CHEROKEE NATION

W.W. Hastings Replacement Hospital

SCHEMATIC DESIGN SIGN-OFF

Childers Architect and HKS, Inc. respectfully request a formal sign-off, acknowledgement and approval of the submitted information. Sign off signifies that the client is satisfied with the deliverables listed below. Please let us know if you have any questions, concerns, or require further clarification.

Schematic Design Submittal:

01_Drawings

02_Specificatiopns

03_Narratives

04_Equipment Information

Dr. Stephen Jones _____ Date_____

Parkhill

April 29, 2022

Mr. Breck Childers, AIA
James R. Childers, Architect, Inc.
45 South 4th Street
Fort Smith, AR 72901

Re: Cherokee Nation WW Hastings Replacement Hospital
Schematic Design Civil Narrative

Dear Mr. Childers,

Submitted for Childers review and Design Team coordination is the Schematic Design Civil Narrative.

1. Paving
    a. Traffic Paving
        i. All paving will be concrete pavement using the recommendations of the geotechnical report for subbase preparation, base materials and thickness, and concrete design and thickness. Concrete shall be 4,000-psi at 28-days with a low slump of 1 to 3 inches and air entrained content of 5% to 7%. Concrete pavement thickness is according to the following table.

Traffic	Concrete Thickness (inch)	Aggregate Base (inch)
Heavy Duty	7.0	4.0
Medium Duty	6.0	4.0
Light Duty	5.0	4.0

    b. Drives
        i. The existing loop road along the east and north side of the hospital will remain at 32-ft wide with curbs and gutters using heavy duty pavement.
        ii. The drive between the clinic and the hospital is planned at 26-ft wide with curbs and gutters using medium duty pavement.
        iii. The drive along the south side of the hospital is planned at 26-ft wide with curbs and gutters using medium duty pavement,
        iv. The drop-off and pick-up lanes around the hospital are planned to use medium duty pavement.
    c. Parking
        i. Surface parking is planned with 90-degree spaces that are 9.5-ft wide and 18-ft deep. Drive aisles in parking are 26-ft wide. Surface parking will be light duty pavement.
        ii. Parking Count
            1. From the current Health Clinic Parking, 46 ADA spaces and 758 standard spaces will be lost and reconstructed for a total of 804 spaces.
            2. The Hospital design has 38 ADA spaces and 158 standard spaces for a total of 196 spaces.
            3. There is a net loss of on-site parking of 8 ADA spaces and 600 standard spaces for a total loss of 608 spaces.
            4. The North Surface Parking lot has 1,031 standard parking spaces.
            5. There is a net loss of 8 ADA parking spaces.
            6. There is a net gain of 431 standard parking spaces.
            7. There is a net total gain of 432 parking spaces.
    d. Sidewalks
        i. Sidewalks will be 4-in thick, 3,000-psi at 28-day concrete.

2. Site Utilities
    a. Water
        i. Water line materials and installation will be per TPWA standard specifications.
        ii. A 16-in water line loop around the hospital is proposed to meet the fire flow demand. The new water lines will connect to the existing 16-in main along the east side of the Hastings property. A second connection will be made to the 24-in main along Ross Street. The dual connection will provide two sources of water supply in case one of the TPWA mains are temporarily out of service.
        iii. 16-in water lines are required to be ductile iron pressure rated at 350-psi per TPWA standards.
        iv. Water lines less than 16-in will be PVC per ASTM D-2241, DR21, Class 200.
        v. Domestic water service will be delivered to the Central Energy Plant.
        vi. Fire water will be delivered to the Central Energy Plant. There will be two fire flow pipes into the Central Energy Plant due to the requirements for high rise buildings. The fire lines into the plant are proposed to be 12-in pipes.
        vii. Water lines will need to be constructed in two phases. The initial phase will be to relocate the existing water lines on the east side of the clinic to clear them from the footprint of the Hospital. This phase will involve installation of new 16-in water main and demolition of existing water mains. The second phase will be to complete the 16-in loop at a time to be determined by the contractor.
        viii. A construction permit will be necessary from the Oklahoma Department of Environmental Quality and TPWA.
    b. Sewer
        i. TPWA does not have gravity sewer mains adjacent to the project, so sewer from the hospital will need to be pumped to a gravity main with capacity to accept the flow from the hospital.
        ii. Clinic Lift Station Option
            1. The Technical Committee met with TPWA about using the Clinic lift station to pump the hospital waste into the TPWA collection system. The additional flow is expected to alleviate some of the odor complaints by reducing the time sewage resides in the lift station and force main.
            2. TPWA engineering reviewed the current flow and will allow the clinic lift station to receive and pump the hospital sewer waste into their system.
        iii. Existing Conditions
            1. Record drawing sheet C8-203 from the Clinic construction records show there is a 4-in PVC sewer from the northeast corner of the Clinic to the lift station.
            2. The Clinic's domestic water is approximately 16.5-ft north of the sewer. Approximately 10-ft north of the domestic water is the Clinic fire line. Approximately 7-ft north of the fire line is a proposed storm sewer within Bid Package 1.
        iv. Construction Challenges
            1. ODEQ requires 10-ft separation between water and sewer lines. Since there is approximately 16.5-ft between the domestic water and 4-in clinic sewer, a new gravity sewer could be placed between the utilities.
            2. Construction will likely require trench shoring to protect existing pressure water pipe and gravity sewer. Construction across the Clinic dock area will require a bore and steel casing. The sewer route will cross the Clinic's domestic water, fire water, storm sewer, gas service, and the cooling and heating water supply and return lines between the Clinic and the Clinic's energy plant.
        v. A construction permit application may be necessary from the Oklahoma Department of Environmental Quality and the TPWA.

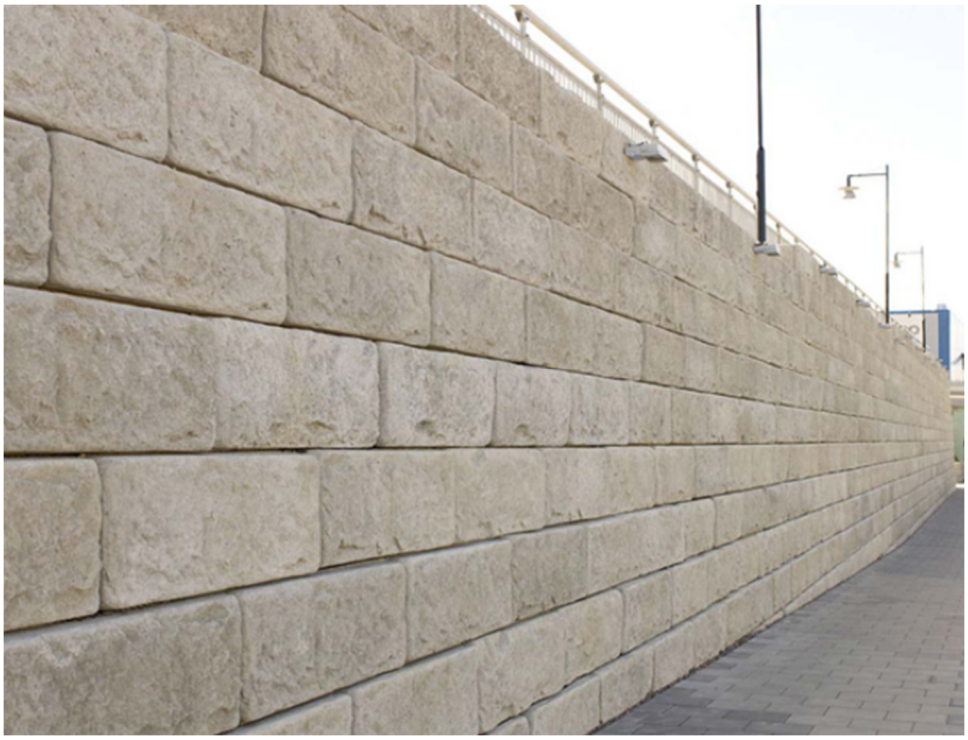
c. Gas
    i. Gas will be provided by Northeast Oklahoma Public Facilities Authority (NOPFA) from a 3-in gas main located north of the hospital. The gas service will travel along the drive between the Clinic and the Hospital to the Central Energy Plant.
d. Electric
    i. Power is to be provided by Oklahoma Gas and Electric (OG&E) from the on-site substation. Power lines are anticipated to be hung from the existing power poles along the east property and north property lines to the Central Energy Plant.
    ii. A court case is currently under review by the Supreme Court of Oklahoma that may affect OG&E's ability to serve the project. OG&E is confident the Court will concur with their interpretation of the State Statutes and will allow them to provide power to the hospital.
    iii. Temporary power is anticipated to be provided by the TPWA.
e. Communications
    i. Fiber optic communications will be provided by Commercial Consolidated and Cox Communications.
    ii. Commercial Consolidated will extend their services along Ross Street to the southeast corner of the Hastings property. Communication conduits were installed along the east property line when the Clinic was constructed. Commercial Consolidated will use the empty conduits to install their fiber optic cables to an existing pull-box east of the clinic parking. New conduits will be needed to extend their service to the point of entry into the building.
    iii. Cox Communications will extend service from Downing Street. Service will be installed overhead along Bliss to the corner of the cemetery, and overhead along the north side of the cemetery to the northeast corner of the cemetery. Service will then go underground in existing conduits to the northeast corner of the Hastings property. New conduits will be needed to extend their service to the point of entry into the building.
f. Oxygen
    i. Oxygen storage tanks are anticipated to be located west of the Central Energy Plant and utility yard. An oxygen line will be installed from the storage tanks to the hospital. The exact location of the tanks needs to be coordinated with the layout of the utility yard so that none of the gates to the utility yard are blocked.

3. Storm Water
    a. Hydrology and Detention
        i. Hydrology calculations will be provided to design storm drain inlets and pipes.
        ii. The existing detention ponds will continue to be used for stormwater detention. The existing ponds were designed for the current site and the Hospital development does not change the commercial runoff coefficient of the property.
    b. Storm Sewer
        i. Storm sewer pipes will be either reinforced concrete pipe or polypropylene ADS HP Storm pipe.
    c. Stormwater Pollution Prevention Plan
        i. A draft Stormwater Pollution Prevention Plan was prepared during Bid Package 1. The plan will need to be updated with the contractor's information and construction dates prior to application with the EPA.
4. Retaining Walls
    a. Retaining walls are needed at the stormwater detention pond at the east side of the property and along the driveway along the north property line and the driveways entering the adjacent surface parking.
    b. The existing retaining wall along the driveway along the north property line is a small block gravity concrete masonry wall. This retaining wall will need to be modified for the driveways and sidewalks to the north surface parking lot. We propose the wall modifications and new walls continue to use the existing masonry block wall design and materials. Existing blocks removed for the driveways may be reused for new walls.

c. The retaining wall at the east stormwater detention pond may be a gravity concrete masonry block wall or a gabion basket wall.
d. Following are examples of small block gravity concrete wall, a large block gravity concrete wall, and a gabion basket wall.

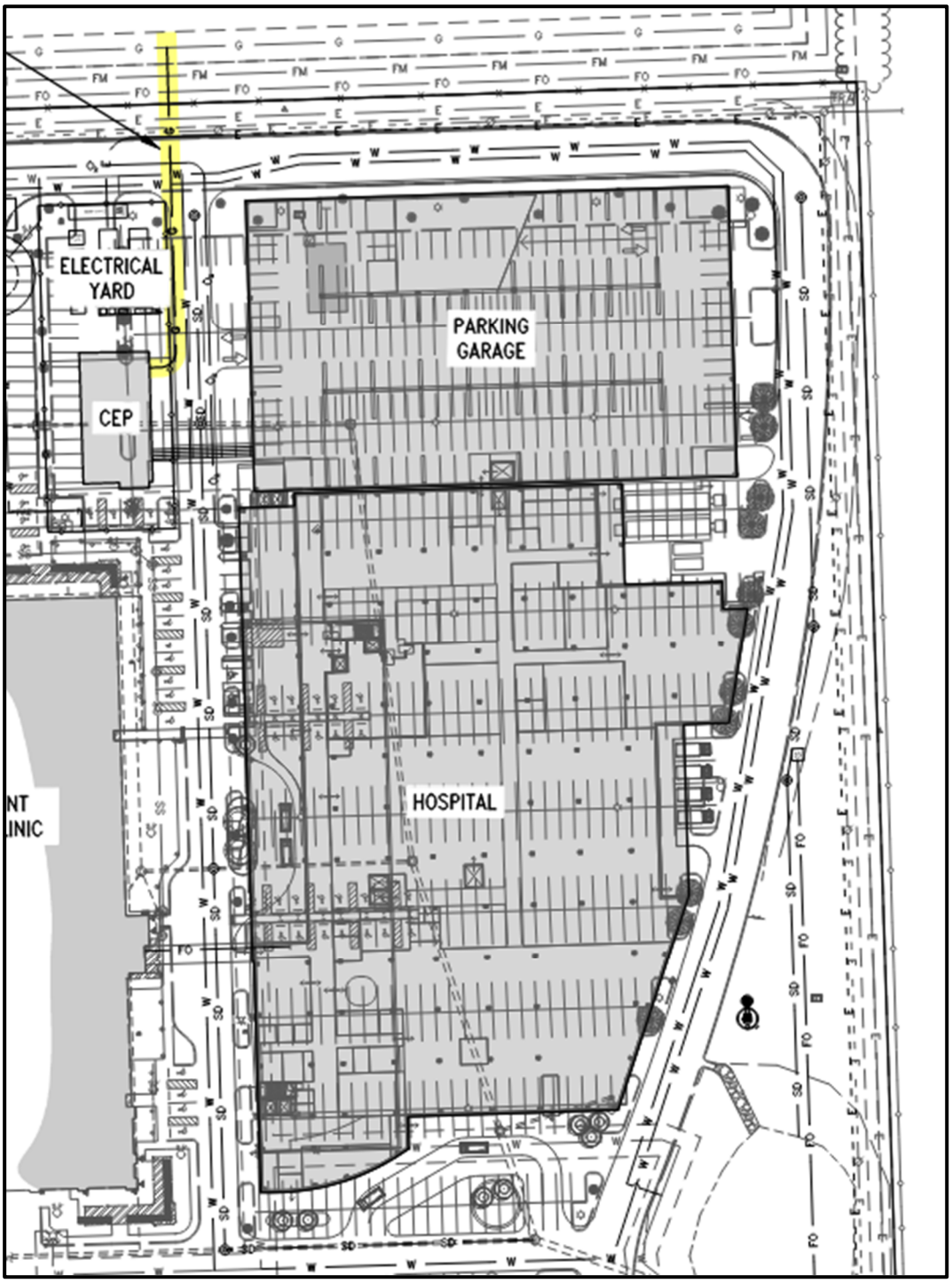
SMALL BLOCK GRAVITY WALL ALONG NORTH PROPERTY LINE

GABION BASKET WALL AT ROSS STREET FRONTAGE

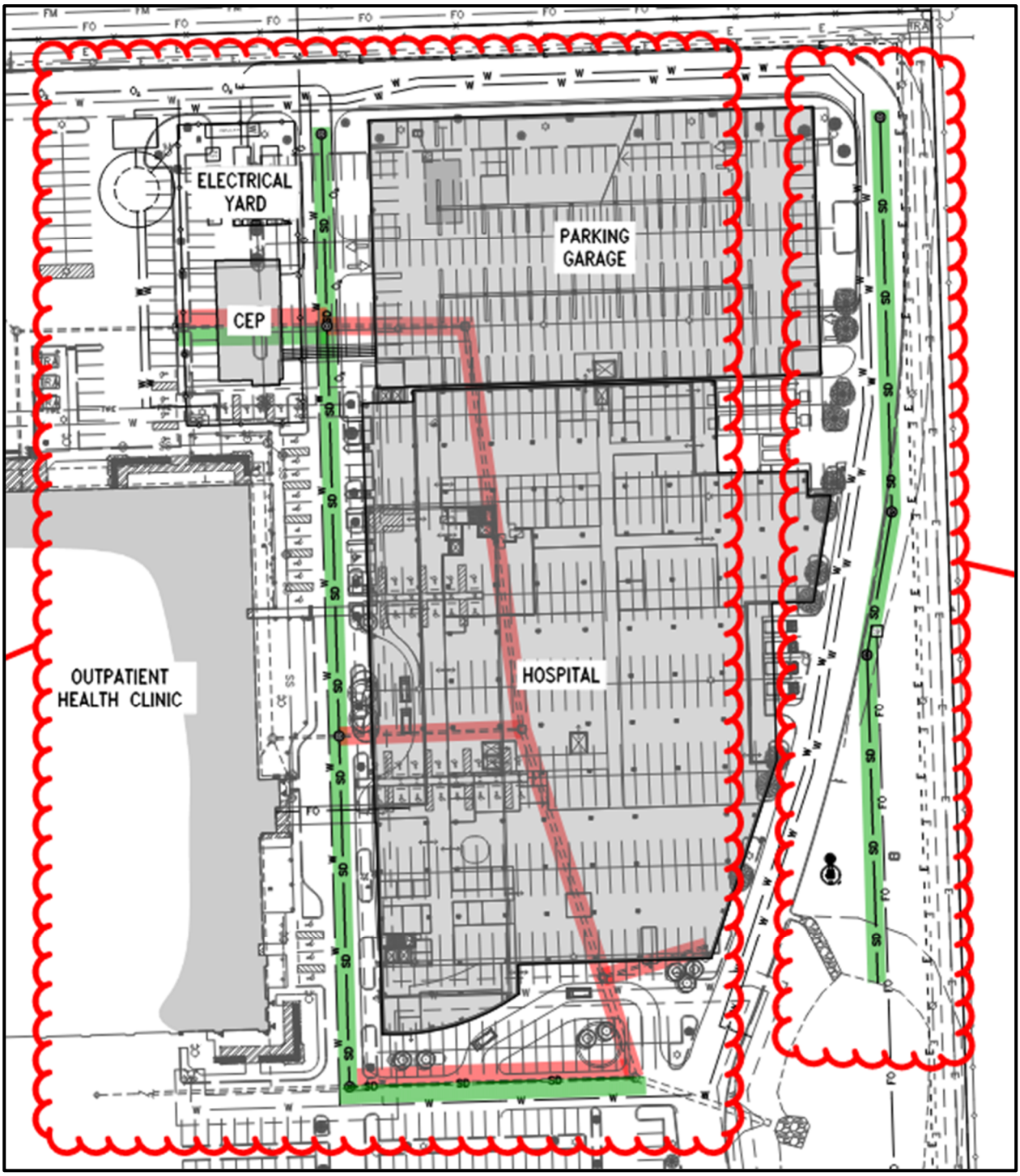


EXAMPLE OF LARGE BLOCK GRAVITY RETAINING WALL

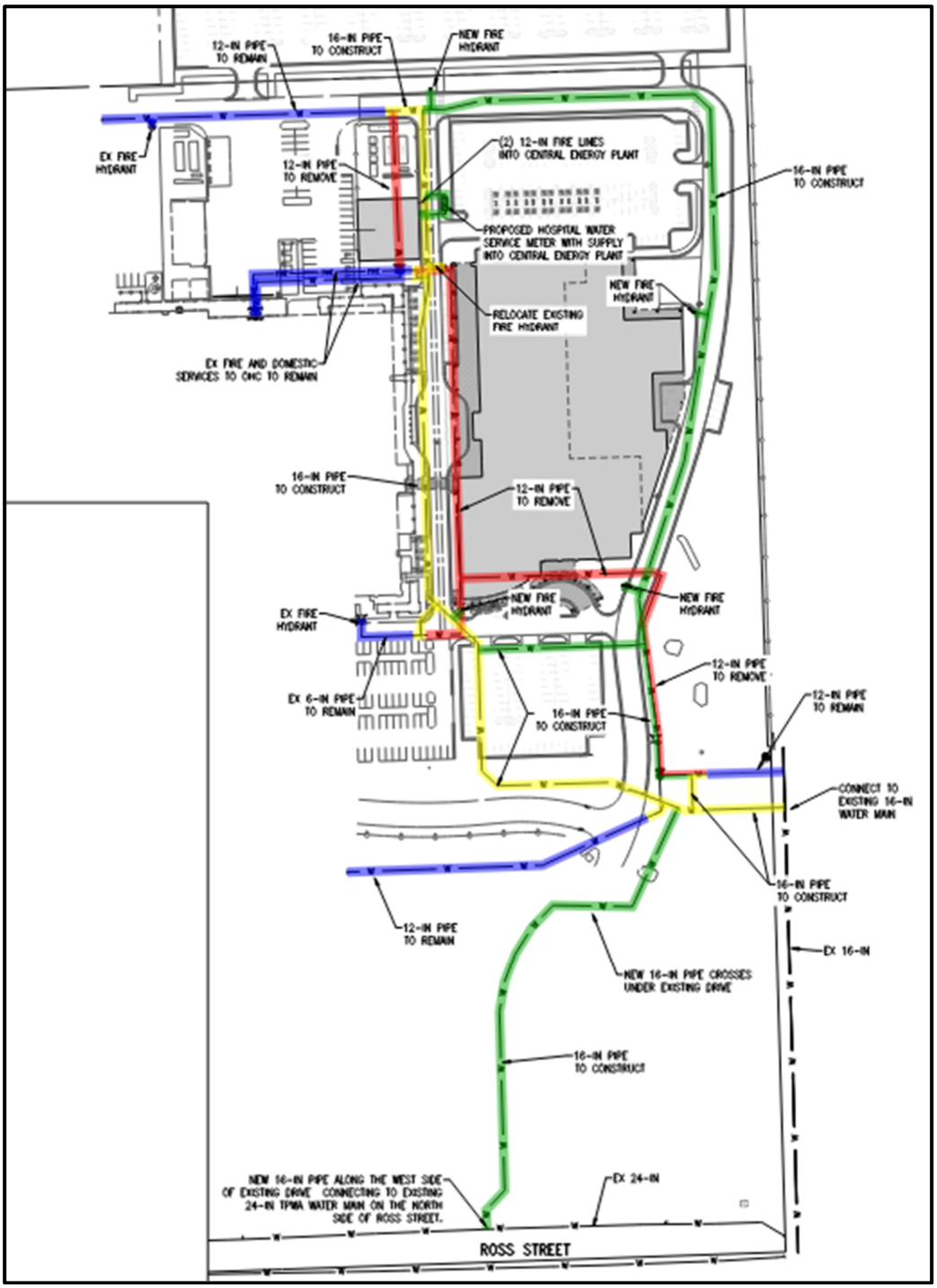
5. Traffic Analysis
    a. Traffic Engineering Consultants are preparing a traffic study for the Hospital. The addition of the surface parking and access to Downing Street added time to the study. The traffic study is anticipated to be completed the week of May 16, 2022.
6. Bid Package 1
    a. A draft Bid Package 1 (BP1) was issued March 31, 2022. BP1 includes site demolition, storm drain construction to relocate storm drains from the Hospital footprint, and temporary construction erosion controls.
    b. The draft Bid Package 1 will be revised to avoid the front canopy columns that were added to the building design after the draft Bid Package 1 was issued.
7. Owner Approvals
    a. Owner Leadership has approved the following site work strategies. See Site Utilities above for site utility strategies.
        i. Gas service connection to the Central Energy Plant. 12/08/21
        ii. Storm drain relocation plan. 12/08/21
        iii. Water distribution plan. 4/22/22
        iv. Fiber communications plan. 4/22/22



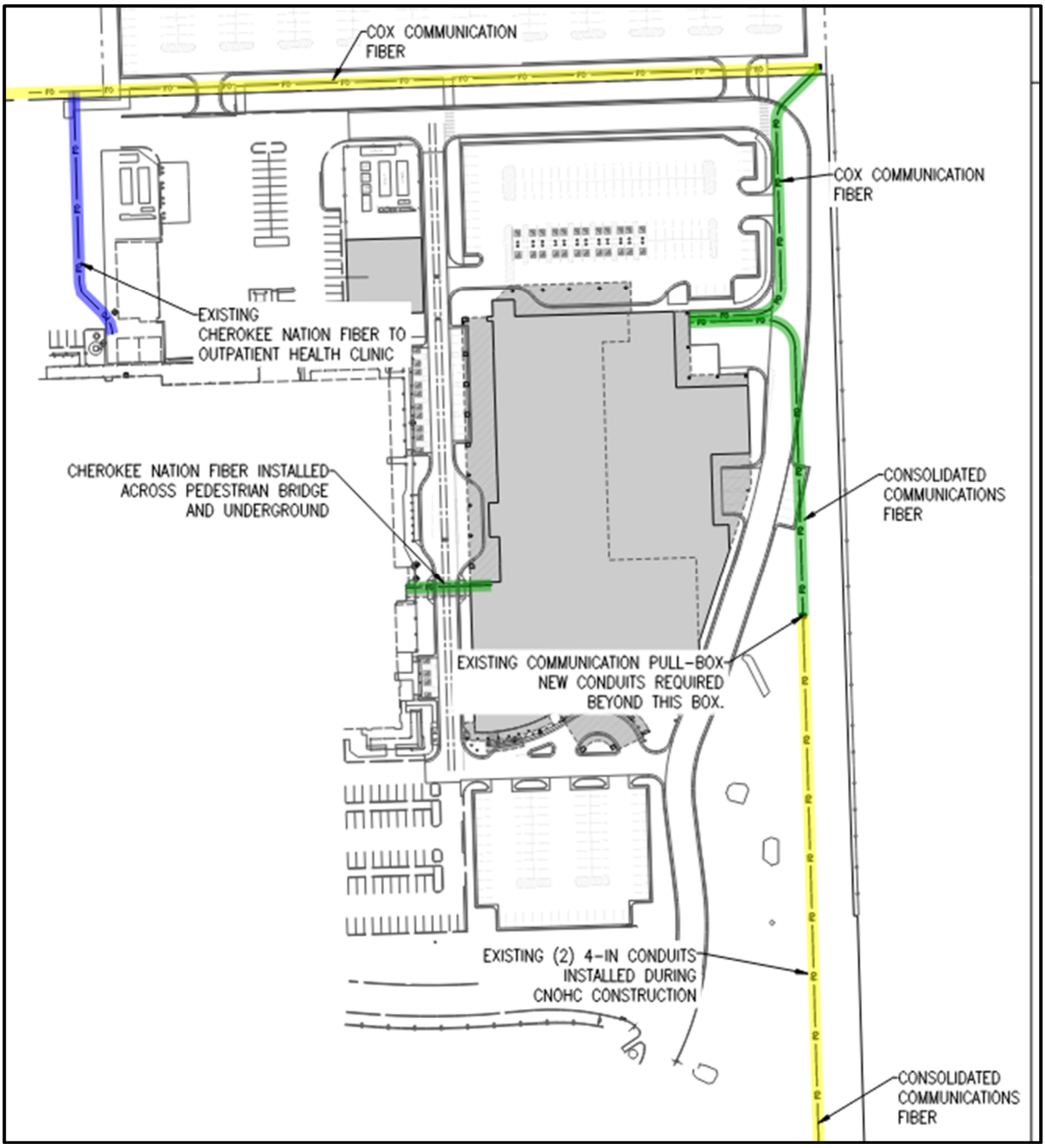
GAS STRATEGY



STORM STRATEGY



WATER STRATEGY



FIBER STRATEGY

b. The following are still in development and will be submitted to Owner Leadership once approved by the Technical Committee.
    i. Sanitary sewer plan.
    ii. Oxygen tank location and service plan.
    iii. Electric service plan.

Sincerely,
PARKHILL

By _____
Corey W. Lipps, PE
Senior Practice Leader

hfsd
landscape architecture

4/29/2022

Concept Design Narrative- Landscape Architecture

Cherokee Nation Hastings Replacement Hospital Narrative | Tahlequah, OK

As the landscape architects on this project we want to make sure to embrace and encompass some sustainable values into the clinic's landscape design through the use of plant materials that reflect the horticultural diversity that exists throughout Oklahoma. Generally, we will be using similar plant materials that were used on the Outpatient Clinic. Incorporating some native plant types that have been selected for their climatic characteristics and adaptability, but also for their physical characteristics. Seasonal colors, textures, sizes, shapes are important criteria for plant selection and how it relates to the building's architecture. The proper shapes and form of plantings were critical in defining spaces, framing views, and accentuating the architectural features of this facility. Landscape plantings generally would be limited to- building entries, accent areas (such as plazas and gathering places), parking islands, and around signage locations.

Varying types of mulches are proposed to be utilized for this project. Premium shredded Cypress mulch is typically one of the best mulches, but does require periodic surface watering to hold it (down) in place. Another type of mulch that is being used is decomposed granite screenings/chips. We also would like to use river stones (of varying sizes). The stone (inert) mulch are very good mulches that do not blow away. They will compact into a firm base around planted areas and can reduce bed maintenance by retarding weed growth. The color of the granite mulch is somewhat limited due to the lack of availability granite quarries in Oklahoma. The color is generally a range of pinkish grey to light grey. The color of river stone will be what is typically found in the NE region of Oklahoma.

For hardscape features, large beams of Hackett stone, or moss covered boulders are proposed for landscape accents. These types of stone can be incorporated into berms and other pedestrian plaza areas. Hardscape paving will include- integrally colored/seeded concrete, with multiple finishes bringing the inside paving patterns outside to create harmony between the inside and outside environments. We intend to implement the same paving type and finishes as was used on the Outpatient Clinic. Typically the hardscape enhancements would be utilized at main all entrances into the clinic facility. Additionally, seat walls/benches can be provided to compliment seating in the break areas and along paths. Site furnishings (benches, tables, and waste receptacles) can also be placed throughout the site at most building entry locations. Again, for consistency, we will match the site furnishings used on the clinic project.

Based upon our experience with the Outpatient Clinic, it is the Owner's desire to not have a permanent irrigation system. This will allow the project to qualify for some points related to LEED certification,

Scott L. Howard, ASLA
Principal

3100 NW 149th St.-Oklahoma City, OK 73134
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Nick Fairless, ASLA
Principal

(Silver classification is the overall goal for this project). We will provide an in-ground quick-coupler system that can be utilized to manually water plant materials during the establishment period, and during periods of drought and dry seasonal conditions.

We recommend incorporating sustainable stormwater management principles into the landscape/site design. This may include "bio-swales" in parking aisles, rain gardens and other forms of bio-retention practices in larger areas within the site. The goal is to improve the quality of stormwater runoff, capturing as much as possible on-site for reuse as supplemental irrigation, slowing the velocity of runoff to prevent erosion, and recharge of ground water aquifers. Landscape design to be coordinated with the civil engineering design.

There are some green roofs proposed for the new hospital facility. One is proposed on the 2nd level near the south drop-off area, and the other is on the 5th floor level. There are several approaches to designing green roofs, or roof deck terraces. To determine what direction is taken, we need to ask the following questions:

1. What is the purpose of the green roof? Is it to look good, meaning it us just a visual element?
2. Will there pedestrian access to/through it? This applies to visitors, staff, and patients.
3. If pedestrians are allowed in the area, how is it to be used? Outside dining, casual seating, walking track, etc.
4. Is shade desired? Via structures like pergolas or shade structures? Or tree canopies?
5. If trees are desired, they require a depth of 4' min. for their root zone.
6. As for the "green" portion of the roof, do you want to utilize a "tray" system of shallow trays filled with sedums and other succulents? Or can the "green" space be construction of built-up planters? Or are above grade pots and planters ok?
7. If pedestrians are allowed, what type of paving system is desired? Pavers on roof ballast, pavers on a pedestal system (where the roof will have to recessed)

We understand the client does not want irrigation for the site, but it will be necessary if anything is to survive on the roof areas.

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May 2, 2022

MOBLEY FIRE PROTECTION

FIRE & LIFE SAFETY CODE SUMMARY

CHEROKEE NATION – WW HASTINGS REPLACEMENT HOSPITAL
TAHLEQUAH, OKLAHOMA

Prepared for:

Childers Architect, Inc.
45 South 4th Street
Fort Smith, Arkansas 72901

Project No. M2166.00
Revision No. 0

TABLE OF CONTENTS

1 INTRODUCTION

The following information summarizes the fire and life safety code compliance approach for the Cherokee Nation WW Hastings Replacement Hospital (Building/Hospital/Project) located in Tahlequah, Oklahoma.

The Project involves a new approximately 400,000 square feet, six-story high-rise hospital. The Hospital will be comprised of various inpatient care services, such as admitting and waiting, imaging, patient sleeping rooms, treatment rooms, operating rooms, examination rooms, and associated support spaces, including administration offices, mechanical rooms, electrical rooms, communication rooms, restrooms, and storage rooms.

The Hospital will be protected throughout with automatic sprinkler systems and an emergency voice/alarm communication fire alarm system.

2 APPLICABLE CODES & STANDARDS

The Authorities Having Jurisdiction (AHJ) for the Project are the Cherokee Nation, City of Tahlequah, and the Centers for Medicare and Medicaid Services (CMS). The following codes and referenced standards are adopted by the AHJs and are applicable to the Project.

- International Building Code, 2018 edition (IBC)
- International Fire Code, 2018 edition (IFC)
- International Mechanical Code, 2018 edition, (IMC)
- ICC 500, *Standard for the Design and Construction of Storm Shelters*, 2014 edition (ICC 500)
- ICC A117.1, *Accessible and Usable Buildings and Facilities*, 2009 edition
- Facility Guidelines Institute, *Guidelines for Design and Construction of Hospitals and Outpatient Facilities*, 2018 edition (FGI)
- NFPA 10, *Standard for Portable Fire Extinguishers*, 2018 edition
- NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2016 edition
- NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 2016 edition
- NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, 2016 edition
- NFPA 24, *Standard for the Installation of Private Fire Service Mains and their Appurtenances*, 2016 edition
- NFPA 70, *National Electrical Code*, 2017 edition (NEC)
- NFPA 72, *National Fire Alarm and Signaling Code*, 2016 edition
- NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, 2016 edition
- NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2012 edition
- NFPA 92, *Standard for Smoke Control Systems*, 2018 edition
- NFPA 99, *Health Care Facilities Code*, 2012 edition (HCFC)
- NFPA 101, *Life Safety Code*, 2012 edition (LSC)
- NFPA 110, *Standard for Emergency and Standby Power Systems*, 2016 edition
- NFPA 418, *Standard for Heliports*, 2016 edition
- NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*, 2018 edition

3 OCCUPANCY CLASSIFICATIONS

3.1 PRIMARY OCCUPANCY

The Building is primarily classified as Health Care and Institutional Group I-2, Condition 2, in accordance with LSC §6.1.5 and IBC §308.3.1.2, respectively.

3.2 ACCESSORY OCCUPANCIES

The following occupancies occupy less than 10 percent of the Building floor area and are ancillary to the primary occupancy, in accordance with IBC §508.2.

- Assembly (Group A-3): conference rooms, waiting areas, break rooms, etc.
- Business (Group B): offices, administration areas, etc.
- Residential (Group R-1): on-call rooms
- Storage (Group S-1 and S-2): storage rooms, mechanical rooms, electrical rooms, etc.

4 CONSTRUCTION

4.1 CONSTRUCTION CLASSIFICATION

The Building shall have a minimum construction classification of Type I (332) and Type IA construction in accordance with LSC Table 18.1.6.1 and IBC Table 601. Therefore, the Project shall be constructed of noncombustible materials, except where permitted in accordance with IBC §603. Refer to IBC §603 for the comprehensive list of exceptions. Building elements shall have minimum fire-resistance ratings in accordance with Table 1, *Building Element Fire-Resistance Ratings*, in accordance with LSC Table 18.1.6.1 and IBC Table 601.

Table 1, *Building Element Fire-Resistance Ratings*

Element	**FR** (hours)
Primary Structure	3
Bearing Walls	3
Floor Construction & Associated Secondary Structural Members	2
Roof Construction & Associated Secondary Structural Members	1½

Using the most restrictive (primary) occupancy classification (i.e., Health Care and Group I-2), Type II (332) and Type IA construction classification, and considering the Building is protected throughout with an automatic sprinkler system, the Building is limited to the allowable height, stories, and area per story defined in Table 2, *Actual/Allowable Height, Stories, and Area*, in accordance with LSC Table 18.1.6.1 and IBC Chapter 5.

Table 2, *Actual/Maximum Height, Stories, and Area*

Description	Actual	Maximum
Height	114 ft	Unlimited
Stories	6	Unlimited
Area per Story	94;950 ft^2	Unlimited

4.2 PEDESTRIAN BRIDGE

The Hospital will be connected to the existing Cherokee Nation of Oklahoma Health Clinic (CNOHC) through an elevated pedestrian bridge, designed in accordance with IBC §3104. The Hospital and CNOHC are considered separate structures/buildings, in accordance with IBC §3104.2.

IBC §3104.3 requires the pedestrian bridge to be constructed of noncombustible construction. Where the pedestrian bridge connects to the Hospital and CNOHC, the exterior walls of the connected building shall be minimum 2-hour fire-resistance rated fire barriers extending 10

feet in every direction surrounding the perimeter of the pedestrian bridge, in accordance with IBC §3104.5.1, and required for separation of different construction types in accordance with LSC §8.2.1.3(1).

The pedestrian bridge shall be protected with an automatic sprinkler system and fire alarm system supplied from CNOHC, and the exit access travel distance shall not exceed 250 feet.

4.3 INTERIOR SEPARATION

Specific spaces and rooms shall be separated from the remainder of the Building with fire-resistance rated fire barriers, in accordance with Table 3, *Interior Separation for Specific Spaces and Rooms*, on the following page.

Smoke compartments shall be separated with minimum 1-hour fire-resistance rated fire barriers enclosing an area not exceeding 22,500 square feet, in accordance with LSC §18.3.7.1 and IBC §407.5.

The means of separation referenced above is defined below and the fire resistance shall be determined in accordance with ASTM E 119, Standard Test Methods for Fire Tests of Building Construction and Materials, or ANSI/UL 263, Standard for Fire Tests of Building Construction and Materials, in accordance with IBC §703.2.

Fire Barrier

A fire-resistance rated barrier shall be constructed in accordance with LSC §8.3 and IBC §707. The barrier shall be continuous from outside wall to outside wall or from one fire barrier to another, or a combination thereof. The barrier shall maintain continuity from floor to floor/roof deck above, including through concealed spaces. A fire barrier may terminate at the bottom of an interstitial space where the construction assembly forming the bottom of the interstitial space has a fire-resistance rating equal to or greater than the that of the fire barrier.

Smoke Barrier

A smoke resistant barrier shall be constructed in accordance with LSC §8.5 and IBC §709. The barrier shall be continuous from outside wall to outside wall or from one smoke barrier to another, or a combination thereof. The barrier shall maintain continuity from floor to floor/roof deck above, including through concealed spaces. IBC §709.3 requires smoke barriers to have a minimum 1-hour fire-resistance rating.

Smoke Partition

A smoke resistant partition shall be constructed in accordance with LSC §8.4 and IBC §710. The partition shall maintain continuity from floor to floor/roof deck above, including through concealed spaces, or to a ceiling system that forms a continuous membrane where a smoke-tight joint is provided between the partition and the bottom of the ceiling and the space above the ceiling is not used as a plenum.

