it was determined that the best practices per capita for collections should be 1.52 volumes per capita with 33% of that collection size to be electronic. Based on current population size and projects, the updated space required for collections in 2025 will be 33,052 square feet.

COLLECTION				
Population	**1.52 per Capita w/33% Digital**	**Physical Collection**	**Square Footage @8 Books per SF**	**Year to Build**
374,800	569,696	381,696	47,712	Build Out
259,636	394,647	264,414	33,052	2025
244,940	372,309	249,447	31,181	2024
231,075	351,235	235,327	29,416	2023
217,996	331,353	222,007	27,751	2022
205,656	312,598	209,440	26,180	2021
194,015	294,903	197,585	24,698	2020
183,033	278,211	186,401	23,300	2019
172,673	262,463	175,850	21,981	January 2018
240,000	364,800	244,416	30,552	Master Plan 2025

Finally, the number of reader and technology seats per capita was set at 7 seats per 1000 population.

The detailed programming requirements are part of the next stage of the project, however, this analysis is included in pre-design to determine if the size of the Beal Building is adequate to meet the needs for library space and services into the year 2025. Should the overall library space remain the same 55,000 SF as existing in the City Hall space, the square feet per capita will lower to .212 SF per capita – significantly lower than the Master Plan goal of .55 SF per capita. As shown below, by moving to the Beal Building, maintaining some space in City Hall and completing the planned Children's Library in a retail space, the space per capita will be .502 SF per capita.

The space listed for the Beal Building includes the 2nd floor office space. During the programming and conceptual design phases of the process, it will need to be determined what library and/or support functions can be utilized in those lower ceiling areas.

SEATING

Population	Current Seats	7 per 1,000	SF Requirement* @ 7/1000	Year
137,330	325	961	28,839	2014
194,015	-	1,358	40,743	2020
259,636	-	1,817	54,524	2025
374,800	-	2,624	78,708	Build Out

OVERALL SPACE ANALYSIS

Future Children's Library Mall	3,000	-	-	-
Space to Remain in City Hall	2,000	-	-	-
Off-site Storage	-	-	-	-
Beal Building	117,874	Including Office	0.454	SF per Capita
Total Library Space	**122,874**	**-**	**0.502**	**SF per Capita**

CITY REQUIREMENTS:

City of Frisco Non-Residential Development Standards: 100% masonry. The use of secondary materials may be used as specified by 4.08.02 (B).

(A) Primary Materials

Unless otherwise provided for in this Ordinance, exterior construction materials are fired brick, natural and manufactured stone, granite, marble, architectural concrete block, and 3-step stucco process for all structures.

(B) Other Materials

Other exterior construction materials for nonresidential structures are tilt wall concrete panels and sealed and painted concrete block.

OTC Façade Requirements:

Not applicable for the Beal Building.

CODE REQUIREMENTS:

ADA Updates:

- Exterior ADA exit paths
- Elevator(s) required for any second floor/loft access for staff and/or public

EXTERIOR REQUIREMENTS:

- Car and bus parking.
- Book return with interior space for automatic sorting.
- Library service window.
- Picnic/outdoor programming spaces.
- People drop off/pick up.
- Benches for waiting and studying/reading.
- Bike racks.
- Trash bins.
- Exterior signage.

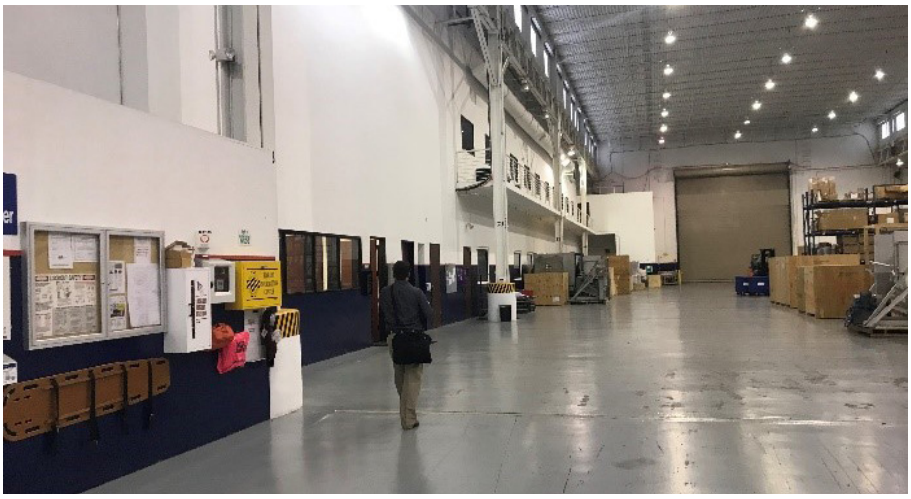
ARCHITECTURAL INVESTIGATIONS AND REQUIREMENTS:

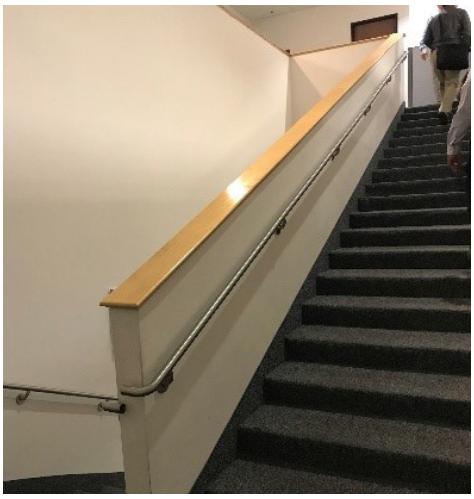
Although the Beal Building is not subject to the aesthetic requirements listed in the City of Frisco Non-Residential Development, its function as a civic building, proximity to the Frisco Square and visibility to the Toll Way and Railroad museum mean that it does not have a "back side" and should reflect the aesthetic and quality of the nearby civic buildings. The existing tilt up concrete walls are "lightly" painted and will require at a minimum new paint. 1" insulated, Low E windows will need to be cut in to the north and east walls to accommodate new functions in those areas and take advantage of views and natural light. The location of the entry should be explored based on access to the site and connection to the Frisco Square. The existing oversize garage doors should be removed and glass cubes inserted for library functions. The delivery dock should be planned for removal.

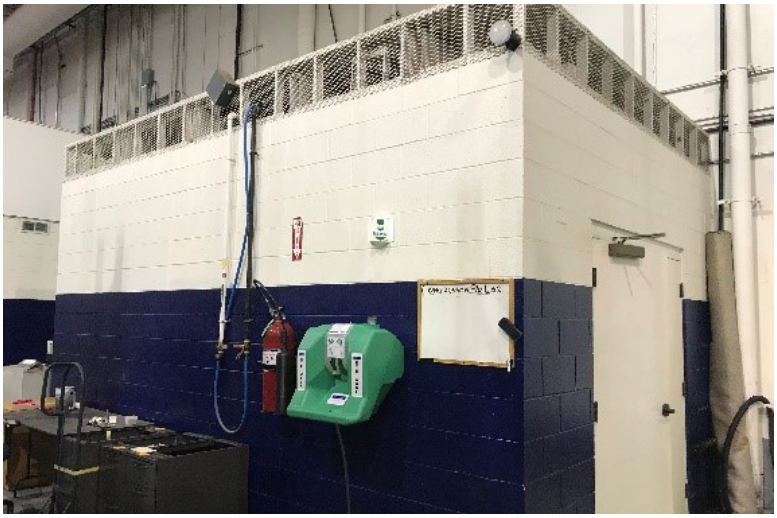
Standards, the energy code will require insulation added to all exterior walls. A functional library will require significant access to power for public library users as well as staff so it should be planned to add duplex outlets with USB ports into the walls as the furred out areas for insulation are created.

Existing Interior Walls and Column Spacing:

The office walls were created with CMU block on the lower level, supporting a poured in place concrete 2nd floor and balcony above. There is no elevator and the stairs serving access to the second floor are not in code. In addition, in a library this size it makes sense for staffing to be located close to the spaces being served and not centrally located in one area. Given the flexibility to remove this area and recreate it will better serve and efficient and functional library saving costs in staffing by spending a one-time cost to re-design.







The other areas where walls have been created over time and mostly drywall and easily removed to create a wide-open library space.

New interior walls into public spaces (study rooms, programming spaces, quiet spaces) should be planned to be mainly glass for security and visibility. Walls into staff areas should be planned to be standard drywall walls but acoustics must be considered. Walls to structure, specialty acoustical ceiling tiles with a layer of drywall on top to provide mass to stop sound should be planned at walls separating staff from public, offices, study rooms, program rooms and restrooms.

The exception is an equipment room and restrooms on the south-east side of the building that was built later with concrete masonry blocks and should be removed.

There are two bays of interior columns in the space leaving most of the area open and flexible for future library use. The steel columns are wrapped with a concrete base which structurally may be removed.

Floor Slab:

The building floor slab is designed to support 400 psi which significantly exceeds the code requirements for libraries and it appears to be in good condition. There are a number of floor drains and grated drains used for manufacturing that will need to be removed, filled or otherwise repaired. In addition, there is an existing expansion joint that extends the full perimeter of the floor, walls and roof that must be respected.

However, it is not known what the structured slab includes and how much space between piers and grade beams are available for trenching for electrical and/or plumbing.

Electrical:

Access to power is one of the most critical aspects to the success of 21st century library design and thus all reader seats must be in close proximity to power for library users that bring their own devices as well as library provided devices. If trenching is not feasible, the library can utilize a raised floor system for distribution of power, data and in some locations, conditioned air. Plugs should be provided that have both power and USB ports.

Data/WiFi:

WiFi should be provided throughout the interior and exterior spaces. The library is a high tech space and currently offers public computers and maker spaces - spaces that will continue to be offered and expanded in the future. The next phase of this project will include work sessions to further define the technology goals. RFID and automated sorting in place and planned to moved.

Lighting:

The existing lighting, designed for manufacturing is not appropriate nor adequate for public library. Light levels, measured in Foot Candles (fc) should be between 50-70 for public library spaces and 30-40 in staff work areas. Library lighting must provide light that is comfortable for reading, without glare, the correct color and the appropriate level for navigating the space. LED lighting has, in recent years been the lamp of choice for libraries to provide adequate lighting, lower energy use and meet energy codes with linear direct/indirect fixtures. Providing light that is also visually interesting is also critical in defining spaces – large, sculptural pendants in tall ceilings, smaller pendants that indicated queuing at service desks, sparkle lighting at displays and retail areas, task lighting at work areas and study spaces should also be incorporated. As discussed earlier, additional natural daylight should also be included. Code required emergency lighting should be included as well as overall lighting controls.

Restrooms:

In addition, the library will require more restrooms than currently exist and likely in new locations based on security, visibility and convenience. Most current libraries are including family restrooms for young children located in the Youth Area as well as unisex restrooms for elderly and other unique situations in addition to gang public and staff restrooms. The following preliminary (subject to revision based on Stage 1: Building Space Programming) fixture count using over all square footage and the space distribution indicated in the Library Needs section of this report indicate the following plumbing fixture requirements:

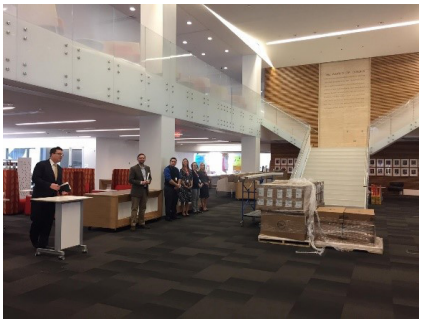
PRELIMINARY TOTAL FIXTURE COUNT				Required No. of Lavatories	
Occupancy	WC Male	WC Female	Drinking Fountains	Male	Female
Men	12	-	-	8	8
Women	-	20	-	-	-
Drinking Fountain	-	-	6	-	-

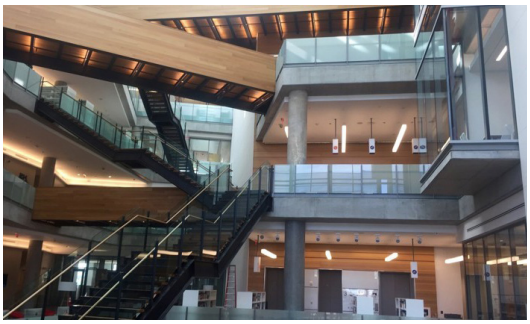
New restrooms should include floor tile, tile to 1'0" below the drywall ceiling, ceiling mounted restroom partitions and all applicable toilet accessories.

Elevators and Stairs:

Finally, the library will be required by function and ADA to include an elevator to access any second-floor area. Again, the foundation will determine if it is feasible to dig out a portion of the slab to accommodate an elevator pit of approximately 5'-9"d x 8'-4"w x 5' deep for a minimum one staff elevator and one public access elevator.

In addition to ADA and access required elevators, a mezzanine, 2nd level or roof deck will require exit stairs to meet code exiting requirements. A library should also have intuitive and visible access to public spaces on other floors. A grand stair case should be planned:

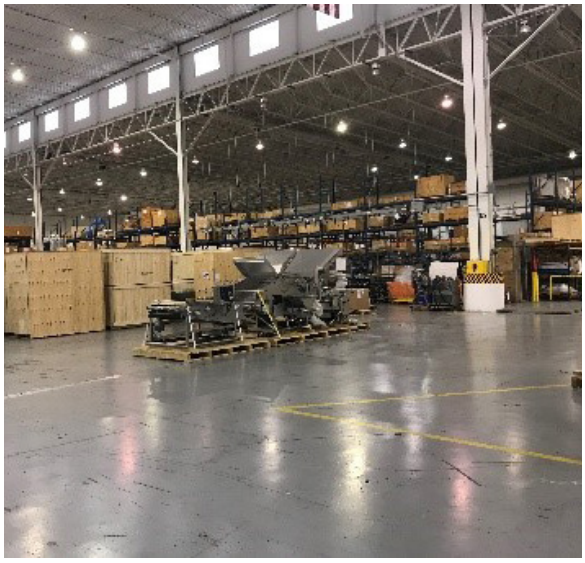




Ceiling:

The existing ceiling consists of an exposed metal deck (non acoustical) and roof joists. In order to meet the energy code, insulation will need to be added (see mechanical report). The library will also require acoustical treatments that may include:

- Traditional lay in ceiling tiles
- Acoustical clouds
- Banners



Existing Ceiling Condition:

Where the roof changes elevation there are existing clerestory windows. These should be confirmed to be insulated glass, frosted and light shelves provided to control as much as possible the west sun.

Other Acoustical Considerations:

Libraries are not quiet spaces however, certain strategies should be employed to help control the sound. The following should be considered to address noise issues:

1. Consider reducing the amount of hard flooring and utilize carpet or other soft flooring.
2. Consider landscaping the ceiling to buffer noise in louder areas like the performance space and Teen Area.

3. Consider quiet rooms like study spaces, offices and quiet reading rooms and ensure their walls extend to structure or include highly acoustical ceiling tiles with drywall caps.

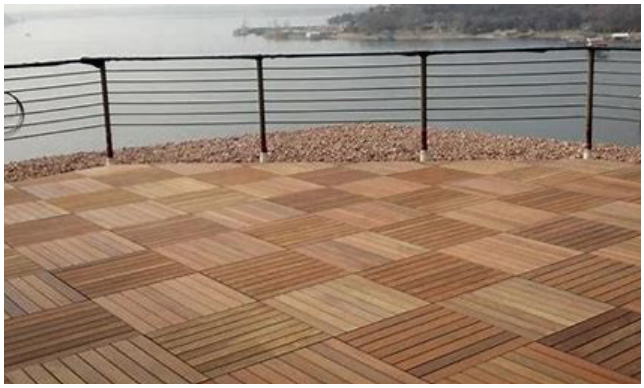
4. Restrooms walls should extend to the structure and have two layers of gypsum board, staggered on the interior fixture wall side.

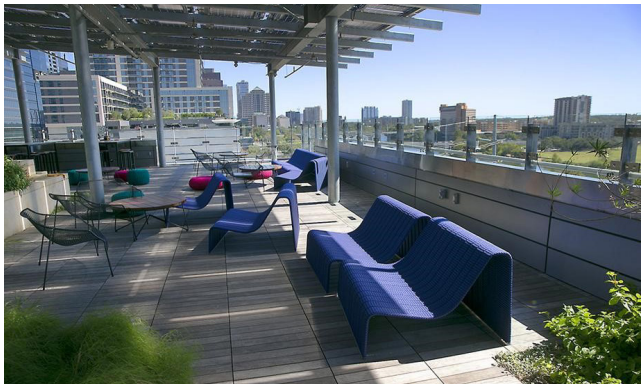
5. Special acoustical treatments at louder areas like service desks and children's areas.

Roof:

The existing roof is a modified bitumen built up system sloped to drain and was installed in 1998 with a 10 year warranty. At more than double the expected life of the roof it should be planned for replacement. The library would like to explore the possibility of expanding the outdoor space to a roof top deck on the north-east side of the building overlooking the planned Railroad Museum for events and library programs. In order to accomplish this:

- A drainable deck would need to be installed over the new roof system.
- The roof joists in the area for the deck would need to be replaced with floor joists to support the added live load (***See Structural Report***).
- An elevator would need to extend to the roof as well as exit stairs.





Building Materials and Finishes:

The facility should be designed throughout to minimize ongoing maintenance requirements. Use paints and wall coverings which are durable and easily cleaned. Wherever possible use stock catalog products from suppliers or manufacturers for items such as flooring, ceiling tiles, paints, wall coverings, upholstery, and counter laminates.

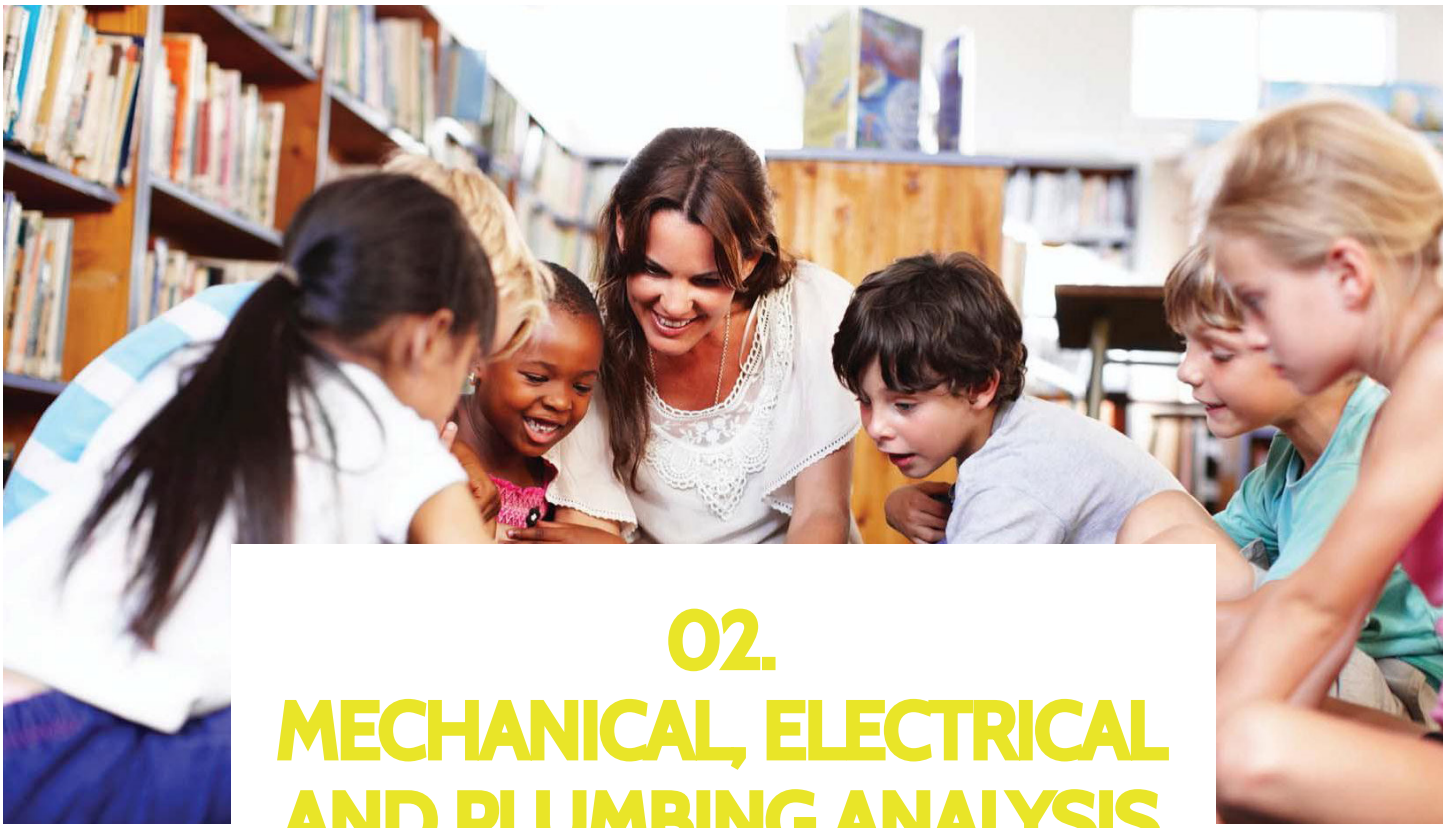
Require the general contractor or subcontractors to provide preventative maintenance manuals giving timetables for maintenance of mechanical/plumbing/electrical equipment (including supplier contacts and parts manuals), and for care and cleaning of furniture/equipment/fixtures. Contractors or subcontractors should be required to provide training in the operation and maintenance of installed systems by professionals who are familiar with those systems.

Provide:

- Corner wall/column protection throughout the facility.
- Carpet Tile of highly durable commercial grade.
- Through color porcelain tile for floors.
- Walk off carpet tile at all entrances.
- Luxury Vinyl Tile (LVT) of the highest commercial grade (no VCT).
- Type II Vinyl wallcoverings with perforations for any exterior wall applications.
- Scuff proof paint throughout.
- Signage package for code, ADA and library requirements from a single source with custom graphics and easily changeable.
- Doors should be solid core, wood doors.

Require contractors to provide "attic stock" of certain building materials for maintenance or repair, including wall coverings, ceiling tile, carpet, carpet tiles, vinyl tile, and ceramic tile (3-5% suggested).

PROS	CONS
Size: Significantly Increases the Square Footage per Capita Through 2025	
Slab: More Than Adequate Strength to Support Book Stacks.	**Slab:** Extra Strength Means Less Flexibility for Power Distribution, Plumbing Locations, and Elevator.
Structural Columns: Wide spacing gives flexibility.	
Exterior Walls: Flexibility to Cut in Windows in the Tilt Up Construction.	**Exterior Walls:** Non insulated, mostly unfinished concrete.
	Electrical: Service and Lighting Will Need to be Replaced.
	HVAC: Units Are at the End of Their Life.
Roof: Planned for Replacement and Should be Coordinated with Library Needs for any HVAC Units and/or Roof Deck Spaces.	**Roof:** Installed in 1998 with a Ten (10) Year Warranty.
Windows: Insulated Glass in Existing Windows.	**Windows:** Only Located on West Side of the Building.
Entry: Oversize Garage Doors Give Good Opportunity to Create a New Entry and Focal Point.	**Entry:** Will Need to Create a New Entry.
Site: Space on Two (2) Sides to Expand Parking and Other Site Amenities.	**Site:** Narrow Space on East Side of Building.
Location: Increased Visibility and Part of a Cultural Campus as well as Proximity to Town Square.	**Location:** Will Need to Rework Access Roads (In Progress with City Planning)
Ceiling: Tall Center Ceiling with Clerestory Lighting.	**Ceiling:** Non insulated Roof Deck. Side Bays Allow for Two (2) Stories but with Maximum 9′-10″ Ceilings.



02.
MECHANICAL, ELECTRICAL AND PLUMBING ANALYSIS

Frisco Public Library

Feasibility Study for Adaptive Reuse of the Beal Building

for

The City of Frisco

Prepared by:
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RWB
Consulting Engineers

BUILDING INFORMATION

GENERAL INFORMATION

1.1 Project Codes for the City of Frisco:

A. 2015 International Energy Conservation Code (ICEE) with local amendments.

B. 2015 International Mechanical Code (IMC) with local amendments.

C. 2015 International Plumbing Code (IPC) with local amendments.

D. 2015 International Fuel Gas Code (IFGC) with local amendments.

E. 2015 National Electric Code (NEC) with local amendments.

F. 2015 International Building Code (IBC) with local amendments.

DIVISION 21 - FIRE PROTECTION

1.1 Fire Protection Systems:

A. The existing facility is served by 8" fire main loop and a 6" fire main serve the existing automatic sprinkler system throughout the building. The existing automatic sprinkler system shall be reworked as required to accommodate the new space layout. System shall be compliant with current applicable NFPA Standards.

B. Sprinklers shall be concealed flush type with factory painted "off-white" cover plates throughout the building. In areas without ceilings, sprinklers shall be upright chrome plated in finished areas and brass in unoccupied spaces.

DIVISION 22 – PLUMBING

1.1 Plumbing Systems:

A. Domestic/Potable Water System:

a. The facility is serviced by a 2" domestic water line and 2" domestic water meter. After the 2" meter the domestic water line transitions to a 2-1/2" domestic water line that enters the building from the west. The existing 2-1/2" domestic cold water main in the building is provided with a double check backflow preventer in the vertical position along with pressure reducing valve and isolation valve. (See image one and two under building image section of this report)

b. The domestic cold water system shall be removed back to the domestic water riser. A new 2-1/2" domestic cold water main shall extend to the new core restrooms and any additional plumbing fixtures throughout the space.

2. Domestic Hot Water System:

a. The existing core restrooms serving the two story office space is served by an existing water heater located above the ceiling. The existing water heater and the domestic hot water loop shall be removed completely. A new domestic hot water heater and circulation system will be provided.

b. An estimated 120 gallon electric storage tank type water heater will be used to serve the sinks, lavatories, mop sink and core restrooms.
c. An estimated 30 gallon electric storage tank type water heater located under the counter shall serve any remote sink and/or sinks that cannot be served from to the main domestic hot water loop.
d. 5 KW Instantaneous water heater shall serve any remote lavatory cannot be served from to the main domestic hot water loop.
e. A thermal expansion tank will be provided for each domestic hot water system where a check valve, or other backflow prevention devices, are installed on the cold water supply to the water heating equipment. Tanks shall be NSF or FDA approved.
f. Centrifugal bronze fitted or non-metallic type in-line circulating pumps with associated controls will be used to circulate the hot water in domestic hot water systems where the supply line exceeds 50'-0" throughout the facility.
g. Thermostatic mixing valves will be provided to temper domestic hot water supply to lavatories as required by Texas Accessibilities Standard (TAS) and Americans with Disabilities Act (ADA). Thermostatic Water Mixing Valve shall be a solid bimetal sensing thermostat directly linked to valve porting, with adjustable limit stop shall be used to domestic hot water loops. Provide point of use mixing valves for tempered domestic hot water for single fixtures.

3. Domestic Water Piping Materials, Insulation and Accessories:

a. Domestic water piping above ground size 3" and smaller will be Type “L” hard drawn copper tube. Fittings shall be wrought copper solder joints.
b. Underground within 5'-0" of building: 3" and smaller shall be Type “K” hard drawn or annealed copper tube.
c. Domestic hot and cold water and horizontal storm drain piping shall receive pre-formed glass fiber pipe insulation with factory applied all service jacket. Exposed piping shall receive a canvas jacket sized for painting. Condensate drain lines shall receive one half inch thick “Armaflex” type insulation with butt glued joints. Sanitary piping receiving cold condensate shall receive insulation same as for domestic cold water piping.

B. Sanitary Waste/Vent System:

1. System Description:

a. The facility is served by an existing 8” sanitary sewer that enters the warehouse area and then transitions to a 4” to serve the core restrooms in the two story office space. The 8” sanitary line is adequate in size to serve the new space layout. All existing sanitary sewer/vent shall be removed. All floor drains, floor sinks, and hub drains shall be removed and cap.
b. A complete new sanitary waste and vent system for general floor/hub drains, floor sinks, and general use plumbing fixtures will be provided. A 6” sanitary sewer main shall be provided for the facility and connect to the existing 8” main serving the building. There are two options for installation of the sanitary sewer. One option shall be to sawcut the floor and install the new sanitary line if structural possible. Second option to provide a raised floor to allow installation above the exiting slab and route to a location that will allow the new sanitary sewer to connect to the existing 8” sanitary line. Individual sanitary vents will be provided for all floor drains, hub drain, floor sinks and plumbing fixtures. Clean-outs will be provided as required by the international plumbing code.
c. Provide a 50 gpm 24ft head submersible simplex sump pump to serve the elevator. Provide a 50 gpm sand/oil interceptor for the discharge of the sump pump.

2. Sanitary Waste and Vent Piping Material:

a. Above ground piping and fittings shall be cast iron: CISPI 301 or ASTM A888, service weight, no hub cast iron fittings. Below grade piping and fittings: Poly Vinyl Chloride (PVC) Schedule 40, drain waste vent (DWV) PIPE, ASTM D2466, ASTM D 2321, ASTM D2665, ASTM 1785

and ASTM 1784, NSF stamped and approved. System shall be rated for 200 psi minimum pressure.

C. Roof and Overflow Drain System:

1. System Description:

a. The existing roof drainage system shall be maintained in its current state. Any changes to the existing storm drain system shall follow the guidelines below.
b. Flat roof areas will have primary roof drains at all low points. The primary roof drains and any gutter leaders will be collected, exit the building; and terminate to the underground storm drainage system.
c. Secondary overflow roof drains for flat roof areas and gutters that cannot overflow due to surrounding roof areas will accompany the primary roof drains as a separate piping system. Overflow drains are implemented for emergency drainage situations to allow only a maximum of 2" of rain water accumulation on the roof. These drains will be collected separately from the primary roof drains to discharge at “open-sight” locations.
d. The roof drain and overflow drainage system will be sized for a minimum rainfall rate of 5 inches an hour.
e. Rooftop garden shall be provided with drainage system to control irrigation and runoff.

2. Storm Drains Piping Material:

a. Above ground piping and fittings shall be cast iron: CISPI 301 or ASTM A888, service weight, no hub cast iron fittings. Below grade piping and fittings: Poly Vinyl Chloride (PVC) Schedule 40, drain waste vent (DWV) PIPE, ASTM D2466, ASTM D 2321, ASTM D2665, ASTM 1785 and ASTM 1784, NSF stamped and approved. System shall be rated for 200 psi minimum pressure.

D. Natural Gas System:

1. System Description:

a. The facility is served by a 5 psi gas meter and service line. The existing piping then routes from the existing gas meter up the side of the building and onto the roof. Once on the roof the gas line is distributed to the mechanical rooftops on the building. The 5 psi gas meter is of adequate size for the new renovation space. (See image 3 under building image section)
b. The existing natural gas piping system will be designed and reworked as required to serve the new gas-fired HVAC equipment. All gas piping above grade will be Schedule 40 black steel pipe. Below grade piping will be polyethylene with thermally bonded joints and fittings.
c. Additional Equipment and Accessories will include a gas meter rated and service sized to deliver a minimum of 5 pounds of pressure at the connected gas demand; gas pressure regulator, and iron cocks and plug valves rated for 125 psig.

2. Natural Gas Piping Material:

a. The natural gas piping shall be standard weight black steel: ASTM A53, Grade A or B, seamless, Schedule 40 pipe. 2” and smaller: Threaded and coupled. 2-1/2” and larger: Butt welded joints. Fittings, 2 Inches and Smaller: ASTM A197, 150 LB black malleable iron, screwed joint. Piping system with pressure of 2 psig or greater shall have socket welded joints for all sizes. Fittings, 2-1/2 Inches and Larger: ASTM A234, WPB standard weight, weld joint fittings

E. Plumbing Fixtures:

1. The existing two story office space used vitreous china wall hung manual flush valve water closets and urinals and countertop lavatory with widespread faucets. These plumbing fixtures were in decent shape but are showing signs of wear and tear. The warehouse space used vitreous china wall hung sensor flush valve water closets and urinals and semi-circle wash fountains. These plumbing fixtures are showing significant wear and tear. The existing fixtures will not meet the

new occupancy requirements for quantities for the new space layout and design. The breakroom has a stainless steel double compartment sink, dishwasher and ice maker. These plumbing fixtures and appliances are showing significant wear and tear. All plumbing fixtures shall be removed as part of the new space requirements.

2. Plumbing fixtures will meet all applicable accessibility requirements of the Texas Accessibilities Standard (TAS) and Americans with Disabilities Act (ADA). Fixtures shall be low water consumption design in compliance with the State and Local Water Conversation requirements. All faucets shall meet National Sanitation Foundation (NSF) Standard 61, Section

3. Generally, all plumbing fixtures will be as follows:

   a. Water Closets: White floor mounted vitreous china elongated bowl siphon jet flush valve type water closets with floor mounted chair carriers.
   b. Urinals: White vitreous china wall hung siphon jet flush valve type urinals with floor mounted chair carriers.
   c. Lavatories: White countertop oval vitreous china lavatories with manual control chrome plated faucet and perforated grid drain. At least one lavatory in each toilet room shall meet handicap requirements.
   d. Janitor's Sinks: Floor mounted basin with wall mounted chrome plate combination faucet with vacuum breaker, five foot (5') hose, and stainless steel splash panels.
   e. Electric Water Coolers: Wall mounted stainless steel cabinet water coolers to meet handicap requirements.
   f. Countertop Sinks: Stainless steel countertop sinks with hot and cold water mixing faucet, ADA and TAS Compliant where required.

DIVISION 23 – MECHANICAL

1.1 Heating, Ventilation, and Air Conditioning Systems (HVAC)

A. The facility is served by fourteen existing constant volume rooftop units. These units are in bad shape and have exceeded their life expectancy with the exception of RTU-2. The expected life expectancy of these units are 12-14 years. These fourteen units would be removed and the roof patched. (See image 5 and 6 in the building image section for an overall view of the existing RTU layout, image 10 for damaged RTU). The associated condensate lines located on the roof where broken in several places and draining onto the roof. Below are the outline of the fourteen rooftop units.

Name	Manufacturer	Model	Serial Number	Manufactured Date
RTU-01	Lennox	LGA300SH1G	5698C03540	1998
RTU-02	Lennox	KGA090S4BH2G	5612H07735	2012
RTU-03	Lennox	GCS24-953-200-1G	5698C00712	1998
RTU-04	Lennox	LGA300SS1G	5698C05241	1998
RTU-05	Lennox	LGA300SH1G	5698C03539	1998
RTU-06	Lennox	LGA300SS1G	5698C05245	1998
RTU-07	Lennox	LGA300SH1G	5698C03541	1998
RTU-08	Lennox	LGA300SH1G	5698C03543	1998
RTU-09	Lennox	LGA300SS1G	5698C05243	1998
RTU-10	Lennox	LGA300SS1G	5698C05242	1998
RTU-11	Lennox	LGA300SS1G	5698C05246	1998
RTU-12	Lennox	LGA300SS1G	5698C05240	1998
RTU-13	Lennox	LGA300SS1G	5698C05244	1998

RTU-14	Lennox	LGA300SH1G	5698C03542	1998

B. The existing two story office space is served by multiple split DX systems. The exterior condensing units were manufactured by multiple vendors Carrier, York, Lennox and other off brand type units. The associated condensing units are in poor condition with severe rusting fans and exterior. The disconnect power switches on the majority of the units are also rusting and one laying directly on the roof. (See images 7, 8, and 9).

C. The existing facility appears to have no wall insulation at all the walls, tilt up panels, and between the airspace/brick. The roof deck has minimal rigid insulation. Energy code requires insulation r value of 38 below the roof deck or 25 above the deck and 13 for walls.

D. Building heating and cooling design criteria based on ASHRAE 2013 Fundamentals Handbook for Dallas – Fort Worth.

1. Outdoor summer 100.5°F DB, 74.6°F WB (mean coincident WB).
2. Outdoor winter 23.0°F DB.
3. Indoor summer 75.0°F, maximum relative humidity 60%.
4. Indoor winter 72.0°F, no minimum relative humidity.

E. The new first and second floor spaces shall be served by packaged rooftop or air handling units, electronically controlled, heating and cooling units utilizing direct expansion (DX) cooling and natural gas heating. Either hot-gas re-heat or multiple compressor units shall be used for humidity control. Variable air volume (VAV) rooftop units will be used to serve the offices, conference rooms and huddle rooms in order to provide optimum thermal control of those spaces. Constant volume rooftop units will be utilized to serve large open areas when possible. Multiple constant volume rooftop units can be used to provide thermal control in these large spaces. Each rooftop unit will include 2” thick pleated filters that provide a MERV 13 rating. Another option for the open space is to provide constant volume units to serve an underfloor air distribution system through a raised floor setup.

F. The Elevator Equipment Room and IT Room shall have a ductless split air conditioning unit with a remote roof mounted condensing unit and electronic space temperature control.

G. Exhaust fans will generally be roof-mounted, dome-type, up-blast centrifugal fans, direct drive, and be interlocked with the respective air handling system serving that area, lights, thermostat, timer, or be controlled by the Energy Management System.

H. Each rooftop unit (RTU) and/or indoor air handling units (AHU) will be furnished with Energy Management System manufacturer provided wall mounted temperature sensors with automatic change-over capabilities and software limited temperature adjustment capability, wall mounted humidity sensors and integral Lexan cover guards. Carbon Dioxide (CO_2) sensors shall be provided in all assembly type areas such as the Auditorium or Conference rooms to limit outside air requirements and energy consumption.

I. Air Distribution Systems:

1. Each zone shall be served by an intermittent fan powered variable air volume terminals with an electric heating coil.
2. All HVAC equipment shall be selected to achieve the highest possible energy efficiency.
3. All motors one horsepower or larger shall receive high (premium) efficiency motors.

J. Exhaust Fans:

1. Exhaust fans will generally be roof mounted (using curbs), dome type, direct drive, up-blast centrifugal fans, and interlocked with attendant air handling system, lights, thermostat, or be controlled by the Energy Management System.
2. All motors one horsepower or larger shall receive high (premium) efficiency motors.

K. Ductwork:

1. Ductwork shall be new, minimum 26 gauge, galvanized steel construction, and be installed in accordance with the latest editions of the SMACNA Duct Construction Standards. Flexible duct will only be allowed at the last six feet (6') for connection to the diffusers. Ductmate type rectangular and spiral seam round ductwork shall be used for medium pressure ductwork.
2. Insulate all conditioned supply air, mixed air, and outside air ductwork with 1.5 inch thick, internal acoustical and thermal duct liner. Return and transfer air ducts shall receive one inch (1") thick liner.
3. All ductwork not lined, such as round ductwork, shall receive a two inch (2") thick foil faced duct wrap.

L. Controls and Instrumentation

1. System Description

   a. Scope of work will include a facility Energy Management System (EMS) with direct digital controllers, all local and remote control panels, temperature control field devices, appurtenances, etc., to accomplish specific control sequences, to provide fire and freeze protection; cocks and wells for various temperature and pressure control, sensing and indicating devices; pressure and temperature indicating instruments; supporting structures, and other required components for a complete and operating system.
   b. The automatic temperature control system will be the Direct Digital Control (DDC) type with electric components as required. All digital and analog control loops will be microprocessor (DDC) controlled.
   c. The Contractor will interface the controls system supplied with controls factory furnished with equipment. Provide additional control devices, interlock relays, and signal conditioners when necessary to accomplish specified sequences.
   d. Include all electric connections to thermostats, sensors, dampers and actuators, and all other new components of the system requiring electric connections.
   e. System will be fully automatic, subject to various types of remote surveillance, routine remote adjustments, remote status, remote alarms, remote data collection for trending/historical files, and other operations from a microprocessor-based Local Area Network (LAN).
   f. Provide a suitable computer workstation with a printer for local operation and troubleshooting of the control system.

M. Systems Testing, Adjusting, and Balancing (TAB)

1. TAB of the mechanical systems shall be performed by an impartial technical firm whose operations are limited only to the field of professional TAB work. The TAB firm shall be one of the following:

   a. Engineered Air Balance Company
   b. Delta-T LTD
   c. Air Engineering and Testing Inc.
   d. Professional Balancing Services Inc.
   e. Air Balancing Company

2. Scope of work shall include the overall commissioning of control systems and subsystems, such as the verification and of operation of each control device and all equipment sequences of operation.
3. Include the calibration of all pressure and temperature sensors provided.

DIVISION 26 – ELECTRICAL

1. General:
   a. Materials, methods, and work will be provided in accordance with the 2014 National Electrical Code, applicable local ordinances, and the 2015 IECC.
2. Electrical Service:
   a. The existing 4000A, 277/480V, 3PH, 4W, Main Lug Only (MLO) service entrance main switchboard for the facility will be reused to feed a new electrical distribution system. The existing main switchboard is good shape and has adequate capacity for the new finish out of the new building. (See image 4) All existing electrical distribution equipment downstream of the service entrance switchboard will be demolished and replaced with new.
   b. Utility metering is at the existing pad mounted transformer and shall remain for reuse.
   c. Surge protection devices will be provided at new distribution switchboards and other panelboards as required by the owner. The existing service entrance surge protector is intended to remain.
   d. All K-Rated dry-type distribution transformers will have 200% neutral conductors.
   e. All standard dry-type distribution transformers will have 100% neutral conductors.
3. Raceways:
   a. Minimum raceway size shall be 3/4 inch.
   b. Provide rigid non-metallic conduit with manufactured spacers for electric service entrances and underground feeders. Provide galvanized rigid metal conduit for elbows, vertical runs, and exposed portions of rigid non-metallic raceways.
   c. Provide galvanized rigid metal conduit for all uses in damp and wet locations, in hazardous areas, in concrete slabs, in locations subject to physical damage.
   d. Provide galvanized electrical metallic tubing (EMT) for branch circuits concealed in walls and above ceilings.
   e. Provide steel, watertight, compression type fittings for electrical metallic tubing raceways. All EMT entering boxes shall be secured with insulating throat connectors and locknuts.
   f. Provide fire sealing materials for all raceways passing through fire rated partitions, walls, and floors.
4. Wires and Cables:
   a. Electrical conductors shall be of soft drawn copper with conductivity 98% of pure copper, equal to General Cable Company.
   b. Electrical conductors shall be solid for #10 AWG and smaller; stranded for #8 AWG and larger.
   c. All wires and cables shall be Type THW, THWN/THHN.
   d. All lighting and power circuits shall be #12 AWG or larger. For 120 volt homeruns over 50 feet long, use #10 AWG conductors. For 120 volt homeruns over 120 feet long, use #8 AWG conductors.
   e. Consistently color code wiring continuous throughout the project.
   f. Branch circuit wiring may be combined into a single raceway in accordance with the NEC. All circuits shall include a grounded circuit conductor.
   g. Feeders requiring multiple, parallel sets of conductors, shall use a separate raceway for each set of conductors.
5. Outlet Boxes:

a. Provide standard, stamped galvanized steel type 4S/4SD and 40/4OD outlet boxes with factory conduit knockouts and one piece, welded construction. Outlet boxes maybe used within the

b. Provide masonry boxes in block and masonry walls.

c. In exposed work and in wet locations, provide cast Type FS and FD boxes.

d. Provide plaster rings and/or covers on boxes where required.

e. Where required in new concrete floors, provide cast flush floor boxes complete with service fittings and carpet flanges.

f. In raised floor areas, cast flush boxes below or poke thru devices will be provided with trim ring or cover matching carpet finish or solid metal covers for concrete floors.

6. Wiring Devices:

a. Wall toggle switches shall be 120V, 20A, specification grade, single pole and three way, ivory colored.

b. Cover plates shall be satin finish stainless steel.

c. Data outlets shall be single and two-gang boxes as required, with conduits stubbed into ceiling space.

d. Typical convenience receptacles are to be industrial grade, located throughout the facility and at HVAC equipment locations per code and design guidelines.

e. GFCI receptacles will be installed at all kitchen, outdoor and other locations per code. Metal weather proof receptacle covers shall be provided where required.

f. Isolated ground receptacles fed from panelboards and transformers with isolated ground systems will be provided at computer workstations, MDF and IDF locations as required by the owner.

7. Panelboards:

a. Distribution Panels, Square D I-Line, 65,000 AIC complete with copper bussing, solid neutral, ground bus, and bolt-in circuit breakers.

b. Branch Circuit Panelboards, will be rated for 480Y/277 or 208Y/120 volts with copper bussing, NEMA 1 enclosure, and molded case circuit breakers.

8. Disconnect Switches:

a. Provide heavy duty type disconnect switches. Switches shall be fusible or non-fusible as required by the NEC.

b. Provide single phase, NEMA horsepower rated manual toggle switches complete with sized heater elements for single phase motors, 1/2 HP and smaller.

c. Exterior disconnect switches shall be within a Nema 3R weatherproof enclosure.