Table 3, *Interior Separation for Specific Spaces and Rooms*

Room or Space	FR	Separation	Reference
Interior Exit Enclosures	2-hour	FB	LSC §7.1.3.2.1(3) | IBC §1023.2
Vertical Shaft Enclosures	2-hour	FB	LSC §8.6.5(1) | IBC §713.4
Mechanical Rooms Open to Shaft(s)	2-hour	FB	LSC §8.6.5(1) | IBC §713.4
Elevator Lobby	---	SP	IBC §3006.3
Elevator Machine/Control Room	2-hour	FB	IBC §3005.4
Fire Command Center	2-hour	FB	NFPA 72 §24.3.14.4.1 | IBC §911.1.2
Fire Pump Room	2-hour	FB	NFPA 20 §4.14.1.1.1 | IBC §913.2.1
Rooms Housing Fire Alarm Panels	2-hour	FB	NFPA 72 §24.3.14.4.1
Emergency Power Supply Room	2-hour	FB	NFPA 110 §7.2.1.1 | IBC §403.4.8.1
Boiler & Fuel-Fired Heater Room	1-hour	FB	LSC Table 18.3.2.1 | IBC Table 509

Smoke Compartment	1-hour	SB	LSC §18.3.7.1 | IBC §407.5
Health Care Suite	---	SP	LSC §18.2.5.7.1.2 | IBC §407.4.4.2
Medical Gas Supply Room	1-hour	FB	HCFC §5.1.3.3.2 | IBC §427.2
Rooms with Soiled Linen > 64 gallons	1-hour	FB	LSC Table 18.3.2.1 | IBC Table 509
Storage Room > 50 ft² & ≤ 100 ft²	---	SP	LSC Table 18.3.2.1 & §18.3.6.3.11
Storage Room > 100 ft²	1-hour	FB	LSC Table 18.3.2.1 | IBC Table 509
Rooms with Trash > 64 gallons	1-hour	FB	LSC Table 18.3.2.1 | IBC Table 509
Laundry Room > 100 ft²	1-hour	FB	LSC Table 18.3.2.1 | IBC Table 509
Laboratories	1-hour	FB	LSC Table 18.3.2.1 | IBC Table 509
Maintenance Shops	1-hour	FB	LSC Table 18.3.2.1 | IBC Table 509
Corridors	---	SP	LSC §18.3.6.2.3 | IBC §407.3

FB – Fire Barrier | SB – Smoke Barrier | SP – Smoke Partition

Structural elements, or portions thereof, that support exit components and either penetrate a fire-resistance rated assembly or are installed outside of a fire-resistance rated assembly shall be protected with a minimum fire-resistance rating equal to the respective rated assembly, in accordance with LSC §7.1.3.2.1(6). In addition, LSC §8.2.3.3 and IBC §707.5.1 require structural elements supporting a fire barrier to have a minimum fire-resistance rating equal to the fire-resistance rating of the fire barrier supported.

4.4 FIRE-RESISTANT JOINT SYSTEMS

Joints installed in or between fire-resistance rated construction shall be protected by an approved fire-resistant joint system designed to resist the passage of fire for a period not less than the required fire-resistance rating of the associated construction, in accordance with LSC §8.3.6 and IBC §715.

4.5 OPENING PROTECTION

Doors and/or other openings in enclosures and separations require protection in accordance with the following:

2-hour Fire Barrier

Doors shall be self-closing or automatic-closing, upon detection of smoke, positive latching, minimum 90-minute fire-resistance rating, and shall have no louvers, in accordance with LSC §8.3 and IBC §716.2. Ducts and air transfer openings shall be protected with minimum 90-minute fire-resistance rated fire dampers, in accordance with IBC §717.5.2, unless the fire barrier encloses a shaft, then the duct or air transfer opening shall be protected with fire/smoke damper having a Class I or II leakage rating and rated for no less than 250°F, in accordance with IBC §717.5.2. Through penetrations shall be sealed using an approved fire-resistant material and/or assembly in accordance with LSC §8.3.5 and IBC §714.3.1.

1-hour Fire Barrier

Doors shall be self-closing or automatic-closing, upon detection of smoke, positive latching, minimum 45-minute fire-resistance rating, and shall have no louvers, in accordance with LSC §8.3 and IBC §716.2. Ducts and air transfer openings shall be protected with minimum 90-minute fire-resistance rated fire dampers, in accordance with IBC §717.5.2, where fire dampers are required. Through penetrations shall be sealed using an approved fire-resistant material and/or assembly in accordance with LSC §8.3.5 and IBC §714.3.1.

1-hour Smoke Barrier

Doors shall be self-closing or automatic-closing, upon detection of smoke, positive latching, minimum 20-minute fire-resistance rating, and shall have no louvers, in accordance with LSC §8.5.4 and IBC §716.2. In addition, doors shall comply with the smoke and draft control requirements defined in UL 1784 and shall be installed in accordance with NFPA 105. Ducts and air transfer openings shall be protected with smoke dampers having a Class I or II leakage rating and rated for no less than 250°F, in accordance with LSC §8.5.5 and IBC §717.5.5, where smoke dampers are required.

Smoke Partition

Doors shall be self-closing or automatic closing upon detection of smoke, positive latching, and shall have no louvers. In addition, doors shall comply with the smoke and draft control requirements defined in UL 1784 and shall be installed in accordance with NFPA 105, in accordance with LSC §8.4 and IBC §710. All necessary air transfer openings shall be protected with smoke dampers having a Class I or II leakage rating and rated for no less than 250°F.

4.6 INTERIOR FINISH

Interior wall and ceiling finishes shall be classified for fire performance and smoke development, in accordance with ASTM E84 or UL 723, and grouped into the classes defined in Table 4, *Interior Finish Classifications*, in accordance with LSC §10.2.3.4 and IBC §803.1.1.

Table 4, *Interior Finish Classifications*

Class	Flame Spread Index	Smoke-Developed Index
A	0 - 25	0 - 450
B	26 - 75	0 - 450
C	76 - 200	0 - 450

Interior wall and ceiling finishes in the Project spaces are limited to the classifications defined in Table 5, *Component Interior Finish Classifications*, for specific rooms, spaces, and means of egress, in accordance with LSC §18.3.3 and IBC §803.13.

Table 5, *Component Interior Finish Classifications*

Component	Class
All spaces, unless noted otherwise	A
Rooms (occupancy ≤ 4 persons)	B

Interior floor finishes and covering materials shall comply with DOC FF-1 “Pill Test”, in accordance with LSC §A.10.2.7 and IBC §804.4.

Combustible decorative materials shall comply with NFPA 701 Flame Propagation Criteria, in accordance with LSC §10.3.1 and IBC §806.4. Where combustible decorative materials are attached to a wall or ceiling the combustible materials shall not exceed 10 percent of the aggregate wall or ceiling area, in accordance with LSC §10.2.5.1 and IBC §806.3.

Interior trim shall have a minimum flame spread and smoke-developed index equivalent to a Class C interior finish, in accordance with LSC §10.2.5.1 and IBC §806.7.

Cellular or foamed plastics, where applied to a wall or ceiling, shall not exceed 10 percent of the aggregate wall or ceiling area, shall have a minimum 20 lb/ft^3 density, shall have a maximum ½ inch thickness and 4-inch width, and shall comply with the Class A or B interior finish requirements, in accordance with LSC §10.2.4.3.2 and IBC §§ 806.5 and 2604.2.

5 MEANS OF EGRESS

5.1 GENERAL

Means of egress shall be designed and maintained to provide headroom (ceiling) with a minimum height of 90 in. above the walking surface with projections from the ceiling no less than 80 in. above the walking surface, in accordance with LSC §7.1.5.1 and IBC §§ 1003.2 and 1003.3.

Walking surfaces in the means of egress shall be nominally level, having a slope no greater than 1 in 20, and shall have a slip-resistant surface, in accordance with LSC §7.1.6 and IBC §1003.4. Where the walking surface has a change in elevation less than 12 inches the surface shall be sloped, and where the slope exceeds 1 in 20, a ramp shall be used, in accordance with IBC §1003.5. In addition, if the change in elevation is greater than 12 inches a ramp or stair shall be used, in accordance with LSC §7.1.7 and IBC §1003.5. Guards shall

be installed along open sides of means of egress that exceed 30 inches above the floor or ground below, in accordance with LSC §7.1.8 and IBC §1015.2.

In accordance with LSC §9.4.1 and IBC §1003.7, elevators, escalators, and moving walks shall not be used as component of an accessible means of egress.

5.2 EGRESS CAPACITY

Means of egress components shall be sized using egress capacity factors defined in Table 6, *Egress Capacity Factors*, to accommodate the occupant load for the building, floor, room, or space served, in accordance with LSC Table 7.3.3.1 and IBC §1005.3.

Table 6, *Egress Capacity Factors*

Component	Factor (in/occupant)
Stairways	0.3
Other egress components	0.2

Egress capacity for stairways with clear widths exceeding 44 inches are permitted to be calculated using the following equation, in accordance with LSC §7.3.3.2.

$$C = 146.7 + {}^{(Wn - 44)}/_{0.218}$$

Where:

C = capacity, in persons

Wn = nominal width of stair

5.3 OCCUPANT LOAD

The occupant loads for the rooms and spaces are determined using the occupant load factors defined in Table 7, *Occupant Load Factors*, on the following page, in accordance with LSC Table 7.3.1.2 and IBC Table 1004.1.2.

Table 7, *Occupant Load Factors*

Occupancy or Use	Factor (ft^2/occupant)
Assembly – unconcentrated	15 net
Business areas (including circulation)	150 gross
Inpatient areas	240 gross
Outpatient areas	100 gross
Sleeping Areas	120 gross
Exercise Rooms, with equipment	50 gross
Exercise Rooms, without equipment	15 gross
Kitchens	100 gross
Locker Rooms	50 gross
Accessory storage and mechanical areas	300 gross

5.4 NUMBER OF EXITS & EXIT SEPARATION

Means of egress serving a story shall have a minimum number of exits or access to exits dependent on the occupant load served, in accordance with LSC §7.4.1 and IBC §1006.3.1 as shown in Table 8, *Minimum Number of Exits or Access to Exits*.

Table 8, *Minimum Number of Exits or Access to Exits*

Occupant Load (per Story)	**Minimum No. of Exits** (per Story)
1 - 500	2
501 - 1,000	3
> 1,000	4

A minimum of two means of egress shall be accessible from every room or space where either the minimum required occupant load or common path of travel is exceeded, dependent on the occupancy or use, in accordance with LSC §18.2.5 and IBC Table 1006.2.1 as shown in Table 9, *Spaces or Rooms Permitted to have One Exit or Exit Access Doorway*.

Table 9, *Spaces or Rooms Permitted to have One Exit or Exit Access Doorway*

Occupancy or Use	**Max. Occupant Load**	**Max. Common Path of Travel**
Health Care | Group I-2	10	75 ft

Where more than one exit, exit access, or exit discharge is required, they shall be arranged and separated to minimize the possibility of having more than one blocked by one fire or another emergency condition. Therefore, according to LSC §7.5.1.3.3 and IBC §1007.1.1 Exception 2, the exits, exit accesses, or exit discharges shall be separated a minimum distance, equal to one-third the overall maximum diagonal dimension of the building or space, measured in a straight line to the nearest edge of each means of egress component.

Every habitable room shall have direct access to an exit access corridor, in accordance with LSC §18.2.5.6.1 and IBC §407.4.1.

5.5 TRAVEL DISTANCES

Means of egress shall be arranged to provide exit access travel distances no greater than the distances defined in Table 10, *Maximum Exit Access Travel Distances*, in accordance with LSC §18.2.6.2 and IBC Table 1017.2 regarding maximum travel distances, LSC §18.2.5.2 and IBC §1020.4 regarding dead-end corridors, and LSC §18.2.5.3 and IBC §1006.2.1 regarding common paths of travel.

Table 10, *Maximum Exit Access Travel Distances*

Occupancy or Use	**Travel Distance**	**Dead-End Corridor**	**Common Path**
Health Care | Group I-2	200 ft	20 ft	75 ft
Pedestrian Bridge	250 ft	NA	NA

5.6 DOORS

Doors shall have a width no less than 32 inches or no less than the minimum egress width required to accommodate the occupant load served, and calculated using the applicable egress capacity factor, whichever is greater, in accordance with LSC §7.2.1.2.3 and IBC §1010.1.1. The maximum width of a swinging door leaf shall not exceed 48 inches (IBC §1010.1.1), and the minimum door height shall be no less than 80 in. above the walking surface, in accordance with LSC §7.1.5.1 and IBC §1010.1.1.

Egress doors shall be pivoted or side-hinged swinging type and shall swing in the direction of egress travel where serving an exit enclosure or an occupant load exceeding 49 occupants, in accordance with LSC §7.2.1.4 and IBC §1010.1.2.1.

Stairway doors, other than the exit discharge doors, are permitted to be locked from the stairway side, in accordance with IBC §403.5.3, in high-rise buildings. Stairway doors that are locked shall be capable of being unlocked simultaneously without unlatching upon a signal from the fire command center.

Electrically locked and controlled egress doors are permitted where the clinical needs of persons receiving care require specialized protective measures for their safety, provided the doors comply with the following in accordance with LSC §18.2.2.2.5.2 and IBC §1010.1.9.6:

- The building is protected throughout with an automatic sprinkler system
- The locked space is protected throughout with a complete smoke detection system or the locks can be unlocked from an approved, constantly attended location within the locked space
- The doors unlock upon activation of the automatic sprinkler system or automatic fire detection system
- Staff can readily unlock doors at all times
- Locks release upon loss of power

5.7 CORRIDORS

Exit access corridors shall be no less than 8 feet in clear and unobstructed width, except for corridors in adjunct areas not intended for housing, treatment, and inpatient use are permitted to have a clear and unobstructed width no less than 44 inches, in accordance with LSC §18.2.3.4 and IBC §1020.3.

5.8 STAIRS

Stairs shall conform to the dimensional requirements defined in Table 11, *Stair Required Dimensions*, on the following page, in accordance with LSC §7.2.2 and IBC §1011.

Table 11, *Stair Required Dimensions*

Description	Dimensions
Minimum Width (Occupant Load < 2,000)	44 in
Minimum Width (Occupant Load ≥ 2,000)	56 in
Minimum Headroom	80 in
Maximum Height Between Landings	12 ft
Minimum Tread Depth	11 in
Riser Height (min. to max.)	4 in to 7 in

5.9 RAMPS

Ramps shall conform to the dimensional requirements defined in Table 12, *Ramp Required Dimensions,* in accordance with LSC §7.2.5.3 and IBC §1012.

Table 12, *Ramp Required Dimensions*

Description	Dimensions
Minimum Width (Occupant Load < 50)	36 in
Minimum Width (Occupant Load ≥ 50)	44 in
Minimum Headroom	80 in
Maximum Slope	1 in 12
Maximum Cross Slope	1 in 48
Maximum Single Run Rise	30 in

5.10 HANDRAILS

LSC §7.2.2.4. and IBC §1014 require stairs, ramps, and stepped/ramped aisles to have handrails limited to a minimum height of 34 inches and a maximum height of 38 inches. The handrail shall be continuous without obstruction for the full length, and shall terminate to a wall, guard, or walking surface. Where not continuous between flights, the handrail shall extend a minimum 12 inches horizontally beyond the top riser and shall continue to slope for the depth of one tread beyond the bottom riser.

The graspable portion of the handrail shall have a minimum diameter of 1¼ inch, a maximum diameter of 2 inches, shall have a minimum clearance of 2½ inches from a wall or guard, and shall not project into the required egress width more than 4½ inches.

Where the distance to a handrail exceeds 30 inches, an intermediate handrail shall be provided.

5.11 GUARDS

LSC §7.2.2.4.5 and IBC §1015 require guards along open-sided walking surfaces, including mezzanines and equipment platforms, stairs, ramps, and landings that are located more than 30 inches to the floor or grade below.

Guards shall not be less than 42 inches in height measured from the walking surface, a line connecting the leading edges of stair tread nosings, or the ramp surface served, in accordance with LSC §7.2.2.4.5.2 and IBC §1015.3.

Openings in guards shall prevent the passage of a 4-inch sphere from the walking surface up to the guard height, and from 36 inches in height to 42 inches, guards shall resist the passage of a 4-3/8-inch sphere, and the triangular openings formed between stair tread and risers and the guard shall resist the passage of a 6-inch sphere.

5.12 LIGHTING

The means of egress shall be equipped with artificial lighting facilities to provide a continuous light intensity at the floor of 10 ft-candle, for stairs, and 1 ft-candle, for all other components, during conditions that require the exits be available (LSC §§ 7.8.1.3(1) and 7.8.1.3(2)). Additionally, in assembly occupancies, the illumination of the walking surfaces of exit access shall be at least 0.2 ft-candle during periods of performance or projections involving directed light (LSC §7.8.1.3(3)). A minimum of 0.2 ft-candle intensity shall be maintained for all floor surfaces if a single light were to fail (LSC §7.8.1.4).

In the event of power supply failure, the emergency electrical system shall automatically illuminate all the following areas, in accordance with LSC §7.9 and IBC §1008.3.

- Corridors, stairs, ramps, aisles, and exit passageways
- Exit discharge vestibules and landings
- Access-controlled egress doors
- Doors equipped with delayed-egress locks

- Electrical equipment rooms
- Public restrooms with an area greater than 300 ft^2

The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment, or an on-site generator, in accordance with LSC §7.9.2.1 and IBC §1008.3.4.

Emergency lighting facilities shall be arranged to provide initial illumination that is at least an average of 1 ft-candle (11 lux) and a minimum 0.1 ft-candle (1 lux) measured at floor level along the path of egress. Illumination levels shall be permitted to decline to 0.6 ft-candle (6 lux) average and a minimum 0.06 ft-candle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded, in accordance with LSC §7.9.2.1 and IBC §1008.3.5.

Locations where deep sedation and general anesthesia is administered shall be provided with one or more battery-powered lighting units capable of providing lighting within the space required to terminate the intended procedures, in accordance with HCFC §6.3.2.2.11. The battery power shall be capable of sustaining the required lighting for no less than 90 minutes.

5.13 EXIT SIGNS

All rooms and spaces requiring more than one exit or exit access, the means of egress shall be indicated with approved exit signs reading “EXIT”. Access to exits shall be marked by readily visible exit signs in cases where the exit or the path of egress travel is not immediately visible to the occupants. Exit sign placement shall be such that no point along the path of egress is more than 100 feet from the nearest visible exit sign, in accordance with LSC §7.10 and IBC §1013.

Exit signs shall be illuminated by a source providing not less than 5 ft-candles at the illuminated surface, in accordance with LSC §7.10.6.3 and IBC §1013.6.2. Exit signs shall be connected to emergency power or local batteries to assure continued illumination for at least 90 minutes in conditions of primary power loss, according to LSC §7.10.4 and IBC §1013.6.3.

5.14 LUMINOUS EGRESS PATH MARKING

Approved luminous egress path markings delineating the exit path shall be provided in new high-rise building exit enclosures, in accordance with IBC §1025.1, including the following locations:

- Steps
- Landings
- Handrails
- Perimeter demarcation lines
- Obstacles
- Door hardware and frame, including a low-location emergency exit symbol

5.15 EXIT DISCHARGE

Exits shall discharge directly to the exterior of the building, at grade or shall provide direct access to grade, and shall not re-enter the building. The exit discharge shall provide a direct and unobstructed access to a public way, in accordance with LSC §7.7.1 and IBC §1028.1.

According to LSC §7.7.2 and IBC §1028.1 Exception 1, a maximum of 50 percent of the number and required capacity of interior exit stairways and ramps is permitted to discharge into the interior of the building on the level of exit discharge provided all the following are met:

- A free and unobstructed path of travel to an exterior exit door is readily visible and identifiable from the point of termination of the enclosure
- The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the enclosure
- The egress path from the point of termination of the enclosure on the level of exit discharge is protected throughout by an automatic sprinkler system

5.16 HEALTH CARE SUITES

Health care suites are defined in LSC §3.3.272 in accordance with the following:

- Non-Patient Care Suite: A suite within a health care occupancy not intended for sleeping or treating patients
- Patient Care Suite: A series of rooms or spaces or a subdivided room separated from the remainder of the building by wall and doors designed to prevent the passage of smoke
- Patient Care Non-Sleeping Suite: A patient care suite for treating patients with or without patient beds not intended for overnight sleeping
- Patient Care Sleeping Suite: A patient care suite containing one or more patient beds intended for overnight sleeping

5.16.1 Non-Patient Care Suite

Non-patient care suites shall comply with the means of egress requirements for the primary use and occupancy of the space, in accordance with LSC §18.2.5.7.4.

5.16.2 Patient Care Non-Sleeping Suite

Patient care non-sleeping suites, henceforth referred to as “suite” throughout this section, shall be in accordance with LSC §18.2.5.7.3 and IBC §407.4.4. Suites with an area exceeding 2,500 square feet shall have two means of exit access, and at least one of the means of exit access directly to a corridor and the other means of egress is permitted through an adjacent suite.

Suites are limited to a maximum area of 10,000 square feet, except where the suite is protected with total coverage automatic smoke detection, the suite is permitted to have a maximum area of 15,000 square feet.

The travel distance from any point within the suite to an exit access door shall not exceed 100 feet, and the travel distance from any point with the suite to an exit shall not exceed 200 feet.

5.16.3 Patient Care Sleeping Suite

Patient care sleeping suites, henceforth referred to as “suite” throughout this section, shall be in accordance with LSC §18.2.5.7.2 and IBC §407.4.4. Suites with an area exceeding 1,000 square feet shall have two means of exit access, and at least one of the means of exit access directly to a corridor and the other means of egress is permitted through an adjacent suite.

Suites are limited to a maximum area of 7,500 square feet, except where the suite is protected with total coverage automatic smoke detection, the suite is permitted to have a maximum area of 10,000 square feet.

The travel distance from any point within the suite to an exit access door shall not exceed 100 feet, and the travel distance from any point within the suite to an exit shall not exceed 200 feet.

6 FIRE & LIFE SAFETY SYSTEMS

6.1 FIRE COMMAND CENTER

A fire command center is required in high-rise buildings located in an approved and accessible location on the level of fire department vehicle access, in accordance with IBC §911. The fire command center shall be a minimum 200 square feet with a minimum interior dimension of 10 feet and separated from the remainder of the building with minimum 2-hour fire-resistance rated fire barriers. The fire command center shall contain all of the following:

- Fire alarm control unit with live-voice control
- Fire department communication system
- Elevator annunciator panel indicating the location of all elevators and whether they are operational
- Elevator fire recall switch for all elevators in accordance with ASME A17.1/BSA 44
- Elevator emergency or standby power selector switches
- Status indicators and controls for air distribution (i.e., building automation system control desktop)
- Fire fighter's smoke control panel (i.e., stair pressurization system manual override panel)
- Means to simultaneously unlock all interior exit stairway doors
- Emergency and standby power status indicators (i.e., generator and transfer switch annunciators)
- Generator supervision devices with manual start and transfer features
- Telephone with controlled access to the public telephone system for fire department use
- As-built life safety, fire alarm system, and fire protection system plans
- An approved Building Information Card
- Worktable

6.2 FIRE ALARM SYSTEM

LSC §18.3.4.2 and IBC §907.2.6 requires a Health Care (Group I-2) building to be protected throughout with a manual and automatic fire alarm system that is designed and installed in accordance with NFPA 72. In addition, the fire alarm system shall be an emergency voice/alarm communication (EVAC) system, in accordance with LSC §11.8.4.1 and IBC §907.2.13, for high-rise buildings.

According HCFC §15.7.4.3.1, the fire alarm system shall be zoned by smoke compartment to initiate a defend-in-place response to emergency conditions.

6.2.1 Initiation

The fire alarm system shall supervise initiating devices for signals, including alarm signals, supervisory signals, and trouble signals. Each signal shall be distinctively and descriptively annunciated and transmitted in accordance with NFPA 72 Chapter 10 for the specific type of signal.

Alarm

Fire alarm priority signals shall be automatically received and transmitted within 10 seconds after activation of an alarm initiating device in accordance with NFPA 72 Chapter 10. Initiation of an alarm signal activates the occupant notification signals, annunciates at the fire alarm control unit and peripheral annunciators, activates emergency control functions, and notifies the emergency responders.

Manual Fire Alarm Boxes

LSC §9.6.2.3 and IBC §907.4.2 require manual fire alarm boxes (pull stations) to be located within 5 feet of the entrance to every exit, and the manual pull stations shall be located so the travel distance to the nearest pull station is no greater than 200 feet. Manual pull stations shall be red in color, double-action, accessible, unobstructed, and visible. Provide dedicated clean agent fire extinguishing system releasing manual pull stations located all exits to the Information Technology (IT) related room,s along with an abort station located adjacent to the releasing manual pull station.

Manual pull station operable component shall be located no less than 42 inches and no more than 48 inches above finish floor, in accordance with NFPA 72 §17.14.5.

Smoke Detection

Smoke detectors shall be located above each notification appliance power supply, digital alarm communicator transmitter (DACT), workstation, and fire alarm control unit (FACU) in accordance with LSC §9.6.1.8.1 and IBC §907.4.1.

Automatic-closing doors (i.e., doors on magnetic hold-opens) shall have smoke detectors installed within 5 feet of the opening on both sides of the opening where the top of the opening is greater than 24 inches below the ceiling and only on one side of the opening where the top of the opening is equal to or less than 24 inches, in accordance with NPFA 72 §17.7.5.6, to automatically close the associated door(s) upon detection of smoke. Where smoke detectors are provided throughout the corridor, smoke detectors are not required within 5 feet of an automatic-closing door on the side with corridor smoke detection.

Areas open to the corridor and not within direct line-of-sight from a nurses' station, intended for 24-hour attendance, shall be protected with smoke detectors, in accordance with LSC §18.3.6.1, HCFC §15.7.3, and IBC §407.2.1.

Sleeping rooms not used for patients, such as on-call and patient family sleeping rooms, shall be protected with smoke alarms connected to the building fire alarm system, in accordance with LSC §906.2.10 and IBC §907.2.11.

Smoke detectors shall be located at each elevator landing within 21 feet of all elevator openings, at the top of each hoistway, and in the elevator equipment rooms to initiate elevator recall operations, in accordance with NFPA 72 §§ 21.3.5, 21.3.7, and 21.3.12.

Smoke detectors shall be installed within 5 feet of pressurized stair doors to activate the associated stair pressurization system, in accordance with IBC §909.20.7. Where smoke detectors are provided throughout the corridor, smoke detectors are not required within 5 feet of a pressurized stair door.

A minimum of two (2) smoke detectors shall be installed in IT related rooms, programmed for cross-zoned activation of the clean agent fire extinguishing system and the pre-action automatic sprinkler system releasing solenoid.

Spot-type smoke detectors shall be installed in accordance with NFPA 72 §17.7.3.2. Where smoke detectors are installed below smooth ceilings the detector shall be located within 12 inches down from the ceiling and the detectors shall maintain a nominal spacing of 30 feet. Smoke detector spacing shall be reduced in spaces with high air movement and with obstructed (solid beam) construction.

Heat Detection

Heat detectors shall be provided in elevator hoistways and in elevator equipment rooms, within 24 inches of required sprinklers, to shunt the associated elevators' power prior to the activation of a sprinkler, in accordance with NFPA 72 §21.4.

Fire Protection Systems

Sprinkler water flow devices shall be supervised by the fire alarm system to detect the flow of water through an automatic sprinkler system equivalent to or greater than the flow from a single sprinkler, in accordance with LSC §907.2.2 and IBC §903.4. Initiation of a water flow device shall occur within 90 seconds of water flow, in accordance with NFPA 72 §17.12.

Activation of a fire suppression system, such as a kitchen hood fire suppression system, clean agent fire extinguishing system, or pre-action automatic sprinkler system, shall initiate an alarm condition in accordance with NFPA 72 §23.8.5.7.

Supervisory

Supervisory signals shall be automatically received and transmitted within 90 seconds after a supervisory initiating component changes state, in accordance with NFPA 72 §10.14. Initiation of a supervisory signal activates emergency control functions, annunciates at the fire alarm control unit and peripheral annunciators, and transmits to a supervising station.

Fire Protection Systems

Fire protection system valve, pressure, and releasing solenoid supervisory devices shall be supervised for off-normal conditions in accordance with LSC §907.2.1 and IBC §903.4.

Fire pump controllers shall be supervised for pump running, loss of power, and phase reversal in accordance with NFPA 20 §10.4.7.

Elevators

Elevator control circuits used to shut down elevator power shall be supervised for loss of operating voltage in accordance with NFPA 72 §21.4.4.

Smoke Control Systems

Activation of a smoke control system (e.g., smokeproof enclosure stair pressurization system) shall activate a supervisory signal on the fire alarm system.

HVAC

Smoke detectors shall be installed in heating, ventilation, and air-conditioning (HVAC) systems to initiate the shutdown of fans, with a capacity exceeding 2,000 cfm, and the closure of smoke and fire/smoke dampers upon detection of smoke, in accordance with NFPA 72 §21.7, NFPA 90A §6.4, and IBC §907.3.1.

Smoke detectors shall be located downstream of filters and before all branch connections in supply air ducts and upstream of filters and after all branch connections in return air ducts, in accordance with NFPA 90A §6.4.2 and IMC §606.2. Smoke detectors associated with smoke and fire/smoke dampers shall be located within 5 feet of the respective damper.

Duct smoke detectors located above the ceiling or associated with a damper shall be provided with a remote test key switch with LED indicating lamps. The remote test key switch shall be located on the wall near as possible to the associated detector and 12 inches below the ceiling. The cover plate shall be flush to the wall.

Emergency Power

Emergency generator controllers shall be supervised for generator running, generator fault, and generator switch in the nonautomatic position, in accordance with LSC §9.1.3.2 by either the FACU or at a constantly attended location.

Trouble

Trouble signals shall be automatically received and transmitted within 200 seconds after receipt of a fault condition, in accordance with NFPA 72 §§ 10.15 and 23.8.5. Initiation of a trouble signal annunciates at the fire alarm control unit and peripheral annunciators and transmits to a supervising station.

Fire alarm system circuits and peripheral devices are supervised for fault conditions, such as ground faults, short circuits, open circuits, loss of power, data transmission failure, and component failure.

A fault condition on a smoke control system shall initiate a trouble signal on the fire alarm system.

6.2.2 Interface

The fire alarm system shall interface with fire protection systems, HVAC systems, smoke control systems, and other building systems to activate emergency control functions. NFPA 72 §21.2.4 requires the fire alarm output component initiating the control of emergency control functions to be located within 3 feet of the controlled circuit or appliance.

Doors

LSC §7.2.1.6 and IBC §1010.2.14 require electronically locked egress doors, including delayed-egress locking systems, to unlock upon actuation of the automatic sprinkler system or automatic detection system (i.e., smoke detectors). Automatic-closing fire doors in rated assemblies shall close upon actuation of the automatic sprinkler system or automatic detection system, in accordance with LSC §7.2.1.8.2 and IBC §716.2.6.6. In addition, IBC §407.6.1 requires all automatic-closing doors within the same smoke compartment to close simultaneously. All interior stairway doors shall simultaneously unlock, without unlatching, by manual means located in the fire command center to permit firefighter reentry access, in accordance with LSC §7.2.1.5.8.1 and IBC §1010.2.7.

Smoke Control Systems

Activation of an automatic sprinkler system water flow switch or a smoke detector located within 5 feet of a pressurized stair door shall activate the associated smokeproof enclosure stair pressurization system, in accordance with IBC §909.20.7.

HVAC

Smoke detectors shall be installed in heating, ventilation, and air-conditioning (HVAC) systems to initiate the shutdown of fans, with a capacity exceeding 2,000 cfm, and the closure of smoke and fire/smoke dampers upon detection of smoke, in accordance with NFPA 72 §21.7, NFPA 90A §6.4, and IBC §907.3.1.

Elevators

Detection of smoke at elevator landings, in the hoistway, and elevator equipment rooms shall initiate the emergency recall operations, in accordance with NFPA 72 §21.3.14. Heat detectors located in elevator hoistways and equipment rooms shall shutdown the associated elevator(s) power, in accordance with NFPA 72 §21.4.

Public Address System

Activation of the fire alarm system notification appliances shall take priority (override) the Hospital's public address system.

6.2.3 Notification

Occupant notification shall be provided throughout the Building in accordance with the LSC, HCFC, IBC, and the Facility's emergency response plan. Notification signaling zones shall coincide with the Building's smoke compartment boundaries or as specified in the Facility's emergency response plan, in accordance with HCFC §15.7.4.3.1.

Audible

An EVAC system is required to distribute emergency response messages throughout the Building preceded by a minimum of two (2) cycles of the emergency signal, in accordance with NFPA 72 §24.4.1.3. The emergency signal is permitted to be a three-pulse temporal pattern, or a chime sounded at "on" intervals lasting 1 second, with 2-seconds "off" interval after each third "on" stroke, in accordance with NFPA 72 §18.4.2. A chime tone is recommended in patient care units.

The audible emergency signal shall have a minimum sound level of 15 dBA above the average ambient sound level or 5 dBA above the maximum sound level, whichever is greater, in accordance with NFPA 72 §18.4.3. The minimum sound levels shall be provided in all areas of the Building. Where the ambient sound level exceeds 105 dBA, visible notification appliances shall be used in lieu of audible notification appliances. The combined ambient and alarm signal sound level shall not exceed 110 dBA.

There is an exception in IBC §907.2.13 and NFPA 72 §24.4.2.8 that allows a manual voice message in lieu of automatic voice notification for Health Care occupancies where relocation is used instead of evacuation. The emergency pre-recorded and live voice messages are not required to comply with the audibility requirements, in accordance with NFPA 72 §18.4.1.5. However, the voice messages shall be intelligible where required within the acoustically distinguishable spaces (ADS). Designation of the ADS shall align with the Facilities emergency response plan. Unless required by the AHJs or the Facility's emergency response plan, intelligibility is not required in the following locations:

- Private restrooms and bathrooms
- Mechanical, electrical, and elevator equipment rooms
- Elevator cars
- Individual offices
- Kitchens
- Storage rooms
- Closets
- Rooms and areas where intelligibility cannot be reasonably predicted

Sleeping rooms (nonpatient care) shall have a pre-alert tone, prior to the voice message, with a low frequency component, 520 Hz square wave range, in accordance with NFPA 72 §24.4.2.4.2.

Audible notification is not required in critical care areas, in accordance with HCFC §15.7.4.3.5.

Audible notification appliances shall be spaced to provide the minimum required audibility and intelligibility. NFPA 72 §18.4.8 permits audible notification appliances to be located on the ceiling or on walls no greater than 90 inches above the finished floor, measured to

the top of the appliance. Where combination visible and audible notification appliances are installed on walls, the appliance height is permitted to comply with the requirements for wall mounted visible notification appliances.

Visible

Visible notification appliances are required in public and common use areas within the Building, except where the Facility's emergency response plan defines otherwise. For instance, HCFC §15.7.4.3.7 permits visible notification appliances to be omitted from exam rooms, special procedure rooms, dressing rooms, and nonpublic toilet rooms where staff is required to respond in accordance with the Facility's emergency response plan. In addition, visible notification appliances are not required in surgical operating rooms, patient sleeping rooms, or psychiatric care areas where the visible signal would interfere with patient treatment, in accordance with HCFC §15.7.4.3.6. Single person office spaces do not require visible notification. However, offices spaces intended for two or more people shall have visible notification coverage.

Visible notification appliances shall be located within rooms in accordance with NPFA 72 §18.5.5.4 to provide compliant coverage, dependent on the appliance's effective light intensity (i.e., candela setting). Visible notification appliances in corridors with widths not exceeding 20 feet are permitted to be spaced 100 feet on center where a visible appliance is located within 15 feet from each end of the corridors.

Sleeping areas (nonpatient care) shall have visible notification appliances located within 16 feet of the pillow in accordance with NFPA 72 §18.5.5.7.3. The visible notification appliance intensity shall be set to 110-candela where the lens is located no less than 24 inches below the ceiling or 177-candela where the lens is less than 24 inches below the ceiling, in accordance with NFPA 72 §18.5.5.7.2.

NFPA 72 §18.5.5 permits visible notification appliances to be installed on ceilings or on a wall with the entire lens no less than 80 inches and no more than 96 inches above the finished floor.

6.2.4 Wiring

LSC §9.6.1 and IBC §907.6.1 require fire alarm system wiring to be installed in accordance with the NEC and NFPA 72. The signaling line circuits (SLC), initiating device circuits (IDC), and notification appliance circuits (NAC) shall be either Class A, Class B, or Class X pathways in accordance with NFPA 72 §12.3. SLCs in Health Care facilities are recommended to be minimum Class A pathways. A Class A pathway is a redundant pathway with operational capability that continues past a single open. Therefore, the fire alarm system has the capability to continue operation for occupants defending-in-place in a scenario where fire has impaired the SLC in an adjacent smoke compartment.

The circuits responsible for employing defend-in-place or relocation notification shall have Level 3 pathway survivability, in accordance with NFPA 72 §24.3.6.4. Therefore, the circuits shall be protected with a minimum 2-hour fire-resistance rating (e.g., 2-hour fire-rated circuit integrity (CI) cable or a 2-hour fire-rated enclosure) in accordance with NFPA 72 §12.4.4.

The fire alarm system wiring installation shall comply with the following NEC Article 760 requirements:

- Install in a neat workmanlike manner. [NEC Article 760.24]
- Cables shall not be supported or attached to the exterior of any raceways. [NEC Article 760.143]
- Where cables emerge from conduit or boxes used for mechanical support or protection, a bushing shall be installed to prevent damage to the wiring insulation. [NEC Article 760.3(K)]
- All splices or terminations shall be made in a listed fitting, box, enclosure, or fire alarm device. All cabling shall be adequately supported by the building structure and in a protective manner. [NEC Article 760.130(B)(1)]
- Cables shall be installed in raceways where passing through a floor or wall to a height of 7 ft. above the finished floor. [NEC Article 760.130(B)(2)]
- Accessible portions of abandoned fire alarm cable shall be removed. [NEC Article 760.25]

6.3 WATER-BASED FIRE PROTECTION SYSTEMS

LSC §18.3.5 and IBC §903.2.6 require buildings with Health Care (Group I-2) occupancies to be protected throughout with an automatic sprinkler system in accordance with NFPA 13. In addition, LSC §11.8.3.1 and IBC §403.4.3 requires an automatic wet Class I standpipe

system to be installed in high-rise buildings that are protected throughout with an automatic sprinkler system. LSC §9.7.4.2 and IBC §905.2 require standpipe systems to be designed and installed in accordance with NFPA 14.

The Seismic Design Category is Category B, and therefore, seismic protection of the fire protection systems is not required.

6.3.1 Water Supply

Automatic water-based fire protection systems shall have a minimum of one reliable automatic water supply that can adequately and dependably supply the greatest system demand and/or 150 percent of the rated capacity of a fire pump (where required), in accordance with NFPA 13 §27.1, NFPA 14 §9.1, and NFPA 20 §4.6. Where fire protection systems are supplied from a municipal water supply (i.e., potable water source), the potable water source shall be protected against backflow, in accordance with IBC §903.3.5.

Fire Flow

The required fire flow for the Hospital in accordance with IFC Appendix B is calculated in accordance with the following:

- Construction Classification: Type IA
- Sprinkler Protection: Throughout in accordance with IBC §903.3.1.1
- Area of Three (3) Largest Consecutive Stories: 244,000 square feet

Required Fire Flow is 1,313 gpm at 20 psi for a minimum duration of four (4) hours resulting in a required water storage capacity of 316,000 gallons.