9. Lighting:

a. The lighting within the existing facility utilizes high bay HID metal halide type fixtures within the warehouse area and a combination of 2'X4' parabolic T8 fluorescent fixtures, incandescent can lights and misc. fluorescent strip cove lighting within the two story office space. The exterior lighting on the sides and the rear of the building have wall packs. All existing interior and exterior lighting shall be removed for the new space design.

b. The lighting design for this facility will be limited to 1.19 Watts/sq. ft. by the 2015 IECC. Exterior lighting zones will be designed to accommodate the respective wattage limitations for those areas.

c. All interior and exterior lighting fixtures will be LED lit, including exit signs and emergency lighting fixtures.

d. All emergency egress lighting and exit signs will have battery backup rated for a minimum of 90 minutes of operational capability upon loss of power.

e. Interior and exterior lighting will typically be served at 277V or 480V.

f. Interior and exterior lighting, including pole mounted fixtures will have conductors sized as appropriate for respective branch circuit distance and voltage drop.

g. Existing exterior parking lot pole mounted fixtures and bollards will be replaced with new LED fixtures.

h. Flagpole lighting fixtures will be specified as required.

i. Typical interior lighting is to be recessed indirect/direct LED troffers, downlights, and linear direct/indirect strip fixtures for open areas. Specialty lighting for directional accent on points of interest throughout the space.

j. A lighting control system will be provided for interior and all exterior fixtures, utilizing a system of relay panels, control modules, occupancy sensors, time clocks and photocells. Low voltage wall switches will be provided for control of lighting in classrooms, corridors, assembly areas, cafeteria and other spaces.

k. Exterior lighting fixture controls shall interface with and be controlled by the Energy Management System, EMS.

l. Wall switches are to be standard industrial grade, with weatherproof covers where required.

10. Fire Alarm System Addition:

a. A complete automatic Fire Alarm System with voice evacuation shall be provided throughout the facility. System shall be fully addressable, intelligent microprocessor based and be provided with class A signaling circuits and audible and visual alarm appliances.

11. Public Address System Addition:

a. Provide a complete Public Address System Addition with speakers in conference rooms, offices, and other areas as selected by the owner.

12. Voice and Data Communications:

a. Contractor shall provide outlet boxes and conduit stub-ups for Voice and Data cabling which will be provided by the owner for all computer workstation outlets in accordance with the owner's guidelines.

b. Projectors are to be provided with appropriate A/V (HDMI) and power connections.

c. Conference room monitors are to be provided with appropriate A/V (HDMI) and power connections.

13. Clock and Program System

a. Provide a new master clock system.

b. Program signal shall be through the owner's information technology system.

14. Access Control and Security Systems

a. Power connections, back boxes and raceways are to be provided for the access control and security systems as required by the Owner.

b. Power connections, back boxes and raceways are to be provided for RFID library materials security and sorting systems.

c. Power connections, back boxes and raceways are to be provided for AV and other equipment to be determined in the building space programming phase.

BUILDING IMAGES

IMAGE ONE

IMAGE TWO

IMAGE THREE

Reed, Wells, Benson and Company
12001 N. Central Expressway, Suite 1100, Dallas, Texas 75243
Tel: 972.788.4222 Fax: 972.788.0002 www.rwb.net

IMAGE FOUR

IMAGE FIVE

Reed, Wells, Benson and Company
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Tel: 972.788.4222 Fax: 972.788.0002 www.rwb.net

IMAGE SIX

IMAGE SEVEN

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IMAGE EIGHT

IMAGE NINE

IMAGE TEN

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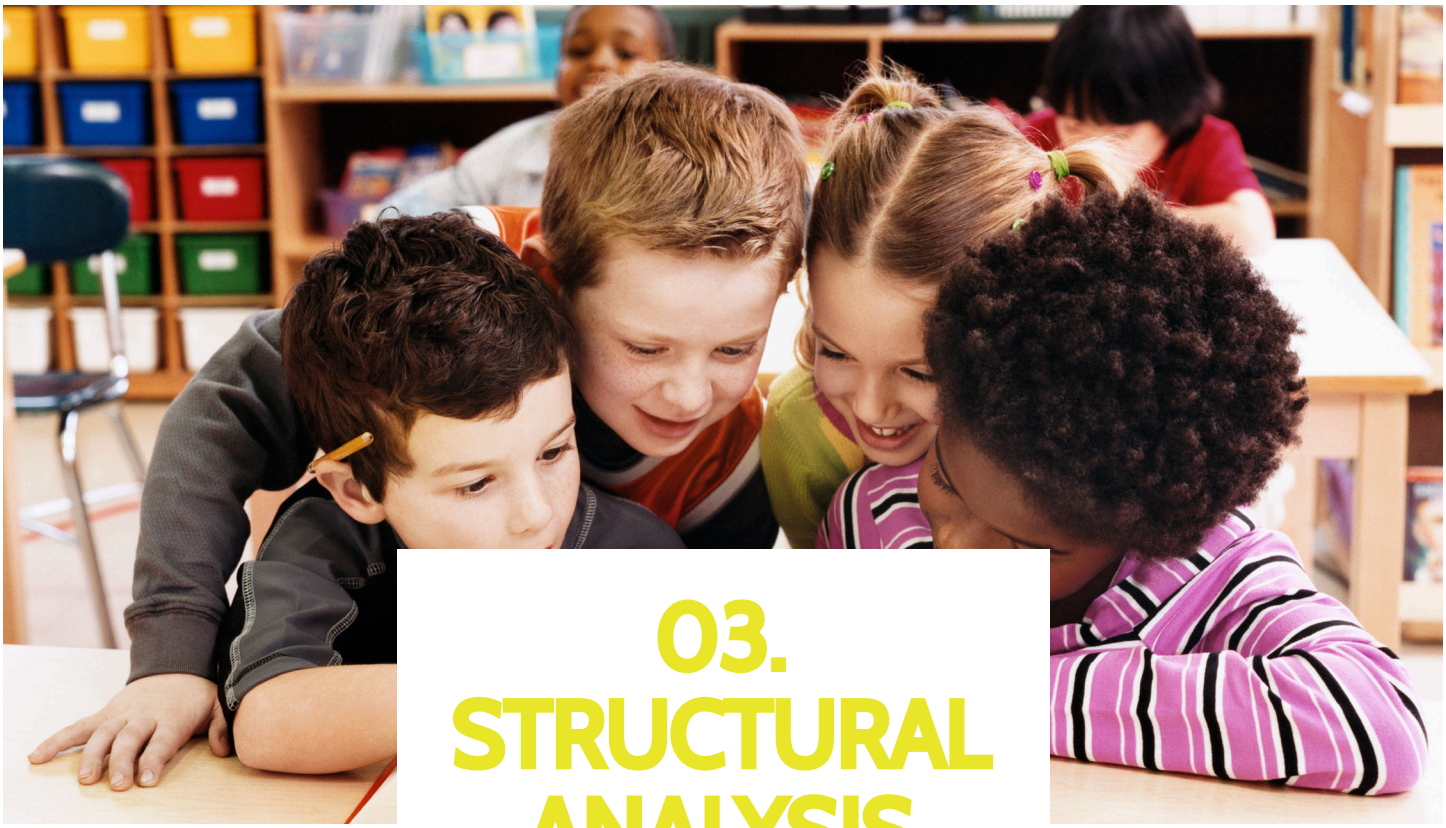

03. STRUCTURAL ANALYSIS

shaping the built environment

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03.08.18

Maureen Arndt AIA, RID, LEED GA
Principal
720 Design
9003 Oakpath Lane
Dallas, Texas 75243

Re: Frisco Library Feasibility Study
8000 Dallas Parkway, Frisco, TX 75034
JQ Project No. 3170473

Dear Ms Arndt:

JQ Engineering, LLP (JQ) performed a limited, feasibility review the existing Beal Aerospace Phase 1 warehouse building. The purpose of the review is to determine the suitability of the existing structure as a public library for the City of Frisco, Texas.

The following documents were available for review at the time of our site visit:

- Beal Aerospace Phase 1 – Frisco, Texas – Alliance Architects 1997 & 1998.
  - Structural Sheet S1.1 Foundation and S1.3 Roof Framing Plan are missing from this set.

Our findings are as follows:

Building Description

The existing building is approximately 120,000 GSF and the superstructure consists of pier supported tilt-wall construction. The roof framing consists of three major structural bays at 75 foot, 75 foot, and 100 foot respectively with long-span bar joists supported by steel wide flange girders and steel joist girders. The center 75 foot structural bay has a clerestory which is raised approximately 6 feet to 7 feet above the main roof elevation. The steel wide flange columns that extend up to the clerestory roof along grids A and B support the joist girders which support the main roof framing. The ground floor appears to be a pier supported 8" thick structured slab-on-void (possibly a one-way slab). The building has an expansion joint which divides the building in half between grids 4 and 5. (See Photographs 1 and 2).

The building has been modified also has a cast-in-place mezzanine slab at the northwest corner of the existing building which extends south to the main entrance on the west side of the building. The mezzanine appears to have been added about a year after the initial building was constructed.

The descriptive specifications for the proposed renovations to the existing structure are:

Descriptive Specifications

- **Concrete**
  Normal weight Portland cement concrete with 3" to 7" slump, depending on the application.
  Minimum 28-day compressive strength:

Drilled Piers	4,000 psi
Grade Beams, Pilasters, and Pier Caps	4,000 psi
Slab-on-Void	4,000 psi
Elevated Slabs	4,000 psi

- **Reinforcing Steel**

Deformed Bars (typical)	ASTM A615, Grade 60
Post-tensioning tendons (1/2" dia., 7-wire strand)	ASTM A416 (270 ksi)

- **Structural Steel**

Wide-Flange Shapes	ASTM A992
Steel Angles, Channels, Plates	ASTM A36
Steel Tubes (HSS)	ASTM A500, GR B (46 ksi)
Steel Pipe	ASTM A53, GR B or A500, GR B
Field Bolted Connections	ASTM A325 Bolts
Anchor Rods	ASTM F1554, GR 36
Welding	E70XX per AWS D1.1

- **Composite Steel Deck**

  2" or 3" deep, 20 GA, 12" rib pattern; ASTM A653, G60 Galv. Finish

- **Steel Roof Deck**

  1 1/2", 20 GA, Type B (wide rib) roof deck; ASTM A653, G60 Galv. Finish

- **Concrete Masonry Units (CMU)**

Masonry Wall Compressive Strength (f'm)	1500 psi
Mortar	ASTM C270, Type S
Masonry Unit	ASTM C90, 1900 psi net area compressive strength
Grout	ASTM C476, f'm 2000 psi min.

Design Analysis

- **Codes and Standards**
  The following codes and standards will be used for the structural design of the project:

  International Building Code (IBC), 2015 Edition with Amendments.

International Existing Building Code (IBC), 20xx Edition with Amendments.

American Society of Civil Engineers (ASCE) 7, Minimum Design Loads for Buildings and Other Structures.[1]

American Concrete Institute (ACI) 318, Building Code Requirements for Structural Concrete.[1]

American Institute of Steel Construction (AISC) Specification for Structural Steel Buildings, AISC 360.[1]

Concrete Masonry: Building Code Requirements for Concrete Masonry Structures, American Concrete Institute, (ACI) 530.[1]

Design Loads

- **Dead Loads**
  Design dead loads for the structural frame will include self-weight of the structural elements and the following superimposed dead loads:

Ceiling and Mechanical at Roof	10 psf
Roofing and Rigid Insulation	15 psf
Ceiling and Mechanical at Floors	5 psf

- **Live Loads**
  Based on the anticipated functions to be contained in the building, the following superimposed live loads will be utilized in the design of the structural frame:

Public areas, corridors, lobbies	100 psf
Auditoriums	100 psf
Libraries (reading rooms)	60 psf
Libraries (stack rooms minimum)	150 psf
Offices	50 psf
Classrooms	50 psf
Partitions at areas with less than 80 psf live load	15 psf
Stairs	100 psf
Balconies	1.5 x adjacent live load or 100 psf
Mechanical rooms	150 psf
Storage (minimum)	125 psf
Restrooms	60 psf
Access floor system (office use)	50 psf
Access floor system (computer use)	100 psf
Roof (unreducible)	20 psf

The proposed renovations to the existing structure are:

[1] The edition of the standard will be the edition referenced in the noted edition of the International Building Code.

Raised Flooring at Ground Floor

The original foundation plan is not available, however the structural notes on sheet S2.1 indicate that the floor structure is designed for a live load of 400 psf. The design live load is more than adequate for the code live load for library stacks with reserve capacity for a raised floor system. Given the design live load indicated on the drawings and the 8" thick slab thickness on sheet S3.1, the slab supporting piers would likely be spaced close together. The reinforcement in the slab would also likely be very dense and likely even more congested over the pier supports. The details on sheet S3.1 also indicate that there are interior grade beams present, but without any foundation plans the location of these beams are unknown. The interior grade beams also seem to indicate the top bars located within the slab depth, thus the grade beams may be designed as flange section ("tee-shaped"). There are many unknowns related to the existing slab reinforcement, slab spans, location of grade beams and associated reinforcement which could be impacted by trenching the slab.

Trenching of the slab would impact several structural elements which would require repair and should be limited as to not damage the structure during construction activities. The slab reinforcement (top and bottom) would need to be either spliced or mechanical couplers used to reconstruct/patch the slab. If a slab cut/trench crossed an existing interior grade beam, the top and bottom bars would also need to be spliced/coupled in the reconstruction. If the trench cut is located near the pier support the slab reinforcement may be very dense and splicing or the use of mechanical couplers may be difficult due to the space limitations.

New Elevator and Pit

The impacts to the existing slab-on-void could possibly be limited by locating the elevator pit in an area where the pit would have existing pier foundations nearby to frame into. The pit would require a slab cut, chipping down the existing piers and new grade beams/pit walls spanning between the existing piers. This may prove to be difficult depending on the pier spacing, thus new piers may be required to limit the spans. One possible solution is to add the new elevator as part of the new entry additions/modifications at the north and west faces of the existing building.

New Exterior Glazing – East Side of the Building

The existing exterior walls consist of 9 1/4" thick concrete tilt-wall panels supporting the long-span joists. The east elevation has a very limited number of openings. The new design is anticipated to add new glazing along this side of the building. The existing tilt-wall panels would need to be cut and reinforced to allow for the new glazing. Openings sizes and locations would need to be coordinated with the existing panel joint locations. The new openings would need to be located a minimum of 2 feet from an existing panel joint edge and possibly 3 to 4 feet away depending on the size and elevation of the proposed opening. The tilt-wall panel reinforcement such as structural steel channels, tubes, angle, etc. would be bolted to the inside face of the tilt-wall panel. Enlargement the large existing panel openings for overhead doors is not recommended due to the limited amount of tilt-wall leg in the original design and the presence of spandrel tilt-wall panels.

New Rooftop Units

The roof structure currently supports rooftop units at both ends bays, 75 foot and 100 foot respectively. The original drawings indicate the rooftop unit locations and it appears that the load was likely accounted

for in the design of those specific joists. The adjacent joists were likely not designed for rooftop units as the drawings indicate that the engineer is to be notified if additional units are added. The center clerestory bay does not indicate any existing rooftop units. The joist designations are unknown, but the joist appear to be spaced approximately 6'-3" on center. If roof framing plans cannot be acquired, the existing joists may have joist tags near the ends of the joists which would give information regarding the steel joist supplier, job number, mark number and plant location. The joist tags are over 30 feet above the ground floor, thus a lift will be needed to locate tags if they haven't already been removed.

Depending on the existing joist capacity, larger rooftop or hung units may overstress the roof joists and need to be reinforced. One possible idea to avoid this is to place larger equipment on a new mezzanine platform in lieu of hanging from the long span roof structure. The existing joist bending/shear capacity and the existing deflection limits will also need to be considered if ceilings or mechanical are hung from the existing roof joists. Currently the existing warehouse does not have a ceiling and minimal suspended mechanical ductwork.

New and Existing Mezzanines

The existing mezzanine at the northwest side of the building is 15 feet above the existing ground floor. The existing mezzanine consists of an 8" thick concrete formed slab supported by either the existing tilt-wall panels or new CMU walls. The interior supports for the existing mezzanine slab are supported by steel beams and steel HSS columns. The columns are supported by new concrete piers and pier caps.

The new mezzanine would likely consist of a light weight concrete composite slab over composite steel framing supported by steel columns. The steel columns are anticipated to be located at the existing concrete piers to limit the need for additional foundations and strengthening. The columns could be post-installed into the slab directly above the piers so that the impact to the existing slab and reinforcing is minimal. The post-installed base plate and anchors would project above the current finish floor elevation, but would be concealed if a raised flooring system was used. The number and frequency of columns is dependent on the mezzanine live loads and the ground floor live load which underneath the proposed mezzanine location.

New Rooftop Deck (East Side)

The new rooftop deck at a portion of the east side of the building would be supported by the same mezzanine columns extending up to the roof level. The rooftop slab construction is anticipated to be similar in construction as the new mezzanine below. Due to the additional dead and live loads from the rooftop deck level, the existing piers would likely be near or at the original design capacity. Live loads at the first floor and mezzanine level could be limited by not locating library stacks in the influence area for the piers which would be utilized to support the two new floor levels. Additionally, limiting the super-imposed dead loads such as rooftop paver systems, topping slabs, etc. would help limit the likelihood of new pier foundation/modifications within the building footprint. Additional means to limit the load carried by the existing foundation, is for the new steel columns for this area be located at each of the slab foundation piers. The perimeter of the rooftop level would likely be connected to the existing roof diaphragm so that the existing lateral system may be utilized. Depending on the geometry and relationship between the existing roof deck and the new rooftop deck, the new framing may require an independent lateral brace frame system to transfer the loads from the roof level down to the foundation level.

New Building Entries – North and West Entrances

The proposed new entrance additions at the north and west building face are anticipated to be supported by a similar foundation system as the existing structure. Depending on the addition height, the new additions will likely have an independent lateral system as to not load/overstress the existing tilt-wall panels by applying load at mid-height. The entry additions are assumed to be a possible location for new elevators in an effort to minimize the impact to the existing foundations.

Disclaimer

The opinions and comments provided in this report are based upon field observations as part of our scope of services. JQ has ascertained to the best of our ability the visually apparent defects in the building structure. However, as field observations were conducted on a structure in which some of the structural elements are concealed and not accessible as the building is currently occupied. JQ cannot be responsible for failing to ascertain deficiencies which were not visible due to the existing conditions in the building. No warranty, expressed or implied, regarding the condition of the building structure is intended. In addition, no representation as to the expected useful life of the building structure or other components identified in this report is made.
If you have any questions, or if we can be of further assistance, please contact us.

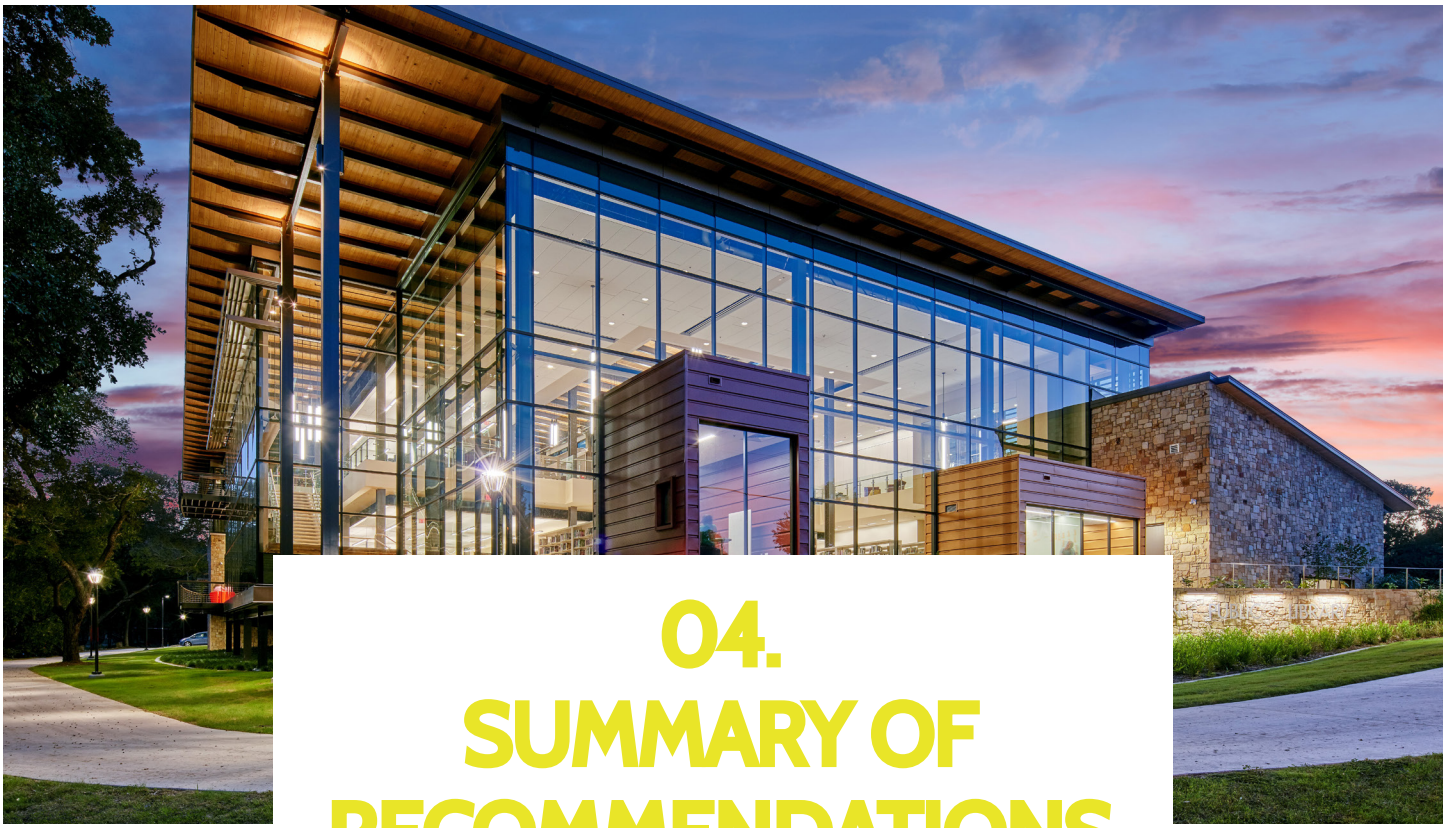
Sincerely yours,

JQ Engineering, LLP
Texas Registered Engineering Firm: 1294

Christopher Baker, P.E.
Associate / Senior Project Manager

Photograph 1 – Center Clerestory Bay

Photograph 2 – Expansion Joint at Center Clerestory Bay



04.
SUMMARY OF RECOMMENDATIONS

FRISCO LIBRARY SUMMARY OF RECOMMENDATIONS

As outlined in the *2015 Growing City, Growing Library Frisco Public Library Master Plan* the City of Frisco determined space needs of .55 square feet (SF) per capita for their growing population or a total of 142,800 SF for their estimated population in 2025. In December 2017, the City of Frisco identified the Beal Aerospace Building as a potential adaptive reuse for new library space.

The team ultimately evaluated the value the Beal Building would present to the City if adapted for use as a library in comparison to the cost of building a new library on a new site. The following is a summary of findings and recommendations for the four options considered:

1. Renovate the existing 114,500 SF of the single floor of the Beal Building.
2. Renovate the existing 114,500 SF and expand to include a 31,000 SF mezzanine in the Beal Building.
3. For options #1 and #2 provide an option of including a 2,000 SF roof deck programming and event space.
4. Determine the probable cost for a new 114,500 SF and 146,000 SF library.

Option No.1: *Renovate the Existing 114,500 SF Space Only*

Pros:

- Would not need to add a public elevator (may still need a staff elevator if the existing staff mezzanine remains).
- Represents a significant increase in space from the current library.

Cons:

- Does not meet the square foot per capita for library space for 2025. A future building would need to be planned to meet the needs for 2025 and beyond.

- Tall ceiling space would not meet its potential.

Total Estimated Construction Cost	$24,226,220
Cost Per SF	$211.58/SF

Option No.2: *Renovate the Existing 114,500 SF Space and Include a 31,000 SF Mezzanine*

Pros:

- Meets the square foot per capita for library space for 2025.
- Tall ceiling space would meet its potential.
- Represents a significant increase in space from the current library.

Cons:

- Would need to add a public and staff elevator.

Total Estimated Construction Cost	$24,226,220
Cost Per SF	$211.58/SF

Optional Roof Deck: Add a 2,000 SF roof deck programming and event space.

This optional space would significantly increase programming capabilities of the library and highlight the Town Center and new city cultural hub of the library, railroad museum and Sci-Tech Discovery Center. This should be planned with either Option No. 1 or No. 2 in the event that it becomes a future phase of the library development.

Estimated Construction Cost	$1,062,234

The construction cost for the alternate would be similar for each listed scenario with an estimated *$330,000 in soft costs* associated. An additional alternate to consider would be to "notch" the east edge of the building and create a mezzanine level courtyard. This would save on vertical circulation costs by not adding a third level/stop for the elevator or the added structural costs to strengthen the roof joists.

Please reference the Appendix for detailed cost estimates of each option.

In order to fully understand the full value of the Beal Building it is important to compare the renovation costs to the current cost of a new construction library. The following are probable cost estimates for construction only:

New 146,000 SF Building Construction Cost: For comparison, construction costs (not including soft costs or site acquisition) for a new 146,000 SF library **@** $450/SF = **$65,700,000** million.

Total Estimated Construction Cost of 146,000 SF in Beal Bldg	$35,553,416
Construction Savings by Reusing the Beal Bldg	$30,146,584

New 114,500 SF Building Construction Cost: For comparison, construction costs (not including soft costs or site acquisition) for a new 114,500 SF library **@** $450/SF = **$51,525,000** million.

Total Estimated Construction Cost of 114,500 SF in Beal Bldg	$24,226,220
Construction Savings by Reusing the Beal Bldg	$27,298,780

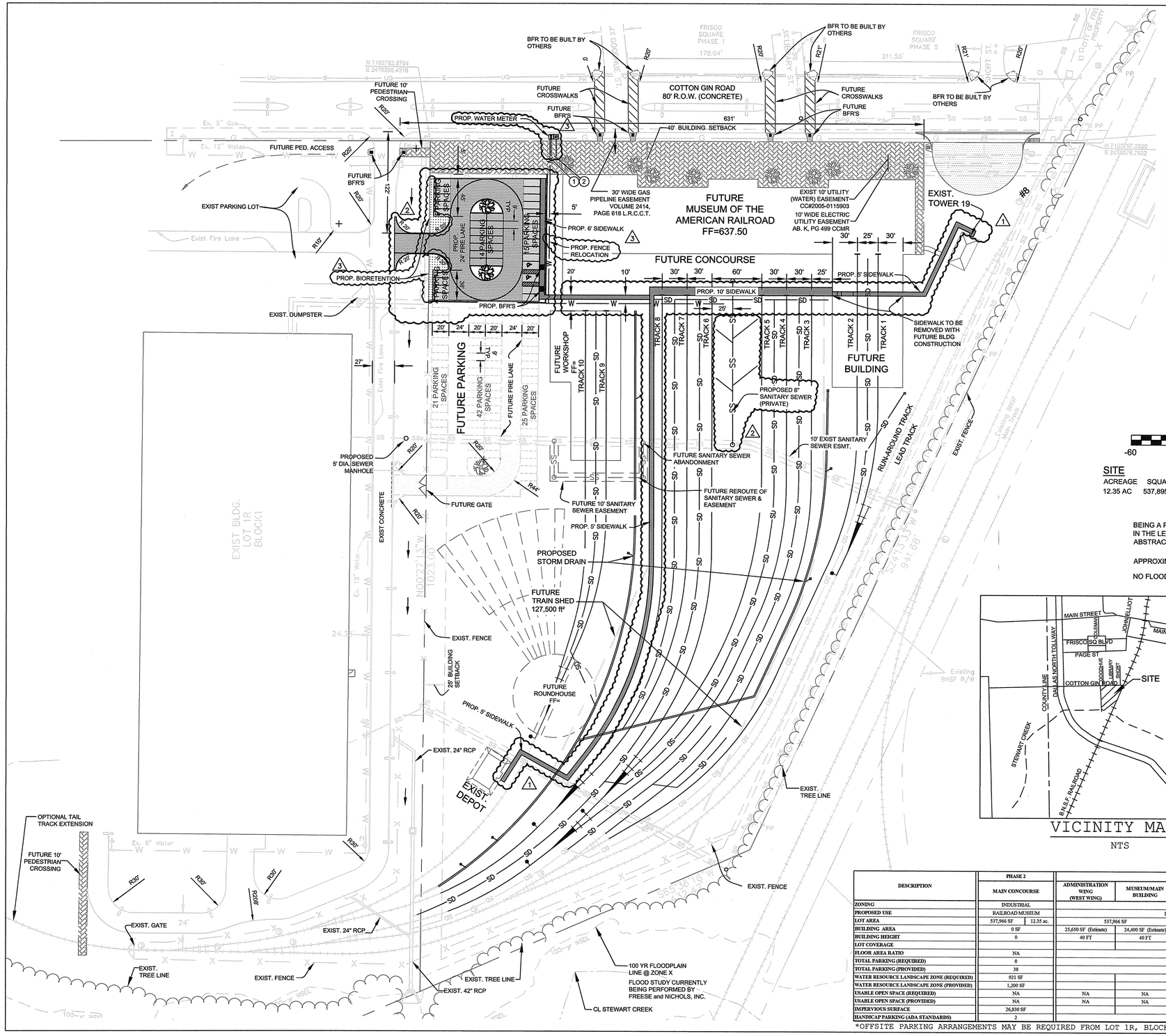
Soft Cost Summary

Soft Costs: A total project cost is more than construction costs for the city. The planning process should include these costs to avoid surprises later in the process. Soft costs include the furniture, fixtures and equipment, interior wayfinding, architectural and engineering fees, technology, audio visual, staff and public computers, move costs, data wiring, book security, automated materials handling/ self check/RFID equipment, building security, materials and soil testing. In addition, a 5% owner contingency is included for unknown conditions discovered during renovations. These costs will be the similar whether the project is a renovation or new construction:

Estimated soft costs for a 114,500 SF renovation of the existing Beal Building:	$10,308,701
Estimated soft costs for a 146,000 SF renovation of the existing Beal Building:	$13,664,861

Estimated soft costs for a 146,000 SF new building:	$18,088,999.00 (Note that this does not include site acquisition costs)
Estimated soft costs for a 114,500 SF new building:	$15,001,999.00 (Note that this does not include site acquisition costs)

05.
APPENDIX



SITE PLAN NOTES:

1. Any revision to this plan will require city approval and will require revisions to any corresponding plans to avoid conflict between plans.
2. Open storage, where permitted, shall be screened in accordance with the Comprehensive Zoning Ordinance.
3. Buildings with an aggregate sum of 5,000 square feet or greater on a lot shall have automatic fire sprinklers installed throughout all structures. Alternative fire protection measures may be approved by the Fire Department.
4. All signage is subject to Building Inspection Division approval.
5. All fences and retaining walls shall be shown on the site plan and are subject to Building Inspection Division approval.

ACTION

APPROVED	DENIED
STAFF _____ Date	_____ Initials
P&Z _____ Date	_____ Initials

See the staff Approval Letter or P&Z Result Memo for any conditions associated with the approval of this project.

WATER METER AND SEWER SCHEDULE				
I.D.	TYPE	WATER SIZE	NO.	SEWER SIZE
1	DOMESTIC	1.5"	1	8"
2	IRRIGATION	2"	1	

LEGEND

- OVERHEAD ELECTRIC
- OVERHEAD UTILITIES
- ROW / PROPERTY LINE
- BUILDING LINE
- EXISTING GAS LINE
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- PERF. DRAIN PIPE
- STORM PIPE
- UNDERGROUND CABLE
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- UNDERGROUND UTILITIES
- EXISTING WATERLINE
- PROPOSED WATERLINE
- PROPOSED STORM DRAIN
- EASEMENT LINE
- PROPOSED EASEMENT
- 5 FOOT CONTOUR
- 1 FOOT CONTOUR
- PROP. FENCE
- EXISTING RAIL
- PROPOSED RAIL
- PROPOSED BIORETENTION
- PROPOSED 8' FIRE LANE PAVEMENT
- PROPOSED FIRE LANE STRIPING
- PROPOSED WHEEL STOP

LEGEND SYMBOLS

- BENCHMARK
- TREE
- SANITARY SEWER CLEANOUT
- DRAINAGE MANHOLE
- EXISTING FIRE HYDRANT
- ELECTRIC RISER
- FIBER OPTIC MARKER
- GAS METER
- DRAINAGE INLET
- GATE VALVE
- HANDICAP
- IRRIGATION CONTROL VALVE
- IRON PIN
- LUMINARE
- MAILBOX
- SIGN
- SANITARY SEWER MANHOLE
- TRAFFIC RISER
- POWER POLE
- WATER METER
- PROPOSED GATE VALVE
- LIGHT POLE
- PROPOSED SWITCH
- FUTURE SWITCH

GRAPHIC SCALE 1"=60'

-60 0 60 120 180

SITE

ACREAGE	SQUARE FOOTAGE
12.35 AC	537,895 FT²

DATA SUMMARY

ZONING	INDUSTRIAL
USE	RAILROAD MUSEUM
LOT AREA	12.35 AC

BEING A PORTION OF A 44.641 ACRE TRACT
IN THE LEWIS H. McNEIL SURVEY
ABSTRACT NO. 618

APPROXIMATELY 1200 FT EAST OF DALLAS PKWY

NO FLOODPLAIN EXIST ON THE SITE

VICINITY MAP
NTS

OWNER
CITY OF FRISCO
6101 FRISCO BLVD.
FRISCO, TX. 75034

ENGINEER
LUNSFORD ASSOCIATES, L.C.
4025 WOODLAND PARK BLVD.
ARLINGTON, TX. 75034

STATE OF TEXAS
ROBERT J. PRETUS
106826
LICENSED PROFESSIONAL ENGINEER
7/11/14

P&Z Commission
Date: 7/22/14
Approved / Denied 5-0

NO.	REVISION	BY	DATE
5	ADDED FENCE TO BE RELOCATED REVISE BIORETENTION LOCATION	JP	7/11/14
4	REV. WATER & IRRIGATION METER TO INSIDE OF COTTON GIN ROAD R.O.W.	JP	7/11/14
3	REV. PARKING LOT TO ALIGN WITH ADJACENT FIRE LANE, REV. SIDEWALK TO 6' WIDTH	JP	7/7/14
2	REV. SAN. SEWER MANHOLE LOCATION REV. WATER & IRRIGATION METER LOCATION	DV	7/7/14
1	REV. PARKING LOT & SIDEWALK	VK	6/20/14

DESCRIPTION	PHASE 2	FUTURE					
	MAIN CONCOURSE	ADMINISTRATION WING (WEST WING)	MUSEUM/MAIN BUILDING	EDUCATION WING (EAST WING)	ROLLING STOCK EXHIBITS (SOUTH EAST WING)	TRAIN SHED	FUTURE SHOP
ZONING	INDUSTRIAL	INDUSTRIAL					INDUSTRIAL
PROPOSED USE	RAILROAD MUSEUM	RAILROAD MUSEUM					RAILROAD MUSEUM
LOT AREA	537,966 SF 12.35 ac.	537,966 SF		12.35 ac.		537,966 SF	12.35 ac.
BUILDING AREA	0 SF	25,650 SF (Estimate)	24,400 SF (Estimate)	13,500 SF (Estimate)	0 SF	127,500 SF	12,945 SF
BUILDING HEIGHT	0	40 FT	40 FT	40 FT	40 FT	40 FT	30 FT
LOT COVERAGE							
FLOOR AREA RATIO	NA	38.00%					
TOTAL PARKING (REQUIRED)	0	186					
TOTAL PARKING (PROVIDED)	38						
WATER RESOURCE LANDSCAPE ZONE (REQUIRED)	921 SF						
WATER RESOURCE LANDSCAPE ZONE (PROVIDED)	1,200 SF						
USABLE OPEN SPACE (REQUIRED)	NA	NA	NA	NA	NA	NA	NA
USABLE OPEN SPACE (PROVIDED)	NA	NA	NA	NA	NA	NA	NA
IMPERVIOUS SURFACE	26,830 SF				145,867 SF		
HANDICAP PARKING (ADA STANDARDS)	2	7					

*OFFSITE PARKING ARRANGEMENTS MAY BE REQUIRED FROM LOT 1R, BLOCK 1 FOR PHASES 1 & 3

LOT 3, BLOCK 1
BEAL AEROSPACE ADDN.
FRISCO, TEXAS
COLLIN COUNTY

MUSEUM OF THE AMERICAN RAILROAD
SITE PLAN (PHASE 2)

LUNSFORD ASSOCIATES, LC
TEXAS REGISTERED ENGINEERING FIRM F-545
4025 WOODLAND PARK BLVD. SUITE 370
ARLINGTON, TEXAS 76013
PH. 817-461-4744 FAX: 817-460-8002

DRAWN BY:	JP-DV	DATE:	05/27/14
CHECKED BY:	RL-RP	DATE:	05/27/14
SCALE:	1"= 60'	SHEET NO	C-2

RECEIVED
JUL 14 2014
BY: .....

EXISTING TREE

BEAUTY-BERRY

DWARF YAUPON

TURK'S CAP

ARBOR WITH PASSIONVINE

'PURPLE SHOWERS' RUELLIA

FOUR-NERVE DAISY

BIG BLUESTEM

BENCH WITH FLAGSTONES

PURPLE CONEFLOWER

TURK'S CAP

AUTUMN SAGE

TEXAS SAGE (TRANSPLANTED)

MEXICAN FEATHERGRASS

ANNUALS

ANNUALS

DECOMPOSED GRANITE PATH

BIRD BATH

YARROW

ANNUALS

TURK'S CAP

BENCH WITH FLAGSTONES

LAMP POST

EXISTING TREE

4-NERVE DAISY

DWF YAUPON

'AUTUMNJOY' SEDUM

MEX. FEATHER GRASS

'MYSTIC SPIRES' SALVIA

AUTUMN SAGE

SPINELESS PRICKLY PEAR

WOOLY STEMODIA

LANTANA

BLACK FOOT DAISY

HARDY PLUMBAGO

YARROW

PURPLE SHOWERS' RUELLIA

TEXAS SAGE (TRANSPLANTED)

'MYSTIC SPIRES' SALVIA

FRISCO DISCOVERY CENTER

N

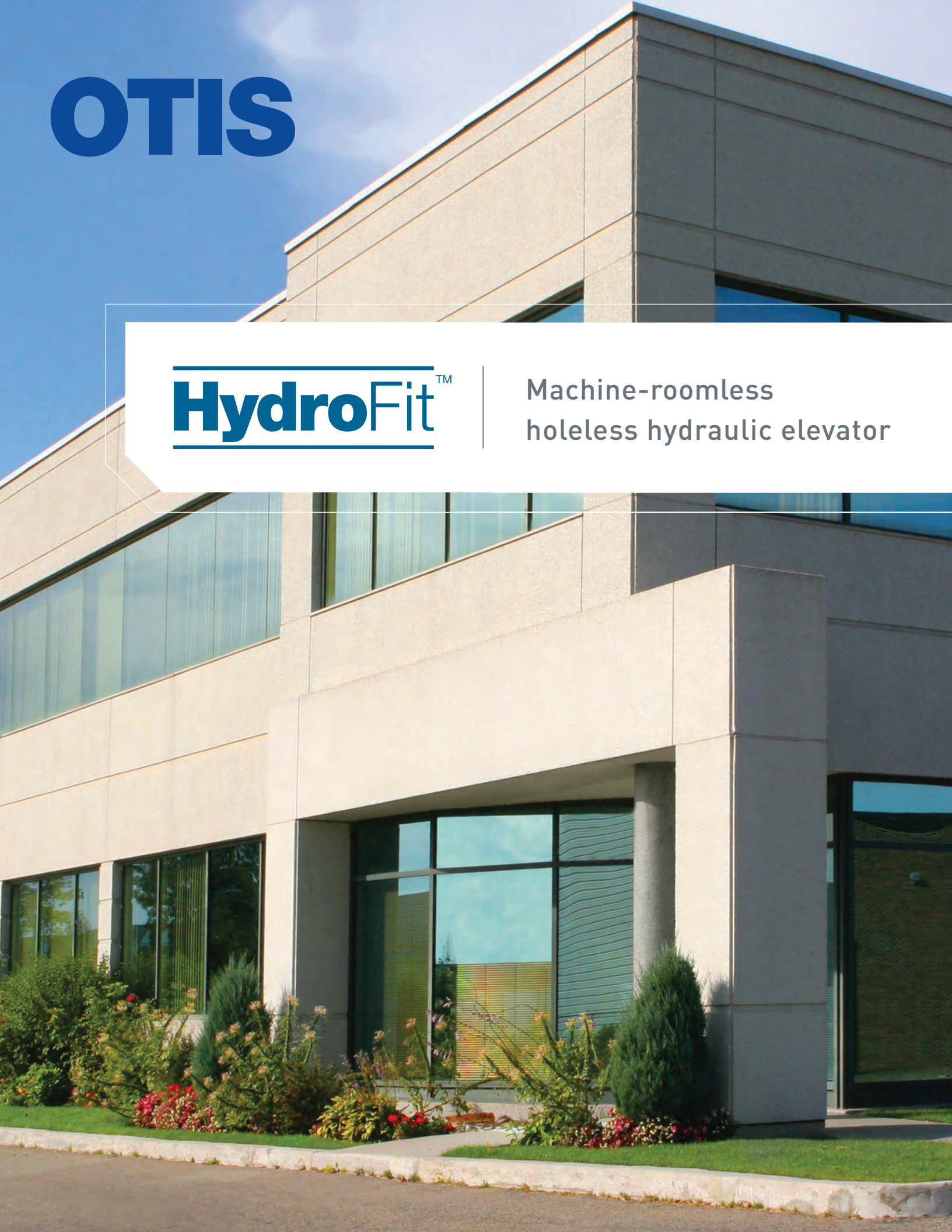
SCALE 1/4" = 1'

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.

OTIS

HydroFit™

Machine-roomless
holeless hydraulic elevator



Design freedom for low-rise buildings.

The HydroFit system:

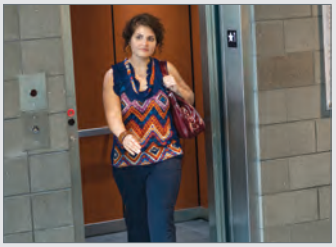
a machine-roomless holeless hydraulic elevator.

Otis HydroFit Delivers:

Design freedom

Minimal jobsite coordination

Energy efficiency



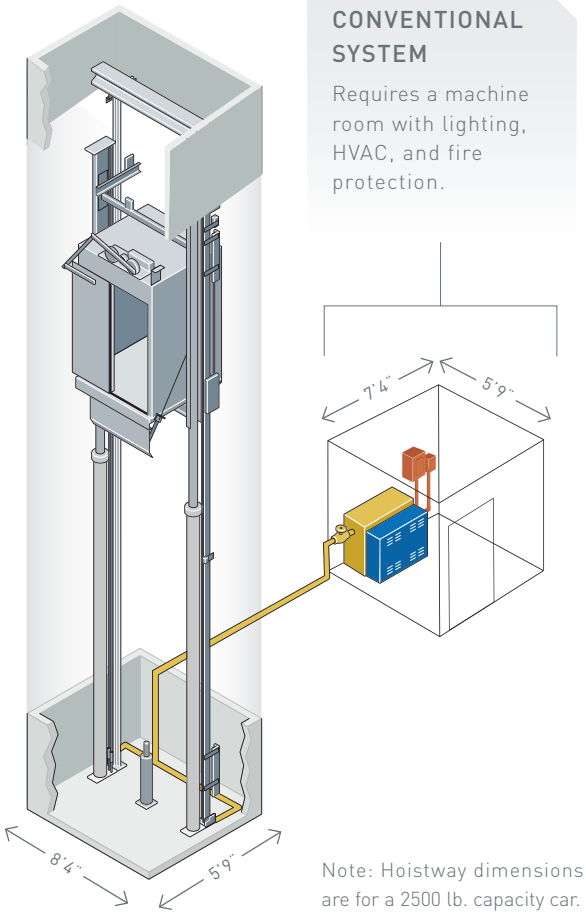
Proven reliability

Otis knows it's not just any building–it's your building. We applied the strength of our worldwide engineering resources and created the HydroFit system, an innovative hydraulic elevator system that eliminates the need for a machine room and allows all critical components to be contained in the hoistway. The result is a system that frees up valuable floor space and supports your design vision in a way that only Otis can.

Machine-roomless technology. Available in holeless hydraulic systems.

The HydroFit elevator is a self-contained system that uses Otis' proven holeless hydraulic design. Key components were redesigned to be more compact and able to fit in a standard hydraulic hoistway, eliminating the need for a machine room.