Fire Hydrants

Fire hydrants shall be located along fire apparatus roads surrounding the Hospital so that the travel distance from a hydrant to all portions of the perimeter exterior wall of the Hospital is within 600 feet, in accordance with IFC §507.5.1. The Hospital will be a high-rise with an automatic Class I standpipe requiring a minimum of two (2) remotely located fire department connections, and IFC §507.5.1.1 requires a fire hydrant to be located not more than 100 feet from a fire department connection serving a standpipe system.

Fire Pump

Where the automatic water supply (i.e., municipal water supply) is unable to adequately supply the greatest system demand, a fire pump must be installed to supplement the municipal water supply, increasing the flow and pressure as necessary to satisfy the greatest system demand. IBC §913.1, NFPA 13 §4.6.2, and NFPA 14 §9.1.5 require fire pumps to be installed in accordance with NFPA 20. In most cases, where an automatic standpipe system is installed, the standpipe demand will determine the size of the fire pump. NFPA 20 §4.8 requires the fire pump to be sized so that the single greatest system demand does not exceed 150 percent of the pumps rated capacity. For instance, if the standpipe demand, in accordance with NFPA 14, is 1,000 gpm, then a pump with a rated capacity of 750 gpm, with 1,125 gpm available at 150 percent of the rated capacity, would be an acceptable pump for the standpipe system. However, it is advisable to select a pump for an automatic standpipe system that has a rated capacity equal to the standpipes total flow demand (e.g., 1,000 gpm rated pump for a 1,000 gpm standpipe flow demand).

The fire pump suction and discharge piping require components installed in a specific configuration, in accordance with applicable sections of NFPA 20 Chapter 4, to assure the pump operates and performs in an acceptable manner. Included in the requirements defined in NFPA 20 §4.14 is the requirement for a bypass that enables the municipal water supply to bypass the pump in conditions where the pump is out of operation. Also, a flow test header is required on the discharge side of the fire pump to test the pump at its rated conditions, as well as the suction supply at the maximum flow conditions, in accordance with NFPA 20 §4.20.

Where the pump discharge pressure exceeds the pressure limitations of the components downstream of the pump, a means for reducing the pressure shall be provided to comply with NFPA 20 §4.7.7. However, pressure relief valves and pressure regulating devices are not acceptable means of reducing the pressure according to NFPA 20 §4.7.7.2. Fire pumps shall be sized to prevent the need to reduce the pressure. Nevertheless, there are cases that require the discharge pressure to be reduced. In such cases, pressure reducing valves installed in accordance with the applicable standard(s), NFPA 13 and/or NFPA 14, and variable speed pressure limiting controls are acceptable means of controlling the discharge pressure.

Electric-driven fire pumps installed in high-rise buildings shall be connected to the emergency power system, in accordance with LSC §11.8.5 and NFPA 20 §5.5. The electrical equipment and installation methods shall comply with NFPA 20 Chapter 9 and NEC Article 695. The fire pumps normal power electrical connection shall be a dedicated connection to a reliable source complying with NFPA 20 §9.2.2. No more than one disconnecting means and associated overcurrent protection device shall be installed in the fire pump power supply, and the disconnecting means shall be located remote from other disconnecting means, locked in the closed position, and clearly labeled "Fire Pump Disconnecting Means" with a minimum 1 inch high lettering that is visible without opening enclosure doors or covers. Where connected to an on-site standby generator the standby generator system shall comply with NFPA 20 §9.4 and meet the requirements of Level 1 Type 10 Class X systems of NFPA 110, Standard for Emergency and Standby Power Systems, 2010 edition. Service conductors shall be routed outside of the building in accordance with NEC §230.6, and where routed inside a building the conductors shall be in a raceway encased in concrete or brick not less than 2 inches thick. NEC §695.6(A)(2) requires fire pump supply conductors on the load side of a disconnect to be entirely independent of all other wiring, supply only loads directly associated with the fire pump system, and where inside of a building, the conductors shall be protected with a minimum 2-hour fire rating.

Fire Department Connection

Water-based fire protection systems, including standpipe systems and automatic sprinkler systems, shall be provided with fire department connections as required in the applicable sections of the IBC, NFPA 14, and NFPA 13.

A minimum of one (1) Fire Department Connection (FDC) shall be connected on the system side of the system supply control valve, check valve, or any pump and on the supply side of any system isolating valves, in accordance with NFPA 13 §16.12.5 and NFPA 14 §6.4.3. High-rise buildings shall have a minimum of two (2) remotely located FDCs, in accordance with NFPA 14 §7.12.2. The two remote FDCs shall be accessible from fire department vehicle access roads on opposite sides of the Building. NFPA 14 §6.4.5.4 requires the FDC(s) to be located within 100 feet from the nearest fire hydrant. Where serving a standpipe system, the FDC shall have a minimum of one (1) 2½ inch hose connection (inlet) for every 250 gpm of the standpipe system demand, in accordance with NFPA 14 §7.12.3. For example, if the standpipe system demand is 1,000 gpm the FDC shall have a minimum of four (4) inlets. Where approved by the AHJ, a large diameter hose connection capable of accommodating the required flow is permitted, such as a 5-inch or 6-inch Storz connection.

NFPA 13 §16.12.6 and NFPA 14 §6.4 prohibits the installation of a control (shutoff) valve in the FDC piping and require a listed check valve be installed in each FDC piping, located as near as practicable to where the FDC piping joins the system. The piping on the supply side of the FDC check valve shall be provided with a listed automatic drip valve arranged to allow drainage of the FDC piping to prevent damage in freezing conditions. The automatic drain valve must be piped to the exterior of the building or to an approved drain. The FDC piping shall have a minimum 4-inch diameter, and the FDC shall be placed no less than 18 inches and no greater than 48 inches above the level of the adjoining ground.

6.3.2 Standpipe

The automatic wet Class I standpipe system shall comply with NFPA 14, in accordance with the following.

Components

Standpipe system components shall comply with NFPA 14 Chapter 4. All devices and materials used in standpipe systems shall be listed, except for components that do not affect the system performance, such as drain piping, drain valves, and signs, in accordance with NFPA 14 §4.1.

Pipe & Fittings

System piping shall be metal pipe complying with NFPA 14 §4.2.1. All pipe shall be rated for a minimum pressure of 300 psi. System fittings shall be metal fittings complying with NFPA 14 §4.3.1. All fittings shall be rated for a minimum pressure of 175 psi. Where the fittings are exposed to a system operating pressure exceeding 175 psi, fittings shall be extra-heavy pattern and shall have a pressure rating exceeding the system's operating pressure.

Class I standpipes shall be minimum 4-inch diameter pipe, and combined system standpipes shall be minimum 6-inch diameter pipe, in accordance with NFPA 14 §7.6. However, hydraulically calculated standpipes serving buildings that are protected throughout with an automatic sprinkler system in accordance with NFPA 13 are permitted to have minimum 4-inch diameter pipe. Branch lines,

horizontal piping connecting no more than one hose connection with a standpipe, shall be sized based on hydraulic calculations, but no less than 2½-inch diameter pipe.

Standpipe system piping shall be protected from mechanical damage in accordance with NFPA 14 §6.1.2. Standpipe system piping shall be located within enclosed exit stairways or protected with a minimum fire-resistance rating equal to that required for the enclosed exit stairways in the Building, except horizontal feed mains and branch lines do not require fire-resistance rated protection where the Building is protected throughout with an approved automatic sprinkler system.

Valves

All standpipe system valves shall comply with NFPA 14 §§ 4.5 and 6.3, including, but not limited to, the following:

- All valves controlling connections to water supplies shall be listed indicating valves supervised by the building fire alarm system.
- Underground valves with access only through a roadway box are not required to be supervised.
- An approved control valve and check valve shall be provided at each water supply connection and located as close as practical to the water supply (e.g., municipal water main or fire pump).
- An isolating control valve shall be provided to isolate each standpipe without interrupting the supply to other standpipes from the same water source.
- Where branch lines are used to supply remote hose connections, a control valve shall be provided at the standpipe to isolate the branch line.
- Combined standpipe systems shall have a dedicated control valve and check valve for each sprinkler system connection supplied from the standpipe.

Where the standpipe system operating pressure (i.e., static or residual pressure) exposes hose connections and sprinklers, for combined systems, to pressures exceeding 175 psi, pressure-regulating devices shall be used to limit the pressure at hose connections and sprinklers to no greater than 175 psi, in accordance with NFPA 14 §7.2.3. Pressure-regulating devices shall be listed. Where more than two (2) hose connections are used downstream a pressure-regulating device, the following shall apply in accordance with NFPA 14 §7.2.4.

- Pressure-regulating devices shall have a means for isolation (e.g., isolating control valves on either side of the device) to provide maintenance or repair.
- Pressure-regulating devices shall be arranged so that failure of the device does not permit pressures in excess of 175 psi to more than two hose connections. For instance, two pressure-regulating devices should be installed in series so that if one fails the other maintains the maximum pressure downstream.
- An equally sized bypass around the pressure-regulating device(s), with a normally closed control valve, shall be provided.
- Pressure-regulating devices shall not be installed greater than 7 feet 6 inches above the floor.
- Pressure gauges shall be provided at the inlet and outlet of a pressure-regulating device.
- A pressure relief valve shall be provided directly downstream of a pressure-regulating device in accordance with the manufacturer's recommendations.
- The FDC(s) shall be connected downstream of the last isolation control valve associated with a pressure-regulating assembly.
- The pressure downstream of the pressure-regulating assembly shall be supervised by the building fire alarm system for pressure exceeding the pressure-regulating devices' set pressure.

Hose Connections

Hose connections shall be listed hose valves with National Hose Standard (NHS) threads equipped with caps to protect the threads, in accordance with NFPA 14 §4.7. Class I standpipe systems shall be provided with 2½-inch hose connections located at the main floor landings in exit stairways, at the highest landing of a stairway accessing a roof or on roofs with a slope less than 4 in 12 where a stairway does not access the roof, and as needed throughout a story where the travel distance to a hose connection exceeds 200 feet, in accordance with NFPA 14 §7.3.2.

Hose connections shall be no less than 3 feet and no more than 5 feet above the floor, and hose connections and hose cabinets, housing hose connections, shall not be obstructed by any objects, including open or closed doors, in accordance with NFPA 14 §7.3.1. Hose connections in hose cabinets shall have a minimum 1-inch clearance between the valve handle and any part of the cabinet when the valve is in any position (e.g., positions ranging between fully open and fully closed).

Where the static pressure or the residual pressure at a hose connection exceeds 175 psi, a listed pressure-regulating hose valve shall be provided to limit the pressure to no more than 175 psi, in accordance with NFPA 14 §7.2.4.

Drains

Every standpipe shall have a means of draining the standpipe at the lowest point of the standpipe downstream of the isolation valve, in accordance with NFPA 14 §7.11.2. Where a hose connection is located at the lowest point of a standpipe, the hose connection is permitted to be used to drain the standpipe. A main drain connection is also required near the system control valve to drain the feed main and to flow test the water supply connection, in accordance NFPA 14 §7.11.3. The main drain shall be minimum 2 inches for a 4-inch or larger standpipe.

NFPA 14 §7.11.1 requires standpipes with pressure-regulating hose connections to have a minimum 3-inch diameter drain riser provided adjacent to the standpipe with 2½-inch outlets, with hose threads and caps, used to test the pressure-regulating devices. The test connections shall be located on every other story. The drain shall terminate at an approved exterior location at grade or a drain receptor sized to receive full flow from the drain riser.

Supports

NFPA 14 §6.5 requires standpipe system piping to be supported in accordance with NFPA 13 Chapter 17. Refer to the *Sprinkler* section of this report for the applicable requirements.

Signs

Signs shall be permanently marked, constructed of weather-resistant metal or rigid plastic, and secured to a device or building wall with corrosion-resistant chains or fasteners, in accordance with NFPA 14 §§ 4.10 and 6.3. The following signs are required for specific standpipe system components:

- Fire department connections shall have a designated sign with letters at least 1 inch in height reading either “STANDPIPE” or “AUTOSPKR AND STANDPIPE”, where supplying both, in accordance with NFPA 14 §6.4.5.2. A sign shall also indicate the pressure required at the FDC inlets to provide the system demand.
- Standpipe system control valves shall have a sign indicating the portion of the system controlled and the valves’ purpose, in accordance with NFPA 14 §6.3.8.
- Standpipe system drain and test connection valves shall have a sign indicating the valves purpose, in accordance with NFPA 14 §6.3.8.2.
- Standpipe system control valves located in a closed room or concealed space (i.e., above a ceiling) shall have a sign located on the outside and adjacent to the closed room or concealed space indicating the location of the valve, in accordance with NFPA 14 §6.3.8.4.
- Hose valve cabinets shall be marked indicating the contents of the cabinet with 2½-inch high red letters on a white background, in accordance with NFPA 14 §6.3.8.5.
- Fire pump(s) supplying a standpipe system shall be provided with a sign adjacent to the pump indicating the minimum pressure and flow required at the pump discharge flange to provide the system demand, in accordance with NFPA 14 §6.7.
- A hydraulic design information sign shall be provided at the main water supply control valve identifying the basis of the system design (i.e., hydraulically calculated or pipe scheduled), the location of the two (2) hydraulically most remote hose connections, the design flow rate, the design residual inlet and outlet pressures for hose connections, design static pressure, and the system demand at either the system control valve or fire pump discharge flange and at each fire department connection, in accordance with NFPA 14 §6.8.Hose connections

Design

An automatic Class I standpipe system shall be designed in accordance with NFPA 14 Chapter 7. A standpipe shall be provided in each required exit stairway, and where two (2) or more standpipes are required in a building, the standpipes shall be interconnected. The system shall be sized so that the system demand can be independently supplied by the connected automatic water supply and each FDC.

The demand for an automatic Class I standpipe system shall be based on the following hydraulic design criteria:

- Provide a minimum residual pressure of 100 psi at the outlet of the hydraulically most remote hose connection while flowing the required flow rate.
- Provide a minimum flow rate of 250 gpm from the two most hydraulically remote hose connections on the same standpipe. Total flow rate for the most hydraulically remote standpipe shall be no less than 500 gpm.
- Provide a minimum flow rate of 250 gpm for each additional standpipe.
- The maximum system flow rate shall be 1,000 gpm for buildings protected throughout with an approved automatic sprinkler system.

6.3.3 Sprinkler

The Building shall be protected throughout with automatic sprinkler systems and sprinklers shall be provided throughout the Building in all areas, except where omissions are permitted, in accordance with LSC §18.3.5, NFPA 13 §4.1, and IBC §903.3.1.1.

The automatic sprinkler systems shall be zoned by smoke compartment, in accordance with HCFC §15.8.1.2, so that each smoke compartment has a dedicated water flow switch connected to the Building fire alarm system.

Special Considerations

All information technology (IT) related rooms, such as MDF, IDF, and UPS rooms shall be protected with a double interlock pre-action automatic sprinkler system and a NOVEC 1230 clean agent fire extinguishing system. No water-filled piping shall enter IT related rooms. The NOVEC 1230 systems shall be designed and installed in accordance with NFPA 2001 and the manufacturer's listed instructions.

An alternate shall be provided to protect the IDF rooms (i.e., small IT rooms) with recessed horizontal sidewall sprinklers supplied from outside the protected IDF room from the adjacent wet pipe automatic sprinkler system. No water-filled piping shall pass through the IDF rooms.

Components

Sprinkler system components shall comply with NFPA 13 Chapter 7. All devices and materials used in sprinkler systems shall be listed, except for components permitted in accordance with NFPA 13 §§ 7.1.1.3 and 7.1.1.4 regarding pipe, fittings, and supports and components that do not affect the system performance, such as drain piping, drain valves, and signs, in accordance with NFPA 13 §7.1.1.5.

Pipe & Fittings

System piping shall be steel pipe complying with NFPA 13 §7.3. All steel pipe shall be rated for a minimum pressure of 300 psi. System fittings shall be cast iron, malleable iron, or ductile iron fittings compatible with the associated pipe and compliant with NFPA 13 §7.4. All fittings shall be rated for a minimum pressure of 175 psi. Where the fittings are exposed to a system operating pressure exceeding 175 psi, fittings shall have a pressure rating exceeding the system's operating pressure.

Valves

All sprinkler system valves shall comply with NFPA 13 §16.9. Each sprinkler system shall have a listed indicating valve located in an accessible location, free of obstructions, and supervised by the building fire alarm system.

Sprinklers

Sprinklers shall comply with the requirements in NFPA 13 §7.2 and Chapters 9 through 15, including, but not limited to, the following:

- Only new sprinklers are permitted to be installed (i.e., sprinklers cannot be reused), and the sprinklers shall be installed in accordance with their listing.
- All components associated with a sprinkler, such as escutcheons, cover plates, guards, water shields, and other devices, shall be listed with the associated sprinkler.

- Sprinkler finishes shall be applied only by the manufacturer. If paint or another finish is applied to a sprinkler by other than the manufacturer, the sprinkler shall be replaced with a new listed sprinkler of the same orifice size, thermal response, orientation, and water distribution.
- Sprinklers subject to mechanical damage (e.g., located below 7 feet above finish floor) shall be protected with a listed guard, and where subject to a corrosive environment, corrosion-resistant sprinklers shall be installed.
- Sprinklers shall be ordinary temperature (135°F to 170°F) or intermediate temperature (175°F to 225°F) sprinklers throughout the building, unless the maximum ceiling temperature exceeds 100°F or as required in specific locations in accordance with NFPA 13 §9.4.2.5 and Table 7.2.4.1.
- Sprinklers in light hazard occupancies shall be quick response.
- Quick response sprinklers are not permitted in extra hazard occupancies.

All new sprinklers shall be quick response ordinary temperature concealed sprinklers, with white cover plates, where installed in all finished ceilings. Areas without ceilings shall be protected with quick response, ordinary and intermediate temperature, upright sprinklers. Extended coverage sprinklers are permitted where applicable.

Drains

Provisions shall be provided to drain all parts of a sprinkler system in accordance with NFPA 13 §§ 16.10.4 through 16.10.6. Every system shall have a main drain valve located at the system riser to drain the system. The main drain connection shall be sized according to the size of the riser, in accordance with NFPA 13 Table 16.10.4.2, where that a 2-inch or smaller riser has a minimum ¾-inch drain connection, a 2½-inch or 3-inch riser has a minimum 1¼-inch drain connection, and risers 4-inch and larger have a minimum 2-inch drain connection.

Auxiliary drains shall be provided throughout a sprinkler system to drain trapped water in isolated sections of pipe in accordance with NFPA 13 §16.10.5.2 for wet pipe systems, including the following:

- **Trapped water greater than 50 gallons:** a minimum 1-inch auxiliary drain provided at the low point of the trapped section of pipe, including a drain valve piped to an approved and accessible location. Means must be provided for access to the drain valve.
- **Trapped water greater than 5 gallons and less than 50 gallons:** a minimum ¾-inch drain valve and plug or nipple and cap shall be provided at the low point of the trapped section of piping. Means must be provided for access to the drain valve.
- **Trapped water less than 5 gallons:** a means for draining the trapped water shall be provided by removing a coupling, sprinkler, cap, or plug.

Auxiliary drains in dry pipe systems and pre-action system shall comply with NFPA 13 §16.10.5.3, including the following:

- **Trapped water greater than 5 gallons:** a minimum 1-inch auxiliary drain provided at the low point of the trapped section of pipe routed to an approved and accessible location and terminating with one (1) 1-inch valve followed by 12 inches of 2-inch pipe followed by one (1) 1-inch valve (i.e., a drum drip valve assembly).
- **Trapped water less than 5 gallons:** a minimum ½-inch drain valve and plug or nipple and cap shall be provided at the low point of the trapped section of piping. The drain valve shall be accessible. Where subject to freezing conditions, the drain valve shall be at least 1-inch.

Test Connections, including the following

Test connections shall be provided on sprinkler systems in accordance with NFPA 13 §16.4

- **Wet pipe sprinkler systems:** a minimum 1-inch test connection shall be provided at any point of a wet pipe automatic sprinkler system, downstream of the water flow alarm device, terminating in a smooth bore corrosion-resistant orifice providing flow equal to or less than the smallest orifice sprinkler installed on the system.
- **Dry pipe and pre-action sprinkler systems:** a minimum 1-inch trip test connection shall be provided at the end of the highest, most remote branch line of the system terminating in a smooth bore corrosion-resistant orifice providing flow equal to or less than the smallest orifice sprinkler installed on the system. The trip test shall be configured to simulate the number of sprinklers flowing in accordance with NFPA 13 Table 8.2.3.6.1, based on the primary hazard protected by the system. For example, where the primary hazard is an ordinary hazard occupancy the test manifold shall terminate in two smooth bore orifices to simulate two sprinklers flowing.

Means shall be provided downstream of backflow preventers for flow tests at the greatest system demand, in accordance with NFPA 13 §16.14.5.

Supports

NFPA 13 Chapter 17 defines the minimum requirements for supporting sprinkler piping. All components of a pipe hanger assembly that directly attach to the pipe or the building structure shall be listed, unless noted otherwise. Hangers certified by a registered professional engineer are not required to be listed considering the hanger assembly complies with all the requirements defined in NFPA 13 §17.1.2. Hanger rods are not required to be listed; however, hanger rod diameters shall comply with NFPA 13 Table 17.2.1.1, in accordance with the following:

- Hanger rod supporting pipe having a diameter 4-inches or less shall be no less than 3/8-inch in diameter.
- Hanger rod supporting pipe having a diameter 6-inches to 8-inches shall be no less than ½-inch in diameter.
- Hanger rod supporting pipe having a diameter 10-inches to 12-inches shall be no less than 5/8-inch in diameter.

The maximum distance between pipe supports (i.e., hangers) shall comply with NFPA 13 §17.4.2, in accordance with Table 13, *Maximum Distance Between Hangers (ft-in)*, below.

Table 13, *Maximum Distance Between Hangers (ft-in)*

Pipe Size (in.)	¾	1	1¼	1½	2	2½	3	4	6	8
Steel Pipe	NA	12	12	15	15	15	15	15	15	15
CPVC	5-6	6	6-6	7	8	9	10	NA	NA	NA

In addition to the hanger spacing requirements defined above, NFPA 13 §17.4.3.2 requires steel pipe to have no less than one (1) hanger for each section of pipe, unless two (2) sprinklers are spaced less than 6 feet apart and starter lengths less than 6 feet, hangers spaced no greater than 12 feet apart are permitted. Hangers shall maintain minimum 3 inches of clearance from the center line of an upright sprinkler.

Unsupported horizontal lengths of steel pipe between the last sprinkler and the last hanger shall not exceed the lengths define Table 14, *Maximum Unsupported Length of Steel Pipe (in)*, in accordance with NFPA 13 §§ 17.4.3.4 and 17.4.3.5.

Table 14, *Maximum Unsupported Length of Steel Pipe (in)*

Pipe Size (in.)	1	1¼	1½ or Greater
Mains & Branch Lines	36	48	60
Branch Lines - > 100 psi		12	
Armovers - ≤ 100 psi		24	
Armovers - > 100 psi		12	

The hanger closest to a sprinkler, where the system operating pressure exceeds 100 psi, shall have provisions to prevent upward movement of the pipe (e.g., Anvil Fig. 773 UL Listed Surge Restrainer).

Sprigs (i.e., vertical pipe between a sprinkler and a branch line or main) with a length greater than 4 feet shall be restrained against lateral movement, in accordance with NFPA 13 §17.4.3.7. Risers shall be supported with listed riser clamps or by hangers located on the horizontal connections within 24 inches of the centerline of the riser, in accordance with NFPA 13 §17.4.5. Pipe stands shall be approved and capable of supporting five (5) times the weight of the water-filled pipe plus 250 pounds, in accordance with NFPA 13 §17.5.

Signs

Signs shall be permanently marked, constructed of weather-resistant metal or rigid plastic, and secured to a device or building wall with corrosion-resistant chains or fasteners, in accordance with NFPA 13 §16.9.12.2. The following signs are required for specific system components, in accordance with NFPA 13 §§ 16.9.12, 28.5, and 28.6:

- System control valves shall have a sign indicating the portion of the system controlled and the valves' purpose. Systems with more than one control valve shall have a sign indicating the location of each valve.

- System drain and test connection valves shall have a sign indicating the valves purpose.
- Dry pipe and pre-action systems with low point drains shall have a sign at the respective dry pipe or pre-action valve indicating the number of drains and location of each drain.
- A hydraulic design information sign shall be provided at the system valve for each hydraulic design area associated with the respective system.
- A general information sign shall be provided at the system valve.

Design

The design of a sprinkler system is dependent on the hazard(s) protected by the system. NFPA 13 §4.3 classifies hazards into occupancy classifications. The following hazards are anticipated to be present within the scope of work:

- **Light Hazard Occupancy:** occupancies or portions of other occupancies where the quantity and/or combustibility of contents is low and fire with relatively low heat release rates are expected (NFPA 13 §4.3.2), such as offices, exam rooms, waiting rooms, conference rooms, dining areas, fitness areas, etc.
- **Ordinary Hazard Group 1 Occupancy:** occupancies or portions of other occupancies where combustibility is low, quantity of combustibles is moderate, stockpiles of combustibles do not exceed 8 feet in height, and fires with moderate heat release rates are expected (NFPA 13 §4.3.3), such as electrical rooms, mechanical rooms, janitor closets, storage rooms, file rooms, etc.
- **Ordinary Hazard Group 2 Occupancy:** occupancies or portions of other occupancies where the quantity and combustibility of contents are moderate to high, stockpiles of combustibles with moderate heat release rates do not exceed 12 feet in height, and stockpiles of combustibles with high heat release rates do not exceed 8 feet in height (NFPA 13 §4.3.4), such as medical gas rooms, storage rooms, and laboratories.
- **Extra Hazard Group 2 Occupancy:** occupancies or portions of other occupancies with moderate to substantial amounts of flammable or combustible liquids or occupancies where shielding of combustibles is extensive (NFPA 13 §4.3.6), such as miscellaneous storage of Group A plastics below 12 feet high.

Miscellaneous storage is defined in NFPA 13 §4.3.1.4 as storage less than 12 feet in height that is incidental to another occupancy use group. Miscellaneous storage shall be no greater than 10 percent of the Building area or 4,000 square feet of the sprinklered area, whichever is greater, and the storage pile or area shall not exceed 1,000 square feet and shall be separated from other storage areas by at least 25 feet.

The Buildings are primarily light hazard occupancies with incidental ordinary hazard occupancies, extra hazard occupancies, and miscellaneous storage. Below are examples of rooms or spaces with hazards greater than those found in a light hazard occupancy.

- **Ordinary Hazard Group 1 Occupancy**
  Small storage rooms with storage not exceeding 8 feet in height.
  Small mechanical, electrical, and communications rooms.
  Maintenance shop.
  Clean and soiled linen rooms.
  Kitchens and associated serving areas.
  Laundry rooms.
  Janitor's closets.
- **Ordinary Hazard Group 2 Occupancy**
  Small storage rooms with storage greater than 8 feet in height and less than 12 feet in height.
  Central Utility Plant.
  Laboratories.
  Small hazardous materials storage rooms, excluding flammable and combustible liquids.
- **Extra Hazard Group 2 Occupancy**
  Miscellaneous storage rooms storing exposed plastics on shelves greater than 5 feet in height and less than 12 feet in height, in accordance with NFPA 13 Table 4.3.1.5.1.
  Small rooms storing and/or using flammable and combustible liquids.
  Generator rooms with diesel fuel storage.

Table 15, *Hazard Occupancy Design Criteria*, on the following page, summarizes the design criteria for each occupancy classification present in the Building, in accordance with NFPA 13 §§ 4.5, 10.2.4.2, and 19.3.3.

Table 15, *Hazard Occupancy Design Criteria*

System Area	Sprinkler Area	Sprinkler Spacing Min.	Sprinkler Spacing Max.	Design Density	Design Area[1]	Hose Allowance Inside	Hose Allowance Outside	Supply Duration
Light Hazard Occupancy								
52,000 ft²	225 ft²	6 ft	15 ft	0.10 gpm/ft²	1,500 ft²	100 gpm	0 gpm	30 min.
Ordinary Hazard Group 1 Occupancy								
52,000 ft²	130 ft²	6 ft	15 ft	0.15 gpm/ft²	1,500 ft²	100 gpm	150 gpm	60 min.
Ordinary Hazard Group 2 Occupancy								
52,000 ft²	130 ft²	6 ft	15 ft	0.20 gpm/ft²	1,500 ft²	100 gpm	150 gpm	60 min.
Extra Hazard Group 2 Occupancy								
40,000 ft²	100 ft²	6 ft	12 ft	0.40 gpm/ft²	2,500 ft²	100 gpm	400 gpm	90 min

[1] Design area may be reduced in accordance with NFPA 13 §19.3.3.2.3 for the use of quick response sprinklers on wet pipe systems with a ceiling height less than 20 feet.

The design areas defined in Table 15, above, shall be adjusted in accordance with NFPA 13 §§ 19.3.3.2.4, 19.3.3.2.5, and 19.3.3.2.6 to comply with the following:

- **Ceilings sloped greater than a 2 in 12 pitch:** increase the design area 30 percent.
- **Dry pipe and double interlock pre-action systems:** increase the design area 30 percent.
- **High-temperature sprinklers used in extra hazard occupancies**: decrease the design area 25 percent, but no less than 2,000 square feet.

Where multiple adjustments are required, the adjustments shall be compounded, in accordance with NFPA 13 §19.3.3.2.7. For instance, a dry pipe sprinkler system protecting an ordinary hazard group 1 occupancy beneath a ceiling with a pitch greater than 2 in 12 will have a minimum design area of 2,535 square feet.

Design and installation of sprinklers shall consider obstructions that prevent sprinkler discharge from reaching the hazard and clearances to storage, in accordance with NFPA 13 §§ 9.5.5.3 and 9.5.6, respectively. Where an obstruction is located within 18 inches below a sprinkler, the sprinkler must be spaced a minimum distance from the obstruction, on either side, in accordance with the respective section specific to the sprinkler type used (e.g., standard spray and extended coverage pendent, upright, and sidewall and control mode special application sprinklers). Sprinklers shall be installed beneath fixed obstructions with a width greater than 4 feet in the least dimension, and sprinklers shall maintain a minimum clearance of 18 inches above the top of storage. Top of storage is the highest point of a top product stored in a pile or on a shelf, and not the top of the shelf, itself.

In addition to the design requirements defined above, NFPA 13 further defines requirements for specific applications and scenarios. For additional information refer to NFPA 13.

6.4 PORTABLE FIRE EXTINGUISHERS

LSC §18.3.5.12 and IBC §906.1 requires portable fire extinguishers (PFE) to be installed throughout buildings with Health Care and Group I-2 occupancies in accordance with NFPA 10. According NFPA 10 §4.1, PFEs shall be listed and labeled.

PFEs shall be selected for the hazards present in accordance with NFPA 10 Chapter 5. The PFEs required in the Project area shall be listed for one or multiple of the fire classifications listed below:

- Class A fires involving ordinary combustibles, such as wood, cloth, paper, plastics, and rubbers, according to NFPA 10 §5.2.1.
- Class B fires involving flammable and combustible liquids, according to NFPA 10 §5.2.2.
- Class C fires involving energized electrical equipment, according to NFPA 10 §5.2.2.
- Class K fires involving cooking appliances where combustible cooking media is used, according to NFPA 10 §5.2.5.

Majority of the hazards throughout the Building can be protected using a PFE listed for Class A, Class B, and Class C fires (i.e., an ABC general purpose portable fire extinguisher). However, a Class K PFE shall be used only in areas with the potential for Class K fires, such as kitchens where hot oils and animal fat will be present. Spaces containing sensitive or delicate electrical equipment shall not be protected with dry chemical PFEs, instead the recommended PFE is a clean agent PFE listed for Class C fires, such as PFEs filled with a halocarbon compound listed for PFEs. Sensitive electrical equipment may include data storage, processing, and transmission equipment or medical imaging equipment. PFEs intended for use in magnetic imaging rooms shall be reliable and safe non-magnetic PFEs.

The selected PFEs shall be located throughout the building in designated places that are accessible, without obstruction, along the normal path of travel, immediately available in the event of a fire, and spaced to comply with the applicable requirements for the specific hazards present, in accordance with NFPA 10 Chapter 6. Majority of the spaces in the Buildings shall be protected for Class A fires. Therefore, there shall be a minimum of one Class A PFE for a maximum floor area of 11,250 square feet and within a maximum travel distance of 75 feet, in accordance with NFPA 10 Table 6.2.1.1.

PFEs weighing less than 40 pounds shall be mounted with the top of the PFE no greater than 5 feet above the floor and the bottom of the PFE no less than 4 inches above the floor, in accordance with NFPA 10 §6.1.3.8. A PFE shall be conspicuously labeled with operating instructions, and the operating instructions shall be located on the front of the PFE, so the label is clear and visible when mounted, in accordance with NFPA 10 §6.1.3.9. When a PFE is mounted in a cabinet, the cabinet shall be clearly marked identifying the presence of the PFE, and the cabinet shall not be locked, in accordance with NFPA 10 §6.1.3.10.

6.5 SMOKEPROOF ENCLOSURE SMOKE CONTROL SYSTEM

The exit stairs serving an occupiable floor located greater than 75 feet above the lowest level of fire department vehicle access shall be smokeproof enclosures in accordance with IBC §403.5.4. Smokeproof enclosures shall be protected from the infiltration of smoke in accordance with IBC §909.20. To avoid the use of vestibules, the stairway pressurization alternative shall be applied in accordance with IBC §909.20.5, including all applicable sections of IBC §909 for smoke control systems.

The stairway pressurization system shall be a mechanical ventilation system supplying the stair enclosures with outside air to maintain no less than 0.10 inches of water and no greater than 0.35 inches of water in the stair shaft relative to the interior of the Building.

The design, installation, and performance of the stairway pressurization system shall be in accordance with the engineering analysis per IBC §909.4, NFPA 92, and IBC §909, including, but not limited, to the following:

- All pressurization fans are required to be equipped with a source of emergency power per IBC §909.11.
- All components of the smoke control system shall be rated to 250°F per IBC §909.10.
- Automatic dampers, regardless of the purpose for which they are installed within the smoke control system, shall be listed and conform to the requirements of approved recognized standards in accordance with IBC §909.10.4.
- Belt-driven fans shall have 1.5 times the number of belts required for design duty, with a minimum of two (2) belts, in accordance with IBC §909.10.5.
- All smoke control system wiring is required to be in conduit and shall be protected with a minimum 2-hour fire-resistance rating. The wiring includes fire alarm system and/or building automation system network and control circuits used for control of the smoke control system.
- It is required by IBC §909.12 that the smoke control systems be controlled by equipment that is UL 864-UUKL listed for smoke control systems.

6.6 POST-FIRE SMOKE REMOVAL SYSTEM

IBC §403.4.7 requires means to mechanically remove smoke from the Building for post-fire salvage and overhaul operations. The mechanical smoke removal system shall provide one exhaust air change every 15 minutes for the area involved. Return and exhaust air shall be moved directly to the exterior of the Building without recirculation to other areas of the Building. A means to manually control the post-fire smoke removal system shall clearly indicate each zone controlled and shall be located in the fire command center.

6.7 LIFE SAFETY TWO-WAY COMMUNICATION SYSTEM

LSC §7.2.12.1.1 requires a two-way emergency communication system to be provided at elevator landings on each level, except the level of exit discharge. The two-way emergency communication system shall communicate with a central control point located in a 24-hour attended security control center. Instructions explaining the use of the system and written identification of the location shall be posted adjacent to the two-way emergency communication system at each elevator landing. The signage visual characters shall comply with ICC A117.1. The system shall include both audible and visible signals.

In addition, IBC §403.5.3.1 requires stairs, with interior doors locked from the stairway side, to be equipped with a two-way communication system connected to a 24-hour attended control center. The means for communication shall be provided in stair(s) no greater than every fifth-floor level.

Two-way communication system circuits shall have Level 3 pathway survivability (i.e., 2-hour cable systems) in accordance with NFPA 72 §24.3.14.8.

6.8 EMERGENCY RESPONDER COMMUNICATION SYSTEM

According to LSC §11.8.4.2 and IBC §918.1, an in-building two-way emergency responder communication coverage shall be provided in all new buildings in accordance with IFC §510.

6.9 STANDBY & EMERGENCY POWER

LSC §11.8.5.2 requires a high-rise building to have a Type 60, Class 1, Level 1, standby power system in accordance with NEC §701 and NFPA 110. In addition, LSC §18.5 requires the emergency power to comply with the requirements defined in HCFC. The standby power system shall have a capacity and rating sufficient to supply power to all required equipment, including:

- Air compressor serving dry-pipe and pre-action systems
- Electric fire pump
- Fire protection pressure maintenance (jockey) pump
- Fire command center equipment and lighting
- Elevators
- Smoke control systems
- Emergency lighting
- Exit signs
- Fire detection and alarm system
- Life-support devices

7 CONCLUSION

This report summarizes the fire and life safety code compliance approach for Cherokee Nation WW Hastings Replacement Hospital. This document is a living document to be updated as the Project progresses through design.