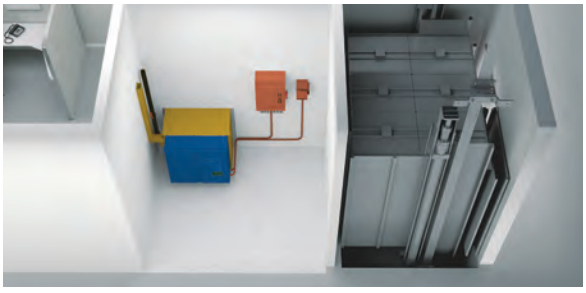
HOLELESS HYDRAULIC ELEVATOR



CONVENTIONAL SYSTEM

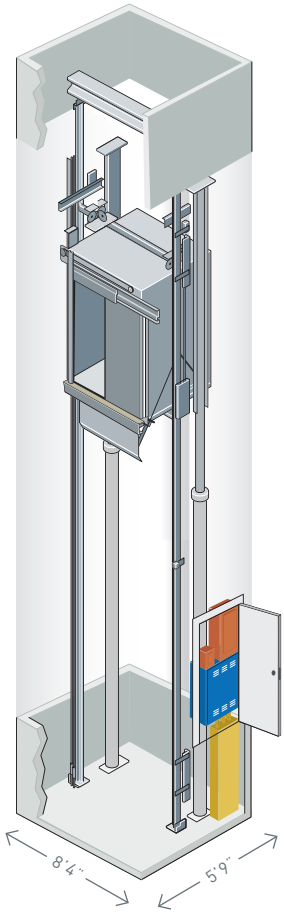
Requires a machine room with lighting, HVAC, and fire protection.

Note: Hoistway dimensions are for a 2500 lb. capacity car.



Conventional System: Requires dedicated space for the elevator machine room.

OTIS HYDROFIT ELEVATOR

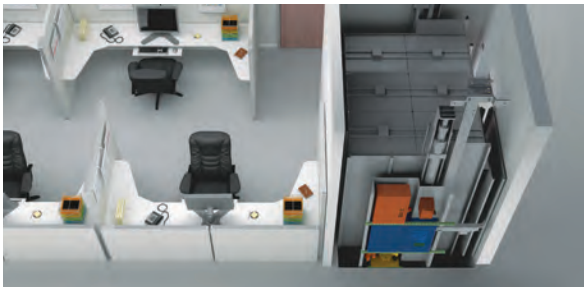


HYDROFIT SYSTEM

No machine room. Everything fits in the hoistway.

Remains the same as a conventional system:

- Hoistway depth
- Hoistway width
- Pit depth
- Overhead



HydroFit System: Machine-roomless means more usable space in your building.

DESIGN FREEDOM

Experience more design freedom with Otis HydroFit.

With more square feet in your building, you have the freedom to create spaces that meet your design vision and needs.

The HydroFit system allows building owners to increase income with more rentable space.

MINIMAL JOBSITE COORDINATION

Save construction time and cost.

A machine room is more than just a room. It requires lights, fire protection and HVAC. HydroFit doesn't require a machine room saving time and money on the jobsite. To further reduce coordination with numerous trades on the jobsite, hall call buttons are mounted in the door jamb.

U.S. manufacturing facility.

Coordinating a construction project is complex. Otis' factory in Florence, South Carolina allows us to be closer to the majority of our customers, resulting in shorter lead times. This enables flexible project planning, and helps avoid costly storage and remobilization fees caused by missed target dates.

Energy efficiency: standard on the HydroFit.

At Otis, we believe that being energy efficient is not optional. The HydroFit system comes standard with features to maximize the efficiency of your elevator.

EFFICIENT LED LIGHTING

- Reduces energy consumption
- Lasts up to 10 times longer

SLEEP MODE

- Lights and fan are shut down when there's no demand, making lights up to 75% more efficient
- Seamlessly springs back to life

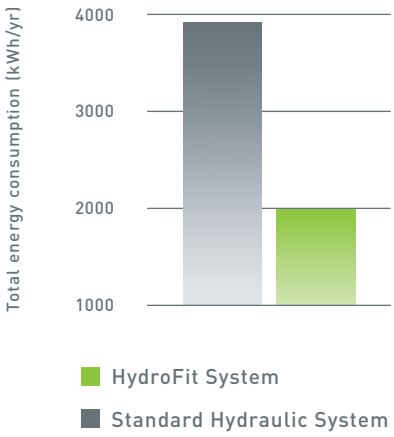
Industry-leading service that only Otis can provide.

Otis optimizes equipment performance throughout each product's lifecycle. Innovative technologies let Otis engineers precisely identify or anticipate possible issues. When our mechanics arrive at customer sites, they are prepared to make repairs quickly and efficiently.

REM®

REMOTE ELEVATOR MONITORING

- Hundreds of diagnostic points monitored
- Expert analysis
- Irregularities proactively corrected
- Standard on the HydroFit system



MAXIMIZED EFFICIENCY

The HydroFit system, with LED lighting and sleep mode, uses less energy when compared to a traditional hydraulic system

OMMS®

OTIS MAINTENANCE MANAGEMENT SYSTEM

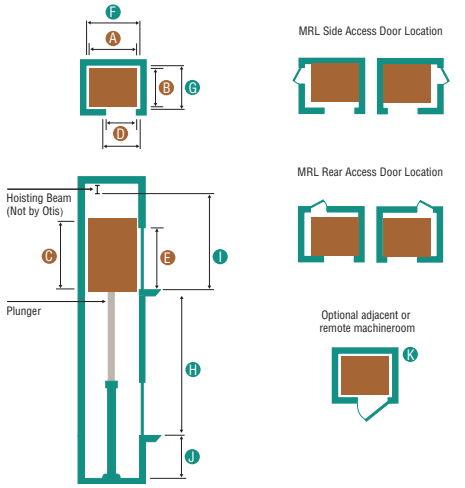
- Predictive and preventative system
- Fewer service calls
- Industry-leading uptime

Otis HydroFit: less space, less coordination, more value.

Another breakthrough from Otis: a machine-roomless option for hydraulic elevator systems. The HydroFit system is another example of Otis' commitment to perfecting elevator technology. Because the HydroFit system is from Otis, you can rest assured that it comes with the reliability and service you've come to expect.

HYDROFIT SPECIFICATIONS

Travel height maximum	26'–6" 8m	
Maximum stops	4	
Speed (ft/min)	100 0.51m/s	125 0.64m/s



IMPORTANT:
To assist in your planning, we recommend that you call your Otis representative at the beginning of the project.

Dimensions

Rated lbs. / Passenger Capacity	PASSENGER 2100 (953kg) 13	PASSENGER 2500 (1134kg) 15	PASSENGER 3000 (1361kg) 18	PASSENGER 3500 (1588kg) 21	SERVICE 4500 (2041kg) 28	SERVICE 5000 (2268kg) 31	SERVICE 5000AIA (2268kg) 31
Car[1]							
A Interior width	5'-8 5/16" (1735mm)	6'-5 3/16" (1970mm)			5'-5 5/16" (1665mm)	5'-11 5/16" (1811mm)	5'-8 5/16" (1735mm)
B Interior depth	4'-3 3/16" (1309mm)	5'-0 3/16" (1528mm)		5'-5 5/16" (1665mm)	7'-10 15/16" (2411mm)	8'-4 3/16" (2544mm)	9'-0 1/8" (2747mm)
for front and rear openings	4'-4 1/8" (1324mm)	5'-0 3/4" (1543mm)		5'-6 1/8" (1680mm)	7'-11 1/2" (2426mm)	8'-4 3/4" (2559mm)	9'-0 3/4" (2762mm)
C Interior height[2]	7'-9" Optional 9'-9" (2362mm Optional 2972mm)				7'-9" Optional 9'-9" (2362mm Optional 2972mm)		
D Car door width	3'-0" (914mm)	3'-6" (1067mm)			4'-0" (1219mm)	4'-6" (1372mm)	
E Entrance height	7'-0" Optional 8'-0" (2134mm Optional 2438mm)				7'-0" Optional 8'-0" (2134mm Optional 2438mm)		
Hoistway							
F Width[3]	7'-7" (2311mm)[4]	8'-4" (2540mm)			7'-9" (2362mm)[5]	8'-4" (2540mm)[5]	8'-2" (2489mm)
G Depth	5'-9" (1753mm)	6'-4" (1930mm)	6'-11" (2108mm)		9'-7" (2921mm)	10'-1" (3073mm)	10'-8" (3251mm)
for MRL rear door access[10]	6'-8" (2033mm)	7'-3" (2210mm)	7'-10" (2388mm)		10'-7" (3226mm)	11'-1" (3378mm)	11'-8" (3556mm)
for front and rear openings	6'-3 1/4" (1911mm)[6]	6'-11 7/8" (2130mm)	7'-5 1/4" (2267mm)		10'-4 1/2" (3162mm)	10'-9 3/4 (3295mm)	11'-5 11/16" (3498mm)
H Maximum rise	SINGLE STAGE				TWO STAGE		
@100 ft/min (with 4' pit depth)	13' 5" (4089mm)				21'-6" (6553mm)		
@125 ft/min (with 4' pit depth)	13'-2" (4013mm)				21'-6" (6553mm)		
@100 ft/min (with 5' pit depth)	14'-5" (4394mm)				26'-6" (8077mm)		
@125 ft/min (with 5' pit depth)	14'-2" (4318mm)				26'-6" (8077mm)		
I Clear overhead to hoist beam	SINGLE STAGE	TWO STAGE			SINGLE STAGE	TWO STAGE	
@100 ft/min (with 7'-9" cab)	12'-0" (3658mm)	12'-4" (3759mm)			12'-3" (3734mm)	12'-6" (3810mm)	
@125 ft/min (with 7'-9" cab)	12'-1" (3683mm)	12'-7" (3835mm)			12'-3" (3734mm)	12'-10" (3912mm)	
@100 ft/min (with 9'-9" cab)	14'-0" (4268mm)	14'-4" (4369mm)			14'-3" (4343mm)	14'-6" (4420mm)	
@125 ft/min (with 9'-9" cab)	14'-1" (4293mm)	14'-7" (4445mm)			14'-3" (4343mm)	14'-10" (4521.2mm)	
J Minimum pit depth	4'-0" / 5'-0" (1219mm/1524mm)[7]				4'-0" / 5'-0" (1219mm/1524mm)[7]		

Machine Room (optional)

K Minimum width and depth[8]	5'-9" (1753mm) x 7'-4" (2235mm)		5'-9" (1753mm) x 7'-4" (2235mm)

1. Interior dimensions may vary depending on finishes selected.
2. Clear cab height varies by ceiling type and floor recess.
3. The hoistway width and depth dimensions listed represent the minimum requirements for MRL applications. Construction efficiencies can be realized by increasing these dimensions by up to 2" (51 mm).
4. For 2100 lb systems that opt for a machine room, the hoistway width can be reduced by 3".
5. For 4500 lb and 5000 lb systems that opt for a machine room, the hoistway width can be reduced by 2".
6. Front & Rear openings for 2100 and 2500 lb machine-roomless installations allow for rear openings at 2nd and 3rd floors only.
7. Some locations require a 5'-0" pit. Contact your local Otis representative for details.
8. Machine room dimensions for 2 car group arrangements vary by hoistway dimension. Contact your local Otis representative for details.
9. Maximum rise is based on a combination of speed and duty. Contact your local Otis representative for details.
10. Rear door access is allowed on front opening units only. For MRL rear access door location, contact your Otis representative.
11. In certain instances the MRL access door can be located on the 2nd floor. Contact your local Otis representative for details.
12. For multiple car applications, or pre 2008 A17.1, contact your local Otis representative for details.

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Power Base AI

Technical Sheets

Modular Electrical System

System Overview

Haworth's Power Base AI modular electrical system provides a flexible, reconfigurable power distribution infrastructure that can support any furniture layout or office configuration.

In a typical Power Base™ AI application, home-run Metal Clad (MC) cable is connected at the electrical closet and routed to separate zones on the floor or ceiling, terminating at a Zone Distribution Box or Infeed Harness connector. Power is then distributed within each zone using plug-and-play cables and connectors.

Jumpers and Splitters are used to feed Service Modules or furniture systems' Infeed Harnesses. Service Modules can move as office locations move and Jumpers can be easily repositioned. In addition, the Power Base AI system can be expanded with additional Jumpers and Service Modules.

The Zone Distribution Box is available with factory installed pre-wired conduits with three sets of circuits up to 125' and two sets of circuits up to 200'. A field-wired Zone Distribution Box is also available that can be used with locally supplied MC cable or conduit.

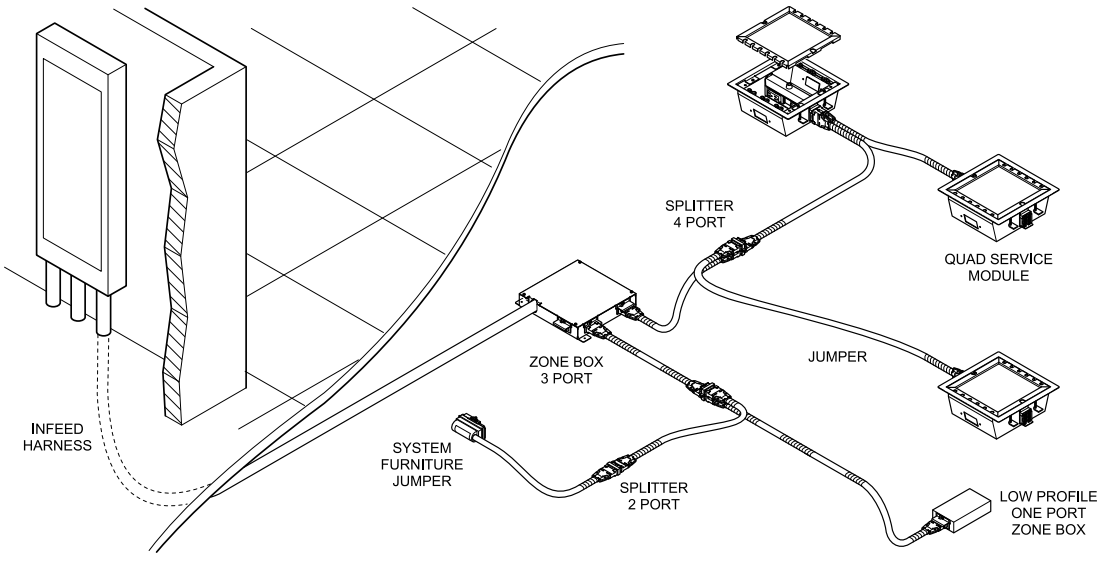
The Power Base AI Single Port Zone Box can be used with locally supplied MC cable to begin a zone or to transition to "hard-wire" conduit.

The Infeed Harness consists of an oval flexible metal cable terminated on one end with a modular connector and on the other with an 8-conductor pigtail. Available in lengths of up to 100', the Infeed Harness offers an alternative to a Single Port Zone Box. It can also be used as a transition from the Power Base AI system to a hard-wired junction box.

Power is routed and branched within each zone using flex conduit Jumpers and Splitters. Jumpers are fully populated with eight conductors, so all circuits are available for future moves. Jumpers are available in lengths up to 50'.

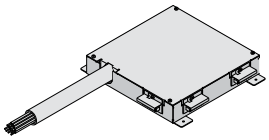
The Power Base AI Service Module provides floor-mounted access to power and voice/data. Available in either dual or quad receptacle configurations. Service Modules use snap-in receptacles; snap-in receptacles take circuit assignment out of the critical path of the construction schedule and allow fast change of circuit assignments. Service Modules can be connected to multiple jumpers, allowing for easy branching or daisy chaining within a zone.

Below Floor Electrical

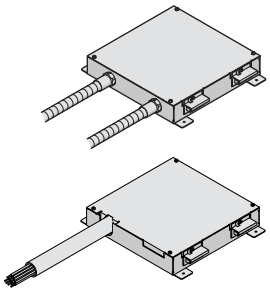


Power Base AI Product Family

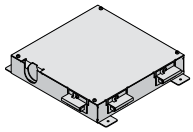
Zone Distribution Boxes



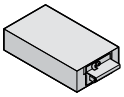
Pre-wired 3-Port
Zone Distribution box



Pre-wired 2-Port
Zone Distribution box

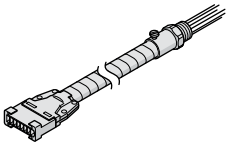


Field-wired 3-Port
Zone Distribution box



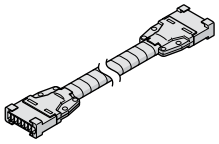
Field-wired 1-Port
Zone Distribution box

Infeed Harness



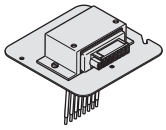
15", 10', 25', 50', 75', or 100' Long

Jumper



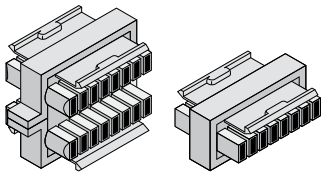
5', 10', 15', 20', 35', or 50' Long

Wall Feed



Wall Feed

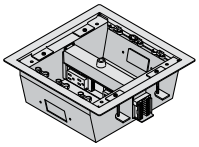
Splitters



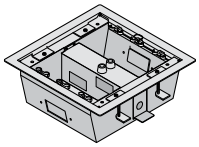
4-Port

2-Port

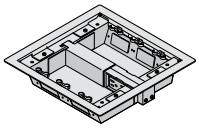
Service Modules



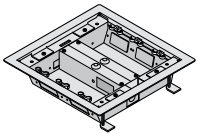
Quad Service Module



Quad Service Module
(Field-Wired)

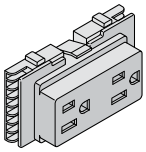


Dual Service Module

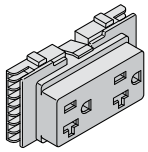


Dual Service Module
(Field-Wired)

Modular Receptacles

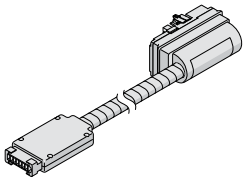


15 Amp Duplex

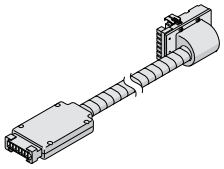


20 Amp Duplex

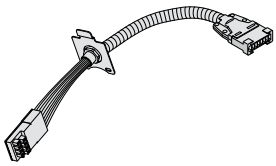
Furniture Modular Base Feeds



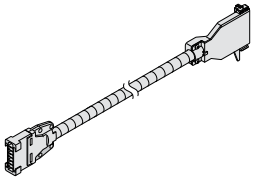
PREMISE®, Moxie®, and
Compose™ Floor Infeed



PLACES®, UniGroup®,
and Tactics® Floor Infeed

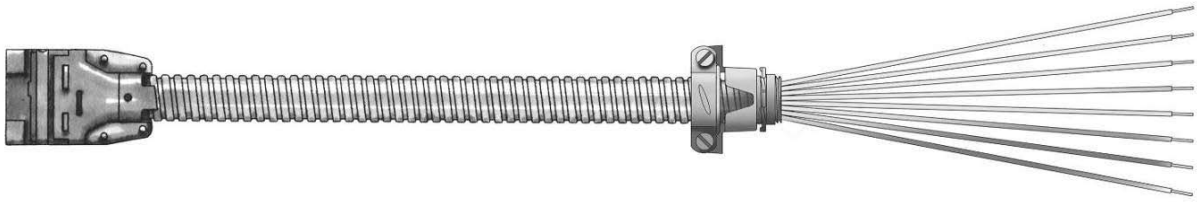


RACE® Single
Harness Connector



Underfloor to Panel "Hidden" Infeed

Infeed Harness



Overview

- Provides transition from building electrical system to modular power distribution system.
- Can be used with a 4-Port Splitter to create a zone distribution point when a full Zone Distribution Box is not needed.
- Can also be used to bring power from the Power Base AI system to non-modular components.
- Available in either 3-Circuit/separate neutral or 4-Circuit/shared neutral 8-Wire configurations.

Infeed Harness

General Specifications

- 20 Amp 120V/208Y or 120V/240V 60 Hz.
- Includes flexible metal conduit with female modular connector and conduit fitting.
- Provided with 12 AWG wire (10 AWG for shared neutral) up to 50 feet, "T" version is 50', 75', or 100' available with 10 AWG wire. Excess length can be coiled under the floor.
- Conduit fitting for ½" knockout. Exception: "T" version uses fitting for ¾" knockout.
- Infeed can connect directly to Service Modules; Splitter required to connect to Jumpers, base feeds, and modular wall connectors.
- 3-Circuit system provides three phase conductors, three neutral conductors, and two ground conductors.
- 4-Circuit system provides four phase conductors, one shared neutral conductor, one isolated neutral conductor, and two ground conductors.

Listings

- UL listed manufactured wiring system rated for 20 Amp 120V/208Y or 120/240V 60 Hz and for use in "other air handling spaces" per NEC Article 604.
- UL listed manufactured wiring system per UL 183 and CSA standard C22.2 No 203-M.

Infeed Harness Specification

- Available cable lengths: 15", 10', 25', 50', 75', and 100'
- 8-Wire/3-Circuit or 8-Wire/4-Circuit.

Applicable Codes

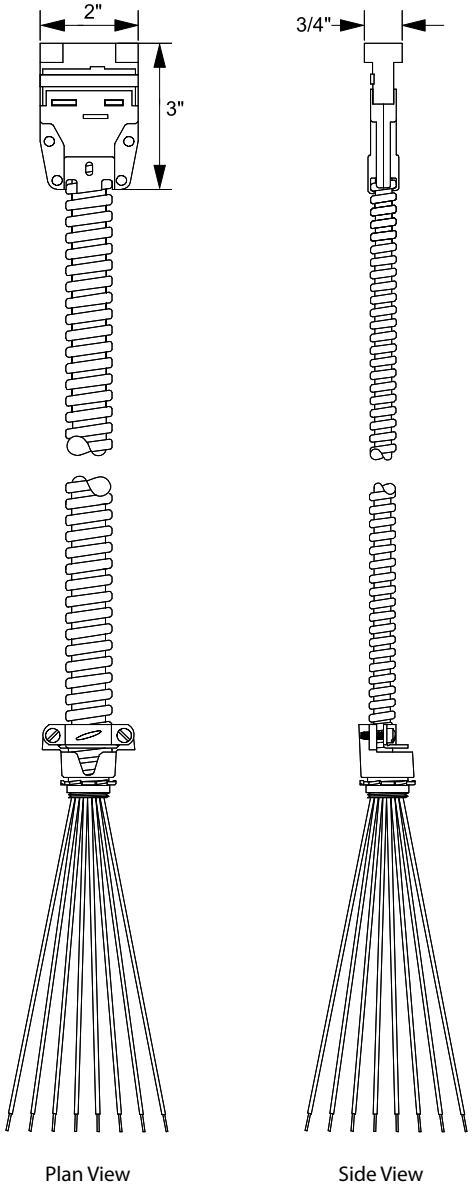
- Infeed harness must be installed in accordance with the National Electrical Code (NEC) , Canadian Electrical Code (CEC), and local electrical codes.

Complementary Products

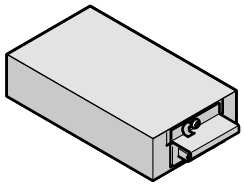
- Haworth TecCrete
- Haworth Pre-Terminated Zone Data
- Haworth Walls, Work Systems, and Freestanding Furniture

Typical Configuration

- Power distribution under an access floor or in a ceiling.



1-Port Zone Distribution Box



Overview

- Provides transition from building electrical system to modular power distribution system.
- Can be used with MC cable or conduit from the electrical closet to begin a power zone.
- Can also be used to bring power from the Power Base AI system to non-modular components.
- Provides one female modular connector mounted in junction box.
- Available in either 3-Circuit/separate neutral or 4-Circuit/shared neutral 8-Wire configurations.
- Field wired by licensed electrician.
- Fits below a 3" high or higher TecCrete floor.

1-Port Zone Distribution Box

General Specifications

- 20 Amp 120V/208Y or 120/240V 60 Hz.
- 16 gauge galvanized steel construction (see schematic).
- Zone Distribution Box supplied by Haworth, installed by a licensed electrician.
- Box shall be secured to building as per NEC, CEC, and local electrical codes.
- 3-Circuit system provides three phase conductors, three neutral conductors, and two ground conductors.
- 4-Circuit system provides four phase conductors, one shared neutral conductor, one isolated neutral conductor, and two ground conductors.

Listings

- UL listed manufactured wiring system rated for 20 Amp 120V/208Y or 120/240V 60 Hz and for use in "other air handling spaces" per NEC Article 604.
- UL listed manufactured wiring system per UL 183 and CSA standard C22.2 No 203-M.

1-Port Zone Distribution Box Specification

- Includes 3" x 7" x 1.75" junction box with one female modular connector mounted to junction box. Junction box has two concentric knockouts for ½" and ¾" conduit fittings.
- 8-Wire/3-Circuit or 8-Wire/4-Circuit.

Applicable Codes

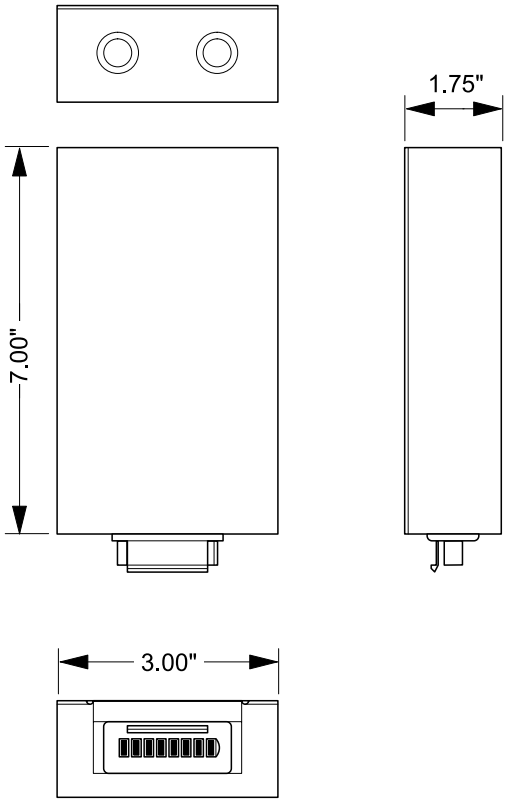
- Infeed harness must be installed in accordance with the National Electrical Code (NEC) , Canadian Electrical Code (CEC), and local electrical codes.

Complementary Products

- Haworth TecCrete
- Haworth Pre-Terminated Zone Data
- Haworth Walls, Work Systems, and Freestanding Furniture

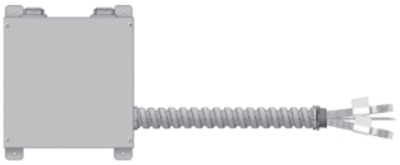
Typical Configuration

- Power distribution under an access floor or in a ceiling.



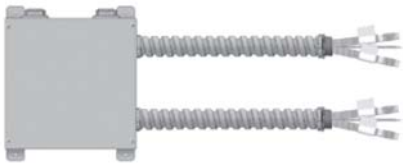
Zone Distribution Box

3-Port Zone Distribution Box



2-Port Zone Distribution Box

Field-Wired Zone Distribution Box



2-Port Zone Distribution Box

Overview

- Provides transition from building electrical system to modular power distribution system.
- Can be used with MC cable or conduit from the electrical closet to begin a power zone.
- Can also be used to bring power from the Power Base AI system to non-modular components.
- Provides one female modular connector mounted in junction box.
- Available in either 3-Circuit/separate neutral or 4-Circuit/shared neutral 8-Wire configurations.
- Field wired by licensed electrician.
- Fits below a 3½" high or higher TecCrete floor.

Zone Distribution Box

General Specification

- 20 Amp 120V/208V or 120/240V 60 Hz.
- 16 gauge galvanized steel construction (see schematic).
- Zone Distribution Box supplied by Haworth, installed by a licensed electrician.
- Box shall be secured to building as per NEC, CEC, and local electrical codes.
- Modular assemblies are available with a pre-wired conduit feed according to specified configurations. The following are available:
  - The 3-Circuit 3-Port Zone Box delivers three circuits to each port for up to nine circuits total.
  - The 3-Circuit 2-Port Zone Box delivers three circuits to each port for up to six circuits total.
  - The 4-Circuit 3-Port Zone Box delivers four circuits to each port for up to twelve circuits total.
  - The 4-Circuit 2-Port Zone Box delivers four circuits to each port for up to eight circuits total.

Listings

- UL listed manufactured wiring system rated for 20 Amp 120V/208Y or 120/240V 60 Hz and for use in "other air handling spaces" per NEC Article 604.
- UL listed manufactured wiring system per UL 183 and CSA standard C22.2 No 203-M.

Specification: 3-Port Zone Distribution Box

- Includes pre-wired flexible metal conduit feed cable attached to 12" x 12" box, lid, and three sets of circuits; each set of circuits is connected to a female modular power connector mounted to the box.
- Power infeed is a single 1¼" flexible conduit, 10 AWG wire in lengths up to 125' and 8 AWG wire in lengths up to 150' and 200'.

Specification: 2-Port Zone Distribution Box

- Includes pre-wired flexible metal conduit feed cable attached to 12" x 12" box, lid, and two sets of circuits; each set of circuits is connected to a female modular power connector mounted to the box.
- Power infeed is a single 1¼" flexible conduit, 10 AWG wire in lengths up to 125' and 8 AWG wire in lengths up to 150' and 200' or two ¾" flexible conduit cables, 10 AWG wire in lengths up to 125'.

Specification: Field-Wired 3-Port Zone Distribution Box

- Includes 12" x 12" box, lid, terminal blocks wired to three female modular power connectors. Boxes are available as field wired, for use with field supplied rigid conduit or MC cable. Box includes six ½" or ¾" concentric knockouts in any combination.

Applicable Codes

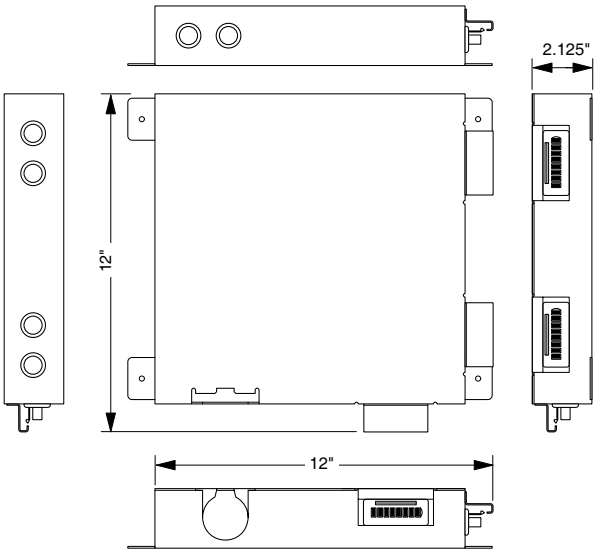
- Zone Distribution Boxes must be installed in accordance with the NEC, CEC, and local electrical codes.

Complementary Products

- Haworth TecCrete
- Haworth Pre-Terminated Zone Data
- Haworth Walls, Work Systems, and Freestanding Furniture

Typical Configuration

- Power distribution under an access floor or in a ceiling.



Jumpers

Overview

- Plug-and-play interconnection between Zone Distribution Boxes, Service Modules, Splitters, Haworth furniture, and wall in-feeds.
- Available in lengths up to 50 feet.
- Available in either 3-Circuit/separate neutral or 4-Circuit/shared neutral 8-Wire configurations.

Jumpers

General Specification

- 20 Amp 120V/208Y or 120V/240V 60 Hz.
- Constructed with 12 AWG wire (10 AWG for shared neutral). Exception: 25' and 50' versions use 10 AWG wire.
- Flexible conduit with male modular connectors at both ends. Connects directly to zone box or service module. Use Service Module or Splitter to connect up to four Jumpers or base feeds. Excess length can be coiled under the floor.
- 3-Circuit system provides three phased conductors, three 3-Circuit neutral conductors, and two ground conductors.
- 4-Circuit system provides four phase conductors, one shared neutral conductor, one isolated neutral conductor, and two ground conductors.

Listings

- UL listed manufactured wiring system rated for 20 Amp 120V/208Y or 120/240V 60 Hz and for use in "other air handling spaces" per NEC Article 604.
- UL listed manufactured wiring system per UL 183 and CSA standard C22.2 No 203-M.

Jumper Specification

- Available cable lengths: 5', 10', 15', 20', 25,' 35', and 50'.
- 8-Wire/3-Circuit or 8-Wire/4-Circuit.

Applicable Codes

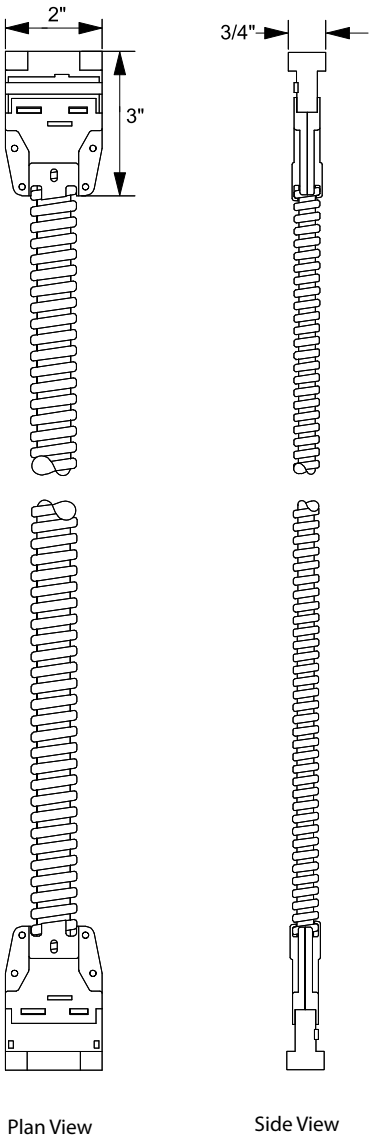
- Jumper must be installed in accordance with the NEC, CEC, and local electrical codes.

Complementary Products

- Haworth TecCrete
- Haworth Pre-Terminated Zone Data
- Haworth Walls, Work Systems, and Freestanding Furniture

Typical Configuration

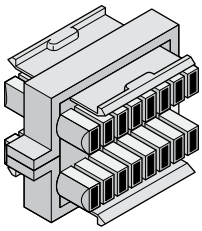
- Power distribution under an access floor or in a ceiling.



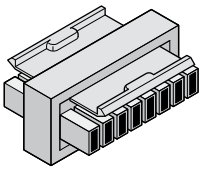
Plan View

Side View

Splitter



4-Port Splitter



2-Port Splitter

Overview

- Available in 4-Port and 2-Port configurations.
- 4-Port Splitter connects up to four Jumpers, allowing for branching of power within each zone.
- 2-port Splitter connects two Jumpers.
- 4-Port Splitter can be used with Infeed Harness to begin a zone distribution point.
- Connectors are color coded and have a polarity key system to prevent connection between 3- and 4-Circuit components.
- Available in either 3-Circuit/separate neutral or 4-Circuit/shared neutral 8-Wire configurations.

Splitter

General Specification

- 20 Amp 120V/208Y or 120/240V 60 Hz.
- 3-Circuit/separate neutral or 4-Circuit/shared neutral 8-Wire configurations.
- 4-Port device (one female port receives circuits/ three female ports distribute circuits out).
- 2-port device (one female port receives circuits/one female port distributes circuits out).
- Connectors are color coded and have a polarity key system to prevent connection between 3- and 4-Circuit components.
- Eight copper alloy busbars in polymeric enclosure provide two or four female connections with integral latching system.

Listings

- UL listed manufactured wiring system rated for 20 Amp 120V/208Y or 120/240V 60 Hz and for use in "other air handling spaces" per NEC Article 604.
- UL listed manufactured wiring system per UL 183 and CSA standard C22.2 No 203-M.

Splitter Specification

- Specify 3-Circuit or 4-Circuit configuration.

Applicable Codes

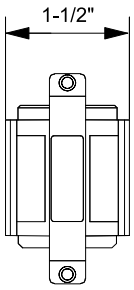
- Splitter must be installed in accordance with the NEC, CEC, and local electrical codes.

Complementary Products

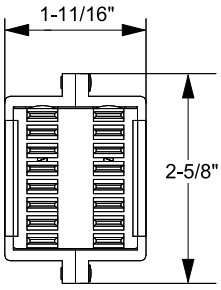
- Haworth TecCrete
- Haworth Pre-Terminated Zone Data
- Haworth Walls, Work Systems, and Freestanding Furniture

Typical Configuration

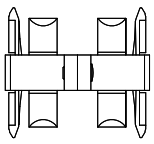
- Power distribution under an access floor or in a ceiling.



Plan View

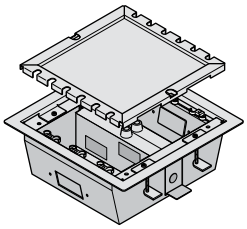


Front View

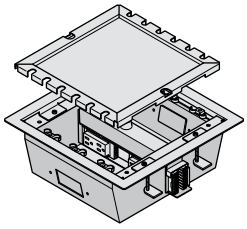


Side View

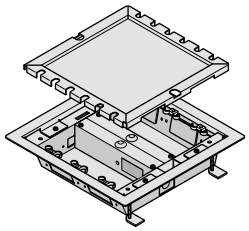
Service Modules



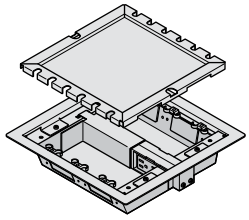
Quad Service Module
Field–Wired



Quad Service Module
Modular



Dual Service Module
Field–Wired



Dual Service Module
Modular

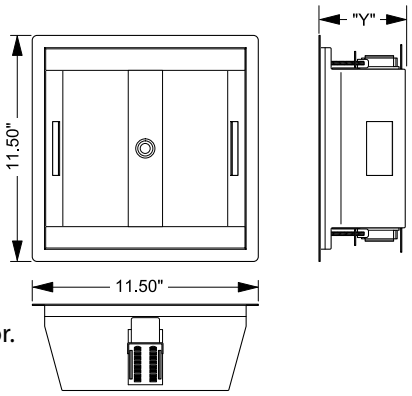
Overview

- Service Modules provide in-floor power and voice/data access to users.
- Quad and Dual Service Module power block accepts modular snap-in receptacles allowing quick change of circuit assignments.
- Modular connectors have integral latching system for easy installation and quick reconfiguration.
- Modular connectors are color coded and have a polarity key system to prevent connection between 3- and 4-Circuit components.
- Quad Service Module has four ports, Dual Service Module has two ports, so multiple modules can be easily daisy-chained.
- Service Modules can be used with Infeed harness to begin a zone distribution point.
- Hinged steel lid has a durable powdercoat finish and includes recess to receive carpet insert.
- Available in either 3-Circuit/separate neutral or 4-Circuit/shared neutral configurations.
- Quad Service Module Includes two data openings for mounting furniture info plates or single gang data plates for use with all major telecommunications connector systems.
- Dual Service Module includes four openings for mounting furniture info plates or single gang data plates for use with all major telecommunications connector systems.

Service Modules

General Specification

- 20 Amp 120V/208Y or 120/240V 60 Hz.
- Available in 3" & 2½" deep 2-gang box or 4½" deep 4-gang box.
- 16 gauge galvanized steel construction.
- Durable powdercoat finish on lid and trim ring.
- Hinged lid with recess to accept carpet inlay (carpet by Others).
- "Indented" finger pull handle.
- Specify 15A or 20A modular receptacles separately.
- Includes openings (2.71" x 1.38") for furniture info plates.
- Each opening has a knock out to accept a single gang data plate.
- Data plate or furniture info plate provided by Others.
- Cords and cables may exit 12 small ports in lid while lid is flush to the floor.
- Mounts in 10½" x 10½" opening in raised floor tile.



FLOOR BOX	"Y"
QUAD SERVICE MODULE	4-3/8"
DUAL SERVICE MODULE	3" & 2-1/2"

Listings

- UL listed manufactured wiring system rated for 20 Amp 120V/208Y or 120/240V 60 Hz and for use in "other air handling spaces" per NEC Article 604.
- UL listed manufactured wiring system per UL 183 and CSA standard C22.2 No 203-M.

Quad Service Module Specification

- Includes steel box with modular connector for up to four modular duplex receptacles and an opening for two furniture info plates. Each opening has a knockout to accept a single gang data plate.
- Power connections on outside of box may be used in place of Splitter to join up to four Jumpers. Female connector has integral latching system.
- Two furniture info plate openings.

Dual Service Module Specification

- Includes steel box with modular connector for up to two modular duplex receptacles and openings for four furniture info plates. Each opening has a knockout to accept a single gang data plate.
- Power connections may be used in place of Splitter to join up to two Jumpers. Female connector has integral latching system.
- Four furniture info plate openings.

Field Wired Service Module Specification

- Includes steel box with junction box for hardwiring of Decora™ style duplex receptacles and conduit. Quad service module can accept up to four duplex receptacles. Dual service module can accept two receptacles. Quad has two openings for furniture info plates; Dual has four openings for furniture info plates. Each opening has a knockout to accept a single gang data plate.

Applicable Codes

- Zone Distribution Boxes must be installed in accordance with the NEC, CEC, and local electrical codes.

Complementary Products

- Haworth TecCrete
- Haworth Pre-Terminated Zone Data
- Haworth Walls, Work Systems, and Freestanding Furniture

Typical Configuration

- Power distribution under an access floor.

Modular Receptacles

20 Amp Duplex Receptacle

15 Amp Duplex Receptacle

Overview

- Modular 20 Amp or 15 Amp duplex receptacle with integral latching system.
- Fits into power block inside Service Module.
- Patented snap-in design allows Service Module receptacle circuit assignments to be changed on-the-fly, without tools.
- Takes circuit assignment out of critical path of construction schedule.
- Connectors are color coded and have a polarity key system to prevent connection between 3- and 4-Circuit components.
- Available with common ground or isolated ground configuration.

Modular Receptacles

General Specification

- 20 Amp 120V 60 Hz or 15 Amp 120V 60 Hz.
- 3+1 and 2+2 four-circuit wiring configurations require unique receptacles for circuit 3 access. Verify which wiring configuration is used in the application before ordering.
- Specify circuit assignment, amperage, ground type, and either 3-Circuit or 4-Circuit/3+1, 4-Circuit/2+2 configuration.
- Common ground receptacle face is black, Isolated ground receptacle face is rust red color.

Listings: 20 Amp Duplex Modular Receptacle

- UL listed manufactured wiring system rated for 20 Amp 120V 60 Hz and for use in "other air handling spaces" per NEC Article 604.
- UL listed manufactured wiring system per UL183 and CSA standard C22.2 No 203-M.

Listings: 15 Amp Duplex Modular Receptacle

- UL listed manufactured wiring system rated for 15 Amp 120V 60 Hz and for use in "other air handling spaces" per NEC Article 604.
- UL listed manufactured wiring system per UL183 and CSA standard C22.2 No 203-M.

Applicable Codes

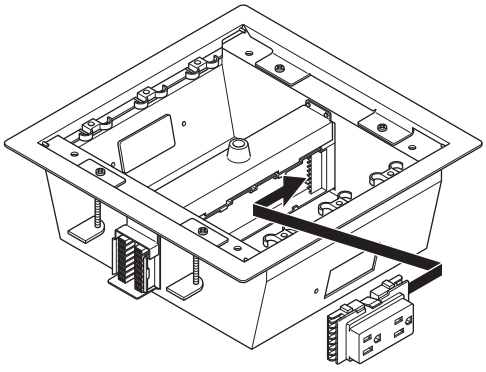
- Power Base AI system must be installed in accordance with the NEC, CEC, and local electrical codes.

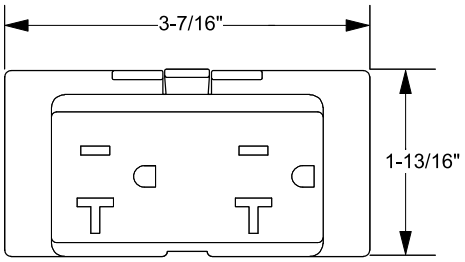
Complementary Products

- Haworth TecCrete
- Haworth Pre-Terminated Zone Data
- Haworth Walls, Work Systems, and Freestanding Furniture

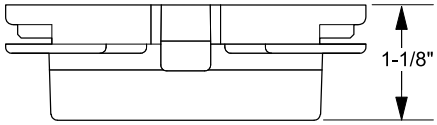
Typical Configuration

- Power distribution under an access floor.