Sincerely,

Tyler D. Mobley, PE (31813)
Fire Protection Engineer
Mobley Fire Protection Engineering, LLC
Oklahoma Registered Professional Engineering Firm 8650

WW Hastings Hospital_FLS Code Summary.docx

Generic Room Type	Level of Design	Reasons for Design (Theming)	Finishes
INPATIENT UNITS			
Acute Care Unit	High	It is helpful for the patient and the family to be engaged in the healing process. The patient room should be designed in a manner in which patients and families forget that they are in a hospital. The patient room should reflect a sophisticated and calming hospitality environment. Maintainable and durable products will be integrated.	Floors: Vyinyl Compostion Tile, Armstrong - Isolation Room to be Rubber sheet, Nora. Base: 4" Rubber Base - Isolation to have 6" Integral base, Isolation Rooms to have 6" integral base with aluminum top cap. Walls: Paint - eggshell; Headwall/Footwall to be plastic laminate wall panel and sconces on either side of the bed, millwork to be plastic laminate. Ceiling: Acoustical ceiling tile 24" x 24". Armstrong Calla, gypsum board-flat paint, Recessed down lights and sink and family area. Remarks: Solid surface at sink area and window seals, mecho shades at window (1-2% openness factor, 3000 series) with blackout shade, full height corner guards, cubicle curtain, Laminate doors. Alternate: Sheet Vinyl, Teknoflor Forestscapes HPD
Labor Delivery Recovery, NICU and Postpartum Unit	High	It is helpful for the patient and the family to be engaged in the healing process. The patient room should be designed in a manner in which patients and families forget that they are in a hospital. The patient room should reflect a sophisticated and calming hospitality environment. Maintainable and durable products will be integrated.	Floors: Rubber Sheet, Nora Base: 6" Integral sheet vinyl (heat welded) Walls: Painted gypsum board, low-odor, zero V.O.C., washable latex enamel, semi-gloss; Headwall/Footwall to be plastic laminate. Ceiling: Gypsum board – semi-gloss paint. Recessed down light at sink and family area. Remarks: Millwork to be plastic laminate, solid surface countertop at sink area and window seals, mecho shades at window (1-2% openness factor, 3000 series) with black out shade, full height corner guards, Laminate doors, cubicle curtain. Alternate: Sheet Vinyl, Teknoflor Forestscapes HPD
ED - Triage, Treatment, Anti Ligature Treatment, Safe Treatment, POS Treatment, ISO Treatment, Trauma	High	Create positive distractions to calm patients.	Floors: Vinyl Composition Tile (1 field ,1 accent), Armstrong Striations BBT Base: 4" Rubber Base Walls: Painted gypsum board, low-odor, zero V.O.C., washable latex enamel, semi-gloss; Headwall/Footwall to be plastic laminate wall panels Ceiling: Acoustical ceiling tile 24" x 24" (Armstrong Calla) Remarks: Millwork to be plastic laminate, solid surface countertop at sink area and window seals, mecho shades at window (1-2% openness factor, 3000 series), full height corner guards, Laminate doors, cubicle curtain.
Hospice	High	Create positive distractions to calm patients.	Floors: Vinyl Composition Tile, Armstrong Striations BBT Base: 4" Rubber Base Walls: Painted gypsum board, low-odor, zero V.O.C., washable latex enamel, semi-gloss; Headwall/Footwall to be plastic laminate wall panels Ceiling: Acoustical ceiling tile 24" x 24" (Armstrong Calla) Remarks: Millwork to be plastic laminate, solid surface countertop at sink area and window seals, mecho shades at window (1-2% openness factor, 3000 series), full height corner guards, Laminate doors, cubicle curtain.
ICU	High	Create positive distractions to calm patients.	Floors: Rubber Sheet, Nora Base: 4" Rubber Base Walls: Painted gypsum board, low-odor, zero V.O.C., washable latex enamel, semi-gloss; Headwall/Footwall to be plastic laminate wall panels Ceiling: Acoustical ceiling tile 24" x 24" (Armstrong Calla) Remarks: Millwork to be plastic laminate, solid surface countertop at sink area and window seals, mecho shades at window (1-2% openness factor, 3000 series), full height corner guards, Laminate doors, cubicle curtain. Alternate: Sheet Vinyl, Teknoflor Forestscapes HPD

Generic Room Type	Level of Design	Reasons for Design (Theming)	Finishes
INPATIENT UNITS			
Central Nurse Stations	High	Highly defined source of help for families and functionality for staff.	Floors: Vinyl Composition Tile, Armstong Striation BBT Base: 4" Rubber Base Walls: Paint - eggshell Ceiling: Acoustical ceiling tile 24” x 24”, Armstrong Calla, gypsum board soffit at work surfaces. Remarks: Millwork to be plastic laminate with solid surface countertops. Casework to be laminate with solid surface countertops. Full height corner guards, Laminate doors.
Patient Room-Toilet	High	Hospitality design for patients and families, while being functional/maintainable.	Floors: Ceramic Tile, Crossville Altered State, 12"x24" Base: Ceramic Tile, Crossville Altered State, 6"x24" Walls: Porcelain Tile 12” x 24” with stone mosaics at the sink- full height, paint-semi gloss. Mirror as specified with sconce. Ceiling: Gypsum Board-semi gloss paint. Recessed downlight at shower. Remarks: Grout to be Spectra-Lock by laticrete, solid surface countertop with under mount sink, Laminate door. Stainless accessories.
Nourishment Room	Minimal	—	Floors: Vinyl Composition Tile, Armstrong Base: 4" Rubber Base Walls: Paint – eggshell Ceiling: Acoustical ceiling tile 24” x 24”, Armstrong Calla Remarks: Wall protection – full height corner guards, Laminate doors.
Medication Room	Minimal	—	Floors: Vinyl Composition Tile, Armstrong Base: 4" Rubber Base Walls: Paint – eggshell Ceiling: Acoustical ceiling tile 24” x 24”, Armstrong Calla Remarks: Wall protection – full height corner guards, Laminate doors.

Generic Room Type	Level of Design	Reasons for Design (Theming)	Finishes
DIAGNOSTIC AND TREATMENT SERVICES			
Consult	Moderate	Soothing hospitality space to help comfort families in times of stress.	Floors: Vinyl Composition Tile, Armstrong Base: 4" Rubber Base Walls: Paint-eggshell Ceiling: Acoustical ceiling tile 24” x 24”, Armstrong, Calla.
Dressing Rooms	Moderate	Comfortable, hospitality space which offers function and comfort to patients.	Floors: Vinyl Composition Tile, Armstrong Base: 4" Rubber Base Walls: Paint – eggshell Ceiling: Acoustical ceiling tile 24” x 24”, Armstrong, Calla. Remarks: Laminate door, allow 4' bench - laminate with solid surface top.
Diagnostic Imaging - Radiography/Fluoroscopy/MRI/Ultrosound	Moderate	Create positive distractions to calm patients.	Floors: Vinyl Composition Tile (1 field ,1 accent), Armstrong Striations BBT Base: 4" Rubber base Walls: Paint-eggshell Ceiling: Acoustical ceiling tile 24” x 24” (Armstrong Calla) Remarks: Laminate doors; full height corner guards
Diagnostic Imaging - Nuclear Medicine - Uptake / Stress Test / Injection / Hot Lab / Exam	Moderate	Create positive distractions to calm patients.	Floors: Vinyl Composition Tile (1 field, 1 accent), Armstrong Striations BBT; Hot Lab - Rubber sheet, Nora Base: 4" Rubber base, Hot Lab integral base 6" Walls: Paint-eggshell Ceiling: Acoustical ceiling tile 24” x 24” (Armstrong Calla) Remarks: Laminate doors; full height corner guards
Clinical Laboratory	Moderate	—	Floors: Rubber Sheet, Nora Base: 6”(integral) Walls: Eggshell paint Ceiling: Acoustic Ceiling Tile, Armstrong Clean Room VL, 24” x 48” Remarks: Metal doors.

Generic Room Type	Level of Design	Reasons for Design (Theming)	Finishes
SURGERY DEPARTMENT			
Prep / Holding / Recovery Room	Moderate	Create positive distractions to calm patients.	Floors: Rubber Sheet, Nora. Base: 4" Rubber Base Walls: Paint-eggshell Ceiling: Acoustical ceiling tile 24” x 24” ,Armstrong Calla. Remarks: Headwall to be plastic laminate panels, millwork to be wood grain plastic laminate, solid surface countertops. Full height corner guards and crash rails at 14” and 36” AFF, laminate doors, cubicle curtain.
OR	Moderate	Create positive distractions to calm patients.	Floors: Rubber Sheet, Nora. or poured epoxy Base: 6" Integral Base Walls: Paint-eggshell Ceiling: Gyp. Board, Epoxy paint. Remarks: Wall protection on all walls, millwork to be wood grain plastic laminate, solid surface countertops. Full height corner guards and crash rails at 14” and 36” AFF, Laminate doors
Endoscopy Suite	Minimal	_____	Floors: Rubber Sheet, Nora Base: 6” Integral Walls: Epoxy Paint-eggshell Ceiling: Acoustical ceiling tile, Armstrong clean room VL or gypsum board Remarks: Full height corner guards, crash rails at 14” and 36” AFF.
Cath	Minimal	_____	Floors: Rubber Sheet, Nora Base: 6” Integral Walls: Epoxy Paint-eggshell Ceiling: Acoustical ceiling tile, Armstrong clean room VL or gypsum board Remarks: Full height corner guards, crash rails at 14” and 36” AFF.

Generic Room Type	Level of Design	Reasons for Design (Theming)	Finishes
ADMINISTRATIVE AND PUBLIC SERVICES			
Administration/ Boardroom	High	This space should integrate with the finishes in the Main Lobby to create a hospitality feeling.	Floors: Mannington commercial carpet - Design Local Collection - Philadelphia Fishtown Base: 4” Rubber base Walls: Paint – eggshell Ceiling: Acoustical ceiling tile 24” x 24”, Armstrong Calla. Recessed down lights and wall washers/sconces or decorative pendant - on dimmers. Remarks: Wood doors, lower casework, wood with quartz countertops.
Administration Offices	High	This space should integrate with the finishes in the Main Lobby to create a hospitality feeling.	Floors: Mannington commercial carpet - Design Local Collection - Philadelphia Fishtown Base: 4” Rubber base Walls: Paint – eggshell Ceiling: Acoustical ceiling tile 24” x 24” ,Armstrong Calla. Remarks: Plastic Laminate door.
Gift Shop	High	Finishes from the main Lobby are to be integrated into this space to convey a feeling of comfort and hospitality.	Floors: Mannington Commercial carpet - Design Local Collection - Philadelphia Fishtown Base: 4" Rubber base Walls: PT – eggshell Ceiling: Aoustical Ceiling Tile 24” x 24” ,Armstrong Calla.
Lobby (First Floor)	High	Finishes from the main Lobby are to be integrated into this space to convey a feeling of comfort and hospitality.	Floors: Pour-in-place terrazzo Base: Pour-in-place terrazzo cove base Walls: Composite wood paneling, plastic laminate, accent finishes, PT-eggshell Ceiling: Linear wood ceiling combined w/gypsum board and large format acoustical ceiling tiles Casework: Laminate w/quartz countertops
Lobby (Upper Floors)	Moderate	Finishes from the main Lobby are to be integrated into this space to convey a feeling of comfort and hospitality.	Floors: Admix LVT Base: Rubber base Walls: Plastic laminate, accent finishes, PT-eggshell Ceiling: Large format acoustical ceiling tiles w/gypsum board soffits Casework: Laminate w/quartz countertops
Meditation	Moderate	Finishes from the main Lobby are to be integrated into this space to convey a feeling of comfort and hospitality.	Floors: Mannington Commercial carpet - Design Local Collection - Philadelphia Fishtown Base: 4" Rubber base Walls: PT – eggshell w/ decorative acoustical panels Ceiling: Aoustical ceiling tiles - Armstrong - Calla 24" X 24" Remarks: Laminate doors
Physician's Staff Lounge / Dining	Minimal	This space should integrate with the finishes in the Main Lobby to create a hospitality feeling.	Floors: Vinyl Composition Tile, Armstrong Base: 4” Rubber base Walls: Gypsum board-eggshell paint, wall covering Ceiling: 90% Acoustical ceiling tile 24” x 48”,Armstrong Mesa, 10% Gypsum board - eggshell paint. Recessed down lights and decorative pendant. Remarks: Laminate doors, wall protection – corner guards full height, quartz or solid surface countertops with under mount sink. Casework: laminate with quartz countertop.
Patient Registration / Admitting	High	Finishes from the main lobby are to be integrated into this space to create a hospitality sensation.	Floors: Vinyl Composition Tile, Armstrong Base: 4" Rubber base Walls: Paint-eggshell Ceiling: 90% Acoustical ceiling tile 24” x 24”,Armstrong Calla, 10% gypsum board - flat paint. Recessed down lighting. Remarks: Plastic Laminate doors. Millwork to be laminate with quartz countertop

Public Restrooms/Family Toilets	Moderate	Finishes from CNOHC are to be integrated into this space to convey a feeling of comfort and hospitality while still remaining functional and maintable.	Floor: Porcelain tile Base: Schluter trim or metal base Walls: Combination of porcelain tile and epoxy paint Ceiling: Combination of gypsum and acoustical ceiling tile - Armstrong Calla, 24"x24" Remarks: Laminate doors, schluter trim, plastic laminate aprons, quartz countertos w/undermount sinks
Business Office	Moderate	The design will need to be integrated with the main lobby finishes. This space should support staff and create a hospitality feeling.	Floors: Mannington commercial carpet - Design Local Collection - Philadelphia Fishtown Base: 4” Rubber base Walls: Eggshell paint; wood paneling Ceiling: Acoustical ceiling tile 24” x 24”, Armstrong Mesa.
Conference / Classroom	Moderate	This area is located off of the main public lobby. The design will need to be integrated with the main lobby finishes. This space supports staff and patients families 24/7 with a variety of amenities.	Floors: Mannington commercial carpet - Design Local Collection - Philadelphia Fishtown Base: 4” Rubber base Walls: Paint – eggshell Ceiling: Acoustical ceiling tile 24” x 24” (Armstrong Cassa), gypsum board - flat paint at folding wall and soffits. Recessed down lights. Remarks: Laminate doors with aluminum doorframes, folding wall. Linear air diffusers. Refer to plans for lower casework, laminate with solid surface countertops.

Generic Room Type	Level of Design	Reasons for Design (Theming)	Finishes
SUPPORT SERVICES			
Staff Support	Moderate	This space should support staff.	Floors: Vinyl Composition Tile, Armstrong. On-call room, Carpet (Shaw Contract). Base: 4" Rubber base Walls: Eggshell paint Ceiling: Acoustic Ceiling Tile, Armstrong Calla
Central Sterile	Minimal	_____	Floors: Rubber Sheet, Nora Base: 6" Integral (heat welded) Walls: Epoxy Paint-eggshell Ceiling: Acoustical ceiling tile, Armstrong clean room VL Remarks: Full height corner guards, crash rails at 14" and 36" AFF.
Environmental Services	None	___	Floors: Vinyl Composition Tile, Armstrong Base: 4" Integral Walls: Paint – eggshell Ceiling: Acoustical ceiling tile, Armstrong Mesa, 24"x48" Remarks: Laminate doors.
Facilities Management	Minimal	_____	Floors: Vinyl Composition Tile, Armstrong Base: 4" Rubber base Walls: Eggshell paint Ceiling: Acoustical ceiling tile 24" x 24" (Armstrong Mesa) Remarks: Laminate doors
Dietary	Minimal	_____	Floors: Vinyl Composition Tile, Armstrong Base: 4" Rubber base Walls: Eggshell paint Ceiling: Acoustical ceiling tile 24" x 24" (Armstrong Mesa) Remarks: Laminate doors
Pharmacy	Minimal	_____	Floors: Rubber Sheet, Nora Base: 6"(integral) Walls: Eggshell paint Ceiling: Acoustic Ceiling Tile, Armstrong Clean Room VL, 24" x 48" Remarks: Metal doors.
Staff Toilet	Moderate	Hospitality design for staff, while being functional and maintainable .	Floors: Ceramic tile, Daltile Keystones, 1"x2" Base: Ceramic tile, Daltile Rittenhouse Cove Base, 3"x6" Walls: Ceramic tile, Daltile Rittenhouse Cove Base, 3"x6" Ceiling: Gypsum Board-semi gloss paint Remarks: Grout to be Spectra-Lock by laticrete, solid surface countertop with under mount sink if applicable, Laminate door
Soiled Utility	None	___	Floors: Rubber Sheet, Nora Base: 6" Integral Walls: Paint – Semi-gloss Ceiling: Gypsum Painted - Semi-gloss Remarks: 4 ' Sheet wall protection – corner guards full height.

Generic Room Type	Level of Design	Reasons for Design (Theming)	Finishes
SUPPORT SERVICES			
Clean Room	None	_____	Floors: Vinyl Composition Tile Base: 4" Rubber base Walls: Paint-eggshell Ceiling: ACT, Armstrong Remarks: 4' Sheet wall protection - corner guards full height.
Stairwells	None		Floors: Sealed Concrete Base: 4" Rubber base Walls: Paint – eggshell Ceiling: Exposed Remarks:
Building Support, Electrical / Data / Mechanical	None	___	Floors: Sealed Concrete Base: 4" Rubber base Walls: Paint – eggshell Ceiling: Exposed Remarks: Laminate door

General Notes:

1. Welding rod at welder seams in rubber sheet flooring shall match the darker of the rubber sheet colors at seams that divide two colors unless noted otherwise.
2. Rubber sheet flooring material shall have heat-welded seams with a 4" integral cove base, at noted locations; schluter top cap to be installed.
3. Main Lobby, concourse (Gallery) and dinning area shall receive motorized roller shades; all remaining exterior windows to receive manual roller shades.
4. All rubber base to extend wall-to-wall behind equipment, regardless of equipment elevation notation.
5. Elevator finishes to be selected from manufacturer's standards.
6. Chair rails to be installed in all waiting areas and in seating area in exam rooms.
7. Corner guards are to be installed at all outside corners.
8. High impact wall covering is to be installed in all housekeeping rooms, soiled utility rooms and other service areas where carts will be used.
9. Wall rail, bumper rail, or high impact wall covering is to be installed along all major service corridors where carts will be used.

CHEROKEE NATION HEALTH
HASTINGS REPLACEMENT HOSPITAL
PROPOSED DESIGN DEVELOPMENT WORK PLAN

05.02.22

1. **PRELIMINARY DESIGN SELECTIONS PRESENTATION TO TECHNICAL REVIEW COMMITTEE**
    a. RECOMMENDED ATTENDEES:
        i. TECHNIAL REVIEW COMMITTEE
            1. JOHN ASBILL
            2. JESSIE BRACKETT
    b. PURPOSE OF MEETING: PROPOSED DESIGN SELECTIONS AND FINISH/MATERIAL SPECIFICATIONS WILL BE PRESENTED IN ORDER TO OBTAIN FEEDBACK PRIOR TO PRESENTING TO ADMINISTRATIVE LEADERSHIP & DEPARTMENTAL DIRETORS.
    c. PROPOSED AGENDA:
        i. PRESENT/REVIEW PROPOSED DESIGN SELECTIONS AND FINISH/MATERIAL SPECIFICATIONS
        ii. ESTABLISH A LIST OF ITEMS TO BE REVISED PRIOR TO PRESENTING DESIGN SELECTIONS AND FINISH/MATERIAL SPECIFICAITONS TO END USERS
        iii. Q & A
    d. PROPOSED TIMELINE: LAST WEEK OF MAY – THIS WILL ALLOW THE DESIGN TEAM TO MAKE ANY NECESSARY REVISIONS TO THE DESIGN SELECTIONS AND FINISH/MATERIAL SPECIFICATIONS PRIOR TO THE PRESENTATION WTIH ADMINISTRATIVE LEADERSHIP AND DEPARTMENTAL DIRECTORS DURING DD #01 MEETINGS. (TENTATIVELY SCHEDULED FOR 06/14-17)
2. **PRELIMINARY DESIGN SELECTIONS PRESENTATION TO ADMINISTRATIVE LEADERSHIP & DEPARTMENTAL DIRECTORS**
    a. RECOMMENDED ATTENDEES:
        i. ADMINISTRATIVE LEADERSHIP
        ii. DEPARTMENTAL DIRECTORS
    b. PURPOSE OF MEETING: PROPOSED DESIGN SELECTIONS AND FINISH/MATERIAL SPECIFICATIONS WILL BE PRESENTED IN ORDER TO OBTAIN FEEDBACK.
    c. PROPOSED AGENDA:
        i. PRESENT/REVIEW PROPOSED DESIGN SELECTIONS AND FINISH/MATERIAL SPECIFICATIONS
        ii. PRESENT/REVIEW PROPOSED RENDERINGS
        iii. Q & A
    d. PROPOSED TIMELINE: TO BE INCLUDED IN AGENDA FOR DD #01 MEETINGS (TENTATIVELY SCHEDULED FOR 06/14-17)
3. **SECONDARY DESIGN SELECTIONS PRESENTATION TO ADMINISTRATIVE LEADERSHIP, DEPARTMENTAL DIRECTORS & END USERS**
    a. RECOMMENDED ATTENDEES:
        i. ADMINISTRATIVE LEADERSHIP
        ii. DEPARTMENTAL DIRECTORS
        iii. END USERS

b. PURPOSE OF MEETING:
    i. PRESENT/REVIEW REVISED DESIGN SELECTIONS AND FINISH/MATERIAL SPECIFICATIONS
    ii. PRESENT/REVIEW REVISED RENDERINGS
    iii. Q & A
c. PROPOSED TIMELINE: TO BE INCLUDED IN AGENDA FOR DD #02 MEETINGS (TENTATIVELY SCHEDULED FOR 07/19-22)

4. FINAL DESIGN SELECTIONS PRESENTATION TO ADMINISTRATIVE LEADERSHIP, DEPARTMENTAL DIRECTORS & END USERS

a. RECOMMENDED ATTENDEES:
    i. ADMINISTRATIVE LEADERSHIP
    ii. DEPARTMENTAL DIRECTORS
b. PURPOSE OF MEETING:
    i. PRESENT/REVIEW FINAL DESIGN SELECTIONS AND FINISH SPECIFICATIONS
    ii. PRESENT/REVIEW FINAL RENDERINGS
    iii. OBTAIN SIGN-OFF TO PROCEED – ONCE SIGN-OFF IS OBTAINED, DESIGN TEAM WILL PROCEED WITH EXECUTION AND IMPLEMENTATION OF FINAL DESIGN SELECTIONS AND FINISH/MATERIAL SPECIFICATIONS PRIOR TO FINAL DD SUBMISSION. (TENTATIVELY SCHEDULED FOR 10/07)
c. PROPOSED TIMELINE: TO BE INCLUDED IN AGENDA FOR DD #03 MEETINGS (TENTATIVELY SCHEDULED FOR 08/23-26)

Foy *Consulting & Engineering, LLC*
6900 College Blvd., Suite 600
Overland Park, KS 66211
Ph (913) 814 -0404 main

May 06, 2022

Mr. Shane Boren (479) 461-4201 cell
Childers Architect (479) 783-2480 office
45 South 4th Street
Fort Smith, AR 72901

WW Hastings Replacement Hospital, Tahlequah, OK
Schematic Structural Narrative – 5/06/22

Dear Shane,

This structural narrative is what the structural team believes the design parties have decided or agreed upon and is the structural team's direction moving forward for the hospital's design. The parking garage is no longer in included in the WW Hastings Replacement Hospital's scope. Specific design items discussed below.

Hospital Foundations:

1) Drilled piers are the best foundation option.
2) Pre-drilling a probe hole prior to the final design of the drilled concrete pier. This pre-drilling is a 2" probing drill to determine if there are any voids in the foundation soils below the concrete drilled piers and determine actual soil conditions at each column.
3) Pre-drilling recommended in the final soils report. Expect foundations bearing capacities could be up to 100 ksf. Without the probe drilling the allowable capacities were much less.
4) Foy has reviewed the Proposal from PPI for predrilling and dated April 14th, 2022.
5) Foundation reactions will reach 1,100 kips.
    a. There are two main soil types divided into zone-1 and zone-2. These are northern half (zone 1) & southern half (zone 2). Reference Figure 2 of the Geotechnical Engineering Report dated February 9, 2022 (PPI No. 277340).
    b. Zone-2 consists of more stable soil and reachable "rock" for suitable bearing capacities (up to 100 ksf). Foy expects to drill one (1) concrete pier at each column. Three to four pier diameters anticipated on the project to accommodate the heaviest loads and much lighter loads at the hospital that has only one level.
    c. Zone-1 contains softer soil and may not have suitable bearing substrate reachable in the reasonable drilling depths. Therefore, soil probing (pre-drilling) is especially important. Without soil probing, extremely low pier bearing capacity. Only 20 ksf allowable bearing capacity can be approximated … this is only 20% on the Zone-1 capacity (if reached). If suitable bearing stratum cannot be reached; skin friction is the only remaining mechanism for the large foundation loads in Zone-1. This would require large pile caps with multiple drilled piers; three or four drilled piers will be required per heavily loaded columns in this Z the precast panels designed for the one-2. Pre-drilling could enable the soil and structural engineers to coordinate accurate (real) soils information and provide the highest available capacities (exceeding 20 ksf) and optimal solution. At this point, the Owner should be aware, highly loaded columns may require multiple drilled piers with pier caps. These would occur at frame columns. If unreasonable depth for drilling occurs, Foy is expecting the Pre-Drilling to obtain higher soil capacities than 20KSF making the pre-drilling a valuable investment with so much unknows in Zone 1.

6) Pre-drilling eliminated in the one-story area. The one-story structure will its piers sized for 20 ksf end bearing per the original soils report and utilize skin friction if required.
7) Foundation drilled-pier diameters expected to be in 30" minimum to 60" maximum at the tower's lateral frames. The 42" or 48" and even up to 60" piers may be a more typical size.
8) With the above procedure, FOY has agreed to design and determine the actual length of each pier and place in the design documents.
    a. This will allow for more accurate BID proposals because the final and measured concrete driller pier sizes and length with rebars will be fully knowns and stated in the design drawings.
9) Concrete tie beam will connect pier caps and distribute lateral loads to adjacent piers to resistance. The maximum anticipated size is 24" x24".

Hospital Super Structure:

1) Steel Beams with Composite Floor system.
    a. Floor beams will require spray-on fireproofing. Structural steel floor framing does not require primer or paint.
2) The floor slab will have a normal weight concrete.
3) New roof enclosure at the North / West corner. This allows for the stair tower to be open to the roof level. However, this new roof enclosure is about 70'-0" x 40'-0".
4) Mechanical roof screen walls. Foy is expecting about 200'-0" of mechanical screen walls. All post for the mechanical screen walls will require a thermal break between the post the support structure. Final length of the wall system still to be determined.
5) Window cleaning equipment requires additional support framing. The type of support is unknown at the time this narrative. The design teams will be reaching out to various suppliers to coordinate their needs.
6) Expect a 4 /12" concrete cover above the composite steel deck to maintain a 2-hours fire rating.
    a. The underside of the floor deck does not require spray-on fire proofing.
7) Suppressed slab areas (i.e., showers) will require special detailing and coordination to maintain the required 2-hour fire rating.
8) Rigid Lateral Frames. There is no vertical bracing expected. The rigid frame columns are W24. These are heavy column and can have depths up to 27 ½" with 13 ½" flanges. The moment connections are all field bolted connections. The roof may require a welded Moment connection in certain locations, but still progress.
9) Tornado "Hardening" of the structure or its portions is not finalized. Hardening of the perimeter will consist of Precast panels and to protect for horizontal tornado *missals*. Exterior precast panel design is like the Joplin Replacement Hospital.
10) The structure is Design to IBC 2018
11) Risk category = IV
12) Wind:
    a. Basic Wind Speed, V = 119 mph
    b. Components and cladding per building code and specifications,
    c. Cladding designed for tornado hardening will have more stringent requirements.
    d. ICC 500 Tornado Structure per IBC not required or anticipated (V=250 mph).
13) Earthquake Design Data:
    a. Seismic Design Category, SDC = C
    b. Seismic Importance Factor 1.5
    c. Soil Site class "C"
    d. Spectral acceleration parameters:
        i. Ss = 0.139 (period = 0.2s)
        ii. S1 = 0.078 (period =1.0s)
        iii. Fa = 1.3 (site amplification factor at 0.2s)
        iv. Fv = 1.5 (site amplification factor at 0.2s)
        v. Sds = 0.12 (Numeric seismic design value at 0.02 SA
        vi. Sd1 = 0.078 (Numeric seismic design value at 1.0s SA

Helipad:

1) A Helipad specialist will design this structure. The main support system for the structure will be the building columns.
2) If the Helipad support post are not located directly over main building columns, there may be special deflection requirements for roof girders supporting the Helipad's post. Helipad specialist must determine and convey allowable deflection requirement for supporting structure.
3) The posts for the helipad will need to have a thermal break between columns.
4) Height of the Helipad above the roof deck is 7'-0".
5) One elevator extends through the roof to accommodate the Helipad access. Its roof structure that is approximately 35' x 42' and 25'-0" tall. This structure may require additional hardening for emergency operations.

Canopies:

North Canopy:
Approximately **149' x 33'**. A rectangular canopy with a radiused end at the north-west end of the canopy. Expectation for structure is framing are steel beams.

Main Atrium Canopy:
Approximately **9'-6"** wide "eyebrow" canopy will radius approximately **80'-0"** of the front atrium curtainwall at the 3rd level. Directly to the atrium structure for lateral support. Posts, beams, and metal panel roof system. The exterior posts appear to be AESS round steel columns from the ground to roof.

Main Drive-Up Canopy at Front Entrance:
Approximately **180' x 57'** canopy. The entire canopy will have curved shapes on all the perimeters of this car port canopy. Framing will require "rolled-steel" for fabrication. Due to complex framing expectations for this structure, expect steel post and a flat roof framed with steel beams. Positive drainage is with tapered insulation. This structure is an independent structure, self-supporting, not attached to the main building. The cantilevered columns provide the lateral support for this canopy.

Ambulatory Canopy:
Approximately **75' x 41'** canopy.

1) At least one column outside of the structure required to support the framing.
2) Attached to the main structure for lateral support.
3) The canopy will have a 1 ½" composite deck with 2 ½" of concrete on top. The steel for this canopy is raised 3" above the main roof adjacent to the ambulatory canopy to save concrete and raise the bottom of steel for the deep perimeter framing girders. Architectural team has allowed for a maximum 30" structural depth.

Central Plant:

Approximately 80'-0" x 80'-0" and 28'-0" to 30"-0" tall. Two (2) story building and all components in this structure expected to be in a hardened.

1) Column required inside the structure with minimum 3 bays and 3 mods. These can be equal spaced as (3) 26'-8" or adjusted for equipment, i.e., 24', 32', 24'. Four (4) bays (20'-0") will provide for a more economical framing system.
2) Elevated 2nd floor design options:
    a. Concrete over metal deck with house-keeping pads under equipment.
    b. Steel checker plating (may provide reduced diaphragm capacity)
    c. Steel grating on Steel beams (does not provide diaphragm strength in the floor system). Horizontal bracing under the floor system is required and will need coordination with equipment, piping, and duct work.
3) Piping and utilities from the Centeral Plant to the Hospital is UNDERGROUND. No support bridging required, and no structural involvement required.

4) Basic foundation anticipated with utilities buried. Specialty features such as significant tunnels, trenches or access areas required walls and pits not anticipated.
5) No allowance for basement areas or retaining walls considered.

Mechanical Yard:

This yard is about 98'-0 long in the N/S direction and 80'-0" long in the E/W direction. Presently, the structural team had an expectation of designing a Matt Slab foundation at grade, similar to the slab provide on the CNOHC project in 2018. Utility connection between the Mechanical Yard, CEP and Hospital decided to be direct burial without tunnel or bridge.

Mechanical Yard Exclusions:

1) "HARDENING" the Mechanical Yard with a precast wall panels system to protect the equipment, i.e., generators, cooling towers, and piping.
2) The 98'-0 x 80'-0" may need to increase in size to accommodate the cooling towers and final layout.
3) This mechanical yard will also hold the "COOLING TOWERS." Recently, MEP stated eluded equipment may be 30'-0" tall. Provisions for support and protection.
4) To provide a "hardened" 30'-0" panels from "horizontal" tornado projectiles" will required an OPEN roof system with Horizontal bracing.

Cross-Over bridge:

1) This structure will be a steel structure.
2) 1-hour fire rating.
3) Two (2) concrete columns at each end of the bridge required to support the structure.
4) Elevation:
    a. West end elevations will match the CNOHC, +16'-0".
    b. East end is still to be determined if at +16"-0" or +17'-0"
5) Risk category = III
6) Wind:
    a. Basic Wind Speed 114 mph
        i. Wind tunnel effects between the WW Hasting and CNOHC may need special consideration resulting from shedding and cornering.
    b. Components and cladding per building code and specifications,
7) Earthquake:
    a. Seismic Design Category, SDC = "B"
    b. Importance Factor, I_e = 1.25
    c. Soil Site class "C"
    d. Spectral acceleration parameters:
        i. Ss = 0.139 (period = 0.2s)
        ii. S1 = 0.078 (period =1.0s)
        iii. Fa = 1.3 (site amplification factor at 0.2s)
        iv. Fv = 1.5 (site amplification factor at 0.2s)
        v. Sds = 0.12 (Numeric seismic design value at 0.02 SA)
        vi. Sd1 = 0.078 (Numeric seismic design value at 1.0s SA

Parking Structure: Eliminated from project scope

Sincerely,

Bruce F. Roberson, M.S, PE, SE | President, Chief Enginerer
Veteran Owned Small Business (VOSB)
913-814-0404 Ph main | 913-814-0428 Ph dir
bruce@foyconsulting.com | www.foyconsulting.com

Schematic Design Narrative

HVAC, Electrical, and Plumbing Systems

WW Hastings Replacement Hospital

Tahlequah, OK

HP ENGINEERING

HP Engineering, Inc.
5214 W. Village Parkway, STE 120
Rogers, AR 72758
479.899.6370

1. GENERAL

A. Facility Description

1) The WW Hastings Replacement Hospital is planned to be six floors with a total heated and cooled gross area of 400,778 square feet located on the Cherokee Nation's medical campus in Tahlequah, OK. The project will be designed to achieve LEED Silver certification. The mechanical, electrical, and plumbing systems design will focus on energy conservation, indoor air quality, reliability, maintainability, and security. A freestanding central energy plant will be provided in proximity the hospital building.

2) The following departments are planned for the hospital:
   a. Diagnostic Imaging
   b. Emergency
   c. Dietary
   d. Housekeeping
   e. Facility Management
   f. Surgery
   g. Laboratory
   h. Sterile Processing
   i. Infusion
   j. Respiratory Therapy
   k. Intensive Care
   l. Administration
   m. Hospice
   n. Education
   o. Labor and Delivery
   p. Inpatient Care

B. Codes Enforced

1) The project shall comply with all locally adopted codes.
2) Building: 2018 International Building Code
3) Fire: 2018 International Fire Code
4) Electrical: 2017 National Electrical Code
5) Mechanical: 2018 International Mechanical Code
6) Plumbing: 2018 International Plumbing Code
7) Fuel Gas: 2018 International Fuel Gas code
8) Energy: 2006 International Energy Conservation Code

C. Other Major Design Codes and Standards
   1) ANSI/ASHRAE/ASHE Standard 170-2017
   2) Facilities Guidelines Institute 2018
   3) NFPA 99-2018 Healthcare Facilities Code

4. DIVISION 22 – PLUMBING

A. Plumbing Fixtures:
   1) Commercial grade white vitreous China or 18-ga stainless steel for durability and cleanliness. Hands-free sensor activation will be utilized for all lavatory faucets, toilets, and urinals.

B. Domestic Cold Water:
   1) Water service to the central energy plant will be provided for distribution throughout the building. Backflow prevention and redundant booster pumps will be provided.
   2) Domestic cold-water piping will be Type L copper with solder joints and wrought copper tube fittings. PEX piping will not be allowed.
   3) Frost-proof wall and roof hydrants will be provided approximately every 100 feet.

C. Domestic Hot Water:
   1) Domestic water piping will be Type L copper with solder joints and wrought copper tube fittings. PEX piping will not be allowed.
   2) A bank of high-efficiency, dual fuel condensing water heaters will be housed in the central energy plant.

D. Reverse Osmosis and Deionized Water Systems:
   1) To be provided as required by user groups. It is anticipated that treated water systems will be required for central sterilization, pharmacy and laboratory functions.

E. Medical Gas Systems:
   1) Medical air compressors, vacuum pumps, and bottle storage will be provided in dedicated mechanical rooms. A bulk oxygen storage tank will be located outside near the central energy plant.
   2) All medical gas piping will be Type L copper with brazed joints and wrought copper tube fittings.

F. Natural Gas:
   1) Piping will be Schedule 40 black iron pipe with pressure reducing station coordinated with the local natural gas utility company.

G. Irrigation System
   1) A separately metered 2.5” service will be provided at the exterior of the building for irrigation. Provide backflow prevention device. Design of the irrigation system will be provided by others.

H. Sanitary Sewer:

1) The facility will have one 8" sanitary exit of hub-and-spigot cast iron. PVC will not be allowed.

2) Interior sanitary sewer and vent piping will be cast iron. Laboratory acid waste piping will be stainless steel.

3) Each elevator will have a sump and sump pump which terminates into one 55-gallon barrel with alarm notification.

I. Storm Sewer:

1) Storm water will be internal primary, and overflow drains of cast iron.

J. Insulation

1) Domestic cold water and domestic hot water piping will be insulated with preformed fiberglass with self-sealing ASJ, 1/2" thick.

2) All exposed insulation within mechanical rooms will be covered with a PVC jacket to prevent damage.

3) All insulation located outdoors will have stainless steel jacket to prevent damage.

5. DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING

A. The primary heating and cooling systems for the facility will be 4-pipe systems with chilled water and heating water.

B. Central Plant Systems:

1) Cooling Towers:

(a) Antimicrobial high-density polyethylene encased cooling towers with high-efficiency direct-drive fans as manufactured by Delta Cooling Towers.

(b) Four 800-ton banks of six cooling towers cells for optimum redundancy and serviceability is planned for the expected 1,800-ton demand allowing for redundancy.

C. Chillers/Chilled Water:

1) Four 700-ton, permanent magnet bearing high-efficiency centrifugal chillers as manufactured by Carrier are planned for the expected 1,800-ton demand to provide redundancy. The system will be capable of maintaining 100% of peak demand if one chiller is out of commission. A load-shed scheme will be incorporated to ensure that essential systems maintain full capacity.

A heat pump chiller will also be provided to provide preheating of building heating water and increase facility energy efficiency.

2) Free cooling during favorable seasonal conditions from the cooling towers will be provided. The free cooling circuit will be decoupled from the primary chilled water network by way of a plate-and-frame heat exchanger.

3) Chilled water piping will be copper up to 2.5 inches in diameter; steel for 3 inches and over.

4) The chilled water plant shall include water side economizer capability via plate and frame heat exchangers.

D. Pumps:

1) Vertical inline pumps with premium efficiency motors and variable frequency drives.
2) All systems will be variable primary pumping schemes.

E. Boilers/Heating Water:

1) Dual-fuel (#2 fuel oil and natural gas) high efficiency condensing boilers with storage tanks will be provided.
2) Heating water will be preheated by heat rejected by the heat pump chiller.
3) All exposed piping will be identified using stenciled labels and flow arrows. All equipment will be identified using nameplates.
4) Heating water piping will be copper up to 2.5 inches in diameter; steel for 3 inches and over.

F. Steam System:

1) Pending further analysis, the decision to include steam boilers will be made. The alternative method of humidification steam being considered is direct gas fired humidifiers at the air handling units.

G. Air-handling Systems:

1) Temptrol custom air handlers serving multi-zone VAV terminals will be specified. The air handlers will feature the following:
   (a) Direct-drive fan arrays
   (b) Foam insulation injected dual 2” wall, roof, and floor panels.
   (c) Piping vestibules
   (d) 2” MERV-8 prefilters
   (e) MERV-14 final filters (minimum)
   (f) UVC light coil treatment
   (g) Humidification
2) The surgery systems will be central air handler with dedicated outside air (DOAS) preconditioning unit. The DOAS unit(s) will incorporate passive energy wheels to provide low humidity pretreated outside air to manage humidity control for the surgical suites. The DOAS unit(s) will also include steam humidification for winter operations.

H. Redundancy for cooling shall be provided by sizing the cooling coils in the central air handlers to provide adequate cooling and dehumidification to temperatures in compliance with code in the event of the failure of a component such as the DOAS unit. Redundancy in heating, chilled water capacity shall be provided in the Central Energy Plant systems. Additional redundancy for fans shall be provided in selecting the fans for both the central AHU units and DOAS units.

I. Exhaust systems:

1) Nonhazardous exhaust shall be exhausted through DOAS energy recovery units which shall exchange energy with the required building outside air to improve building energy efficiency.

2) A bank of N+1 redundancy high-plume laboratory exhaust fans will be provided for hazardous exhaust.