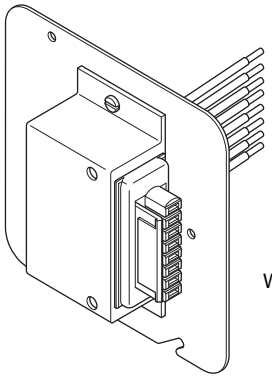


Top View



Side View

Wall Feed



Wall Feed

Overview

- Modular connector with latch mounted to 4-11/16" (119mm) steel plate
- Provides connection between 4-11/16" Junction box and modular power jumper
- Available in either 3 circuit/separate neutral or 4 circuit/shared neutral 8 wire configurations

Wall Feed

General Specification

- 20 Amp 120/208Y or 120/240V 60 Hertz rated circuits
- Constructed with 12 AWG wire (10 AWG for shared neutrals)
- Use to connect between 4-11/16" Junction box and modular power jumper
- 3 circuit system provides three phase conductors, three neutral conductors and two ground conductors
- 4 circuit system provides four phase conductors, two neutral conductors and two ground conductors

Listings:

- UL listed manufactured wiring system rated for 20A 120V/208Y or 120/240V 60Hz per NEC Articale 604.
- UL listed per UL 183 and CSA standard C22.2 No 203-M

Applicable Codes

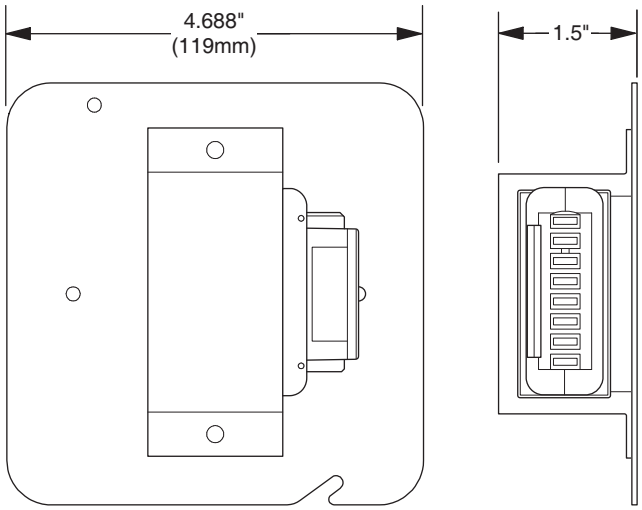
- Wall Feed must be installed in accordance with the NEC, CEC and local electrical codes

Complementary Products

- Haworth Compose, PREMISE, and UniGroup panels systems, Tactics Tables or Enclose Movable Walls
- Haworth Power Base AI modular power for use below raised access floors such as Haworth TecCrete or above ceilings

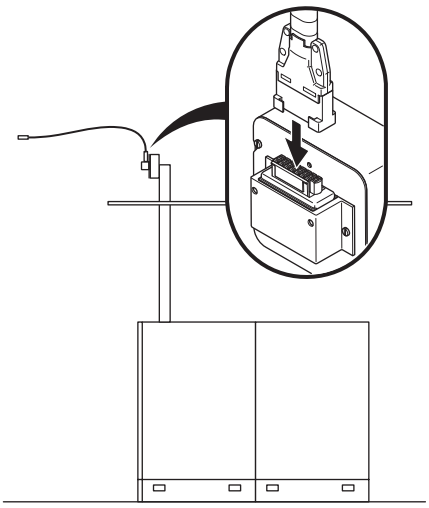
Typical Configuration

- Transition from building hardwire and modular power
- Conversion of furniture top feed to modular connection

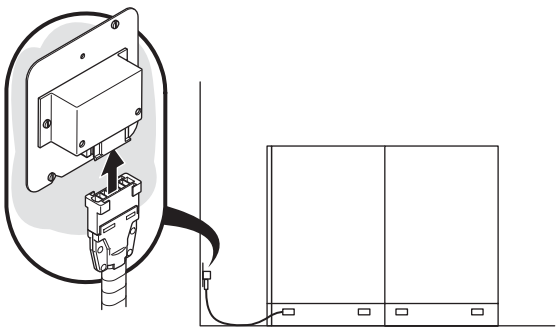


Top View

Side View



Power Base AI Ceiling Distribution



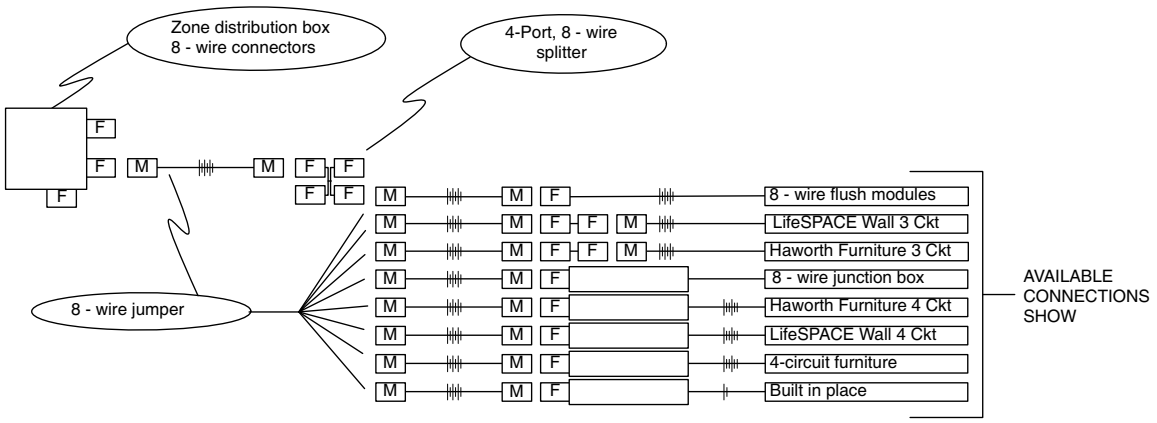
Wall or Column

3-Circuit Schematics

Overview

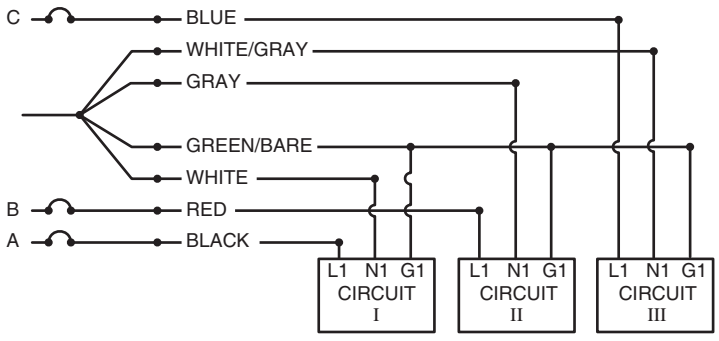
- For home-run wiring supplied by Others, note that, for full system capability, the cable from the electrical panel to the Zone Distribution Box must contain three ungrounded conductors, three neutral conductors, and two ground conductors.
- The home-run cable supplies individual circuits to the Zone Distribution Box.
- The termination of the grounding conductors determines which circuits are isolated ground circuits.

3-Circuit System Schematic: 3-3-2 Configuration



3-Circuit Wiring Diagram: 3-3-2 Configuration

CONNECTIONS TO A GROUNDED THREE-PHASE SYSTEM
RATING: 208Y/120V. 3-PH WYE
60Hz, 20 AMP (CSA 15 AMP)
WHITE RATED AT 20 AMP (CSA 15 AMP)



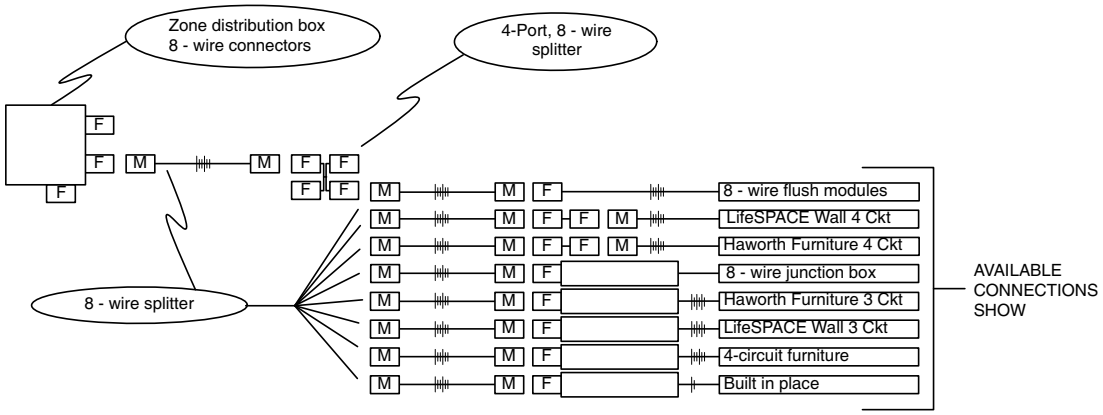
RECEPTACLE CONNECTIONS (LOAD)
Circuit 1, 2 & 3 Isolated ground receptacles also available.

4-Circuit Schematic: 2+2 Configuration

Overview

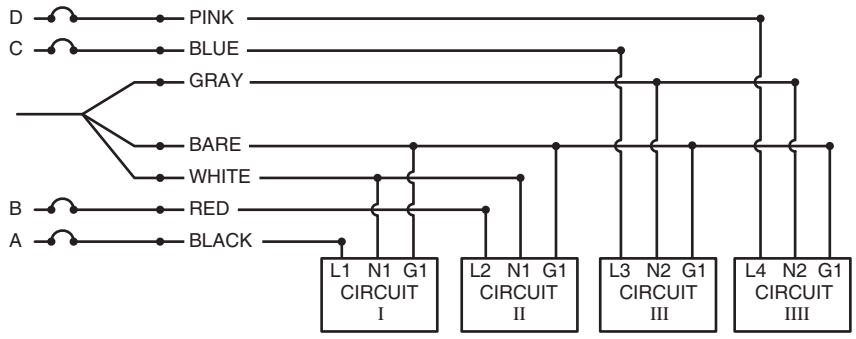
- For home-run wiring supplied by Others, note that, for full system capability, the cable from the electrical panel to the Zone Distribution Box must contain four ungrounded conductors, two neutral conductors of 10 AWG or greater, and two ground conductors.
- The home-run cable supplies individual circuits to the Zone Distribution Box.
- The termination of the grounding conductors determines which circuits are isolated ground circuits.

4-Circuit System Schematic: 2+2 Configuration



4-Circuit Wiring Diagram: 2+2 Configuration

CONNECTIONS TO A GROUNDED THREE-PHASE SYSTEM
RATING: 208Y/120V. 3-PH WYE
60Hz, 20 AMP (CSA 15 AMP)
WHITE RATED AT 35 AMP (CSA 26 AMP)
MULTIWIRE BRANCH CIRCUIT



RECEPTACLE CONNECTIONS (LOAD)

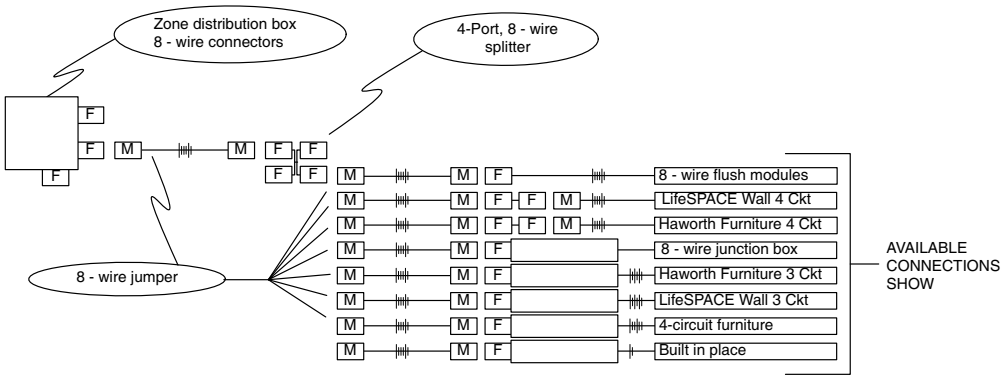
Circuit 1, 2, 3 & 4 Isolated ground receptacles also available.

4-Circuit Schematics: 3+1 Configuration

Overview

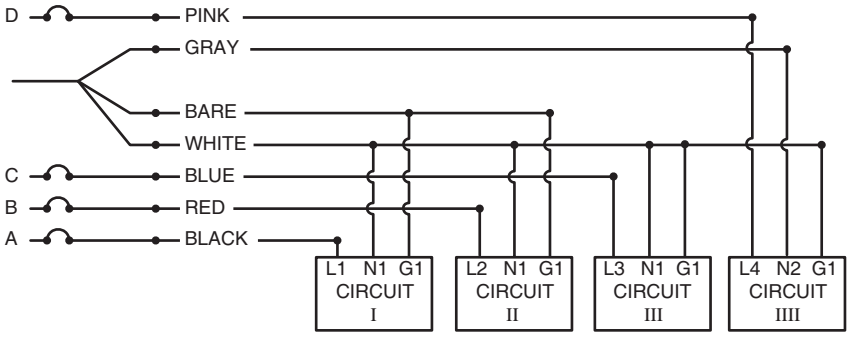
- For home-run wiring supplied by Others, note that, for full system capability, the cable from the electrical panel to the Zone Distribution Box must contain four ungrounded conductors, two neutral conductors of 10 AWG or greater, and two ground conductors.
- The home-run cable supplies individual circuits to the Zone Distribution Box.
- The termination of the grounding conductors determines which circuits are isolated ground circuits.

4-Circuit System Schematic: 3+1 Configuration



4-Circuit Wiring Diagram: 3+1 Configuration

CONNECTIONS TO A GROUNDED THREE-PHASE SYSTEM
RATING: 208Y/120V. 3-PH WYE
60Hz, 20 AMP (CSA 15 AMP)
WHITE RATED AT 35 AMP (CSA 26 AMP)
MULTIWIRE BRANCH CIRCUIT



RECEPTACLE CONNECTIONS (LOAD)

Circuit 1, 2, 3 & 4 Isolated ground receptacles also available.

HAWORTH®

For more information call 800.344.2600 or 616.393.3000.

Cover is printed on 100% chlorine-free paper. Internal pages are manufactured with 10% post-consumer fiber.

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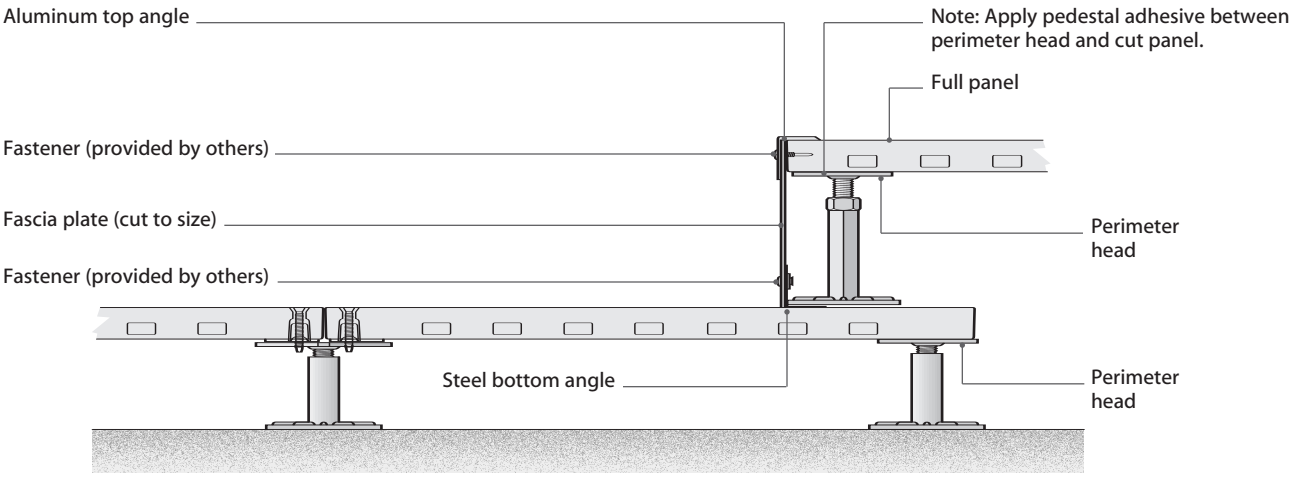
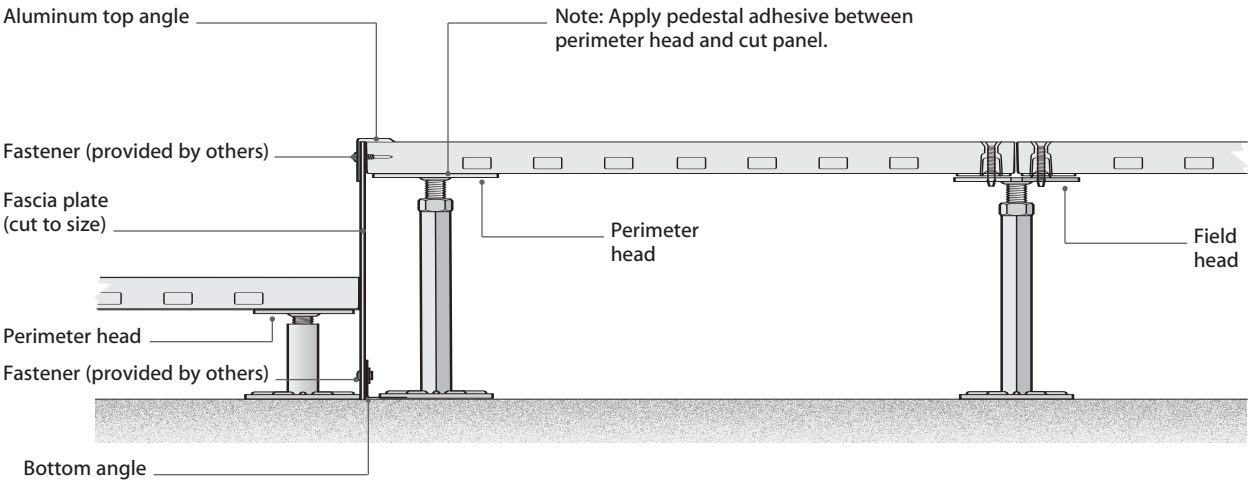
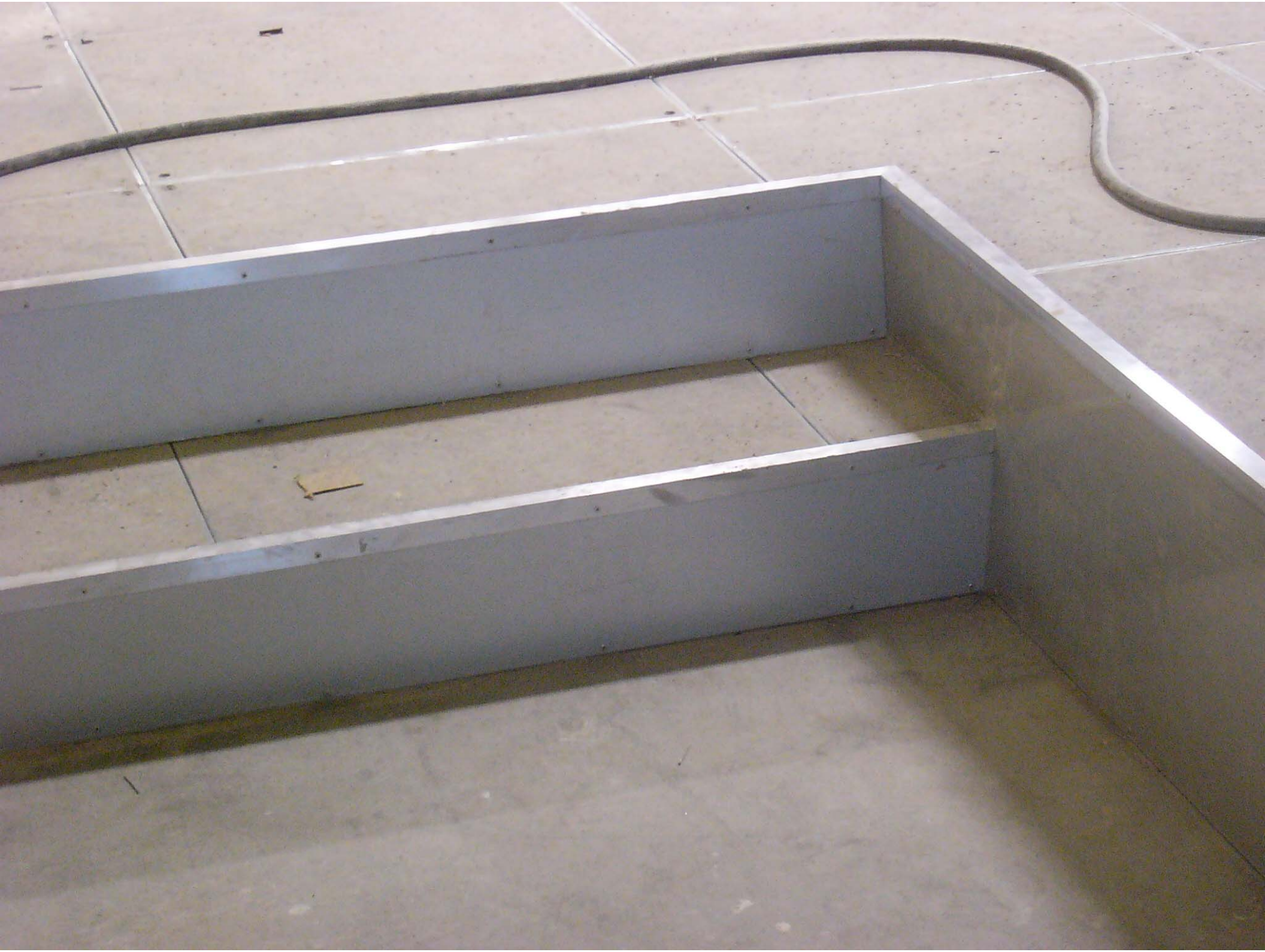
Floor Area Transitions

Transition Between Access Floor Levels







Technical Sheet

TecCrete®

Access Flooring System

Key Features

Range of Load Ratings

- Concentrated load ratings of 1,250 lbs, 1,500 lbs, 2,000 lbs, and 2,500 lbs

Ideal for Underfloor Air

- Flat underside eases installation and sealing of underfloor air plenum partitions
- Tight tile-to-tile gaps
- Optional integral air sealing gasket

Greenest Access Floor Product in America

- Manufactured in a Zero Landfill facility
- 58% recycled content from material regionally sourced in cities and towns throughout the Midwest
- SCS certified as a low-emitting product
- Made in the USA

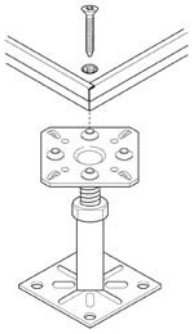
HAWORTH®

TecCrete

General Specification

Standard Panel

- Cornerlock and Non-Cornerlock
- Integral Airseal available
- Factory-supplied cutouts for diffusers, grommets and electrical boxes

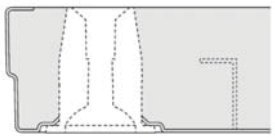


Typical Bare Cornerlock Configuration

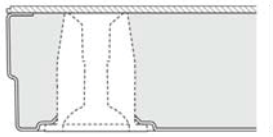
Panel Surface Finish Options

- Finish grade for field-applied staining and sealing
- Standard grade for use under carpeting
- 1/16" or 1/8" static dissipative high pressure laminate with TecTrim™
- 1/16" or 1/8" conductive high pressure laminate with TecTrim
- Static dissipative vinyl with vinyl trim
- Conductive vinyl with vinyl trim
- Other surfaces available by special order

TecTrim is edge trim that is integral to the HPL. Rather than using a separate piece of vinyl trim, the decorative edge is routed into the HPL exposing the dark colored substrate.