J. Air Distribution Systems:

1) All ductwork will be galvanized steel unless any specialty situations call for stainless steel or PVC-lined. There will be no internal insulation liner. All duct systems will be externally wrapped with foil-faced mineral fiber insulation medium pressure duct shall be insulated double wall galvanized.

2) All return air systems will be fully ducted.

3) Standard commercial diffuser, grilles, and registers will be used except in procedure and operating rooms that will have specialty surgical application laminar flow systems.

K. Testing, Adjusting, and Balancing:

1) Testing, adjusting, and balancing will be performed by AABC- or NEBB-certified technicians employed by an independent TAB Contractor. All water and airflow rates shall be adjusted to the specified levels. The operation of all heating and cooling equipment shall be fully tested.

L. Commissioning:

1) All building systems will be fully commissioned by a certified third-party authority.

A. Automatic Temperature Controls:

1) All controls are to be compatible with the owner's remotely located energy management system. Integral controllers that are part of the equipment's factory controls are to be ordered with a BACnet interface capable of communicating with the Campus's building automation system.

2) Automatic temperature controls shall be Direct Digital Control (DDC) type. The automatic temperature control system shall include the following components:

building control panels (located in the building mechanical rooms); Field equipment panels (located in the building mechanical rooms); Equipment controllers shall be located at each rooftop unit. Terminal equipment controllers shall be located at each VAV terminal.

3) Exterior lighting to be controlled via the BAS.

4) All exposed control wiring shall be installed in conduit. Low voltage control wiring where concealed does not have to be installed in conduit. Low voltage control wiring where concealed shall be installed in an organized manner with bridle rings or hooks for cable management. Conduit and wiring shall be installed in accordance with Division 26 – Electrical Specifications requirements.

5) The Controls Contractor shall be responsible for development of color graphic displays (required for each system and item of equipment), weekly scheduling, energy conservation programs, and alarms.
6) The Controls Contractor shall train the Owner in the proper operation and maintenance of the system.

6. DIVISION 26 - ELECTRICAL

A. Electrical Service and distribution:
1) Electrical system capable of supporting the facility: Estimated at 12,000amps @ 480Y277V 3ph.
2) New utility company provided and metered electrical service at 12.47kV. Assume that serving utility design and install MV switchgear, transformers, and associated conduit and MV wiring. This equipment will be in the Mechanical Yard.
3) A 65'-0" x 25'-0" space for the transformers is recommended in the Mechanical Yard.
4) 480Y277V and 208Y120V 3ph branch circuit equipment located in designated electrical rooms.
5) Electrical provisions shall be provided for loads as outlined in Divisions 22, 23, 27, and 28.
6) Arc flash study shall be required to properly label all panels.
7) Breaker coordination study shall be required to obtain correct trip settings for adjustable breakers.

B. Main Electrical Room:
1) (3) 480Y277V, 3ph, 4000A Service Entrance Switchboards with insulated/molded case circuit breakers to feed large HVAC equipment, distribution panels, and step-down transformers. Option to use multiple smaller size switchboards shall be investigated.
2) Switchboard shall include an integral surge protection device.
3) The Service Entrance Equipment will be in the Central Energy Plant or Mechanical Yard, depending on utility transformer location.

C. Other Electrical Spaces:
1) There shall be electrical spaces with branch circuit electrical panels located in other areas of the building (TBD).
2) Panels within electrical rooms shall be surface mounted. Panels in other spaces shall be kept to a minimum. If are required, they shall be flush mounted.

D. Generator
1) Generators shall be provided to provide back-up and emergency power. They are planned to be in the Mechanical Yard.
2) Generators shall back up the entire facility.
3) Estimated requirement is (4) 12,470Y7,200277V, 3ph, 3500kW diesel generators. A 38'-0" x 22'-0" space for each is recommended in the Mechanical Yard.
4) Opportunities to reduce the number or size of generators will be considered.

5) Appropriately sized automatic transfer switches will be provided near the service entrance equipment, to facilitate the use of generator power.

E. UPS Power:

1) UPS power shall be provided per the Cherokee Nation IT Standards.

F. Interior Lighting:

1) General:

(a) The lighting for this facility shall be accomplished using primarily fixtures with LED light sources.

(b) The lighting levels for each space within this facility will be designed in accordance with the Oklahoma Building Code (IECC 2006 / ASHRAE 90.1 2004) and the I.E.S. recommended practices. Where required by the Energy Code, lighting in common areas and corridors will be controlled by occupancy sensors. Individual spaces will be controlled by occupancy sensors or standard wall switches, as applicable.

(c) Lighting control devices (wall switches, occupancy sensors, BAS, lighting control panels, etc.) and design shall comply with all required Energy Codes.

(d) Special lighting will be considered to provide UV protection for designated surgery areas, to be determined during the design process.

(e) Unless noted otherwise, back-of-house areas (storage rooms, mechanical/electrical rooms) shall utilize LED strip light fixtures.

(f) Basis for design will be Bell and McCoy Sales. Refer to provided lighting cut sheets.

2) Spaces:

(a) In areas with high open ceilings – Direct/Indirect LED lighting, to be determined during the design process.

(b) In common corridor areas – Direct/Indirect Linear LED.

(c) In areas with gypsum ceilings – Recessed LED downlights.

(d) In areas with 2’ x 4’ acoustical ceilings – 2’ x 4’ architectural LED.

(e) In areas of special displays, to be determined during the design process - Track lighting.

G. Exterior Lighting:

1) Decorative sconces at non-glass doors/walls

2) Bollards at all glass doors/walls.

3) Parking Lot – Pole mounted, low profile LED fixtures.

4) Basis for design will be Bell and McCoy Sales. Refer to provided cut sheets.

5) Controlled through Campus BAS.

6) Controlled power will be provided for exterior signage. Signage power and control will come from the main building where feasible.

H. Emergency/Exit Lighting:

1) The emergency egress lighting and exit signage will be provided in accordance with

the Life Safety Code (NFPA 101) to delineate the paths of egress.

2) Emergency and back-up lighting shall be accomplished utilizing both the emergency generator and lighting UPS.

3) Emergency lighting layout shall be designed to provide IBC required minimum average light level of 1fc average and uniformity ratios of 40:1 along the defined path of egress.

4) Exit Lighting – All exits will be clearly marked using red or green LED illuminated exit signs. Exterior lighting at the exit doors will be powered by the emergency generator as required by the IBC.

5) Basis for design will be Bell and McCoy Sales

I. Infection Control:

1) Strategies for including UVC lighting as an infection control method will be considered.

J. Power:

1) In general, commercial grade duplex type receptacles will be liberally spaced throughout the entire facility as required for specific equipment power requirements and as required by the NEC. Hospital grade receptacles shall be specified where required.

2) Power will be provided for Electric Vehicle Charging Stations. Quantity and locations TBD.

3) Power will be provided for dock levelers at the loading docks.

4) General receptacle circuits shall have a maximum of six (6) receptacles to a circuit, with #12 AWG and 1/2” conduit minimum.

5) All device outlet covers will be nylon and will have the backside of the cover marked with the serving panel and circuit number in indelible ink.

6) Each junction box installed above an accessible ceiling will also have the covers marked with the panel and circuit number of the circuit(s) contained within.

7) GFCI type devices will be installed at all wet locations and locations required by the NEC. GFCI type receptacles will be located at the mechanical equipment for the connection of service needs as required.

8) Power/devices/conduit/etc. shall be provided for all other Divisions.

9) All interior wiring will be copper with a minimum size of #12 AWG (except auxiliary systems wiring may be a minimum of #18 AWG) and installed in conduit. MC cable will be permitted for use in 120V, 20A branch circuits that will be concealed in walls or above ceilings, but only where allowed by the local AHJ. All panelboard feeders shall be in EMT or galvanized GRC. All conduit installed concealed above grade may be EMT or galvanized GRC with a minimum conduit size of 1/2". All exterior wiring will be copper with a minimum size of #8 AWG (except auxiliary systems wiring may be a minimum of #18 AWG). All conduit installed below grade may be Schedule 40 PVC with galvanized GRC or IMC elbows, with a minimum conduit size of 1”. All exposed conduit will be painted to match wall finish. All conduit will be installed parallel and perpendicular to the building construction and installed in a neat and workmanlike manner.

10) Redundant grounding shall be provided in all patient care areas, per NEC requirement.
11) Isolated power shall be provided in all surgery/procedure areas as required by the NEC and NFPA 99.
12) Life Safety, Critical and Equipment Essential Power Systems shall be provided as required by the NEC and NFPA 99. The emergency power system will be arranged similar to CNOHC, with MV generators and 480V transfer switches. Other arrangements will be investigated as potential cost savings. Items powered by the various branches are as follows:
    (a) Critical Power
        (i) Task illumination.
        (ii) Medical gases.
        (iii) Critical receptacles.
        (iv) Nurse call.
        (v) Telephone and data.
        (vi) Other loads identified as necessary for effective facility operation.
    (b) Life Safety Power
        (i) Egress illumination and exit signs.
        (ii) Alarm and alerting, including fire and med gas alarms.
        (iii) Communications.
        (iv) Generator accessories.
        (v) Elevators and associated circuits.
    (c) Equipment Power
        (i) Central suction.
        (ii) Sump pumps.
        (iii) Compressed air.
        (iv) Smoke control.
        (v) Kitchen hood(s).
        (vi) Heat.
        (vii) Automatic doors.
        (viii) Autoclaves.
    (d) Optional Standby Power
        (i) Any other loads identified by the owner as requiring power, up to and including completely backing up the facility.

K. Lightning Protection System: Per NFPA 780.

L. Power and lighting and infrastructure for safety and IT for the following spaces:
1) Provisions for exterior window washing hoists.
2) Heat trace for grease waste lines.
3) A remote maintenance building.

7. DIVISION 27 – COMMUNICATIONS

A. ISP and Telco service providers demarcation shall be located in the MDF on the first floor. Two providers are being researched so redundant circuits can provide network provided to the hospital. They will be determined at a later date.
B. Communications spaces in the hospital:
    1) First floor:
        i. MDF = 1
        ii. IDF = 1
        iii. LV/IT = 3
    2) Second floor:
        i. LV/IT = 4
    3) Third floor:
        i. LV/IT = 4
    4) Fourth floor:
        i. LV/IT = 4
    5) Fifth floor:
        i. LV/IT = 4
    6) Sixth floor:
        i. LV/IT = 4

1.

C. Panduit fiber optic backbone cabling will be distributed from the MDF to the IDF and LV/IT spaces. Cable sheath shall be rated for the space in which it is to be installed. IT closets will be used to house the Cherokee Nation's network gear and cable terminations. The low voltage closets will be used to house the Cherokee Nation's vendor's systems network gear and cable terminations.
D. The structured cabling system will be a Panduit solution with a 25-year parts and labor warranty and a lifetime application guarantee, installed by the Owner's preferred Panduit Certified Installer, Lynx Systems.
E. All horizontal cables from the IDF/LV/IT spaces, unless otherwise noted, shall be Panduit® TX6A™ 10Gig™ UTP Copper Cabling Systems with Vari-MaTriX Technology with plenum rated sheaths.
F. Copper RJ45 jacks used in wireless applications shall be Panduit Mini-Com® TX6A™ 10Gig Shielded Jack Modules.
G. Intra-building fiber optic backbone cables will be interlocking armored, multi-mode, OM4, with plenum rated sheaths, terminated in Panduit® Opticom® Fiber Adapter Panels.
H. Communication spaces will have A/C grade plywood installed on a minimum of one wall, or as directed by the Cherokee Nation IT team. Metals for both IT/LV will be specified according to the Cherokee Nation Network Cabling Specifications.
    1) A combination of 2- and 4-post Panduit equipment racks/cabinets will be specified for the installation of active network gear, passive cabling connectivity hardware, horizontal and vertical wire management and bonding hardware. With the exception of Chatsworth, Inc. overhead ladder rack, all other metal components will be Panduit products.
    2) Cablofil wire mesh basket tray will be specified by the electrical contractor for low voltage cables in the ceiling space in corridors.

3) Panduit J-Pro cable supports will be specified and provided by the low voltage integrator in areas where basket tray cannot be installed.

I. The Voice / Data System will be determined by the Owner's Network Engineer at a later date. The following is a general description of requirements.
   1) The Contractor will provide rough-in for voice/data outlets consisting of two-ganged back boxes with a single gang mud ring and 1" conduit into an accessible corridor ceiling space within 12" of cable management device. Each conduit shall have a plastic bushing on the end of each conduit termination and shall include pull strings.
   2) Cable management in corridors with accessible ceilings will be by J-hooks, bridle rings or cable tray.
   3) The contractor will provide raceways from the MDF room to the nearest service provider access point service entrance. Conduit for telephone / data will be two (2) 4" PVC.
   4) The MDF/IDF/IT/LV rooms will have copper grounding busbars with an appropriately sized ground wire connection to the main building ground provided by the electrical contractor. IT/LV spaces will include a minimum of four (4) quadruplex outlets on two (2) dedicated circuits. These receptacles will have integral surge arrestors.

J. CATV will be coordinated with the Owner's service provider.

   1) The Contractor will provide rough in for CATV outlets that consist of a single gang back box and a 1" conduit stub up into ceiling space to near cable management device. Each conduit shall have a plastic bushing on the end of each conduit terminated with a pull string installed.

   2) CATV outlets will be provided at locations TBD.
   3) The Contractor shall provide a 4' x 4' backboard in the I.T. Room.
   4) The contractor will provide raceway between I.T. Rooms and entrance room for CATV service. Conduit for CATV shall be (1) 4" PVC with pull string.

K. Special A/V considerations will be given for projectors, screens, speake
L. rs, and audio sound systems for meetings, presentations, etc. All A/V requirements are still to be determined through the design process. Audio-video systems shall include current products that meet the needs of each space and are from the following manufacturers:
   1) Crestron
   2) Sonify
   3) Philips TV
M. The Rauland-Borg nurse call specification and design shall be provided by Rauland-Borg with installation by the Owner's vendor Audio Acoustics.
N. Mass notification and Intercom systems shall be Valcom Inc., installed by Lynx Systems.
O. The Wireless Access System will be determined by Owner's Network Engineer at a later date.

8. DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

A. Video Surveillance
   1. The Owner's Video Management Software is Milestone Systems, and the VMS platform is Xprotect Corporate. All licensing shall co-terminate with the existing base license.
   2. Video surveillance retention shall be no less than 30 days. Recording parameters such as FPS, continuous, or motion activated recording are unknow at this time, but will be addressed in upcoming coordination meetings with the Owner.
   3. The Owner's surveillance camera standard is Axis P series. Exact model numbers have not been established but will be as the design is further established.
   4. It is assumed that video surveillance will be present in all corridors, lobbies and common areas, stairwells parking areas and all points of egress/ingress.
   5. The Owner's preferred security systems integrator is Convergent.

Access Control

   1) Crux's understanding is that the Owner's Access Control System standard is Lenel and no longer Open Options, but this will be confirmed in upcoming coordination meetings.
   2) The Owner's standard for card readers is HID. Mobile credentials will not be used, and as of now there is no expectation of FIPS compliancy, but this will need be confirmed. Depending on the build schedule an alternative manufacturer may need to be considered due to supply chain issues. This will be addressed with the owner as the project develops further.
   3) It is assumed that secure access areas will be designated. The exact location will be determined upon further owner coordination.
   4) Panic/Duress buttons will be installed at registration and reception areas. Other areas as well as panic/duress programming functions will be identified in upcoming coordination meetings.
   5) The Access Control System shall integrate with the video surveillance system.
   6) All perimeter doors as well as roof hatches shall be monitored via magnetic contact switches.
   7) Preferred systems integrator is Convergent.

B. Patient Wandering Alert – to be determined upon user requirement meetings.
C. Infant Protection/Abduction-to be determined upon user requirement meetings.

AC FIRE PUMP
a xylem brand

Submittal

Job/Project:	Representative:	
ESP-Systemwize: WIZE-4ABBFD1B Created On: 04/08/2022	Phone:	
Location/Tag:	Email:	
Engineer:	Submitted By:	Date:
Contractor:	Approved By:	Date:

Split Case Fire Pump

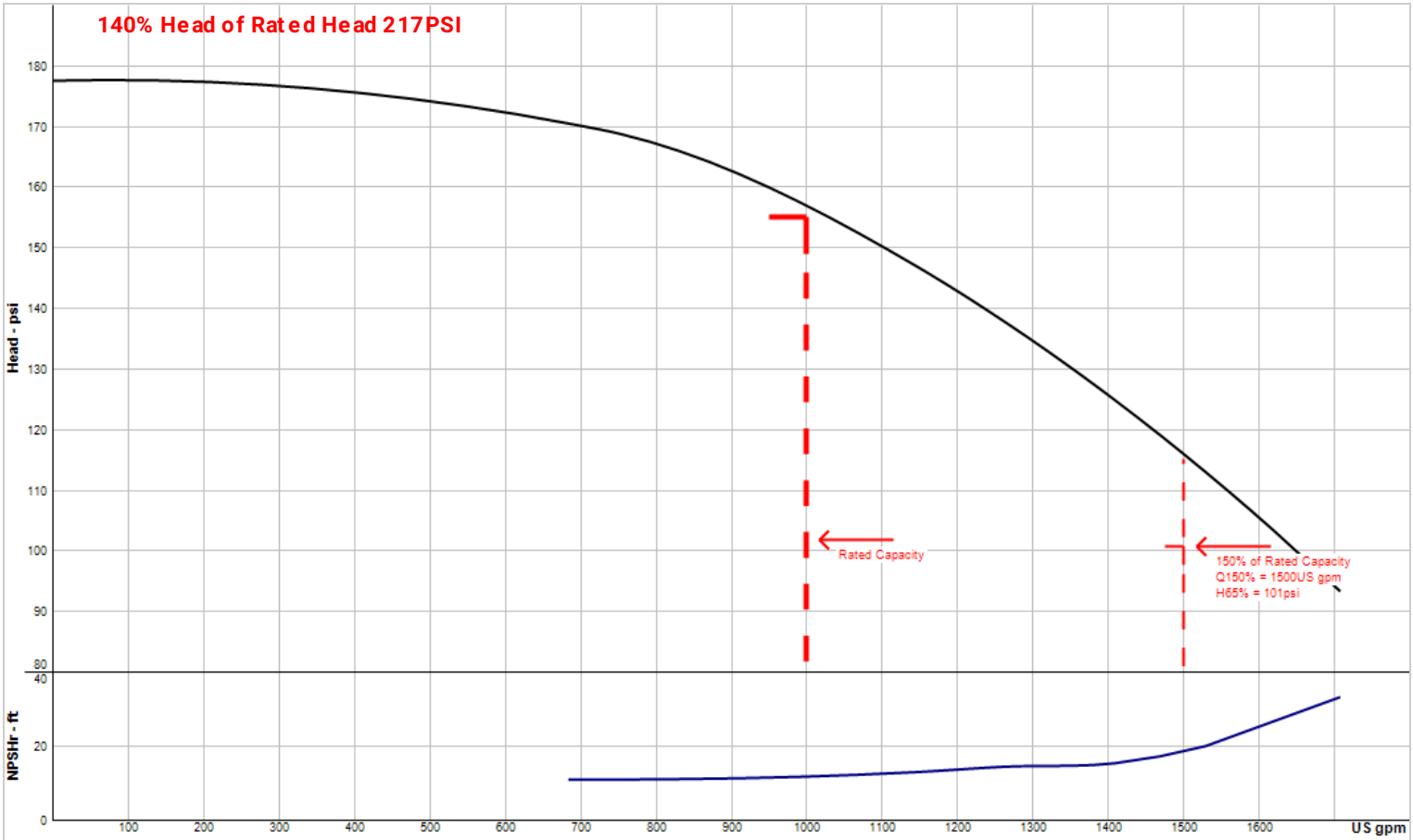
Pump Model: 6x4x11F
Nom. Speed: 3555 rpm
Market: Listed Fire Pump
Approval/Listing: FM/UL

Selection Criteria

Rated Flow	1000 US gpm
Rated Head	155 psi
Imp. Dia	9.667 in
Power Required at Duty	118 hp
Rated Efficiency	75 %
Fluid	Water
Temperature	85 °F
Sp. Gravity	1.000

NFPA Limits

140% Head of Rated Head	217 psi
65% Head at 150% Flow	101 psi
Flow at 150%	1500 US gpm
Head at 150%	115 psi
Power Req at 150%	133 hp
Efficiency at 150%	74.9 %
Max BHP	144 hp
Closed Valve Head	178 psi



Typical Performance Curve is shown. Fire Pumps are tested to ANSI/HI 14.6 acceptance grade 1U.
Rated Duty Point is guaranteed within the following tolerances: Flow 0% to + 10%, Head 0% to + 6%.
NO OTHER POINTS ARE GUARANTEED. PLEASE CONSULT FACTORY IF NEEDED.

Performance Curve Data

Flow (US gpm)	Head (psi)	Efficiency (%)	Power Required (hp)	NPSHr (ft)
0	178	0	0	11
250	175	53.2	66.3	11
500	172	61.6	86	11
750	169	69.9	106	11
1000	155	75	118	12.3
1500	115	74.9	133	20.9
1707	93.4	68	137	33.3

xylem Let's Solve Water
Xylem Inc.
8200 N. Austin Avenue
Morton Grove, Illinois 60053
Phone: (847) 966-3700
Fax: (847) 965-8379
www.acfirepump.com

Mobley Fire Protection
Dallas, Texas
(817) 614-2361

Job Name	:	WW Hastings Replacement Hospital - Standpipe
Drawing	:	
Location	:	
Remote Area	:	
Contract	:	
Data File	:	WW HRH - Standpipe Calc.WXF

Water Supply Curve

Mobley Fire Protection
WW Hastings Replacement Hospital - Standpipe

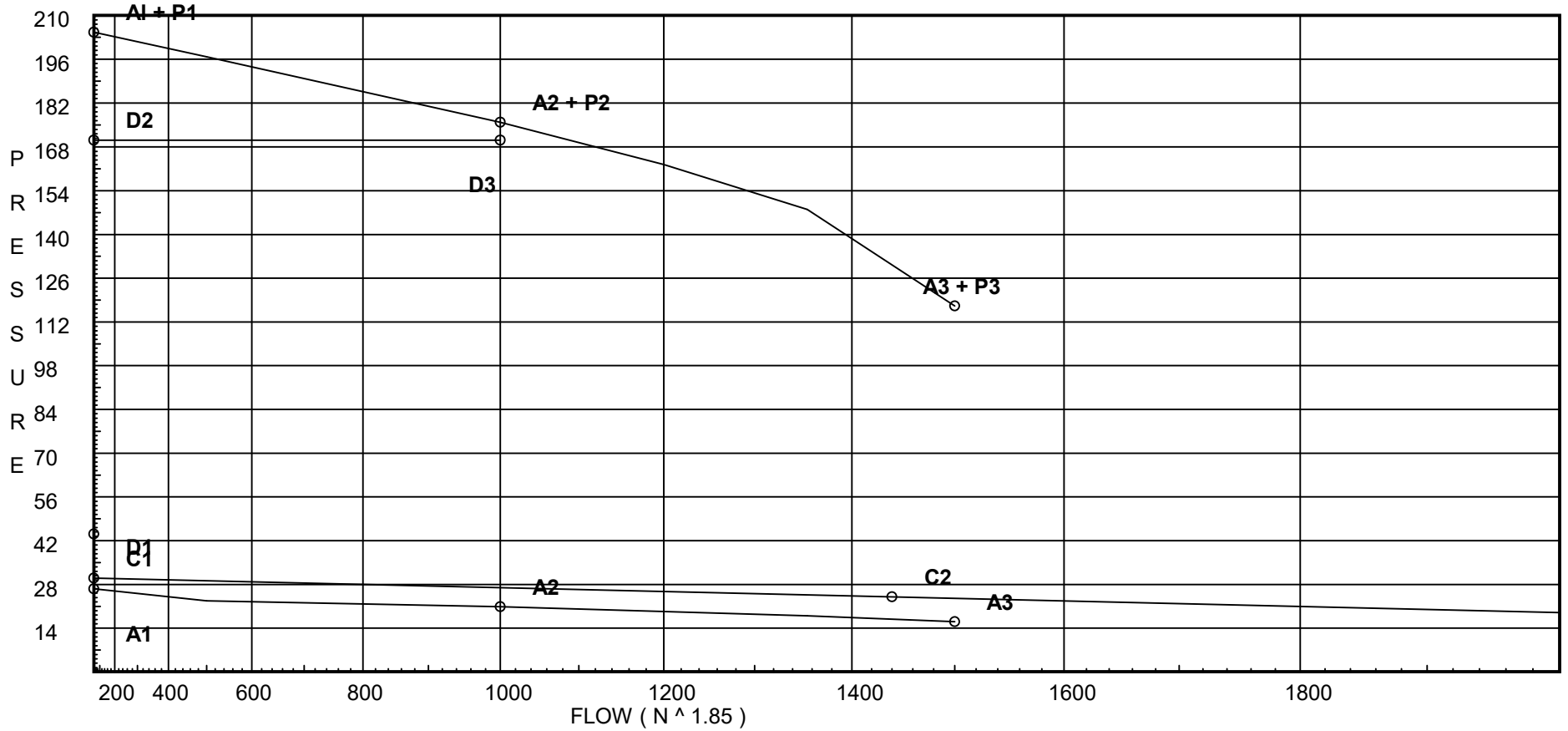
Date 04/22/2022

City Water Supply:
- C1 - Static Pressure : 30
- C2 - Residual Pressure: 24
- C2 - Residual Flow : 1440

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow
- A1 - Adjusted Static: 26.634
- A2 - Adj Resid : 20.901 @ 1000
- A3 - Adj Resid : 16.092 @ 1500

Pump Data:
- P1 - Pump Churn Pressure : 178
- P2 - Pump Rated Pressure : 155
- P2 - Pump Rated Flow : 1000
- P3 - Pump Pressure @ Max Flow : 101
- P3 - Pump Max Flow : 1500
- City Residual Flow @ 0 = 3437.04
- City Residual Flow @ 20 = 1897.93
- City Water @ 150% of Pump = 23.53

Demand:
- D1 - Elevation : 44.176
- D2 - System Flow : _____
- D2 - System Pressure : 170.199
- Hose (Demand) : 1000
- D3 - System Demand : 1000
- Safety Margin : 5.702



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
L	NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
FPD	See Information on Pump Curve			175.901	1000.0	170.199
TEST	30.0	24	1440.0	26.944	1000.0	26.944

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H31	102.0		100.0	250.0	
H32	101.0		100.44	250.0	
H21	85.5		106.66	250.0	
31	102.0		110.56		
32	101.0		110.99		
21	101.0		110.5		
B2	11.0		149.84		
B5	11.0		150.17	250.0	
B3	11.0		151.41		
HSP	1.0		162.32		
UG1	-4.0		165.21		
UG2	-4.0		167.4		
FPD	2.0		170.2		
FPS	2.0		20.9		
CSP	2.0		25.19		
UG3	-4.0		27.86		
TEST	0.0		26.94		

Final Calculations : Hazen-Williams

Node1 / to / Node2	Elev1 / Elev2	K / Fact	Qa / Qt	Nom / Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact / Pf/Ft	Pt Pe Pf	******* Notes ******
H31	102	H250	250.00	2.5	T	12.0	6.000	120	100.000	
to					Eql	31.0	43.000		0.0	
31	102		250.0	2.469			49.000	0.2154	10.555	Vel = 16.75
			0.0							
31			250.00						110.555	K Factor = 23.78
H32	101	H250	250.00	2.5	T	12.0	6.000	120	100.435	
to					Eql	31.0	43.000		0.0	
32	101		250.0	2.469			49.000	0.2154	10.555	Vel = 16.75
			0.0							
32			250.00						110.990	K Factor = 23.73
H21	85.500	H250	250.00	2.5	T	12.0	6.000	120	106.657	
to					Eql	31.0	43.000		-6.713	
21	101		250.0	2.469			49.000	0.2154	10.555	Vel = 16.75
			0.0							
21			250.00						110.499	K Factor = 23.78
31	102		250.00	6			1.000	120	110.555	
to									0.433	
32	101		250.0	6.357			1.000	0.0020	0.002	Vel = 2.53
32	101		250.00	6	2E	35.205	100.000	120	110.990	
to					T	37.72	85.498		38.979	
B3	11		500.0	6.357	B	12.573	185.498	0.0078	1.440	Vel = 5.05
			0.0							
B3			500.00						151.409	K Factor = 40.63
21	101		250.00	6	2E	35.205	84.500	120	110.499	
to					T	37.72	85.498		38.979	
B2	11		250.0	6.357	B	12.573	169.998	0.0022	0.366	Vel = 2.53
			0.0							
B2			250.00						149.844	K Factor = 20.42
B2	11		250.00	6			150.000	120	149.844	
to									0.0	
B5	11		250.0	6.357			150.000	0.0022	0.323	Vel = 2.53
B5	11	H250	250.00	6			160.000	120	150.167	
to									0.0	
B3	11		500.0	6.357			160.000	0.0078	1.242	Vel = 5.05
B3	11		500.00	6	3E	52.808	170.000	120	151.409	
to					B	12.573	65.381		4.331	
HSP	1		1000.0	6.357			235.381	0.0280	6.585	Vel = 10.11
HSP	1		0.0	6	E	17.603	8.000	120	162.325	
to							17.603		2.166	
UG1	-4		1000.0	6.357			25.603	0.0280	0.716	Vel = 10.11
UG1	-4		0.0	8	4E	108.73	250.000	150	165.207	
to							108.731		0.0	
UG2	-4		1000.0	7.98			358.731	0.0061	2.195	Vel = 6.41
UG2	-4		0.0	8	4E	84.564	20.000	120	167.402	
to					B	14.094	233.726		0.801	* * Fixed Loss = 3.4
FPD	2		1000.0	8.249	S	52.853	253.726	0.0079	1.996	Vel = 6.00
					2T	82.215				
			0.0							
FPD			1000.00						170.199	K Factor = 76.65

Final Calculations : Hazen-Williams

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*******	Notes	******
System Demand Pressure									170.199			
Safety Margin									5.702			
Continuation Pressure									175.901			
Pressure @ Pump Outlet									175.901			
Pressure From Pump Curve									-155.000			
Pressure @ Pump Inlet									20.901			
FPS	2		0.0	8	G	4.698	20.000	120	20.901			
to					3E	63.423	68.121		3.600	* * Fixed Loss = 3.6		
CSP	2		1000.0	8.249	Zac	0.0	88.121	0.0079	0.693	Vel = 6.00		
CSP	2		0.0	10	L	19.36	8.000	120	25.194			
to							19.360		2.599			
UG3	-4		1000.0	10.42			27.360	0.0025	0.069	Vel = 3.76		
UG3	-4		0.0	10	2E	39.295	150.000	120	27.862			
to					G	4.465	88.414		-1.732			
TEST	0		1000.0	9.79	T	44.654	238.414	0.0034	0.814	Vel = 4.26		
			0.0									
TEST			1000.00						26.944	K Factor = 192.65		

Foodservice Design Professionals

Dallas: 972.245.5300
Houston: 281.350.2323
San Antonio: 210.704.1250

Mr. Mathew Thomas
Childers Architect
45 South Street
Fort Smith, AR 72901

May 06, 2022

Reference: Section 114000 – Foodservice Equipment
WW Hastings Replacement Hospital
Schematic Design Narrative

Mr. Boren,

Below is the Schematic Design Narrative for the WW Hastings Replacement Hospital for your use and review.

Please review at your convenience and call if there are any questions.

Sincerely,

Lance Brooks

Receiving Area:

- Double door located plan north of kitchen area to accommodate pallet racks.

Janitors Room:

- Mop sink.
- Mop and broom holder.
- One (1) 48" long chemical shelf.

Office:

- Two (2) offices, one dedicated to director, one dedicated for staff.
- Vision panels to be located to allow the manager to view the kitchen and the receiving corridor.
- Size is to accommodate to total amount of staff required within this space.

Restroom and Locker Room:

- Located off of main receiving corridor
- One restroom to be provided with one (1) locker room.
- Number of lockers and coat hooks to accommodate total amount of employees within the kitchen.

Dry Storage Area:

- Shelving to be 24” wide, height 86” maximum.

Cold Storage Assembly:

- To be size to accommodate 7-day inventory.
- To be located in the rear of the kitchen to accommodate a main receiving corridor.
- To be located across from the preparation and production area to minimize cross traffic from the other kitchen support areas.
- An alarm system to be provided to monitor the temperature.
- The refrigeration system to be located in the Service Yard within 75' of the assembly or on the roof above the kitchen.

Production Area:

- The production area is to be located across from the freezer assembly. To be located to minimize any cross traffic from the other kitchen support areas.
- Production equipment to be sized to accommodate the total bed count.
- Exhaust hoods to be designed to accommodate all production equipment, and will be designed per IECC 2015 code requirements.
- Production equipment to include the following-Quantities to accommodate the bed count.
    - Double stack convection ovens
    - Double stack combi oven
    - 40 gallon tilt braising pan
    - 40 gallon tilt kettle
    - Griddle
    - Microwave oven
    - Support worktables with a meat sink and pot rack

Preparation Area:

- The preparation area is to be located across from the walk-in cooler assembly and to be located to minimize any cross traffic from the other kitchen support areas.
- The preparation area is to include the following equipment:
    - Preparation table with two sinks and pot rack
    - Support tables
    - Disposer
    - Slicer with stand
    - Can opener
    - Pan rack

Bakery Area:

- The bakery area is to accommodate scratch or par bar baked cooking.
- The cooking equipment is to include the following:
    - 20 qt mixer with stand
    - Heated/Proofing cabinet
    - Hot water dispenser
    - Support worktables with pot racks
    - Pan rack

Meal Set-Up Area:

- Support worktables with hot or cold holding and transport equipment to support the staging of meals.

Cart Staging Area:

- Area to be adjacent to Meal set-up.
- Area must be large enough to accommodate the number of carts needed to deliver food to patients
- The width of the corridor must be large enough to accommodate the traffic of carts and employees.

Beverage Area:

- Support worktables with beverage brewing and dispensing equipment to accommodate the bed count.
- Beverage equipment to include the following to accommodate the bed count.
    - Coffee Brewer
    - Tea Brewer
    - Coffee/Tea Dispensers
    - Undercounter refrigerator
    - Water dispenser

Soiled Dish and Cart Return Area:

- One (1) door entering into the soiled area, the door size is to accommodate the largest cart used for deliveries.
- One (1) door leaving the soiled area and into the clean area, the door size is to accommodate the largest cart used for deliveries.
- Support the return of soiled trays and carts. Equipment to include:
    - Soiled dish table
    - Dishmachine
    - Disposer
    - Hose Bib
    - Soiled dish shelving

Clean Dish and Cart Staging Area:

- Clean area to accommodate clean and sanitized trays, dishes, and carts coming from soiled area.
- An area to be provided for clean carts to be stored and ready to move to staging area
- 3-compartment sink to clean and sanitize wares used in the kitchen to be adjacent from clean area to prevent any cross-contamination

Grab n' Go Area:

- The grab n' go area is to be located between the public concourse and the kitchen area.
- A section of wall with the refrigerated merchandising equipment to be located between the kitchen and the public concourse.

- The layout of the grab n' go area is designed so that the queuing of the guests does not interfere with normal foot traffic.
- Beverages to be located near the Cashier or at the beginning of the serving line.
- Grab n' Go area to include the following:
    - Silverware/condiment dispenser
    - Refrigerated Grab n' Go merchandiser
    - Refrigerated beverage merchandiser
    - Heated merchandiser
    - Coffee dispenser
    - Tea dispenser
    - Microwave
    - Flat top counter

END OF NARRATIVE

FEC Heliports
5298 River Road
Cincinnati, Ohio 45233

877-HELIPAD (435-4723)
513-621-5260
www.fecheliports.com

May 2022

FEC Heliports will design a rooftop helipad for the WW Hastings Hospital located in Tahlequah, OK. We will generate a complete set of construction ready documents that can be used by other subcontractors for bidding purposes. Below are the Design Services for this project. FEC will file all FAA and State DOT paperwork to register the helipad.

Design Pricing for Elevated Helipad

- Heliport layout and design services to meet or exceed the current FAA criteria for heliport design for (1) 53' x 53' aluminum helistop for a 12,000 pound capacity helicopter with 12'-0" wide walkway to elevator. Pricing is for design through the construction documents.
- Design includes lighting layout to meet FAA, emergency egress from the deck, fuel containment, design coordination for fire suppression as required to meet NFPA 418 and snowmelt if requested for the helipad and walkway. FEC does not stamp the mechanical, electrical or fire suppression drawings.
- Design includes all **horizontal** structural support steel for the helipad and walkway above the foundations. Steel supports to be galvanized.
    - **Foundations and vertical columns** for deck, walkway and stairs to be designed by others. Complete coordination throughout with FEC structural designers including loading information for column design. Design of the column connection to the foundation is by others and design of the column connection to helipad steel is by FEC.
- Package will include H series drawings showing general layout, S series showing structural framing, stairs and all details, E series showing electrical, SN series showing safety netting details, PA series showing painting details, FS series showing fire suppression information, P series showing the pluming information and SM series showing the snow melting information if required.
    - Structural steel and safety net drawings and calculations package stamped by Professional Engineer. Additional stampings priced separately, if applicable.
    - FEC does not stamp electrical, mechanical or fire suppression drawings. Subcontractors to use our submittal as reference layouts in conjunction with their package.
- Electronic Operations and Maintenance manuals for submittals
- Electronic set of drawings and calculations in AutoCAD or PDF format as required.
- FAA and State DOT filing for registration

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Material provided for the WW Hastings Helipad Construction – design not yet completed, so material are subject to change and will be per final design submittal

- ALL aluminum *HELISLAT* for 53' x 53' helipad and 12' wide walkway/ramp
- FEC standard clamping hardware for all supplied aluminum as required
- All other necessary hardware and caulking for deck
- Neoprene isolation between aluminum and steel for the deck as required
- Aluminum Gutter HP0259 along low side of the deck with (3) downspout locations
- 5 ft. wide safety netting, FEC standard design with support brackets galvanized
- HP0285 fuel water separator with high level indicator and heater
- Non-Skid Paint for deck and walkway which includes FAA Markings
- HP0908 LED Lighted Windcone
- LED NVG Perimeter Lights for Helipad HP2090G green
- LED NVG Obstruction lights HP3080P red
- HP0649 LED walkway flood lights
- AFFF Fire Suppression equipment to meet NFPA 418 2021, includes pre made skid with deluge valve, proportioner, fire panel and manual pull stations. Also includes AFFF delivery equipment (fixed nozzles or water cannon) to be approved by the AHJ.
- FEC standard snowmelt equipment; operating skid to include heat exchanger, (2) circulating pumps (1) for redundancy, control panel, air separator, expansion tanks, heat actuator
    - Stainless steel manifolds for helipad and walkway
    - FEC standard rubber tubing for helipad and walkway
- Structural Steel package to be galvanized and includes all steel as shown in FEC approved drawings for the Helipad and walkway to support up to 12,000# aircraft
- All connection hardware for structural steel package and emergency exit stairs
    - Building Engineer to design foundations and/or support columns for the stairs, Helipad and walkway as shown in approved drawings.
- Structural support cradle for the fuel water separator
- Exit stairs as shown in approved drawings

INSTALLATION

FEC will supply an experienced non-union crew to install all the FEC supplied equipment on your site. We provide a single mobilization and coordinate with all other trades.

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WORK TO BE PERFORMED BY OTHERS (When FEC Installs)

FEC will need 5-7 days of crane service for installation. Crane provided by others.

Each helipad is custom designed, so there may be additional costs not identified until the design process. See drawing submittal for clarification. Any pipe sizes and volumes mentioned are considered estimates.

ELECTRICAL CONTRACTOR RESPONSBILITIES
Lighting-Supply wiring and conduit for:

FEC will supply all fixtures.

- HP2090G Perimeter lights, 9 watts each, 120V
  - FEC will mount, EC will make final connections
- HP0649 walkway flood lights, 12 watts each, 120V
  - EC will mount and make final connections
- HP3080P Red obstruction lights 9 watts each, 120V
  - EC will mount and make connections
- HP0908 windcone and HP0202 beacon, 120V
  - EC will mount and make connections
    - Obstruction lights and windcone should be on photo cell, beacon always on
- HP0656 Receiver Controller (for pilot-controlled lighting)
  - EC will mount unit outside, EC will tie in lights and make final connections
  - If unit is to be mounted inside, remote antennae must be purchased and mounting and connections are the responsibility of the EC

Fuel/Separator

- Heater 240 or 208 V single phase, 5KW per heater
- Connect High Oil Level Sensor, 120V

Fire suppression (H-2 category only)

- Skid is fed with a single feed of 120V AC (5 amps typical, but not guaranteed)
- (2) Manual pull station is 120V, 1 amp, mount and wire

Hydronic Snowmelt System

- Single attachment to skid of 480V (3) phase, pumps pulls about 10 amps
- 1 run of 5 strand 18 gauge wire for deck sensor
- 1 run of 2 strand 18 gauge wire for temperature sensor, should be mounted in the shade

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MECHANICAL CONTRACTOR RESPONSIBILITIES (When FEC Installs)

Fuel/Water Separator

- Connect gutter which is provided by FEC to the fuel water separator with 4" black iron pipe with a 6" flanged connector at the separator
- 4 vents that get PVC piping, see FEC dwg. HP0285 for details
- Outlet piping is 6" which can outlet directly onto the roof , hard piping to a roof drain is optional
- Fill separator with fresh water and set drain off tube per FEC operations manual

Hydronic Snowmelt

- Verify steam or hot water heat supply per drawing package
- Skid must be housed in weatherproof room. Skid measures 5' x 6'x 8' and there should be 18-24" of clearance around it for maintenance
- Bring steam or hot water from supply to heat exchanger on skid provided by FEC. Line size TBD in shop drawing phase
- Design and install supply and return piping from skid to FEC supplied manifolds at deck. Manifolds have flanged connections
- FEC will supply and install deck manifolds; both supply and return.
- Fill system with 50/50 glycol water mix and pressure test, glycol supplied by others, system volume can be estimated by FEC

Fire Suppression if H-2

- Skid measures 4' x 8' x 6 and should be in weatherproof room with 18-24" of clearance for maintenance
- Bring water to foam skid (supplied by FEC) from an approved fire supply in 3" black iron to connect to the 3" deluge valve on the skid.
- Run 2 ½" line from skid out to location of fixed nozzles (4) (as designated on drawing, typically the four corners) and then mount nozzles. Line should be sized down to accommodate nozzle connection of 1" NPT
- Nozzles will be supplied by FEC, along with GPM requirements and contractor will be responsible for all piping routes and calculations to meet requirements. Certified sprinkler contractor typically required to pull any permits related to fire suppression

FEC provides training after installation and full coordination with other trades as part of our design build services. At the time of this narrative, the helipad still needs to be designed in full, so not everything mentioned will be applicable, but the document does contain the full scope of all services for this project.

OPR Worksheet
LEED BD&C v4, EA Prerequisite 1,
Fundamental Commissioning
Update 2022-05-02

Project:

Hastings Hospital

Physical Address:

Tahlequah, Oklahoma

Owner's Representative Name and Contact Info:

Jessie Brackett

Cherokee Nation Health

Design Agent's Name and Contact Info:

Shane Boren, AIA, LEED AP

Senior Project Manager

Childers Architect

45 South Fourth Street, Fort Smith, Arkansas 72901

Phone: 479-783-2480 Cell: 479-806-0907

sboern@childersarchitect.com

Approved: _____ _____ _____

Name Owner's Representative Date

_____ _____ _____

Name Design Agent's Representative Date

Contents

I. Overview and Instructions

The purpose of this document is to provide clear and concise documentation of the Owner's goals, expectations, and requirements for equipment and systems. Documentation of the Owner's environmental and sustainability goals are the other important purpose of the Owner Project Requirements. It is utilized throughout project delivery and the commissioning processes to provide an informed baseline and focus for design and for validating systems energy and environmental performance. The Owner's Project Requirements (OPR) is completed and approved by the Owner and is based on coordination with the end user.

The intent of the OPR is to detail functional requirements and expectations of the building's use and operation. Attention is given to special or distinctive characteristics, environmental goals and sustainability goals. It is ideally completed before beginning the schematic design phase and furnished to the design team. The OPR must be completed prior to the approval of Contractor submittals.

Updates to the OPR throughout the course of project delivery are made by the Owner and are based on decisions and agreements coordinated with and agreed to by the end user.

II. Owner and User Requirements

1. General Goals

The purposes of this new facility is to complement the Cherokee Nation Outpatient Health Center (CNOHC) and to replace the existing hospital located on the WW Hastings campus in Tahlequah, Oklahoma. The new full-service hospital includes emergency department, ICU, Imaging, Med Surg, Labor and Delivery, NICU, Nursery, Hospice, Pharmacy, Lab, SPD, Dietary, Surgery, Administration, IT, Property and Supply, Building support.

HKS- ILO to review for operational and departmental goals.

2. Broad Goals

Goals for future expansion are taken into account with shell spaces on the 5th and 6th floors that will be built-out in the future and with equipment storage spaces that may converted to operating rooms.

Materials choices are to use the most restrictive (main) occupancy classification (i.e., Health Care and Group I-2), Type II (222) and Type IB construction classification, and to consider the building is protected throughout with an automatic sprinkler system.

Goals for materials and equipment are to source within the continental United States and locally where possible to fulfill LEED materials and resource objectives.

Estimated turnkey cost = $405 million. Estimate includes A&E, FF&E, CM, construction and site costs.

3. Basic Building Information

a. Building Square Footage – 400,778 including CEP, shell space and sky bridge.

b. Number of floors – 6.

c. Occupancy Days per Year – *365.*

d. Hours of Occupancy per Occupied Day – *24.*

4. Owners Goals for Equipment

The design will consider the Owner's preferred basis of design vendors and equipment listed below. The design will also focus on energy conservation, indoor air quality, reliability, maintainability of the mechanical, electrical, and plumbing systems. Design to be compatible with existing campus BAS.

5. Health Mission Statement

Mission: To ensure the story of the Cherokee Nation continues, we partner with individuals, families, and communities to improve our health and quality of life.

Vision: Healthy Cherokee people, families and communities for this and future generations.

III. Environmental and Sustainability Goals

1. Environmental and Sustainability Goals

Overall sustainability goals, not just LEED Certification.

i. Reduce Energy and Waste
   a. Optimized use of energy based on occupancy
   b. Utilizing different zones of the space to capture energy reduction
   c. Demand control ventilation
   d. Systems and envelope commissioning

ii. Improve the quality of life for all
   a. Better air quality
   b. Sound control
   c. Natural Light and ways to emulate natural light

iii. Infrastructure to promote and support all forms of alternative transportation
   a. Bus transit
   b. Walking
   c. Biking
   d. Carpooling
   e. Electric Vehicle Charging, Low-Emitting, and Fuel-Efficient Vehicles

iv. Waste Reduction
   a. Reuse and recycling of materials
   b. Office Related (i.e. ongoing consumables)

2. Performance, Sustainability, and Health Criteria

i. General Project Goals
   a. Achieve LEED BD+C: Healthcare v4 Silver certification, including the specific credits outlined in the project scorecard, including a deliberate emphasis on Indoor Environmental Quality credits.
   b. Collect Performance Information to be able to replicate and improve the project from a cost perspective so that other projects may follow and improve on the example.
   c. Provide the monitoring and feedback infrastructure to ensure and manage ongoing health and sustainability performance ranging from employee activity and stress levels to energy and air quality management.

ii. Site / Community Goals
   a. Site Microclimate - The Landscape plan is to be based on concepts of:
   b. Access, circulation, and separation of pedestrian and auto traffic.

c. Sets the tone for future development in the vicinity.
d. User experience throughout the site and adjacent to buildings planned view areas
e. Create opportunities to activate main street and the alley.
f. Low maintenance, seasonally transformative, native, restorative plant materials/communities and ecosystems
g. Durable site materials
h. Dark sky compliant lighting

iii. Stormwater Management

a. Capture and slowly release all stormwater on site with the potential to store and re-use on the vegetated roofs.

iv. Respond to the Urban Heat Island effect through roofing and hardscape strategies.

a. Maximize use of PV panels on the roof.
b. Limit hardscape outside the building.
c. KPI: LEED v4 Healthcare, SSc Heat Island Reduction

v. Outdoor Area Function

a. Provide areas of respite with direct access from indoors
b. KPI: LEED v4 Healthcare, SSc Places of Respite and SSc Direct Exterior Access
c. Encourage outdoor engagement
d. KPI: LEED v4 Healthcare, LTc Bicycle Facilities

3. Water Goals and Requirements

i. Indoor Water Use:

a. KPI: Fixture water use reduction of at least 25%. (LEED v4 Healthcare, WEc Indoor Water Use Reduction)
b. All water closets, urinals, showerheads, and patient room sinks must carry a Water Sense label

ii. Potable Water

a. Minimize potable water use for irrigation and cooling towers

iii. Outdoor Water Use

a. KPI: Irrigation water use reduction of at least XX%. (LEED v4 Healthcare, WEc Outdoor Water Use Reduction)
b. Reduce potable water used for landscape irrigation
c. Possible exploration of process water capture and reuse TBD.

4. Energy and Atmosphere

i. Perform Early Daylight and Energy Modeling to inform Design

a. Integrate architectural design with Energy Conservation Measure (ECM) bundles
b. Reduce internal loads to right-size HVAC systems
c. Maximize daylighting to reduce artificial lighting
d. Optimize window-to-wall ratio for daylighting, reduced glare and thermal conditions
e. KPI: Goal is to exceed ASHRAE 90.1-2010 by at least XX%.
f. KPI: Goal in EUI (Energy Use Intensity): XX

ii. KPI: Strive to achieve a combined Site EUI (kBtu/ft2) of XX for the project (based on a XX% improvement over baseline ENERGY STAR portfolio manager median value of XX for <use type> and XX for <use type>).

a. Reduce the overall carbon footprint from the project's construction and operation. Median property value based on ENERGY STAR target finder is 4,550 metric tons of CO2e; design target based on a 36% overall reduction in energy use 2,912 metric tons of C02e.
b. Energy cost reduction estimate based on this 36% improvement over median property type: $232,491.

iii. With an ultimate focus on load flexibility and management strategies, measure and meter end energy use wherever possible
a. KPI: LEED v4 Healthcare, EAc Advanced Energy Metering and LEED v4.1, EAc Grid Harmonization

iv. ENERGY STAR – provide ENERGY STAR rated equipment where available.

v. Maximize roof top area for solar panels and similar on-site renewable energy.

vi. Investigate and pursue all available utility incentives. Estimates will be developed upon completion of the energy model. The project must achieve LEED Silver to qualify for incentives

vii. Standards for the enclosure
a. The acceptable infiltration rates used for the project will be supplied by the AoR and EoR to the Cx Team prior to DD 100%.
EoR will supply and provide a value to be utilized for the Energy Model and to be included in this document.
b. Minimized thermal bridging in the wall and roof assemblies exposed to exterior environments.
The expectation is that thermal bridging of primary structural and cladding components is not acceptable.
c. Level and detail of mockups is to be determined with the project team.
The architect will provide detailed drawings of mockups and specs.

5. Materials

i. Strive to use local/regional materials and materials with recycled content.

ii. Reduce the release of Persistent Bio accumulative and Toxic (PBTs) chemicals associated with the life cycle of building materials.
a. KPI: LEED v4 Healthcare, MRc PBT Source Reduction credits and MRc Furniture and Medical Furnishing

iii. Utilize EPDs, HPDs, and WBLCA to make informed material decisions
a. KPI: LEED v4 Healthcare, MRc Building Life-Cycle Impact Reduction and MRc Building Product Disclosure and Optimization credits

iv. Reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.
a. KPI: Reduce or eliminate construction and demolition waste. Target goal: XX% diversion.

i. Conserve resources associated with the construction and management of buildings by designing for flexibility and ease of future adaptation and for the service life of components and assemblies.
a. KPI: LEED v4 Healthcare, MRc Design for Flexibility

6. Indoor Environmental Quality

i. Provide a comfortable environment with controls for temperature and lighting
a. Night lights in patient rooms
b. Low temperature and humidity in operating rooms
c. Filtration in compound mixing rooms

d. High outside air in an atrium

ii. Address noise and acoustical separation in office/administration areas.

a. KPI: Meet two of the following: HVAC background noise, Sound Transmission, and/or Reverberation time within LEEDv4.1, EQc Acoustic Performance

iii. Provide natural light/daylighting and views

a. Model daylight strategies to optimize solutions for occupant space use conditions.

b. Strive to provide natural light in all regularly occupied spaces with seamless integration of artificial light.

c. Minimize and control glare.

d. Provide views of surrounding landscape from all regularly occupied spaces.

iv. Provide enhanced indoor air environment for all spaces.

a. KPI: LEEDv4, EQc Indoor Air Quality Assessment, Option 1

b. KPI: LEEDv4, EQc Interior lighting: Option 1 and Option 2, if achievable.

c. KPI: LEEDv4, EQc Quality views

v. Strive to use low VOC adhesives, sealants, paints, coatings, and flooring materials.

a. Achieve LEEDv4.1 EQc Low Emitting Materials: at least 3 product categories.

vi. Strive to use composite wood and Agri fiber products that are free of added-urea formaldehyde.

a. Develop and implement an Indoor Air Quality Management plan during project construction.

IV. Expectations by Discipline

Complete for each category or indicate "none identified" or "N/A". Add additional desired features and information for additional desired systems.

1. (00) Architectural

1. General

i. Sustainable Design Reporting

ii. Sustainability Certification Project Procedures - *LEED v4*

HP will get input from LEED Consultant

iii. Code-Required Special Inspections

iv. Temporary Erosion and Sediment Control

HP will get input from Civil Consultant

v. Volatile Organic Volatile Organic Compound (VOC) Content Restrictions

A&E Specifications to be aligned with LEED requirements.
This project will conform to LEED requirements for VOCs.

vi. Closeout Submittals

Childers to include in Agenda of the meeting with the Owner 05-10-22.

vii. Demonstration and Training

Childers to add this to the Agenda of the meeting with the Owner 05-10-22.

viii. This project will employ general commissioning requirements as defined by LEED.

ix. This project will employ Commissioning Authority responsibilities as defined by LEED.

2. Finishes

A. Construction documents are to incorporate a plan to regulate Level 4 finishes. The plan may include third party inspections and testing.

Childers to add this to the Agenda of the meeting with the Owner 05-10-22.

3. Fire and Smoke Dampers

Smoke detectors, dampers and controls shall be located as a function of the Life Safety Plan developed by TYLER MOBLEY. Special caution should be taken to avoid false tripping of detectors by the humidifiers. Smoke damper enunciators/keyed switches are to be located on walls in lieu of the ceiling where possible.

4. Equipment Access

Equipment and systems shall be designed to allow full access for maintenance functions. Submittals will be reviewed in detail to compare and confirm alignment with field conditions both by the engineer and the contractors per contract documents requirements.

To assure proper clearances above ceilings, during BIM coordination, equipment will include a block or shaft indicating the clear right of way for maintenance access.

2. (05) Structural

i. Geotechnical Report

The Geotechnical Report has been prepared and submitted February 9, 2022 by Palmerton & Parrish, Inc. (PPI). In general, the subsurface conditions within the footprint of the structure are highly variable with less variability and higher quality bearing materials within the south half as compared to the north half.

Pre-drilling a probe hole prior to the final design of the drilled concrete pier as prescribed by the structural engineer. This pre-drilling is a 2" probing drill to determine if there are any voids in the foundation soils below the concrete drilled piers and determine actual soil conditions at each column.

ii. Hospital

a. Foundations

Drilled piers are the best foundation option. Foundation reactions will reach 1,100 kips.

b. Hospital Structure

The structure will be steel beams with composite floor system and ridged lateral frames. The floor slab will have a normal weight concrete. The project includes mechanical roof screen walls.

c. Helipad

A Helipad specialist will design this structure. The main support system for the structure will be the building columns.

d. Canopies

The project includes four canopies. One at the north side, the main atrium and drive-up canopies and the ambulatory canopy.

e. Central Energy Plant

Approximately 80’-0” x 80’-0” and 28’-0” to 30”-0” tall. Two (2) story building with all components hardened.

f. Mechanical Yard

This yard is approximately 98’-0 long in the N/S direction and 80’-0” long in the E/W direction. Presently, the structural team has an expectation of designing a Matt Slab foundation at grade. Utility connection between the Mechanical Yard, CEP and Hospital to be direct burial without tunnel or bridge.

g. Cross-over Bridge

This structure will be a steel structure.

3. (10) Wayfinding and Signage

4. (11) Equipment
   i. Vehicle Charging Equipment
   ii. Loading Dock Bumpers
   iii. Loading Dock Seals and Shelters
   iv. Projection Screens
   v. Laboratory Fume Hoods
   vi. Modular Wall Panel Enclosures
   vii. Playground Equipment
   viii. Patient Lifts

5. (11) Food Service Equipment

6. (12) Furnishings and Artwork
   i. Horizontal Louver Blinds
   ii. Vertical Louver Blinds
   iii. Window Shades
   iv. Countertops
   v. Entrance Floor Mats and Frames

7. (13) Shielding (Lead/RF) and Special Construction
   i. Integrated X-Ray Shielding Assemblies
   ii. Integrated RFI/EMI Shielding Assemblies

8. (21) Fire Protection (Sprinklers)

The entire facility shall be protected by a sprinkler system in accordance with NFPA and insurance underwriter requirements.

9. (22) Plumbing

1. Domestic Water Service

i. Desired Type:

a. Tahlequah Public Works Authority (TPWA) is the water provider.

b. Currently there exists a 12-in loop around the clinic. Portions of the water line need to be relocated to remove them from the hospital and central energy plant. The existing water distribution system needs to be improved to provide water sufficient to meet flow demand and pressure requirements of the fire code.

c. Provide construction drawings to relocate existing water lines and to construct a new 16-in water loop around the hospital. The new 16-in water line needs to connect to TPWA's 16-in water main along the east property line. A second 16-in connection needs to be made to TPWA's 24-in water main on Ross Street.

d. Coordinate with TPWA in the planning and design of the water system improvements and Oklahoma Department of Environmental Quality construction permits.

e. MRI cooling back-up is city water which has issues and needs to be discussed.

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vii. Maintenance Requirements:

A. Design to include isolation valves at all equipment and consider ease of maintenance/replacement with minimal water loss.

B. Design to include zone valves and consider ease of maintenance/replacement with minimal water loss and flow balancing.

viii. Desired Technologies:

A. Reverse osmosis and deionized water systems provided as required by user groups.

B. Ice makers – hard piped.

C. Coffee makers – hard piped.

D. “Big John” toilets for patient of size applications.

E. All toilets to be floor mounted.

F. Public toilets to include baby changing stations.

G. No restrooms in Endoscopy.

H. ICU Step-don rooms to include restrooms.

I. No restrooms in ICU rooms.

J. ICU rooms to include clinical sinks (hoppers).

K. Laboratory area to include purified water system.

L. Laboratory area Blood Bank to include eyewash station.

M. Laboratory area Bacteriology (Microbiology) to include eyewash station.

N. Main Laboratory area to include 3-4 eyewash stations (max 20 sec walking distance).

O. Laboratory area to include safety shower.

P. Exterior frost-proof wall and roof hydrants every 100’.

ix. Irrigation System: Separately metered 2.5” service at building exterior including backflow prevention device.

2. Domestic Hot Water

A. Bank of high efficiency, natural gas condensing water heaters located in the Central Energy Plant with large bulk storage tank.

i. Quality:

ii. Preferred Manufacturer:

iii. Reliability:

iv. Automation:

v. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vi. Maintenance Requirements:

A. Design to include isolation valves at all equipment and consider ease of maintenance/replacement with minimal water loss.

B. Design to include zone valves and consider ease of maintenance/replacement with minimal water loss and flow balancing.

vii. Efficiency Target:

Desired Technologies:

3. Medical Gas

i. Pending final decision by owners representative bottled gas for surgery suites to include CO2, Nitrous, and Nitrogen.

ii. Desired Type: Medical air compressors, vacuum pumps, and bottle storage provided in dedicated mechanical rooms. Large, bulk oxygen storage tank located outside near the Central Energy Plant.

iii. Quality:

iv. Preferred Manufacturer:

v. Reliability:

vi. Automation:

vii. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

viii. Maintenance Requirements:

ix. Efficiency Target:

x. Desired Technologies:

A. Head wall.

B. Consider ceiling mount in patient rooms and ER.

4. Water Treatment

A. Water treatment CEP system is to be housed in its own ventilated room.

B. Dedicated water treatment for labs and central sterilization will be included in the design

10. (23) Mechanical

1. Space Heating

A. Dual-fuel (#2 fuel oil and natural gas) condensing boilers with large capacity storage tank located on Central Energy Plant.

B. Hydronic heating will be used as the primary heating sources for the entire facility

i. Quality:

ii. Preferred Manufacturer:

A. Do not allow for Aerco boilers.

iii. Temptrol AHUs are BOD

iv. Reliability: All critical and patient care systems will be designed with necessary redundancy to meet or exceed FGI recommendations.

v. Automation: Chillers and boilers are to be controlled by the manufacturer's control panel, not by BAS, but the BAS should report and receive the addressable points.

vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vii. Maintenance Requirements:

viii. Efficiency Target: High.

ix. Desired Technologies: Heating water preheated by heat rejected by the heat pump chiller, decoupled with a plate-and-frame heat exchanger.

2. Ventilation

i. Desired Type:

A. Bank on N+1 redundancy, high-plume laboratory exhaust fans for hazardous exhaust.

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vii. Maintenance Requirements:

viii. Efficiency Target: High.

ix. Desired Technologies:

3. Air Conditioning

i. Desired Type:

A. Chilled water with four 700-ton centrifugal chillers and one 200 ton heat pump chiller to provide partial reheat capacity for supreme energy efficiency. Locate all chillers in the Central Energy Plant.

B. Free cooling from cooling towers. Circuit decoupled from primary system by way of plate-and frame heat exchanger.

a. Free cooling CW pipe to be insulated.

C. No geo-thermal sources will be included in the design.

D. Roof mounted air handlers (RTU) serving multi-zone VAV terminals. RTU features direct-drive fan arrays, 2" foam insulation injected wall/roof/floor panels, pipe vestibules, MREV 8 prefilters, MERV 14 final filters, UVE coil treatment.

E. Passive regeneration wheel air handlers serve operating and procedure rooms.

F. Design shall consider including rooftop HVAC units with walk-in controls section.

G. Heat trace all exterior pipe subject to freezing including humidifier drains.

ii. Quality:

iii. Preferred Manufacturer:

A. BOD chillers are Carrier.

B. Temptrol semi-custom, roof mounted air handlers are BOD.

C. Surgery: Passive regeneration wheel air handlers for energy efficiency while maintaining low temperature and RH in operating and procedure rooms.

iv. Reliability: Redundancy of fans and other components subject to failure shall be considered.

v. Automation: All air handling systems shall be controlled and monitored via the central BAS for the hospital.

A. Chillers and boilers are to be controlled by the manufacturer's control panel, not by BAS, but the BAS should write to and report addressable points.

vi. Flexibility:

A. System capable of maintaining 100% of peak demand if one chiller is out of operation. Load shed scheme may be incorporated to ensure essential systems maintain full capacity.

vii. Maintenance Requirements:

viii. Efficiency Target:

A. High efficiency chillers.

B. Premium efficiency motors and pumps.

ix. Desired Technologies: Variable-primary pumping schemes.

4. Refrigeration

i. Desired Type: Per LEED requirements

ii. Quality:

iii. Preferred Manufacturer: Carrier

iv. Reliability:

v. Automation:

vi. Flexibility:

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

5. HVAC Controls

i. Desired Type: Direct digital controls, BAC Net Compatible and BTL lab tested.

ii. Quality:

iii. Preferred Manufacturer: ABS Controls, sole source

iv. Reliability:

v. Automation:

vi. Flexibility:

A. Compatible with Owner's remotely located energy management system (EMS).
B. All controllers, including factory provided, to include BACnet interface capable of communicating with Owner's existing remote EMS.
C. Layout to consider future expansion. Refer to section II, 2, b.
D. The quantity and type of DDC input/output points, visible at the BAS, are to be per Owner preferences.
E. Systems available at the BAS are to include, at minimum:
F. HVAC,
G. fire alarm control panel,
H. generator(s),
I. environmental control system(s) such as specimen refrigerators/freezers,
J. lighting control with time schedule adjustment,
K. Swiss Log tube system (Incorporate a way to display the location of obstructions in the tube system if possible),
L. med gas system
M. Chillers and boilers are to be controlled by the manufacturer's control panel, not by BAS, but the BAS should report and receive the addressable points.
N. Some Isolation rooms to be pressure reversable and to also serve as protected environment rooms.

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

6. Process Equipment

i. Desired Type:

A. Model after Hastings Urgent Care Clinic

B. Steam generator/boiler as required for process steam only as determined by user groups. Include deaerators, flash tanks, and 1/3-2/3 pressure reducing stations. PENDING FURTHER EVALUATION.

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

11. (26) Electrical

1. Lighting

i. Maintenance Requirements

A. The design shall minimize the number of bulbs. The CNOHC public corridor light fixtures have eight bulbs each and they are changing 500 bulbs per month.

2. Lighting Controls

i. Desired Type:

A. Combination of wall switches, occupancy sensors, EMS and lighting control panels.

B. UV protection for designated surgery areas.

Childers to include this in the Agenda of the meeting with the Owner 05-10-22.

ii. Quality:

iii. Preferred Manufacturer: Bell and McCoy Sales.

iv. Reliability:

v. Automation:

A. Exterior lights controlled by the EMS.

i. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vi. Maintenance Requirements:

vii. Efficiency Target:

viii. Desired Technologies:

3. Daylighting Controls

i. Desired Type:

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

ii. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vi. Maintenance Requirements:

vii. Efficiency Target:

viii. Desired Technologies:

4. Emergency Power

i. Desired Type:

A. Four, 3500kW diesel generators and transfer switches.

B. UPS provided per Cherokee Nation IT Standards.

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

iii. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vi. Maintenance Requirements:

vii. Efficiency Target:

viii. Desired Technologies:

5. Renewable Energy

i. Desired Type:

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

6. Variable Frequency Drives

i. Desired Type:

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies: Include harmonics protection.

12. (27) Telecom and Communications

1. Communications and Data

i. Desired Type:

a. Current Fiber Service -

Fiber communications to the campus are provided by Cox Communications and Consolidated Communications.

Cox Communications and Consolidated Communications demarcation point is the inside of the existing hospital facilities maintenance building located at the southwest corner of Bond and Bliss Streets.

Cherokee Nation Health has fiber routes throughout campus from the facilities maintenance building.

Fiber service to the clinic is provided along the north side of the cemetery that turns south to enter the clinic on the north side of the building.

Cox Communications also has a fiber line along Ross Street and along the west property line of the campus.

b. Desired Fiber Service Route -

Cherokee Nation fiber is to be extended from the health clinic across the pedestrian bridge into the hospital. Cherokee Nation fiber will also be installed underground from the clinic to the hospital.

Cox Communications fiber service is to be extended from downing street. New fiber will be aerial along bliss to the cemetery and then aerial along the north edge of the cemetery. Fiber service will drop down into the existing Cherokee nation pull-box located northeast of the cemetery. The existing conduits will be used to install fiber to the existing pull-box at the northeast corner of the Hastings property. New conduits will be installed to the hospital. The existing conduits may need to be lowered for the new driveways into the surface parking.

Consolidated Communications fiber service is to be extended down ross street. The empty conduits along the east side of the Hastings property will be used by consolidated communications for their fiber. New conduits will be needed from the existing pull-box to the entry point into the building.

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

A. Surgery Waiting Room pager system.

B. Surgery Waiting Room monitor system.

C. Emergency Department Security counter to include monitor system.

2. Nurse Call

i. Desired Type:

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

A. Anti-ligature components in some restrooms.

B. Emergency Department restroom near Psych to be ant-ligature.

13. (28) Security and Access Control

Childers to review of this topic with the Owner during the DD phase.

1. Access Control

Provide specific room information in Table 1, Health Care and Support Spaces.

i. Desired Type:

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

A. Acute Care Area – Lock-down capabilities.

2. Security

i. Please give us the quantity of tasers, guns, supply, and ammunition storage for us to determine size of storage units. Are these to be in the cage mentioned in the program?

ii. How many clean uniforms are to be stored? Will you want laundry hampers for dirty uniforms?

iii. How many staff will you have for this department? Will you want full height or half height personal lockers?

iv. Is a touch down workstation needed in the breakroom?

v. Operators Office: How many monitors are needed to support all the alarm systems being monitored?

14. Life Safety, Fire Protection and Fire Alarm

i. Desired Type: Passive protection and active protection

ii. Quality:

iii. Preferred Manufacturer:

a. Fire alarm system: Simplex by Johnson Controls, Inc.

iv. Reliability:

v. Automation: The fire alarm system shall interface with fire protection systems, HVAC systems, smoke control systems and other building systems to activate emergency control functions. The fire alarm system shall have means to communicate system status to the Building Automation System (BAS).

vi. Flexibility:

a. Layout to consider future expansion. Refer to section II, 2, b.

b. Designate specific units as Health Care suites to permit less restrictive use of the space, such as emergency departments, surgery, pharmacy, sterile processing, and imaging.

vii. Maintenance Requirements: All equipment shall be installed in a manner that is compliant and provides adequate access for service and maintenance.

viii. Efficiency Target:

ix. Coverage: Throughout the hospital to satisfy code compliance for accreditation and AHJ approval.

x. Desired Technologies:

a. Passive

i. Interior separation

1. Fire barriers

a. Fire dampers are required in all ducts penetrating fire barriers 1-hour fire-resistance rated and greater. Only exclusion are smoke control system ducts and ducts conveying hazardous vapors.

b. Fire barriers enclosing shafts shall have fire/smoke dampers.

2. Smoke barriers

3. Smoke partitions

ii. Compartmentalization – maximum 22,500 square feet smoke compartments separated with 1-hour fire-resistance rated smoke barriers

iii. Fire-resistance rated construction – Type IA

iv. Fire resistive joint systems

v. Interior finishes – Class A

vi. Smokeproof stair enclosures

b. Active

i. Addressable fire alarm system with voice communication

1. Provide remote key-operated test switches with LED indicating lamps for all duct smoke detectors that are not easily accessible. Locate the remote test switch 12 inches below the ceiling on the wall nearest to the concealed detector.

ii. Water-based fire protection systems

1. Automatic sprinkler systems

2. Automatic Class I wet standpipe system

3. Electric-driven centrifugal fire pump

iii. Clean agent fire extinguishing systems and double interlock pre-action systems in all IT rooms, including MDF, IDF, and UPS rooms. Provide alternate to only provide clean agent the MDF and UPS room.

iv. Portable fire extinguishers (PFE)

1. Clean agent PFEs in sensitive electrical equipment areas (e.g., IT rooms)

2. PFEs in magnetic imaging spaces shall be listed as nonmagnetic

v. Stairway pressurization smoke control system

vi. Mechanical post-fire smoke removal system

vii. Life safety two-way communication system (at elevator landings)

viii. Emergency responder communication system

ix. Stand-by and emergency power system

15. (31) Civil and Earthwork

i. Site Clearing
ii. Grading
iii. Excavation
iv. Trenching
v. Rock Removal
vi. Fill
vii. Termite Control

16. Landscaping

17. Helipad

i. Desired Type:
ii. Quality:
iii. Preferred Manufacturer:
iv. Reliability:
v. Automation:
vi. Flexibility: Layout to consider future expansion. Refer to section II, 2, b.
vii. Maintenance Requirements:
viii. Efficiency Target:
ix. Desired Technologies:

18. Acoustical Requirements

i. Acoustic Goals

a. Promote good speech privacy for patient rooms and where sensitive health information is audible
b. Limit ambient noise to create a restful recovery space for patients
c. Provide adequate architectural acoustic surfaces to limit noise buildup, promote good speech intelligibility, and reduce noise transfer to adjoining spaces

ii. Design guide and questions

a. FGI Guidelines are used as the basis for noise isolation, ambient noise level, and room acoustics. Confirm if this is the approved design standard or if other, more strict requirements are needed (overall or for individual spaces)
b. Increased noise isolation is recommended for patient rooms. A minimum STC 50 is suggested, which is above FGI minimum requirements.
c. Speech privacy is expected for all spaces where audible communication of sensitive health information is present. STC 50 is the expected minimum requirement unless sound masking is used.
d. Is sound masking an acceptable speech privacy method for corridors and public spaces?
e. Gypsum board construction is the basis for noise isolation constructions. These partitions should continue to deck. Are there areas where partitions cannot or should not continue to deck?
f. Noise isolation constructions are to be sealed airtight including building system penetrations, electrical boxes, and structure.
g. Building shell noise isolation is not critical as there are no major noise sources near the project property. Advise if there are specific noise sources (e.g. helicopters) that should be considered.
h. Interior room acoustic treatments to be applied to ceiling surfaces (primarily). Wall panels recommended for teleconferencing rooms or other speech critical spaces (meeting rooms, lecture hall, etc.)
i. Mechanical/plumbing/electrical systems to include appropriate vibration isolation. Identify areas where specific vibration criteria may be required (e.g. MRI, labs, etc.)

V. Specific Room and Area Equipment and Systems

HKS to begin to complete information for specific rooms and areas as it applies to their scope during the DD phase.

1. Isolation/Protected Environment Rooms

i. Desired Type:

A. Some Isolation rooms to be pressure reversable and to also serve as protected environment rooms.

B. Rooms may not be located close enough together to share exhaust systems.

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: *Layout to consider future expansion. Refer to section II, 2, b.*

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

A. 120Volt

2. Surgery Area includes OR, PACU, PreOp and Cath Labs

i. Desired Type:

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: *Layout to consider future expansion. Refer to section II, 2, b.*

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

A. Operating rooms (6).

B. Endo set up is changing and will not include restroom.

C. Surgery areas to be segregated for events such as flu season.

D. Hand-held workstations will be used more often than "workstations on wheels".

E. Fridge in Surgery Staff Lounge (no ice/water in the door).

F. Ice maker in Surgery Staff Lounge.

G. No staff lockers in Surgery.

x. What are the priority equipment needed for OR's (booms, med gases, lighting, anesthesia, c-Arms, number of back tables)?

xi. What is the primary equipment needed for the endoscopy suite (procedure, clean & dirty rooms) booms, lighting?

xii. What is the primary equipment needed for the 1 hybrid cath lab & the 1 cardiac EP cath lab?

xiii. What are the primary equipment (differences) for the 2 L&D OR rooms?

xiv. What is the primary equipment needed for pre & post op bays?

xv. If you have preferred manufactures or models for any of the above rooms, please let us know your preference.

xvi. Computer Requirements:

A. OR wall mounts in each

B. Endo rooms wall mounts in each

C. *Cath labs wall mounts in each*

D. *PACU 1 wow for every 2 bays*

E. *Preop 1 wow for every 4 bays*

3. Acute Care Area (Med Surge)

i. Desired Type:

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility:

A. *Layout to consider future expansion. Refer to section II, 2, b.*

B. *ICU and Med Surg rooms will be sized to be used interchangeably*.

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

x. What are the types of procedures & equipment needs for the minor procedure room?

xi. What type of patient beds are preferred; standard vs bariatric? How many of each?

xii. Will med gases be in the headwall?

xiii. What type and how many patient monitors & other diagnostics are required?

A. *Provide centralized monitoring.*

7th floor centralized monitoring room will serve 6th and 7th floors.

4th floor centralized monitoring room will serve ICU and ED.

xiv. Will guest seating, bedside table, patient wardrobes be required?

xv. What are the anti-ligature room requirements, per current policy?

xvi. Computer Requirements:

A. *NO wall mounts in rooms*

B. *Desktops at nurses stations*

C. *10 wows for each floor (20 total)*

D. *15 handheld BCMA devices*

4. ICU Area

i. Desired Type:

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility:

A. *ICU Step-down rooms to include restrooms.*

B. *No restrooms in ICU rooms.*

C. *ICU rooms to include clinical sinks. (hoppers).*

D. *Layout to consider future expansion. Refer to section II, 2, b.*

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

x. What is the preferred ICU bed and quantity?

xi. Do you want lighting & med gases in the headwall?

A. *Provide swing arm for medical gases.*

B. *The Owner does not desire stationary headwalls with plugs and gases on either side.*

xii. What type of information boards are needed?

xiii. Will diagnostics & patient monitors be headwall or stand mount?

A. *Include ICU floor monitoring at nurse stations.*

xiv. Will Dialysis be provided within these rooms?

xv. Will you want guest seating, bedside table, patient wardrobes, or a TV in the room?

xvi. Computer Requirements:

A. *NO wall mounts in rooms*

B. *Desktops at nurses stations*

C. *4 WOWs*

D. *12 handheld BCMA devices*

5. Imaging Area

i. Desired Type:

A. *MRI cooling back-up is city water which has issues and needs to be discussed.*

B. *MRI primary cooling by chillers.*

C. *Provide Nuclear Medicine room in Imaging area.*

D. MRI's are to be on separate HVAC system from rest of radiology. Providing Liebert unit as main with VAV box as back up for MRI's was discussed with Owner.

E. MRI magnets to be provided with dedicated chillers. These might be provided by the MRI manufacturer.

ii. Quality:

iii. Preferred Manufacturer:

A. MRI chillers: Dimplex, maintained by GE.

iv. Reliability:

v. Automation:

vi. Flexibility: *Layout to consider future expansion. Refer to section II, 2, b.*

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

x. What are the program allocations for MRI's, CT's, Rad, and RNF? 2 MRI's, 2 CT's, 3 Rad, 1 RNF?

xi. Is Tesla being considered for MRI's-slices for CT's?

xii. What are the equipment needs for the cardiac EP Lab?

xiii. What are the main equipment needs for nuclear medicine injection, procedure & exam room(s)?

xiv. What equipment do you use for Digital Imaging Processing?

xv. What are the equipment needs for ECHO? Will you need anesthesia or stress test in the room?