Section View of Cornerlock Panel



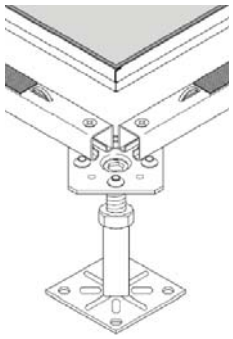
Section View of Non-Cornerlock Panel with Laminate and TecTrim

Understructure Options

- Cornerlock: panel secured to pedestal base with screws all four corners of the panel
- Non-Cornerlock, Gravity-Held: panel resting on a stringer, not physically attached to the understructure
- Cornerlock, Rigid-Grid: panel resting on a stringer & secured to pedestal base with screws in all four corners of the panel

Pedestal Bases

- Pedestal base is steel with hot-dipped galvanized finish. Pedestal head is steel.
- Standard pedestals for finished floor heights from 3" to 30"; additional heights available.
- Seismic pedestals for finished floor heights from 6" to 48"; additional heights available.
- Heads designed to accept bolted stringers (rigid grid)
- Vertical height adjustment of +/- 1"
- To prevent zinc whiskers Haworth does not use any electro-galvanized finishes on its access floor products



Typical Covered Rigid-Grid Configuration

Stringer

- Roll formed 16 guage galvanized steel
- Standard and heavy duty stringers
- Available lengths: 2 ft, 4 ft.
- Integral positioning tab on stringer assists with panel alignment

Fire Rating

- TecCrete meets Class A requirements for flame spread and smoke development in accordance with ASTM-E84-1998, Standard Test Method for Surface Burning Characteristics for Building Materials
- TecCrete is non-combustible as defined by the requirements of ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 deg C

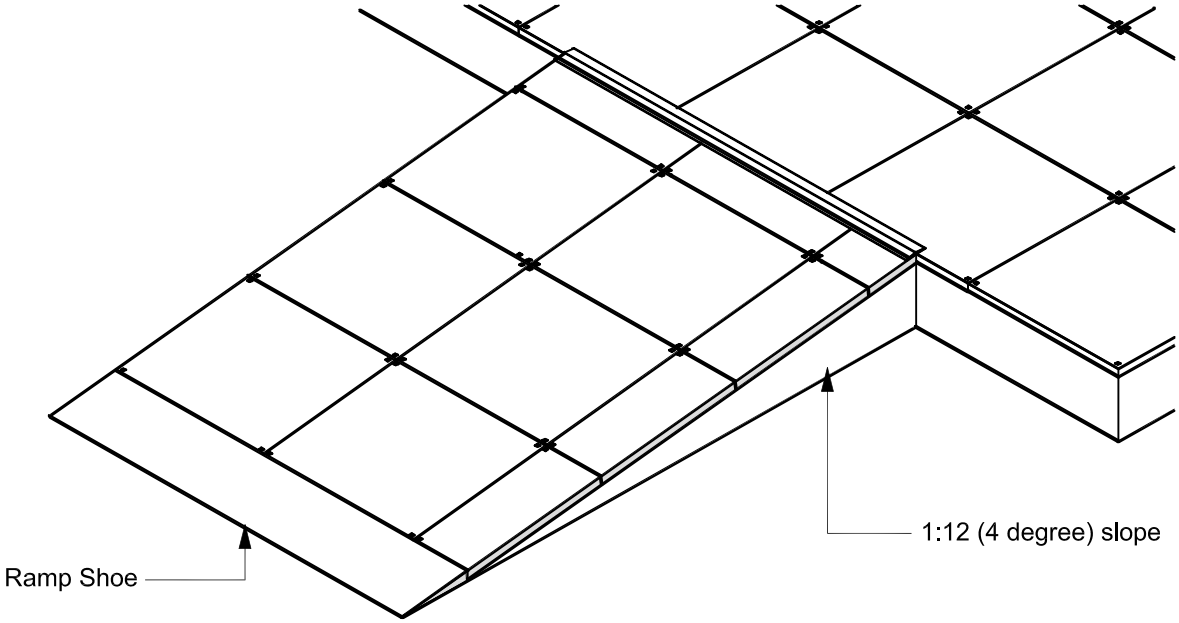
System Performance

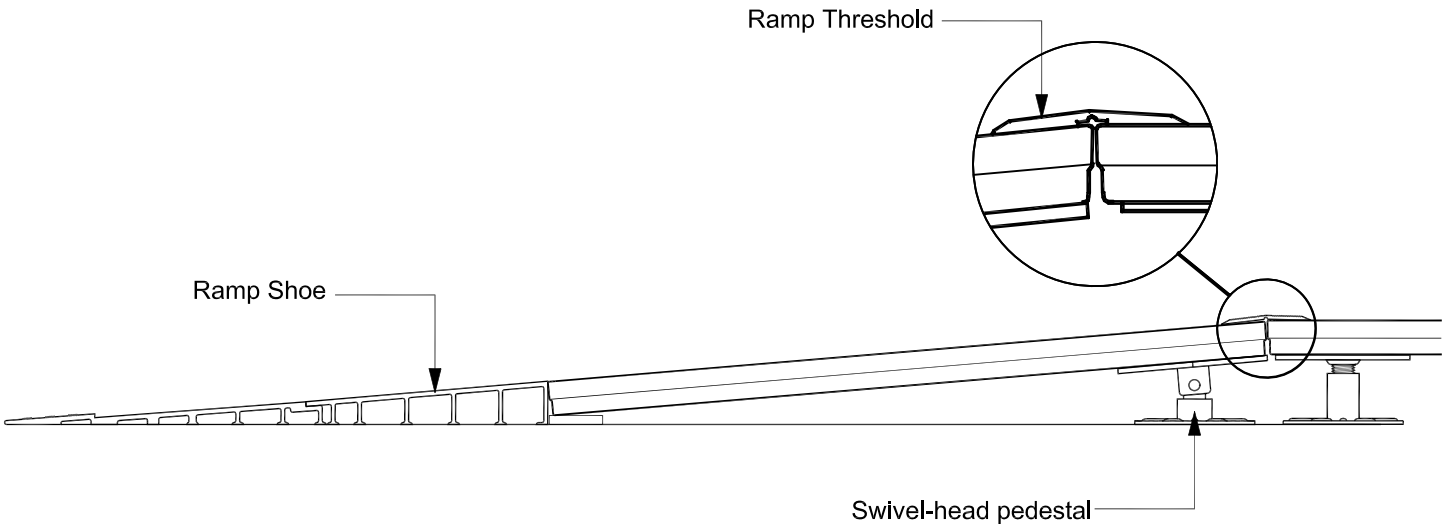
Product			Static Load Rating			Dynamic Load Rating	
System	Panel	Understructure	Concentrated	Uniform	Ultimate	Rolling 10-Pass	Rolling 10,000-Pass
1,250	1 1/8" Panel	Cornerlock	1,250 lbs	600 lbs	1,800 lbs	1,300 lbs	900 lbs
1,500	1 1/8" Panel	Stringer	1,500 lbs	700 lbs	2,500 lbs	1,500 lbs	1,250 lbs
1,500sl	1 1/2" Panel	Cornerlock	1,500 lbs	700 lbs	2,500 lbs	1,500 lbs	1,250 lbs
2,000	1 1/2" Panel	Stringer	2,000 lbs	800 lbs	2,800 lbs	1,500 lbs	1,250 lbs
2,500	1 1/2" Panel	HD Stringer	2,500 lbs	900 lbs	3,100 lbs	2,000 lbs	2,000 lbs

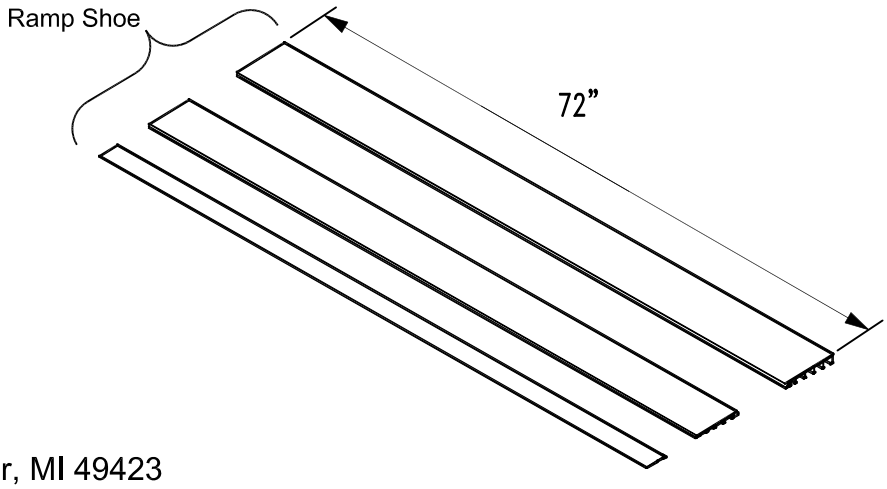
To prevent zinc whiskers, Haworth does not use electro-galvanized finishes on any of its access flooring.

HAWORTH®

TecCrete - Ramp Details







Haworth
One Haworth Center, MI 49423

Frisco Public Library

Project Concept Estimate

Item No.	Scope of Work	Quant.	UM	$/UM	Total Cost	$/SF	Comments
	Total SF of Area	**114284**	**SF**	**-**	**-**		
01	North Glass Entry (40' x 15')	1	LS	609,266	$ 609,266	$ 5.33	
02	Exterior Façade	1	LS	1,492,273	$ 1,492,273	$ 13.06	
03	Interior Construction	1	LS	13,411,829	$ 13,411,829	$ 117.36	
04	Exterior Improvements	1	LS	849,530	$ 849,530	$ 7.43	
05	Roof Replacement	102250	LS	17.15	$ 1,753,588	$ 15.34	
	Subtotal Cost of Work				**$ 18,116,486**	**$ 159**	
06	Staff & General Conditions				$ 1,086,989	$ 9.51	6.00%
07	Temporary Conditions				$ 362,330	$ 3.17	2.00%
08	General Liability Insurance				$ 362,330	$ 3.17	2.00%
09	Builder's Risk Insurance				$ 126,815	$ 1.11	0.70%
10	GC Bond				$ 181,165	$ 1.59	1.00%
11	Contractor Fee				$ 543,495	$ 4.76	3.00%
	Hard Cost Less Contingency				**$ 20,779,609**	**$ 182**	
	Owner Contingency				$ 3,116,941	$ 27.27	15% Covers Escalation.
	TOTAL HARD COSTS				**$23,896,550**	**$ 209**	
12	Architect & Consulting Fees	1	LS	2,867,586	$ 2,867,586	$ 25.09	12% of hard costs per 720 Design.
13	Development Fees				$ -	$ -	
14	Land				$ -	$ -	
15	Project Management	1	LS	358,448	$ 358,448	$ 3.14	1.5% of hard costs.
16	FF&E (Furniture Only)	114284	SF	35	$ 3,999,940	$ 35.00	$35/SF per 720 Design.
17	**FF&E (Tech. Equipment & LV)**	114284	SF	5	$ 571,420	$ 5.00	**Requires Owner input.**
18	**FF&E (RFID System)**	1	LS	500,000	$ 500,000	$ 4.38	**Requires Owner input.**
19	**FF&E (Books)**	1	LS	0	$ -	$ -	**Requires Owner input.**
20	Permit Costs	114284	SF	0	$ 39,999	$ 0.35	
21	Impact Fees				$ -	$ -	
22	Financing Fees				$ -	$ -	
23	Interim Interest				$ -	$ -	
24	Title and Closing				$ -	$ -	
25	Taxes				$ -	$ -	
26	Property Insurance				$ -	$ -	**Requires Owner input.**
27	Legal				$ -	$ -	**Requires Owner input.**
28	Marketing				$ -	$ -	
					$ -	$ -	
	TOTAL SOFT COSTS				**$ 8,337,394**	**$ 73**	
	TOTAL HARD + SOFT COSTS				**$32,233,944**	**$ 282**	
	Alternates (not include in totals below)						
A01	New Mezzanine	31500	SF	327.85	$ 10,327,196	$ 90.36	
A02	Architectural Roof Deck	2000	SF	531.12	$ 1,062,234	$ 9.29	
A03	Access Floor Supply Plenum	30000	SF	10.99	$ 329,670	$ 2.88	

Notes & Clarifications:

01 Conceptual pricing is based on information provided by the City of Frisco Library System Building Analysis & Recommendations Report dated January 24, 2017.

02 Low Voltage System Allowances are included in the "Interior Construction Pricing" section of the estimate.

03 Fireproofing of existing mezzanine columns and the alternate mezzanine is included. Fireproofing is also included at the existing Ceiling Joists directly above the alternate mezzanine. A code review may deem fireproofing at some or all of these locations unnecessary.

04 Taxes, including remodel tax, are not included.

05 Hazardous material survey and abatement is not included.

06 Alternates include all mark ups and soft costs.

Library Size		**114,540** SF	
Renovation Estimated Budget		**24,226,220**	
SUMMARY OF SOFT COSTS			**COMMENTS:**
FFE Budget	**35/SF**	**4,008,900**	
SUMMARY OF A/E FEES			
a. Programming		78,000	Includes Technology Programming
b. A/S/MEP Fee	8.0%	1,938,098	Basic Services: Architectural/Structural/MEP
c. Civil Engineering fee		40,000	Minimal for expanded parking and new entry
d. Landscape Fee		54,000	
d. Cost Estimating		36,000	May not be needed if Construction Mgr is utilized
e. Technology Consultant		90,000	
f. Furniture & Signage		148,000	Furniture, signage, survey of existing to be reused
g. Design team expenses		40,000	Printing, Reproduction, Travel
h. Record drawings		10,000	Optional
TOTAL		**2,434,098**	
PRECONSTRUCTION SERVICES			
a. Pre-design Project Management		363,393	
b. Permitting		39,999	Potential to be waived by City
c. Legal			
SUBTOTAL		**403,392**	
OWNER DIRECT EXPENSES			
a. Public Computers/tablets		60,000	
b. AV/Technology/Maker Equip		50,000	
c. Materials testing		80,000	Slab Scan, Joist Inspection
d. Opening day collection Books		1,000,000	
e. RFID Expansion, Gates, AMH, Self Check, OPAC		425,000	
f. Library Move		60,000	
g. Data Wiring/Network/WiFi		416,000	
h. Subsurface Borings		20,000	Entry expansion/Slab information
i. Site Construction Testing/Balancing		60,000	
j. Owners Project Contin-5%		1,211,311	
k. Staff Computers/Printer/Scanner		30,000	
l. Building Security		50,000	
TOTAL		**3,462,311**	
TOTAL FOR 114,500 SF BUILDING SOFT COSTS		**10,308,701**	

Library Size		**146,000** SF	
Renovation Estimated Budget		**34,553,416**	*(Exsiting space, New Mezzanine and Supply Plenum)*
SUMMARY OF SOFT COSTS			**COMMENTS:**
FFE Budget	**35/SF**	**5,110,000**	
SUMMARY OF A/E FEES			
a. Programming		88,000	Includes Technology Programming
b. A/S/MEP Fee	7.8%	2,677,890	Basic Services: Architectural/Structural/MEP
c. Civil Engineering fee		40,000	Minimal for expanded parking and new entry
d. Landscape Fee		54,000	
d. Cost Estimating		46,000	May not be needed if Construction Mgr is utilized
e. Technology Consultant		120,000	
f. Furniture & Signage		198,000	Furniture, signage, survey of existing to be reused
g. Design team expenses		50,000	Printing, Reproduction, Travel
h. Record drawings		14,000	Optional
SUBTOTAL		**3,287,890**	
PRECONSTRUCTION SERVICES			
a. Pre-design Project Management		518,301	
b. Permitting		39,999	Potential to be waived by City
c. Legal			
SUBTOTAL		**558,300**	
OWNER DIRECT EXPENSES			
a. Public Computers/tablets		80,000	
b. AV/Technology/Maker Equip		580,000	
c. Materials testing		80,000	Slab scan, Joist inspection
d. Opening day collection Books		1,000,000	
e. RFID Expansion, Gates, AMH, Self Check, OPAC		475,000	
f. Library Move		60,000	
g. Data Wiring/Network/WiFi		516,000	
h. Subsurface Borings		20,000	Entry expansion/Slab information
i. Site Construction Testing/Balancing		80,000	
j. Owners Project Contin-5%		1,727,671	
k. Staff Computers/Printer/Scanner		30,000	
l. Building Security		60,000	
SUBTOTAL		**4,708,671**	
TOTAL FOR 146,000 SF BUILDING SOFT COSTS		**13,664,861**	

Library Size		**114,500** SF	
New Building Estimated Budget		**51,525,000**	*(Exsiting space, New Mezzanine and Supply Plenum)*
SUMMARY OF SOFT COSTS			**COMMENTS:**
FFE Budget	**35/SF**	**4,007,500**	
SUMMARY OF A/E FEES			
a. Programming		88,000	Includes Technology Programming
b. A/S/MEP Fee	7.5%	3,864,375	Basic Services: Architectural/Structural/MEP
c. Civil Engineering fee		40,000	Minimal for expanded parking and new entry
d. Landscape Fee		54,000	
d. Cost Estimating		46,000	May not be needed if Construction Manager is utilized
e. Technology Consultant		120,000	
f. Furniture & Signage		198,000	Furniture, signage, survey of existing to be reused
g. Design team expenses		50,000	Printing, Reproduction, Travel
h. Record drawings		14,000	Optional
SUBTOTAL		**4,474,375**	
PRECONSTRUCTION SERVICES			
a. Pre-design Project Management		772,875	
b. Permitting		39,999	Potential to be waived by City
c. Legal			
SUBTOTAL		**812,874**	
OWNER DIRECT EXPENSES			
a. Public Computers/tablets		80,000	
b. AV/Technology/Maker Equip		580,000	
c. Materials testing		80,000	Slab scan, Joist inspection
d. Opening day collection Books		1,000,000	
e. RFID Expansion, gates, AMH, Self Check, OPAC		475,000	
f. Library Move		60,000	
g. Data Wiring/Network/WiFi		516,000	
h. Subsurface Borings		100,000	Entry expansion/Slab information
i. Site Construction Testing/balancing		150,000	
j. Owners Project Contin-5%		2,576,250	
k. Staff Computers/printer/scanner		30,000	
l. Building Security		60,000	
SUBTOTAL		**5,707,250**	
TOTAL FOR NEW BUILDING SOFT COSTS		**15,001,999**	

NOTE: THIS DOES NOT INCLUDE SITE COSTS

Library Size		**146,000** SF	
New Building Estimated Budget		**65,700,000**	*(Exsiting Space, New Mezzanine and Supply Plenum)*
SUMMARY OF SOFT COSTS			**COMMENTS:**
FFE Budget	**35/SF**	**5,110,000**	
SUMMARY OF A/E FEES			
a. Programming		88,000	Includes Technology Programming
b. A/S/MEP Fee	7.5%	4,927,500	Basic Services: Architectural/Structural/MEP
c. Civil Engineering fee		40,000	Minimal for expanded parking and new entry
d. Landscape Fee		54,000	
d. Cost Estimating		46,000	May not be needed if Construction Mgr is utilized
e. Technology Consultant		120,000	
f. Furniture & Signage		198,000	Furniture, signage, survey of existing to be reused
g. Design team expenses		50,000	Printing, reproduction, travel
h. Record drawings		14,000	Optional
SUBTOTAL		**5,537,500**	
PRECONSTRUCTION SERVICES			
a. Pre-design Project Management		985,500	
b. Permitting		39,999	Potential to be waived by City
c. Legal			
SUBTOTAL		**1,025,499**	
OWNER DIRECT EXPENSES			
a. Public Computers/tablets		80,000	
b. AV/Technology/Maker Equip		580,000	
c. Materials testing		80,000	Slab scan, Joist inspection
d. Opening day collection Books		1,000,000	
e. RFID Expansion, gates, AMH, Self Check, OPAC		475,000	
f. Library Move		60,000	
g. Data Wiring/Network/WiFi		516,000	
h. Subsurface Borings		100,000	Entry expansion/Slab information
i. Site Construction Testing/balancing		150,000	
j. Owners Project Contin-5%		3,285,000	
k. Staff Computers/printer/scanner		30,000	
l. Building Security		60,000	
SUBTOTAL		**6,416,000**	
TOTAL FOR NEW BUILDING SOFT COSTS		**18,088,999**	

NOTE: THIS DOES NOT INCLUDE SITE COSTS

Library Size		**2,000** SF	
New Buidling Estimated Budget		**1,062,234**	*(Exsiting space, New Mezzanine and Supply Plenum)*
SUMMARY OF SOFT COSTS			**COMMENTS:**
FFE Budget	**35/SF**	**70,000**	
SUMMARY OF A/E FEES			
a. Programming		2,000	
b. A/S/MEP Fee	7.5%	79,668	Basic Services: Architectural/Structural/MEP
c. Civil Engineering Fee		0	
d. Landscape Fee		12,000	
d. Cost Estimating		2,000	May not be needed if Construction Mgr is utilized
e. Technology Consultant		10,000	
f. Furniture & Signage		3,800	Furniture, signage, planters
g. Design Team Expenses		0	Printing, reproduction, travel - included in base fee
h. Record drawings		2,000	Optional
SUBTOTAL		**111,468**	
PRECONSTRUCTION SERVICES			
a. Pre-design Project Management		15,934	
b. Permitting			Potential to be waived by City
c. Legal			
SUBTOTAL		**15,934**	
OWNER DIRECT EXPENSES			
a. Public Computers/Tablets		0	
b. AV/Technology/Maker Equip		30,000	
c. Materials testing		10,000	Slab scan, Joist inspection
d. Opening day collection Books		0	
e. RFID Expansion, gates, AMH, Self Check, OPAC		20,000	
f. Library Move		0	
g. Data Wiring/Network/WiFi		10,000	
h. Subsurface Borings		0	Entry expansion/Slab information
i. Site Construction Testing/Balancing		0	
j. Owners Project Contin-5%		53,112	
k. Staff Computers/Printer/Scanner		0	
l. Building Security		10,000	
SUBTOTAL		**133,112**	
TOTAL FOR NEW BUILDING SOFT COSTS		**330,513**	

NOTE: THIS DOES NOT INCLUDE SITE COSTS