6. Laboratory Area

i. Desired Type:

ii. Quality:

iii. Preferred Manufacturer:

iv. Reliability:

v. Automation:

vi. Flexibility: *Layout to consider future expansion. Refer to section II, 2, b.*

vii. Maintenance Requirements:

viii. Efficiency Target:

ix. Desired Technologies:

A. Laboratory area to include purified water system.

B. *Laboratory area Blood Bank to include eyewash station.*

C. *Laboratory area Bacteriology (Microbiology) to include eyewash station.*

D. *Main Laboratory area to include 3-4 eyewash stations (max 20 sec walking distance).*

E. *Laboratory area to include safety shower.*

x. How much space is required per work area?

xi. What equipment is needed for microbiology-bacteriology area?

xii. Will there be any robotics or conveyor systems to support any of the analyzer systems in the Main Lab Work Area?

xiii. What are the refrigeration & freezer requirements (walk in or free standing) for both main lab & bacteriology?

A. *Condensing units for walk-in coolers are to be mo8nted on the roof.*

xiv. Are there any preferred manufactures or models for chemistry, hematology, ABG, urinalysis, etc?

xv. What are the water purification systems necessary to support analyzers?

xvi. How much staff is anticipated?

xvii. How many and what type of workstations will be need for staff (standing height, sitting heights)?

7. Central Sterile/Sterile Processing

i. What cart washer(s) will be required for anticipated shift volume?

ii. Do you have preferred manufactures & models for pass thru disinfectors?

iii. Do you have preferred sterilizer manufactures & models, or size & quantity for anticipated volume?

A. *Quantity of sterilizers = 3.*

iv. How many staff? How many standing & sitting workstations in all central sterile work areas?

v. What equipment is required in decontamination & scope washroom?

vi. How many and what size case carts are needed?

8. Pharmacy

i. Will there be a Script Pro 200 in outpatient pharmacy & inpatient pharmacy, for total of 2 or will 1 be shared?

ii. What are the refrigeration needs & preferences: Program indicates 5 refrigerators (would this be single or double doors?) or a walk in. Would walk in need to be

centralized? Individual refrigeration units could be sprinkled throughout decreasing number of steps?

iii. Is there a need for pharmaceutical freezers? If so; single, double door, under counter or ultra-low freezers?

iv. What is the priority equipment needed in the clean compounding & hazardous compounding work room(s) as it relates to USP 787 & 800 guidelines?

v. How many staff for main work area? What type of workstations, sitting & standing?

vi. What are your filing needs? How many filling stations are required?

vii. How many pharmacist check stations are required?

viii. What are the break room needs?

9. Emergency Department and Ambulance Area

i. What priority equipment such as booms, overhead lighting, number of med gases, PC solutions is required in trauma rooms?

ii. What priority equipment such as headwalls, lighting, stretchers, diagnostics, PC solutions is required in treatment rooms?

iii. What priority equipment such as secured headwalls, lighting, stretchers, diagnostics is required in anti-ligature rooms?

iv. Would you prefer a single or double scrub sink in the alcove?

v. In the medication work room(s), are Omnicell units, or single or multiple auxiliary cabinets required?

vi. Are refrigeration & freezer requirements required in the medication work room(s)?

vii. What size and quantity blanket warmer(s) are required?

viii. Will patient monitoring/telemetry systems equipment be on patient rooms wall or mobile? What manufactures/model is preferred (Nihon Kohden, Philips,etc.)?

ix. How many portable patient lift(s) & portable x-ray unit(s) are required?

x. How many crash carts are needed for this department?

xi. Will a guest seat and/or bedside table be needed?

xii. Computer Requirements:

A. NO wall mounts in rooms

B. Desktops at nurses stations

C. 10 wows

D. 20 handheld BCMA devices

xiii. Ambulance Area

A. Include Shoreline receptacles for ambulances.

10. Labor and Delivery (OB)

i. What priority equipment is required for the labor & delivery room (lighting, headwall(s), infant warmer, OB bed preference, patient monitor, fetal monitor, PC solution)?

ii. What priority equipment is needed for the post-partum rooms (bed type, crib, etc.)?

iii. Will guest seating, bedside table, sleeper sofa, patient wardrobes be needed?

iv. Will a double or single sink be required at the scrub alcoves?

v. Both OR table & surgical table are listed for SIM lab, is this correct?

vi. Will med gases be required?

vii. Please provide more information on the blue cart.

viii. What will be the function & equipment needs for the sub sterile workroom?

ix. What are the nursery equipment storage quantities required?

A. Wall mounts in every room (L&D and post partum)

B. 2 WOWs for triage

11. Neonatal ICU

i. What equipment is required for med gases, headwalls, lighting, monitors & diagnostics?

ii. What is needed for handwash & prep station?

iii. Will you want multiple bed patient rooms or single?

iv. Will there be couplet care rooms for post-partum?

v. What equipment is needed in the procedure room?

vi. Will you want the family transition room to have a more residential feel?

vii. Will guest seating, bedside table, patient wardrobes be required?

12. Hospice

i. What is the preferred bed type?

ii. What type of diagnostics equipment is required?

iii. What type of equipment is needed in the minor procedure room? (Lighting, headwall, med gases, patient monitors, procedure table or stretcher)

iv. What type of equipment will be stored in the storage room? (Quantity of beds, blanket warmer, IV pumps, PCA pumps, hover mats, stair chairs? Quantity for wheelchairs, CPM, heating pad machine. Please let us know if you have preferred manufacturer(s) for all equipment)

v. What type of accommodations will be provided for family member(s)?

vi. Will guest seating, bedside table, patient wardrobes be required?

vii. Is there to be a bereavement room?

A. *NO wall mounts in rooms*

B. *Desktops at nurses stations*

C. *NO wows*

D. *6 handheld BCMA devices*

13. Infusion Therapy

i. For the open treatment area, do you see in-patient and outpatient? What is their length of visit?

ii. What type of furniture are you thinking for this area? Guest seating, bed side tables, recliners, stretchers?

iii. Will you want mobile or mounted patient monitoring within the bays?

iv. What kind of infusion pumps will you be using?

v. Will you want any kind of supply storage within each of the bays? If so, would you want it mobile or mounted?

vi. What is your linens & waste management plan?

vii. Will you want a blanket warmer in this area?

viii. For patients with longer infusions, are meals or some type of nourishment provided?

14. Property and Supply

i. What type of shelving will you want? We typically see industrial shelving, steel, with either wire or particle board shelving.

ii. Will you want storage cabinets? If so, would you like them to be locking? What are your preferred sizes?

iii. Do you have need for flammable safety storage cabinets?

iv. Will you be needing stock pickers of a forklift?

v. Pallet stacker

vi. Access ladders

vii. How many of the staff will need a workstation? This will include a phone & computer, and any additional equipment used in this department.

viii. Do you want sitting or standing workstations?

ix. What type of equipment do you want in your mail room?

15. Facilities Management

i. What style workshop bench do you need? Laminate or wood tops, shelving, drawers, power, data?

ii. Will you need medical air at work benches?

iii. What are your workshop equipment/tool needs?

iv. How many of the staff will need a workstation? This will include a phone & computer, and any additional equipment used in this department.

v. Do you want sitting or standing workstations?

vi. What are your interior or exterior building and grounds equipment needs?

vii. What type of shelving will you want? We typically see industrial shelving, steel, with either wire or particle board shelving.

viii. Will you want storage cabinets? If so, would you like them to be locking? What are your preferred sizes?

ix. Do you have need for flammable safety storage cabinets?

16. Housekeeping and Linens

i. Will you want any types of ride on equipment? If so, please list any preferred manufacturers & models.

ii. Please give us your preference on other housekeeping cleaning equipment such as vacuums (uprights or other styles), wet/dry vacuums, grout cleaners, floor dryers.

iii. Do you have a manufacturer and model of preferred housekeeping carts?

iv. Will you want shelving for biohazard boxes, large roll out containers?

v. What is your laundry solution? Will you be doing in house or have a service? If in house, what capacity will you want your washer(s) and dryer(s)? Will you want them to be gas or electric? Will you want detergent dispensers?

vi. What linen cart types will you want? Clean, soiled? What capacity?

17. Clinical Engineering

i. What style workshop bench do you need? Laminate or wood tops, shelving, drawers, power, data?

ii. What typical equipment will be at each workbench?

iii. Do you want sitting or standing workstations?

iv. What will your printer and copier needs be? What capacity will you need?

v. Will you need reference manual storage or filing storage?

vi. Will you want status monitors/boards for work orders?

vii. How will you want to manage your parts storage, equipment storage?

viii. The refrigerator mentioned in the program, will it be for staff lunches or other storage?'

ix. Is a coffee pot, or microwave required or wanted?

18. Information Technology

i. What style workshop bench do you need? Laminate or wood tops, shelving, drawers, power, data?

ii. What typical equipment will be at each workbench?

iii. Do you want sitting or standing workstations?

A. The open workspace will be provided with 8x8 cubicles.

iv. What will your printer and copier needs be? What capacity will you need?

v. Will you need reference manual storage or filing storage?

vi. Will you want status monitors/boards for work orders?

vii. How will you want to manage your parts storage, equipment storage?

19. Respiratory Therapy

i. What type of treatments will you be doing in this department?

ii. What are your equipment needs? We typically see, ventilators, bi-paps, etc. Please provide a list of preferred manufacturers & quantities.

iii. For the RT workroom what type of equipment will be needed? Blood gas equipment, pc solution, etc.?

20. Kitchen and Cafeteria

i. What equipment will the kitchen planning consultant be providing?

ii. Will dining and vending areas are included in kitchen planning consultant package?

Kitchen equipment located on Sheet K1 will be specified unless directed otherwise. Equipment not shown i.e. Smallware's will be provided by others or within the FFE budget.

Current plan includes display merchandisers included within the foodservice scope. Waiting for further directions on this area.

21. Education and Group Conference

i. What technology requirements will you have for this department? For example, tv monitors, projectors, drop down screens, presentation centers (wall mounted or portable), computers, lecterns (with or without microphones)?

ii. Will you want wireless or data ports?

iii. Will you want power or data in the floor to support group conference or training tables?

iv. Is there any other equipment required for different styles of conference or training?

v. Will you want any refrigeration for water or drinks?

vi. Will you want coffee service?

22. Administration

i. For the staff lounge, is a dishwasher needed?

ii. For the conference room:

iii. What technology requirements will you have for this department? For example, tv monitors, projectors, drop down screens, presentation centers (wall mounted or portable), computers, lecterns (with or without microphones)?

iv. Will you want wireless or data ports?

v. Will you want power or data in the floor to support group conference or training tables?

vi. Will you want any refrigeration for water or drinks?

vii. Will you want coffee service?

23. Health Information Management

i. What type of PC solutions will be needed for the clerks?

ii. Will they require any types of special printers or scanners at their workstations?

iii. Is there a need for any kind filing storage in these work areas?

iv. Please list the equipment needed for duplicating & supply equipment needs (copier, shredder boxes, paper shredder, mail management).

24. Business Office

i. Will patient registration, Patient Admitting & Interview all be one space, or will they be separate areas.

ii. What type of PC solutions will be needed for the clerks?

iii. Will they require any types of special printers or scanners at their workstations?

iv. Is there a need for any kind filing storage in these work areas?

v. What is the function of the patient access supervisor that will be located in the emergency department?

25. Employee and Provider Facilities

i. Will you want a refrigerator for breast milk in the Lactation Rooms?

ii. How many lockers for staff will you have for this department? Will you want full height or half height personal lockers?

iii. How would you like to furnish the on-call rooms? We typically see the following:

small tv
phone
computer
bed (please let us know what size, typical twin, full, or queen)
nightstand

26. Public Spaces

i. For the following spaces please provide typical equipment you would like to see in each area.

Gift shop (computer-pos, phone, tv monitor for digital display messaging, refrigeration f or drinks)
Meditation/healing rooms (type of furnishings)
Patient advocate (pc, phone, printer, etc.)
Information desk (pc, phone, etc.)
Waiting areas (tv monitors, kiosks etc.)

VI. Building Occupant and O&M Personnel Requirements

a. How will the facility be operated?

b. Who will operate the facility?

c. What is the desired level of training and orientation for the future building maintenance staff and building administrators to understand and use the building systems?

OPR Worksheet

LEED BD&C v4, EA Prerequisite 1,

Fundamental Commissioning

VII. Table 1 Healthcare and Support Spaces

Space Name / Use or Activity	Access Control Type	Num of Occupants	Time-of-Day Schedule	After Hours Use Requirements	Cooling Requirements	Heating Requirements	Humidity Requirements	Ventilation / Filtration Requirements	Room Pressure Requirements	Acoustic Requirements	Lighting Requirements	Occupant Adjustability Requirements	Notes
ADMINISTRATION													
Business Office													
Health Info Management													
IT Office													
Security Counter													*At each entry.*
Security Office													
AMBULATORY													
ED Consult /Bereavement													
ED Nurse Station		*7 nurses, 2 Drs, 2 PAs*											
ED Restroom, Psych													
ED Safe / Gyn													
ED Trauma									*User adjustable pressure (+ or -) in one ED treatment room.*				
ED Treatment									*User adjustable pressure (+ or -) in one treatment room.*				
ED Treatment / Consult													*Design with privacy to serve as back-up consult/bereavement*
ANCILLARY													
Diagnostic Imaging, MRI					*Include back-up cooling for MRI.*								
Diagnostic Imaging, Nuclear Medicine													
Endoscopy Procedure	*proximity*												

OPR Worksheet

LEED BD&C v4, EA Prerequisite 1,

Fundamental Commissioning

Space Name / Use or Activity	Access Control Type	Num of Occupants	Time-of-Day Schedule	After Hours Use Requirements	Cooling Requirements	Heating Requirements	Humidity Requirements	Ventilation / Filtration Requirements	Room Pressure Requirements	Acoustic Requirements	Lighting Requirements	Occupant Adjustability Requirements	Notes
Helicopter Building													
Laboratory													
Operating Room	*proximity*												
Pharmacy													
Respiratory Therapy													
Surgery Clean Corridor	*proximity*												
Surgery, Clean Storage	*proximity*												
Surgery, Soiled Storage	*Proximity from Clean to Soiled. Proximity from Soiled to Corridor*												
Surgery, Staff Lounge	*4*												
Surgery, Sterile Corridor	*proximity*												
FACILITY SUPPORT													
Central Energy Plant Building													
Clean Storage													
Clinical Engineering													
Closet, Electrical													
Closet, IT													
Closet, Low Voltage													
Electrical, Main Room													
Facility Management													
MDF Room													
Soiled Storage	*proximity*												

OPR Worksheet

LEED BD&C v4, EA Prerequisite 1,

Fundamental Commissioning

Space Name / Use or Activity	Access Control Type	Num of Occupants	Time-of-Day Schedule	After Hours Use Requirements	Cooling Requirements	Heating Requirements	Humidity Requirements	Ventilation / Filtration Requirements	Room Pressure Requirements	Acoustic Requirements	Lighting Requirements	Occupant Adjustability Requirements	Notes
UPS Room													
Wheelchair Storage													
INPATIENT													
Acute Care Isolation Anti-room													
Acute Care Isolation Patient Room									*User adjustable pressure (+ or -).*				
Acute Care Patient Room									*User adjustable pressure (+ or -).*				
Hospice Patent Room													
ICU Room Patient Room									*Ne*				
ICU Step-down Patient Room													
ICU, Nurse Station													
Infusion Patient Room													
Isolation Patient Room									*User adjustable pressure (+ or -).*				
Labor & Delivery, NICU													
Labor & Delivery, Nursery													
Labor & Delivery, Nursery Isolation Patient Room													
Labor & Delivery, Patient Room													
Nurse Station													*1 Nurse Station in each of 6 Pods.*
Patient Room													
Patient Room, Person of Size													

OPR Worksheet

LEED BD&C v4, EA Prerequisite 1,

Fundamental Commissioning

Space Name / Use or Activity	Access Control Type	Num of Occupants	Time-of-Day Schedule	After Hours Use Requirements	Cooling Requirements	Heating Requirements	Humidity Requirements	Ventilation / Filtration Requirements	Room Pressure Requirements	Acoustic Requirements	Lighting Requirements	Occupant Adjustability Requirements	Notes
PUBLIC FACILITIES													
Concession													
Lactation Room													
Toilet, Family													
Toilet, Mens, ganged													
Toilet, Womens, ganged													
SUPPORT SERVICES													
Dietary													
Education & Group Consultation													
Employee/Provider Facilities													
Housekeeping & Lines													
Property and Supply													
Public Facilities													
Sterile Processing	*proximity*												

Cherokee Nation – WW Hastings Hospital – LEED v4.0 Charrette Report + Preliminary Scorecard with Action Items

EXECUTIVE SUMMARY

Cherokee Nation – WW Hastings Hospital is a new 80-bed hospital project in Tahlequah, Oklahoma. The project will be three- to five-stories, 317,685 square feet, and include a parking garage. The program includes administration, business office, health information management, information technology, security, emergency department, diagnostic imaging, laboratory, pharmacy, physical rehabilitation services, respiratory therapy, surgery, clinical engineering, facility management, acute care, intensive care, labor and delivery / nursery, dietary (food service), employee facilities, education and group consultation, housekeeping & linen, medical supply services, public facilities, and property & supply spaces.

This report investigates the ability to comply with LEED v4.0 BD+C certification criteria. LEED certification requires award of all prerequisites and a minimum of 40 points to achieve LEED Certified level. In order to conduct the analysis on March 24, 2022, Ecoworks facilitated a LEED workshop discussing the LEED categories and strategies for the project. To supplement this workshop feedback, Ecoworks was provided the Schematic Development drawings as well as the project narratives from each design discipline.

According to Ecoworks Studio's analysis, the WW Hastings Hospital is a candidate for LEED certification. Based on the current design conditions, implementation of actions during construction and building operations, it is favorable that the building can achieve all prerequisites and a minimum of 50 points within the credits. Additional points have been identified as 'maybe' within the scorecard that require further clarification and investigation as the project progresses. These additional points would solidify the Hospital building to certification at the LEED Silver (50 points) level and Gold (60 points) level certification may be achievable. LEED Gold (60 points) will be challenging, and LEED Platinum (80 points) does not appear to be feasible at this stage. The most critical LEED prerequisites and credits to be confirmed during the design phase have been included in this report. See the *100% SD Review- Action Items List* for reference. These items have been identified by responsible party and an area has been provided for feedback/response.

Ecoworks recommends the following near term next steps:

- WW Hastings Hospital Design Team and Cherokee Nation provide feedback on the action items list
- WW Hastings Hospital Design Team and Cherokee Nation have a programming focused workshop to identify opportunities for developing areas of respite and evaluating patient access to these areas within the Hospital. Additionally, the team would evaluate the possibilities of increasing building flexibility and ease of adaptive use over the life of the structure.
- WW Hastings Hospital Design Team and Cherokee Nation have an energy-focused workshop to identify the monitoring and metering requirements necessary to achieve the desired outcomes for compliance with the following possible credits:
    - EAc1 Enhanced Commissioning; EAc2 Optimize Energy Performance; EAc3 Advanced Energy Metering; EAc4 Demand Response/Grid Harmonization
- Ecoworks to set up Cherokee Nation policy and operations meeting (at the appropriate time) to further identify policies and strategies associated with CN policies and building operations and maintenance that align or can be incorporated to earn additional LEED points.

The following pages include the preliminary workshop LEED checklist from March 24th and an updated LEED checklist as a result of discussions from the workshop, dated April 7, 2022. Following the checklists are the *100% SD Review- Action Items List*s broken down by design discipline (Architectural, Civil/Landscape, Mechanical/Plumbing, and Electrical) and Appendix A (occupancy definitions) and B (pilot credits) for reference.

Hastings Replacement Hospital
LEED v4.0 Healthcare - *Owner Review*
March 24, 2022

ECOWORKS STUDIO

Y	?+	?-	N				
1	**0**	**0**	**0**		**Integrative Process**		**1**
Y				d	IPp1	Integrative Project Planning and Design	Required
1				d	IPc1	Integrative Process *(v4.1 substitution)*	1
1	**3**	**3**	**2**		**Location and Transportation**		**9**
			9	d	LTc1	LEED for Neighborhood Development Location	9
1				d	LTc2	Sensitive Land Protection	1
		2		d	LTc3	High Priority Site	2
		1		d	LTc4	Surrounding Density and Diverse Uses	1
			2	d	LTc5	Access to Quality Transit *(v4.1)*	2
	1			d	LTc6	Bicycle Facilities *(v4.1)*	1
	1			d	LTc7	Reduced Parking Footprint	1
	1			d	LTc8	Green Vehicles *(v4.1 June 2020 Addenda)*	1
2	**3**	**0**	**4**		**Sustainable Sites**		**9**
Y				c	SSp1	Construction Activity Pollution Prevention	Required
Y				d	SSp2	Environmental Site Assessment	Required
1				d	SSc1	Site Assessment	1
			1	d	SSc2	Site Development - Protect or Restore Habitat	1
			1	d	SSc3	Open Space	1
			2	d	SSc4	Rainwater Management **[RP 2 points]**	2
	1			d	SSc5	Heat Island Reduction	1
1				d	SSc6	Light Pollution Reduction	1
	1			d	SSc7	Places of Respite	1
	1			d	SSc8	Direct Exterior Access	1
2	**5**	**4**	**0**		**Water Efficiency**		**11**
Y				d	WEp1	Outdoor Water Use Reduction	Required
Y				d	WEp2	Indoor Water Use Reduction	Required
Y				d	WEp3	Building- Level Water Metering	Required
1				d	WEc1	Outdoor Water Use Reduction **[RP 1 point]**	1
						50% (1 point)	
1	2	4		d	WEc2	Indoor Water Use Reduction	7
						25% (1 pt), 30% (2 pt), 35% (3 pt), 40% (4 pt), 45% (5 pt); Plus up to 2 points	
	2			d	WEc3	Cooling Tower Water Use	2
	1			d	WEc4	Water Metering	1
11	**10**	**14**	**0**		**Energy and Atmosphere**		**35**
Y				c	EAp1	Fundamental Commissioning and Verification	Required
Y				d	EAp2	Minimum Energy Performance - 5% Improvement	Required
Y				d	EAp3	Building-Level Energy Metering	Required
Y				d	EAp4	Fundamental Refrigerant Management	Required
5		1		c	EAc1	Enhanced Commissionin: Opt 1 - Path 1 (3pts), Path 2 (4pts); Opt 2 (2p	6
5	5	10		d	EAc2	Optimize Energy Performance **[RP 12 points]**	20
						6% (3 point), 8% (4 points), 10% (5 points), 12% (6 points), 14% (7 points), 16% (8 points)	
						18% (9 point), 20% (10 points), 22% (11 points), 24% (12 points), 26% (13 points), 29% (14 points)	
						32% (15 point), 35% (16 points), 38% (17 points), 42% (18 points), 46% (19 points), 50% (20 points)	
	1			d	EAc3	Advanced Energy Metering	1
	1	1		d	EAc4	Demand Response	2
	1	2		d	EAc5	Renewable Energy Production	3
						1% (1 points), 5% (2 points), 10% (3 points)	
1				d	EAc6	Enhanced Refrigerant Management	1
	2			d	EAc7	Green Power and Carbon Offsets	2
						50% (1 points), 100% (2 points)	
10	**3**	**4**	**2**		**Materials and Resources**		**19**
Y				d	MRp1	Storage and Collection of Recyclables	Required
Y				c	MRp2	Construction and Demolition Waste Management Planning	Required
Y				d	MRp3	PBT Source Reduction-Mercury	Required
0	1	4		c	MRc1	Building Life-Cycle Impact Reduction	5
						Option 1 - Historic Building Reuse (5 point)	
						Option 2 - Renovationof Abandoned or Blighted Building (5 points)	
						Option 3 - Building and Material Reuse (2-4 points): 25% (2 pts), 50% (3 pts), 75% (4 pts)	
						Option 4 - Whole-Building Life-Cycle Assessment (3 points)	
1			1	c	MRc2	Building Product Disclosure & Optimization - Environmental Product De	2
						Option 1 - Environmental Product Declaration (EPD) (1 point)	
						Option 2 - Multi-Attribute Optimization (1 point)	

Y	?+	?-	N				
					Materials and Resources - Continued		
1			1	c	MRc3	Building Product Disclosure & Optimization - Sourcing of Raw Materials *(v4.1)*	2
						Option 1 - Raw Material Source and Extraction Reporting (1 point)	
						Option 2 - Leadership Extraction Practices (1 point)	
2				c	MRc4	Building Product Disclosure and Optimization - Material Ingredients *(v4.1)*	2
						Option 1 - Material Ingredient Reporting (1 point)	
						Option 2 - Material Ingredient Optimization (1 point)	
						Option 3 - Product Manufacturer Supply Chain Optimization (1 point)	
1				c	MRc5	PBT Source Reduction-Mercury **[RP 1 points]**	1
2				c	MRc6	PBT Source Reduction-Lead, Cadmium, and Copper	2
1	1			c	MRc7	Furniture and Medical Furnishings (30%, 40%)	2
1				c	MRc8	Design for Flexibility	1
1	1			c	MRc9	Construction and Demolition Waste Management	2
						Option 1 - Diversion (1-2 points)	
						Option 2 - Reduction of Total Waste Material (2 points)	
8	**3**	**0**	**5**		**Indoor Environmental Quality**		**16**
Y				d	IEQp1	Minimum Indoor Air Quality Performance	Required
Y				d	IEQp2	Environmental Tobacco Smoke Control	Required
2				d	IEQc1	Enhanced Indoor Air Quality Strategies **[RP 1 point]**	2
						Option 1 - Enhanced Indoor Air Quality Strategies (1 point)	
						Option 2 - Additional Enhanced IAQ Strategies (1 point)	
2	1			c	IEQc2	Low-Emitting Materials *(v4.1)*	3
					*	Paints and Coatings (Emissions: at least 75%, VOC Content: 100%)	
					*	Adhesives and Sealants (Emissions: at least 75%, VOC Content: 100%)	
					*	Flooring (90%) ::: Walls (75%) ::: Ceilings (90%) ::: Insulation (90%)	
					*	Composite Wood (75% Not covered by other categories)	
					*	Furniture (At least 75% by cost)	
						Healthcare Categories: 2 (1 pt), 3 (2 pts), 4 (3 pts), 5 (3pts + EP)	
1				c	IEQc3	Construction Indoor Air Quality Management Plan	1
1	1			c	IEQc4	Indoor Air Quality Assessment *(v4.1)* **[RP 2 points]**	2
						Option 1- Flush-out (1 point)	
						Option 2- Air Testing (2 points), Path 1 / Path 2	
			1	c	IEQc5	Thermal Comfort	1
	1			c	IEQc6	Interior Lighting	1
			2	d	IEQc7	Daylight	2
						Option 1 - Simulation: Spatial Daylight Autonomy & Annual Sunlight Exposure (40% 1 pts, 55% 2	
						Option 2 - Simulation: Illuminance Calculations (55% 1 point, 75% 2 points)	
						Option 3 - Measurement (55% 1 points, 75% 2 points)	
			2	d	IEQc8	Quality Views	2
2				d	IEQc9	Acoustic Performance	2
4	**2**	**0**	**0**		**Innovation**		**6**
3	2			Credit		Innovation	5
						Option 1 - Innovation (1 point)	
						Option 2 - Pilot (1 point)	
						Option 3 - Additional Strategies (3 points)	
						Innovation (1-3 points)	
						Pilot (1-3 points)	
						Exemplary Performance (1-2 points)	
1				c	Credit	LEED Accredited Professional	1
4	**0**	**0**	**0**		**Regional Priority**		**4**
1				Credit		RP: PBT Source Reduction - Mercury (1 point)	1
1				Credit		RP: Outdoor Water Use (1 point)	1
				Credit		RP: Optimize Energy Performance (12 points)	
				Credit		RP: Rainwater management (2 points)	1
1				Credit		RP: Indoor Air Quality Assessment (2 points)	1
1				Credit		RP: Enhanced IAQ Strategies (1 point)	
43	**29**	**25**	**13**		**TOTALS**		**110**

Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80+

Hastings Replacement Hospital

April 7, 2022

ECOWORKS STUDIO

Y	?+	?-	N				
0	**0**	**1**	**0**		**Integrative Process**		**1**
Y				d	IPp1	Integrative Project Planning and Design	Required
		1		d	IPc1	Integrative Process *(v4.1 substitution)*	1
2	**0**	**6**	**1**		**Location and Transportation**		**9**
			9	d	LTc1	LEED for Neighborhood Development Location	9
1				d	LTc2	Sensitive Land Protection	1
		2		d	LTc3	High Priority Site	2
		1		d	LTc4	Surrounding Density and Diverse Uses	1
		2		d	LTc5	Access to Quality Transit *(v4.1)*	2
1				d	LTc6	Bicycle Facilities *(v4.1)*	1
			1	d	LTc7	Reduced Parking Footprint	1
		1		d	LTc8	Green Vehicles *(v4.1 June 2020 Addenda)*	1
3	**2**	**0**	**4**		**Sustainable Sites**		**9**
Y				c	SSp1	Construction Activity Pollution Prevention	Required
Y				d	SSp2	Environmental Site Assessment	Required
1				d	SSc1	Site Assessment	1
			1	d	SSc2	Site Development - Protect or Restore Habitat	1
			1	d	SSc3	Open Space	1
			2	d	SSc4	Rainwater Management **[RP 2 points]**	2
1				d	SSc5	Heat Island Reduction	1
	1	0		d	SSc6	Light Pollution Reduction	1
	1	0		d	SSc7	Places of Respite	1
1				d	SSc8	Direct Exterior Access	1
4	**3**	**4**	**0**		**Water Efficiency**		**11**
Y				d	WEp1	Outdoor Water Use Reduction	Required
Y				d	WEp2	Indoor Water Use Reduction	Required
Y				d	WEp3	Building- Level Water Metering	Required
1				d	WEc1	Outdoor Water Use Reduction **[RP 1 points]**	1
						50% (1 point)	
	3	4		d	WEc2	Indoor Water Use Reduction	7
						25% (1 pt), 30% (2 pt), 35% (3 pt), 40% (4 pt), 45% (5 pt); Plus up to 2 points	
2				d	WEc3	Cooling Tower Water Use	2
1				d	WEc4	Water Metering	1
15	**8**	**12**	**0**		**Energy and Atmosphere**		**35**
Y				c	EAp1	Fundamental Commissioning and Verification	Required
Y				d	EAp2	Minimum Energy Performance - 5% Improvement	Required
Y				d	EAp3	Building-Level Energy Metering	Required
Y				d	EAp4	Fundamental Refrigerant Management	Required
6				c	EAc1	Enhanced Commissionin: Opt 1 - Path 1 (3pts), Path 2 (4pts); Opt 2 (2p	6
5	5	10		d	EAc2	Optimize Energy Performance **[RP 12 points]**	20
						6% (3 point), 8% (4 points), 10% (5 points), 12% (6 points), 14% (7 points), 16% (8 points)	
						18% (9 point), 20% (10 points), 22% (11 points), 24% (12 points), 26% (13 points), 29% (14 points)	
						32% (15 point), 35% (16 points), 38% (17 points), 42% (18 points), 46% (19 points), 50% (20 points)	
1				d	EAc3	Advanced Energy Metering	1
1	1			d	EAc4	Demand Response	2
1	2			d	EAc5	Renewable Energy Production	3
						1% (1 points), 5% (2 points), 10% (3 points)	
1				d	EAc6	Enhanced Refrigerant Management	1
		2		d	EAc7	Green Power and Carbon Offsets	2
						50% (1 points), 100% (2 points)	
10	**3**	**6**	**0**		**Materials and Resources**		**19**
Y				d	MRp1	Storage and Collection of Recyclables	Required
Y				c	MRp2	Construction and Demolition Waste Management Planning	Required
Y				d	MRp3	PBT Source Reduction-Mercury	Required
	1	4		c	MRc1	Building Life-Cycle Impact Reduction	5
						Option 1 - Historic Building Reuse (5 point)	
						Option 2 - Renovationof Abandoned or Blighted Building (5 points)	
						Option 3 - Building and Material Reuse; 25% (2 points), 50% (3 points), 75% (4 points)	
						Option 4 - Whole-Building Life-Cycle Assessment (3 points)	

Y	?+	?-	N				
					Materials and Resources - Continued		
1		1		c	MRc2	Building Product Disclosure & Optimization - Environmental Product Declaration	2
						Option 1 - Environmental Product Declaration (EPD) (1 point)	
						Option 2 - Multi-Attribute Optimization (1 point)	
1		1		c	MRc3	Building Product Disclosure & Optimization - Sourcing of Raw Materials *(v4.1)*	2
						Option 1 - Raw Material Source and Extraction Reporting (1 point)	
						Option 2 - Leadership Extraction Practices (1 point)	
2				c	MRc4	Building Product Disclosure and Optimization - Material Ingredients *(v4.1)*	2
						Option 1 - Material Ingredient Reporting (1 point)	
						Option 2 - Material Ingredient Optimization (1 point)	
						Option 3 - Product Manufacturer Supply Chain Optimization (1 point)	
1				c	MRc5	PBT Source Reduction-Mercury **[RP 1 points]**	1
2				c	MRc6	PBT Source Reduction-Lead, Cadmium, and Copper	2
1	1			c	MRc7	Furniture and Medical Furnishings (30%, 40%)	2
1				c	MRc8	Design for Flexibility	1
1	1			c	MRc9	Construction and Demolition Waste Management	2
						Option 1 - Diversion (1-2 points)	
						Option 2 - Reduction of Total Waste Material (2 points)	
8	**2**	**1**	**5**		**Indoor Environmental Quality**		**16**
Y				d	IEQp1	Minimum Indoor Air Quality Performance	Required
Y				d	IEQp2	Environmental Tobacco Smoke Control	Required
2				d	IEQc1	Enhanced Indoor Air Quality Strategies **[RP 1 points]**	2
						Option 1 - Enhanced Indoor Air Quality Strategies (1 point)	
						Option 2 - Additional Enhanced IAQ Strategies (1 point)	
2	1			c	IEQc2	Low-Emitting Materials *(v4.1)*	3
					*	Paints and Coatings (Emissions: at least 75%, VOC Content: 100%)	
					*	Adhesives and Sealants (Emissions: at least 75%, VOC Content: 100%)	
					*	Flooring (90%) ::: Walls (75%) ::: Ceilings (90%) ::: Insulation (90%)	
					*	Composite Wood (75% Not covered by other categories)	
					*	Furniture (At least 75% by cost)	
						Healthcare Categories: 2 (1 pt), 3 (2 pts), 4 (3 pts), 5 (3pts + EP)	
1				c	IEQc3	Construction Indoor Air Quality Management Plan	1
2				c	IEQc4	Indoor Air Quality Assessment *(v4.1)* **[RP 2 points]**	2
						Option 1- Flush-out (1 point)	
						Option 2- Air Testing (2 points), Path 1 / Path 2	
			1	c	IEQc5	Thermal Comfort	1
1				c	IEQc6	Interior Lighting	1
			2	d	IEQc7	Daylight	2
						Option 1 - Simulation: Spatial Daylight Autonomy & Annual Sunlight Exposure (40% 1 pts, 55% 2 p	
						Option 2 - Simulation: Illuminance Calculations (55% 1 point, 75% 2 points)	
						Option 3 - Measurement (55% 1 points, 75% 2 points)	
			2	d	IEQc8	Quality Views	2
	1	1		d	IEQc9	Acoustic Performance	2
6	**0**	**0**	**0**		**Innovation**		**6**
1					INc1	Innovation in Design: EBOM Policies	1
1					INc2	Innovation in Design: Resilience	1
1					INc3	Innovation in Design: Green Building Education	1
1					INc4	Innovation in Design: Low-Mercury Lighting	1
1					INc5	Innovation in Design: Passive Survivability	1
1				c	INc6	LEED Accredited Professional	1
4	**0**	**0**	**0**		**Regional Priority**		**4**
1					RPc1	PBT Source Reduction - Mercury (1 point)	1
1					RPc2	Outdoor Water Use (1 point)	1
1					RPc3	Indoor Air Quality Assessment (2 points)	1
1					RPc4	Enhanced IAQ Strategies (1 point)	1

52	**18**	**30**	10	**TOTALS**	**110**

Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80+

ECOWORKS STUDIO 1321 Iverson Street NE Atlanta, GA 30307 I www.ecoworks-studio.com I 404-480-4499

LEED Task List

100% SD Review- Action Items List

CN WW HASTINGS HOSPITAL - LEED CERTIFICATION; ARCHITECTURAL/INTERIORS

Description: LEED Task Items List, (**BOLD/Highlight and marked with >>** are responsibility)

Issued to: Childers Architects - Oscar, Ruel, Mat; HKS – Meg, Sheila, Mackenzie

Issued Date: 2022/04/07

General

1. **>> Space Use Diagram:** work with Ecoworks to produce floor plans depicting the space use classifications for all the spaces within the building. CA (Ruel) and Ecoworks (John) to take the lead on this. This information will inform credit coordination.
    a. **Regularly versus nonregularly occupied spaces:** Occupied spaces are further classified as regularly occupied or nonregularly occupied, based on the duration of the occupancy. Regularly occupied spaces are enclosed areas where people normally spend time, defined as more than one hour of continuous occupancy per person per day, on average; the occupants may be seated or standing as they work, study, or perform other activities.
        i. For spaces that are not used daily, the classification should be based on the time a typical occupant spends in the space when it is in use.
        ii. Occupied spaces that do not meet the definition of regularly occupied are nonregularly occupied; these are areas that people pass through or areas used an average of less than one hour per person per day.
2. **>> LEED Occupancy:** Verify with CN – FTE and visitors and patients (see occupancy definitions in Appendix A).

>> IPp1: INTEGRATIVE PROJECT PLANNING AND DESIGN

Target: Achieve the credit requirements

- Assist in the preparation of an Owner's Project Requirements (OPR) document

>> IPc1: INTEGRATIVE PROCESS

Target: Achieve the credit requirements

- Initiate the completion of the Integrative Process Worksheet:

- https://www.dropbox.com/s/t3x29df9bm9zabj/IPc1%20CN%20Salina%20Clinic_IDP%20Worksheet.xlsx?dl=0
- Pass around to design disciplines for additional input and coordination

LTc4: SURROUNDING DENSITY AND DIVERSE USES

Target: Achieve Option 2. Diverse of Uses (1pt)

- EW will document at least 7 diverse uses
  - Assist with a vicinity map showing project site, use locations, and walking route
- LOv4 Form to be completed by Ecoworks.

>> LTc6: BICYCLE FACILITIES

Target: Demonstrate compliance with the bicycle network and bicycle storage and shower room requirements (1pt).

- Documentation of at least 10 diverse uses and Case 1: Commercial projects - provide long and short-term bicycle parking and LOv4 Form to be completed by Ecoworks.
- EW to provide the vicinity map that shows routes along a bicycle network to the destination(s) selected. The map must identify use type, bicycling distance to the destination(s) from the project boundary (must be within 3 mi), and each segment of the bicycling network identified by type according to the bicycle network definition.
- Coordinate with Civil to provide a site map that includes main and functional building entrances, short-term bicycle storage and long-term bicycle storage, walking distance from short-term storage to the main entrance and from long-term storage to a functional entrance. Label bicycle storage according to type and capacity.
  - Based on assumed occupancy of 766 staff and 962 visitors, provide infrastructure to support (25) short-term bicycle storage and (39) long-term bicycle storage would be required.
    - Provide (39) covered or the equivalent of one rack of =39/2 hoops
  - Infrastructure to support (9) showers would also be required.
    - Provide floor plan highlighting the shower locations

SSc8: LIGHT POLLUTION REDUCTION

Target: Achieve compliance: Meet uplight and light trespass requirements, using either the backlight-uplight-glare (BUG) method (Option 1) or the calculation method (Option 2). Projects may use different options for uplight and light trespass.

- Coordinate fixture selection with Owner and Electrical
- Electrical to pass along the location and manufacture documentation for the exterior lighting fixtures
- Electrical to perform the site photometric, if necessary

>> SSc7: PLACES OF RESPITE

Target: Achieve Compliance by meeting the requirements

- Provide places of respite: accessible, equal to 5% of the net usable program area
- Provide places of respite for staff, equal to 2% of the net usable program area
- Places of respite must be outdoors, or be located in interior atria, greenhouses, solaria, or conditioned spaces; such interior spaces may be used to meet up to 30% of the required area if 90% of each qualifying space's gross floor area achieves a direct line of sight to unobstructed views of nature. All areas must meet requirements outlined in RS.

>> SSc8: DIRECT EXTERIOR ACCESS

Target: Achieve Compliance by meeting the requirements

- Provide direct access to an exterior courtyard, terrace, garden, or balcony.
- The space must be at least 5 square feet (0.5 square meters) per patient for 75% of all inpatients and 75% of qualifying outpatients whose clinical length of stay (LOS) exceeds four hours.

>> WEp2/c2: INDOOR WATER USE REDUCTION

Target: Meet the prerequisite and achieve at least 50% potable water use reduction, 1-7pts.

- All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled
- Appliance and Process Water use: Be sure that appliances, equipment, and processes within the project scope meet the requirements
    - Any residential sized dishwashers and ice machines must be ENERGY STAR labeled. Ice machines must also use either air-cooled or closed-loop cooling, such as chilled or condenser water system. Clothes washers must meet CEE Tier 3A performance equivalent.
    - Commercial dishwasher must meet the following:

Kitchen equipment	Requirement (IP units)
Undercounter	≤ 1.6 gal/rack
Stationary, single tank, door	≤ 1.4 gal/rack
Single tank, conveyor	≤ 1.0 gal/rack
Multiple tank, conveyor	≤ 0.9 gal/rack
Flight machine	≤ 180 gal/hour

- Provide cutsheets for any applicable appliances and Ecoworks will verify compliance.

>> MRp1: STORAGE AND COLLECTION OF RECYCLABLES

Target: Achieve compliance.

- Provide floor plans highlighting the recycling storage areas
    - Ensure storage is available for batteries, mercury-containing lamps, and/or e-waste

MRc1: BUILDING LIFE-CYCLE IMPACT REDUCTION

Target: Achieve compliance: Option 4. Whole Building Life-Cycle Assessment (2-4 pts)

- If pursued, help coordinate Whole Building assessment with Structural and Interiors
    - Ecoworks to complete the form

BUILDING PRODUCT DISCLOSURE & OPTIMIZATION

MRc2: EPDs

Target: Achieve v4.1 substitution - 1, maybe 2 pts.

- Option 1 - Use at least 20 different permanently installed products sourced from at least five different manufacturers.
- Provide an editable version of the 01 8113 - Sustainable Design Requirements for Ecoworks to review and edit, update specifications per suggestions
- Become familiar with the LEED BPDO Calculator to be used to track materials during construction: https://www.usgbc.org/resources/leed-v41-building-products-calculator

- Work with Ecoworks to complete the Calculator for EPDs

MRc3: Sourcing of Raw Materials

Target: Achieve v4.1 substitution - 1, maybe 2 pt.

- Option 2 - Use products that meet at least one of the responsible extraction criteria for at least 15%, by cost, of the total value of permanently installed building products in the project (material reuse, biobased, recycled content, regional, FSC).

MRc4: Material Ingredients

Target: Achieve v4.1 substitution - 2 pts.

- Option 1 - Option 1. Material ingredient reporting: Use at least 20 different permanently installed products from at least five different manufacturers that use Manufacturer Inventory, HPDs, or C2C to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).
- Option 2 – use at least 5 permanently installed products sourced from at least three different manufacturers that have a compliant material ingredient optimization report or action plan.

>> MRc6: PBT SOURCE REDUCTION - LEAD, CADMIUM AND COPPER

Target: Achieve compliance by reducing the release of Persistent Bioaccumulative and Toxic (PBTs) chemicals associated with the life cycle of building materials.

- Specify substitutes for materials manufactured with lead and cadmium:
  - Solder and flux, pipes, pipe fittings, plumbing fittings, and faucets, roofing and flashing, electrical wire and cable, interior or exterior paints

>> MRc7: FURNITURE AND MEDICAL FURNISHINGS

Target: Achieve compliance through Option 1: minimal chemical content. Use at least 30% (1 point) or 40% (2 points), by cost, of all freestanding furniture and medical furnishings (e.g., mattresses, foams, panel fabrics, cubicle curtains, window coverings, other textiles) that meet the criteria.

- All components that constitute at least 5%, by weight, of a furniture or medical furnishing assembly, including textiles, finishes, and dyes, must contain less than 100 parts per million (ppm) of at least four of the five following chemical groups:
  - urea formaldehyde;

  - heavy metals, including mercury, cadmium, lead, and antimony;
  - hexavalent chromium in plated finishes consistent with the European Union Directive on the Restriction of the Use of Certain Hazardous Substances (EU RoHS);
  - stain and nonstick treatments derived from perfluorinated compounds (PFCs), including perfluorooctanoic acid (PFOA); and
  - added antimicrobial treatments.
- Include built-in casework and built-in millwork in the base building calculations, even if manufactured off site. The dollar value of any individual product may be included in the total qualifying value if the product meets the criteria.

>> MRc8: DESIGN FOR FLEXIBILITY

Target: Achieve compliance by conserving resources by designing for flexibility and ease of future adaptation and for the service life of components and assemblies.

- Increase building flexibility and ease of adaptive use over the life of the structure by employing at least three of the following strategies:
  - interstitial space
  - programmed soft space
  - shell space
  - expansion capacity
  - future parking
  - demountable partitions
  - movable or modular casework

>> EQp1: ENVIRONMENTAL TOBACCO SMOKE CONTROL

Target: Achieve prerequisite compliance

- Please provide a copy of the No Smoking policy that prohibits smoking inside the building, as well as within 25 feet of all entries, outdoor air intakes, and operable windows.
- Please provide signage details communicating the no smoking policy. This can be a sign mounted to the building or a window cling.
- Indicate signage locations within 10 feet of all building entrances.

>> EQc1: Enhanced Indoor Air Quality Strategies

Target: Achieve Option 1: Enhanced IAQ Strategies (1pt) and one path in Option 2: Additional Enhanced IAQ Strategies, via path C: Carbon dioxide monitoring (1pt). Mech to explore feasibility of also achieving path B: Increased ventilation for an exemplary performance point.

- Interior cross-contamination prevention documentation: Provide documentation demonstrating how any spaces that store hazardous materials have been designed for sufficient exhaust and separation.
    - Identify on floor plans any spaces that store hazardous materials (Janitor Closets, printer rooms, storage areas, Soiled rooms, biohazard room, MedGas rooms, etc)
        - Printer rooms: Verify whether these printers account for high volume printing based on the number of sheets printed on average per day over a week or month.
    - Door hardware – Door schedule sheet, include plans and highlight all doors with closers. Highlight closers on door schedule / hardware set schedule.
    - Separation – spaces identified as housing hazardous gases/chemicals must have deck-to-deck partitions or a hard-lid ceiling.
- Entryway systems – Identify on the floor plans permanent entryway systems at least 10 feet long in the primary direction of travel to capture dirt and particulates entering the building at regularly used exterior entrances.

EQc2: Low-Emitting Materials

Target: Achieve min 2pts via v4.1 -- Categories: 2 (1 pt), 3 (2 pts), 4 (3 pts), 5 (3pts + EP)

- Emission Evaluation and VOC Compliance per material/product:
    - Paints and Coatings (Emissions: at least 75%, VOC Content: 100%)
    - Adhesives and Sealants (Emissions: at least 75%, VOC Content: 100%)
    - Flooring (90%) ::: Walls (75%) ::: Ceilings (90%) ::: Insulation (90%)
    - Composite Wood (75% Not covered by other categories)
    - Furniture (At least 75% by cost)
- Become familiar with credit requirements per SCAQMD Rule 1168 and Green Seal Standard 36 (GS-36)
- Become familiar with credit requirements per applicable standards (SCAQMD Rule 1113, 2004; Green Seal GS-11, 1993; Green Seal GC-03, 2nd Ed. 1997)
- Become familiar with credit requirements per Carpet and Rug Institute's Green Label Plus program, FloorScore certification or CA Dept of Health Services Standard + SCAQMD for finishes and tile adhesives/grout & 50 g/L VOC limit on carpet adhesives.
- Work with Ecoworks to complete the EQc4 Material Tracking List for all low-emitting materials

- https://www.usgbc.org/resources/leed-v41-low-emitting-materials-calculator

>> EQc6: Interior Lighting

Target: Achieve v4.1 substitution - 1pt.

- Provide dimmable or multilevel lighting for 90% of occupant spaces in staff areas.
- For at least 75% of patient sleeping rooms, provide lighting controls that are readily accessible from the patient's bed.
- In patient rooms with more than one patient, the controls must be individual lighting controls.
  - Exceptions include in-patient critical care, pediatric, and psychiatric patient rooms.

>> EQc9: Acoustic Performance

Target: Achieve v4.1 substitution Options 1 and 2 (2pts)

- Option 1. Speech Privacy, Sound Isolation, and Background Noise (1 point)
  - Speech Privacy and Sound Isolation: Design facility to meet the 2018 FGI Guidelines for Design and Construction of Hospitals – Section 1.2 – 6.1.5 and Section 1.2 – 6.1.6.
  - Background noise: Design the facility to meet the 2018 FGI Guidelines for Design and Construction of Hospitals – Section 1.2 – 6.1.4.
  - Calculate or measure sound levels in representative rooms and spaces of each type to confirm compliance.
- Option 2. Acoustical Finishes and Site Exterior Noise (1 point)
  - Acoustical Finishes: Specify materials, product systems installation details, and other design features to meet the 2018 FGI Guidelines for Design and Construction of Hospitals – Section 1.2 – 5.1.3.
    - Calculate or measure the average sound absorption coefficients for representative unoccupied rooms of each type in the building to confirm conformance with the requirements.
  - Site Exterior Noise: Minimize the effect on building occupants of site exterior noise produced by complying with the 2018 FGI Guidelines for the following noise sources:
    - heliports, A1.3-3.6.2.2;
    - generators, 2.1-8.3.3.1;
    - mechanical equipment, 2.1-8.2.1.1; and
    - building services, A2.2-5.3
    - Measure and analyze data to determine the exterior noise classification (A, B, C, or D) of the facility site and design the building envelope to meet 2018 FGI Guidelines for Design and Construction of Hospitals—Table 1.2-3

>> INc1-5: Innovation in Design

Target: Pursue all available Innovation credits through Exemplary Performance, Pilot Credits, and Innovation.

- INc1 Innovation in Design: EBOM Policies
  - EW will provide Policy templates for Owner review
- INc2 Innovation in Design: IPpc98 - Assessment and Planning for Resilience
  - Coordinate with Owner
  - For any two of the top three hazard-related risks identified in the Hazard Assessment Prerequisite (see link below), implement the mitigation strategy processes described below receiving one point per hazard for a maximum of 2 points.
    - https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-data-50
  - Refer to Appendix B: Hastings Pilot Credit Options
- INc3 Innovation in Design: Green Building Education
  - Provide an educational program on the environmental and human health benefits of green building practices and how building occupants or the public can help improve green performance within the LEED space (such as recycling and appropriate use of efficient fixtures and equipment). The program must be actively instructional and include at least two instructional initiatives that have ongoing components, such as a signage program, case study, guided tours, educational outreach program through periodic events covering green building topics, and/or a website or electronic newsletter.
- INc4 Innovation in Design: Low-Mercury Lighting
  - Use all LED lighting – coordinate with Electrical
- INc5 Innovation in Design: Passive Survivability
  - Coordinate with Owner and MEP
  - Demonstrate that adequate emergency power will be available to provide for critical loads that have been identified by the design team as being necessary for the building. These critical loads will differ by project. Satisfy at least one of the following compliance paths (see link below for more information):
    - Provide electricity for at least three (3) or more of the power demands noted in the link below

- Duration over which backup power must be provided: Meet backup power time durations noted in the link below

- https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-data-47?return=/credits/New%20Construction/v4.1
- Refer to Appendix B: Hastings Pilot Credit Options

LEED Task List

CN WW HASTINGS HOSPITAL - LEED CERTIFICATION; CIVIL/LANDSCAPE

Description: LEED Task Items List, (**BOLD/Highlight and marked with >>** are responsibility)

Issued to: Park Hill - Corey; HFSD - Scott

Issued Date: 2022/04/07

>> LTc2: SENSITIVE LAND PROTECTION

Target: Achieve Option 1. Project is located on a previously developed site (1 pt).

- Document that the project is located on a previously developed site per the LEED Definition of previously developed

LTc3: HIGH PRIORITY SITE

Target: Achieve Option 2. Priority Designation (1 pts).

- Support any research required to determine whether the site meets any of the priority designation areas

>> LTc6: BICYCLE FACILITIES

Target: Demonstrate compliance with the bicycle network and bicycle storage and shower room requirements (1pt).

- Documentation of at least 10 diverse uses and Case 1: Commercial projects - provide long and short-term bicycle parking and LOv4 Form to be completed by Ecoworks.
- EW to provide the vicinity map that shows routes along a bicycle network to the destination(s) selected. The map must identify use type, bicycling distance to the destination(s) from the project boundary (must be within 3 mi), and each segment of the bicycling network identified by type according to the bicycle network definition.
- Coordinate with Arch to provide a site map that includes main and functional building entrances, short-term bicycle storage and long-term bicycle storage, walking distance from short-term storage to the main entrance and from long-term storage to a functional entrance. Label bicycle storage according to type and capacity.
    - Based on an assumed occupancy of 766 staff and 962 visitors, provide infrastructure to support (25) short-term bicycle storage and (39) long-term bicycle storage would be required.
        - Provide (39) covered or the equivalent of one rack of =39/2 hoops

>> LTc8: GREEN VEHICLES / ELECTRIC VEHICLES (v4.1)

Target: Achieve compliance: ~~Designate 5% of all parking spaces used by the project as preferred parking for green vehicles. Install electrical vehicle supply equipment (EVSE) in 2% of all parking spaces used by the project.~~ Achieve v4.1: Install electrical vehicle supply equipment (EVSE) in 5% of all parking spaces used by the project or at least two spaces.

- Coordinate site (with Elec) and parking to provide (23) EV spaces, (69) EV ready spaces
    - Assumes 1,150 spaces available between all the buildings
- Coordinate with Elec to provide a Level 2 charging capacity (208 – 240 volts) or greater for each required space.
- Provide site plan highlighting the location of the Electric Vehicle parking spaces

>> SSp1: CONSTRUCTION ACTIVITY POLLUTION PREVENTION

Target: Create an erosion and sedimentation control (ESC) plan for all construction activities associated with the project.

- A plan has been issued on the drawings. The GC's will document compliance including dust control.
    - GC to provide documentation that the plan was implemented

>> SSp2: ENVIRONMENTAL SITE ASSESSMENT

Target: Achieve the prerequisite.

- Conduct a Phase I Environmental Site Assessment to determine whether environmental contamination exists at the site. If suspected, conduct a Phase II ESA. If contaminated, remediate to meet local, state, or national EPA standards.

>> SSc1: SITE ASSESSMENT

Target: Achieve the credit with a complete site survey.

- Complete Site Assessment Worksheet:
    - https://www.usgbc.org/resources/site-assessment-worksheet
    - Civil / Landscape to start the worksheet and add as much as possible, then pass along to Ecoworks and Arch for more input
- Site assessment and inventory included the following information:
    - **Topography:** Contour mapping, unique topographic features, slope stability risks.

- **Hydrology:** Flood hazard areas, delineated wetlands, lakes, streams, shorelines, rainwater collection and reuse opportunities, TR-55 initial water storage capacity of the site (or local equivalent for projects outside the U.S.).
- **Climate:** Provide verification* how the design team considered any of the following factors and included them in the design: solar exposure, heat island effect potential, seasonal sun angles, prevailing winds, monthly precipitation, and temperature ranges.
- **Vegetation:** Provide verification* how the design team considered any of the following factors and included them in the design: primary vegetation types, greenfield area, significant tree mapping, threatened or endangered species, unique habitat, invasive plant species.
- **Soils:** Natural Resources Conservation Service soils delineation, U.S. Department of Agriculture prime farmland, healthy soils, previous development, disturbed soils (local equivalent standards may be used for projects outside the U.S.).
- **Human use:** Provide verification* how the design team considered any of the following factors and included them in the design: views, adjacent transportation infrastructure, adjacent properties, construction materials with existing recycle or reuse potential.
- **Human health effects:** Provide verification* how the design team considered any of the following factors and included them in the design: proximity of vulnerable populations, adjacent physical activity opportunities, proximity to major sources of air pollution.

* Demonstrate the relationships between the site features and topics listed and how these features influenced the project design; give the reasons for not addressing any of those topics.

>> SSc5: HEAT ISLAND REDUCTION

Target: Document Option 1: Nonroof and roof (1 pt)

- Ecoworks to compile and complete the LOv4 form.
- Based on the final LPB, provide total project paving area and ensure it is consistent with the information used to calculate SSc2 and SSc3.
- Provide a site plan highlighting the nonroof surfaces. Use a key to highlight the different materials.

SSc8: LIGHT POLLUTION REDUCTION

Target: Achieve compliance: Meet uplight and light trespass requirements, using either the backlight-uplight-glare (BUG) method (Option 1) or the calculation method (Option 2). Projects may use different options for uplight and light trespass.

- Coordinate the LEED boundary with exterior light fixture locations
- Form and documentation to be completed by Electrical

>> WEp1/c1: OUTDOOR WATER USE REDUCTION

Target: Document Option 1: No irrigation required (1 pt)

- No irrigation is being planned for the entire project area
- Should irrigation be included in the documents:
    - Once the LPB is established, Landscape and Civil to provide area calculations for vegetated spaces and vegetated irrigated spaces
    - Landscape and Civil to provide details on the irrigation system being installed include weather controllers and spray/drip controllers

CN WW HASTINGS HOSPITAL - LEED CERTIFICATION; MECHANICAL/PLUMBING

Description: LEED Task Items List, (**BOLD/Highlight and marked with >>** are responsibility)

Issued to: HP Engineering, Mark/Zach

Issued Date: 2022/04/07

General

1. Space Use Diagram: work with Ecoworks to product floor plans depicting the space use classifications for all the spaces within the building. Arch and Ecoworks (John) to take the lead on this. This information will inform credit coordination.
2. LEED Occupancy: Verify with Arch and Owner – FTE and visitors
3. Produce a **water budget:** a project-specific method of calculating the amount of water required by the building and associated grounds. The budget considers indoor, outdoor, process, and makeup water demands and any on site supply including estimated rainfall. Water budgets must be associated with a specified amount of time, such as a week, month, or year and a quantity of water such as kGal, or liters.

>> WEp2/c2: INDOOR WATER USE REDUCTION

Target: Meet the prerequisite and achieve at least 50% potable water use reduction, 1-7pts.

- Support the calculations that demonstrate how the greywater contributes to over 50% potable water use reductions.
    - Provide the plumbing fixture schedule and plumbing fixture manufacturer documentation. All water closets, urinals, showerheads, and patient room sinks must carry a WaterSense label. Any pre-rinse spray valves must have a flow rate of 1.3 gpm or less.
    - Verify that for any heat rejection or cooling process, there is no once-through cooling with potable water for any equipment or appliances that reject heat.
    - Verify that the cooling towers and evaporative condensers include the following (only required for the building cooling tower not the Central Plant):
        - Makeup water meters
        - Conductivity controllers and overflow alarms
        - Efficient drift eliminators that reduce drift to maximum of 0.002% of recirculated water volume for counterflow towers and 0.005% of recirculated water flow for cross-flow towers.
- Any dishwashers and ice machines must be ENERGY STAR labeled. Ice machines must also use either air-cooled or closed-loop cooling, such as chilled or condenser water system. Clothes

washers must meet CEE Tier 3A performance equivalent. Please provide cutsheets for any applicable appliances and Ecoworks will verify compliance.

- Standards for processes: for venturi-type flow-through vacuum generators or aspirators, use no device that generates vacuum by means of water flow through device into drain. For Discharge water temperature tempering, where local requirements limit discharge temperature of fluids into drainage system, use tempering device that runs water only when equipment discharges hot water OR provide thermal recovery heat exchanger that cools drained discharge water below code-required maximum discharge temperature while simultaneously preheating inlet makeup water. Or, if fluid is steam condensate, return it to boiler.
- If necessary, provide alternative water system design drawings, a narrative describing the alternative source, and calculations confirming the alternative water quantity. Include climate data and storage size/use calculations.

>> WEp3/c4: BUILDING LEVEL and SUBSYSTEM WATER METERING

Target: Install permanent water meters for at least two water subsystems

- Select and ensure the contract documents include water meters capable of compiling data into monthly and annual summaries; meter readings can be manual or automated.
- Complete the LOv4 form and include a list of submeters, their locations, and the percentage of each subsystem metered (as applicable).
- Submetering for Domestic Hot Water and Reclaimed water (both supply and condensate from the Paint Shop).

WEc3: COOLING TOWER WATER USE

Target: For 1 point, maximum number of cycles achieved without exceeding any filtration levels or affecting operation of condenser water system (up to maximum of 10 cycles). OR For 2 points, achieve a minimum 10 cycles by increasing the level of treatment in condenser or make-up water OR Meet the minimum number of cycles to earn 1 point and use a minimum 20% recycled nonpotable water (2 points).

- Owner to track down or conduct a one-time potable water analysis, measuring at least the five control parameters.
- Ecoworks to complete the form with Arch and Owner.

EAp2/c2: FUNDAMENTAL ENERGY PERFORMANCE and OPTIMZE ENERGY PERFORMANCE

Target: Achieve compliance through Option 1. Whole-building energy simulation. Achieve a minimum 10% improvement (5 pts) over ASHRAE 90.1-2010.

- Support EW in the development of the energy model
  - Simple Box Energy Model
    - Provide floor plans
    - Provide system narratives and/or system drawings, if available
  - LEED Energy Model
    - Provide project details including sequence of operations, equipment efficiencies, operational schedules

>> EAp3/c3: BUILDING-LEVEL ENERGY METERING and ADVANCED ENERGY METERING

Target: Achieve compliance by install advanced energy metering for all whole-building energy sources used by the building; and any individual energy end uses that represent 10% or more of the total annual consumption of the building (provided from the energy model).

- Verify the meter selection to confirm that it will perform the required LEED characteristics and appropriately interface with the BAS.
- Confirm that the meters have the following characteristics.
  - *Meters must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location.*
  - *Electricity meters must record both consumption and demand. Whole-building electricity meters should record the power factor, if appropriate.*
  - *The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure.*
  - *The system must be capable of storing all meter data for at least 36 months.*
  - *The data must be remotely accessible.*
  - *All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use.*

>> EAp4/c6: FUNDAMENTAL and ENHANCED REFRIGERANT MANAGEMENT

Target: meet requirements of no CFC's and achieve Option 2: Calculation of Refrigerant Impact.

- Complete Refrigerants table in both LEED forms listing all HVAC&R equipment used in the project scope of work

- BBG&S complete the calculations

>> EAc4: ~~DEMAND RESPONSE~~ / GRID HARMONIZATION (v4.1)

Target: ~~Pending confirmation of the program and commitment from the Owner, achieve Case 1: Demand Response Program Available (2 pts) or Case 2: Not Available, and shed at least 10% of estimated peak electricity demand,~~ GRID v4.1: Achieve Case 3. Load Flexibility and Management Strategies (1-2pts)

- EW to analyze the building's annual load shape and peak load based on the energy model
- Work with EW and Elec Engineer to review the regional grid load profile using the metric of peak load or peak carbon emissions.
- Help to implement one or more of the load flexibility and management strategies:
    - Peak Load Optimization: demonstrate that strategy reduces on-peak load by at least 10% as compared to peak electrical demand referenced to the ASHRAE 90.1-2016 compliant case (1 point)
    - Flexible Operating Scenarios: demonstrate that strategy moves at least 10% of peak load by a time period of 2 hours (1 point)
    - On-site thermal and/or electricity storage: demonstrate that strategy reduces on-peak load by at least 10% as compared to peak electrical demand (1 point)
    - Grid resilience technologies: project served by utilities with resilience programs in place, which leverage strategies such as islanding and part-load operation, automatically achieve this credit (1 point)

>> MRc6: PBT SOURCE REDUCTION - LEAD, CADMIUM AND COPPER

Target: Achieve compliance by reducing the release of Persistent Bioaccumulative and Toxic (PBTs) chemicals associated with the life cycle of building materials.

- Specify substitutes for materials manufactured with lead and cadmium:
    - Solder and flux, pipes, pipe fittings, plumbing fittings, and faucets, roofing and flashing, electrical wire and cable, interior or exterior paints

>> EQp1: MINIMUM INDOOR AIR QUALITY PERFORMANCE

Target: Meet prerequisite requirements

- Complete the LOv4 Form.
- Complete the Minimum Indoor Air Quality Performance Calculator for admin and four supporting functions.
    - https://www.usgbc.org/resources/minimum-indoor-air-quality-performance-calculator

- Upload the Mechanical ventilation controls documentation: Provide a controls drawing or similar documentation showing the monitoring devices (outdoor airflow monitoring devices, current transducers, airflow switches, or similar monitors).

>> EQc1: ENHANCED INDOOR AIR QUALITY STRATEGIES

Target: Achieve Option 1: Enhanced IAQ Strategies (1pt) and one path in Option 2: Additional Enhanced IAQ Strategies, via path C: Carbon dioxide monitoring (1pt). Mech to explore feasibility of also achieving path B: Increased ventilation for an exemplary performance point.

- Interior cross-contamination prevention documentation: Provide documentation demonstrating how these spaces have been designed for sufficient exhaust and separation. Coordinate with Architect.
- Filtration documentation: Provide mechanical schedule(s) (or similar documentation) for each ventilation system in the project scope of work that supplies outdoor air to occupied spaces. The documentation must highlight the MERV or Class ratings for the filtration media that will be installed after construction and prior to occupancy.
- Carbon dioxide monitoring: Provide the ability to monitor CO2 concentrations within all densely occupied spaces. CO2 monitors must be between 3 and 6 feet above the floor. CO2 monitors must have an audible or visual indicator or alert the building automation system if the sensed CO2 concentration exceeds the setpoint by more than 10%. Calculate appropriate CO2 setpoints using methods in ASHRAE 62.1–2010, Appendix C.
- Explore the possibility of Increased Ventilation: Compliance with this requirement is shown within EQ Prerequisite Indoor Air Quality Performance.

EQc4: INDOOR AIR QUALITY ASSESSMENT

Target: Achieve Option 1: Flush-Out, Path 1 or Path 2 (1 pt) or Option 2: Air Testing (2 pts)

- For Option 1:
  - Provide preliminary calculations to determine the amount of time for flush out (both under Path 1 AND Path 2).
  - Pass along the calculations to the GC so that they can provide a flush-out plan that will meet Path 1 or Path 2 requirements
- For Option 2:
  - After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct baseline IAQ testing.
    - Test at least one location per ventilation system for each occupied space type. There must be a minimum of one test per floor. The locations selected for testing must represent the worst-case zones

where the highest concentrations of contaminants of concern are likely to occur.

- Before testing can occur, the Ecoworks Testing Building Preparation Checklist must be followed and signed off.

- For each sampling point where the concentration exceeds the limit, take corrective action and retest for the noncompliant contaminants at the same sampling points. Repeat until all requirements are met.

>> EQc9: Acoustic Performance

Target: Achieve v4.1 substitution Options 1 and 2 (2pts)

- Option 1. Speech Privacy, Sound Isolation, and Background Noise (1 point)
  - Speech Privacy and Sound Isolation: Design facility to meet the 2018 FGI Guidelines for Design and Construction of Hospitals – Section 1.2 – 6.1.5 and Section 1.2 – 6.1.6.
  - Background noise: Design the facility to meet the 2018 FGI Guidelines for Design and Construction of Hospitals – Section 1.2 – 6.1.4.
  - Calculate or measure sound levels in representative rooms and spaces of each type to confirm compliance.
- Option 2. Acoustical Finishes and Site Exterior Noise (1 point)
  - Acoustical Finishes: The specification of materials will be addressed by the Arch team.
  - Site Exterior Noise: Minimize the effect on building occupants of site exterior noise produced by complying with the 2018 FGI Guidelines for the following noise sources:
    - heliports, A1.3-3.6.2.2;
    - generators, 2.1-8.3.3.1;
    - mechanical equipment, 2.1-8.2.1.1; and
    - building services, A2.2-5.3
    - Measure and analyze data to determine the exterior noise classification (A, B, C, or D) of the facility site and design the building envelope to meet 2018 FGI Guidelines for Design and Construction of Hospitals—Table 1.2-3

>> INc1-5: Innovation in Design

Target: Pursue all available Innovation credits through Exemplary Performance, Pilot Credits, and Innovation.

- **>> INc5 Innovation in Design: Passive Survivability**
  - Coordinate with Owner and Arch
  - Demonstrate that adequate emergency power will be available to provide for critical loads that have been identified by the design team as being necessary for the building. These critical loads will differ by project. Satisfy at least one of the following compliance paths (see link below for more information):

- Provide electricity for at least three (3) or more of the power demands noted in the link below
- Duration over which backup power must be provided: Meet backup power time durations noted in the link below

- https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-data-47?return=/credits/New%20Construction/v4.1
- Refer to Appendix B: Hastings Pilot Credit Options

CN WW HASTINGS HOSPITAL - LEED CERTIFICATION; ELECTRICAL

Description: LEED Task Items List, (**BOLD/Highlight and marked with >>** are responsibility)

Issued to: HP Engineering, Mike

Issued Date: 2022/04/07

General

1. Space Use Diagram: work with Ecoworks to product floor plans depicting the space use classifications for all the spaces within the building. Arch and Ecoworks (John) to take the lead on this. This information will inform credit coordination.
2. Occupancy: Ecoworks and Arch will work with Owner to get this info.

>> LTc8: GREEN VEHICLES / ELECTRIC VEHICLES (v4.1)

Target: Achieve compliance: ~~Designate 5% of all parking spaces used by the project as preferred parking for green vehicles. Install electrical vehicle supply equipment (EVSE) in 2% of all parking spaces used by the project.~~. Achieve v4.1: Install electrical vehicle supply equipment (EVSE) in 5% of all parking spaces used by the project or at least two spaces.

- Complete the LOv4 Form.
- Coordinate site (with Civil) and parking
- Provide a Level 2 charging capacity (208 – 240 volts) or greater for each required space.
- Comply with the relevant regional or local standard for electrical connectors, such as SAE Surface Vehicle Recommended Practice J1772, SAE Electric Vehicle Conductive Charge Coupler or IEC 62196 of the International Electrotechnical Commission for projects outside the U.S.
- Meet the connected functionality criteria for ENERGY STAR certified EVSE and be capable of responding to time-of-use market signals (e.g. price). Projects pursuing EA credit Grid Harmonization should incorporate EVSE into any demand response program or load flexibility and management strategies.

>> SSc8: LIGHT POLLUTION REDUCTION

Target: Achieve compliance: Meet uplight and light trespass requirements, using either the backlight-uplight-glare (BUG) method (Option 1) or the calculation method (Option 2). Projects may use different options for uplight and light trespass.

- Complete the LOv4 Form.

- Coordinate site (with Civil) and exterior lighting elements.
- Select the appropriate Lighting Zone - guess is the project is LZ2.
- Provide a site lighting plan depicting the project boundary (coordinate with Civil and Owner/Arch), the property line (if different from the project boundary), the lighting boundary, any additional properties included in the lighting boundary (if applicable), the location and label of all exterior luminaires within the project boundary (both exempt and nonexempt), and any relevant project site conditions.
- Depending on Option chosen, provide the luminaire schedule **or** the site photometric for the vertical illuminance at the site boundary (be sure to highlight the point of greatest illuminance).

>> EAp3/c3: BUILDING-LEVEL ENERGY METERING and ADVANCED ENERGY METERING

Target: Achieve compliance by install advanced energy metering for all whole-building energy sources used by the building; and (for EAc3) any individual energy end uses that represent 10% or more of the total annual consumption of the building (provided by energy modeler).

- Complete the LOv4 Form.
- Confirm that energy meters are on the drawings and in the specs.
- Confirm that the meters have the following characteristics.
    - *Meters must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location.*
    - *Electricity meters must record both consumption and demand. Whole-building electricity meters should record the power factor, if appropriate.*
    - *The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure.*
    - *The system must be capable of storing all meter data for at least 36 months.*
    - *The data must be remotely accessible.*
    - *All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use.*

>> EAc4: ~~DEMAND RESPONSE~~ / GRID HARMONIZATION (v4.1)

Target: ~~Pending confirmation of the program and commitment from the Owner, achieve Case 1: Demand Response Program Available (2 pts) or Case 2: Not Available, and shed at least 10% of estimated peak electricity demand,~~ GRID v4.1: Achieve Case 3. Load Flexibility and Management Strategies (1-2pts)

- EW to analyze the building's annual load shape and peak load based on the energy model

- Work with EW and Mech Engineer to review the regional grid load profile using the metric of peak load or peak carbon emissions.
- Help to implement one or more of the load flexibility and management strategies:
    - Peak Load Optimization: demonstrate that strategy reduces on-peak load by at least 10% as compared to peak electrical demand referenced to the ASHRAE 90.1-2016 compliant case (1 point)
    - Flexible Operating Scenarios: demonstrate that strategy moves at least 10% of peak load by a time period of 2 hours (1 point)
    - On-site thermal and/or electricity storage: demonstrate that strategy reduces on-peak load by at least 10% as compared to peak electrical demand (1 point)
    - Grid resilience technologies: project served by utilities with resilience programs in place, which leverage strategies such as islanding and part-load operation, automatically achieve this credit (1 point)

>> MRp3 / MRc5: PBT SOURCE REDUCTION - MERCURY

Target: Achieve compliance by specifying and installing fluorescent lamps with both low mercury content (MR Prerequisite PBT Source Reduction—Mercury) and long lamp life.

- Complete the PBT Source Reduction Calculator
    - https://www.usgbc.org/resources/pbt-source-reduction-calculator

>> MRc6: PBT SOURCE REDUCTION - LEAD, CADMIUM AND COPPER

Target: Achieve compliance by reducing the release of Persistent Bioaccumulative and Toxic (PBTs) chemicals associated with the life cycle of building materials.

- Specify substitutes for electrical wire and cable manufactured with lead and cadmium

>> EQc6: LIGHTING

Target: v4.1 - Achieve compliance.

- Provide dimmable or multilevel lighting for 90% of occupant spaces in staff areas.
- For at least 75% of patient sleeping rooms, provide lighting controls that are readily accessible from the patient's bed. In patient rooms with more than one patient, the controls must be individual lighting controls. Exceptions include in-patient critical care, pediatric, and psychiatric patient rooms.
- Reference the USGBC **Environmental Quality Space Type Matrix** to perform the calculations
    - https://www.usgbc.org/resources/environmental-quality-space-type-matrix

- Provide drawings highlighting the controls indicated in the tables

>> INc1-5: Innovation in Design

Target: Pursue all available Innovation credits through Exemplary Performance, Pilot Credits, and Innovation.

- **>> INc4 Innovation in Design: Low-Mercury Lighting**
  - Document an average mercury content of less than 80 picograms per lumen hour for all installed lamps
  - Provide manufacturer documentation indicating the total amount of mercury for EACH non-LED light bulb installed in the project.
  - During the submittal process, ensure the bulbs selected are submitted and installed.
- **>> INc5 Innovation in Design: Passive Survivability**
  - Coordinate with Owner and MEP
  - Demonstrate that adequate emergency power will be available to provide for critical loads that have been identified by the design team as being necessary for the building. These critical loads will differ by project. Satisfy at least one of the following compliance paths (see link below for more information):
    - Provide electricity for at least three (3) or more of the power demands noted in the link below
    - Duration over which backup power must be provided: Meet backup power time durations noted in the link below
  - https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-data-47?return=/credits/New%20Construction/v4.1
  - Refer to Appendix B: Hastings Pilot Credit Options

Appendix A: Occupancy Definitions:

Regular Building Occupants

Regular building occupants are habitual users of a building. All of the following are considered regular building occupants.

Employees include part-time and full-time employees, and totals are calculated using full-time equivalency (FTE).
A typical project can count FTE employees by adding full-time employees and part-time employees, adjusted for their hours of work.

EQUATION 1.

$$\text{FTE employees} = \text{Full-time employees} + (\Sigma \text{ daily part-time employee hours} / 8)$$

For buildings with more unusual occupancy patterns, calculate the FTE building occupants based on a standard eight-hour occupancy period.

EQUATION 2.

$$\text{FTE employees} = (\Sigma \text{ all employee hours} / 8)$$

Staff is synonymous with employees for the purpose of LEED calculations.

Volunteers who regularly use a building are synonymous with employees for the purpose of LEED calculations.

Residents of a project are considered regular building occupants. This includes residents of a dormitory. If actual resident count is not known, use a default equal to the number of bedrooms in the dwelling unit plus one, multiplied by the number of such dwelling units.

Primary and secondary school students are typically regular building occupants (see the exception in LT Credit Bicycle Facilities).

Hotel guests are typically considered regular building occupants, with some credit-specific exceptions. Calculate the number of overnight hotel guests based on the number and size of units in the project. Assume 1.5 occupants per guest room and multiply the resulting total by 60% (average hotel occupancy). Alternatively, the number of hotel guest occupants may be derived from actual or historical occupancy.

Inpatients are medical, surgical, maternity, specialty, and intensive-care unit patients whose length of stay exceeds 23 hours. **Peak inpatients** are the highest number of inpatients at a given point in a typical 24-hour period.

Visitors

Visitors (also "transients") intermittently use a LEED building. All of the following are considered visitors:

Retail customers are considered visitors. In Water Efficiency credits, retail customers are considered separately from other kinds of visitors and should not be included in the total average daily visitors.

Outpatients visit a hospital, clinic, or associated health care facility for diagnosis or treatment that lasts 23 hours or less (see SS Credit Direct Exterior Access for credit-specific exceptions).

Peak outpatients are the highest number of outpatients at a given point in a typical 24-hour period.

Volunteers who periodically use a building (e.g., once per week) are considered visitors.

Higher-education students are considered visitors to most buildings, except when they are residents of a dorm, in which case they are residents.

Appendix B: Salina Pilot Credit Options

Passive Survivability and Back-up Power During Disruptions

Option 2: Provide backup power for critical loads

Intent: The electricity needed by a building to maintain a reasonable level of functionality during an extended power outage will vary greatly, depending on building function.

Requirements: Demonstrate that adequate emergency power will be available to provide for critical loads that have been identified by the design team as being necessary for the building. These critical loads will differ by project. Satisfy at least one of the following compliance paths:

Provide electricity for at least three (3) or more of the following power demands:

- Operation of electrical components of fuel-fired heating systems
- ***Operation of a fan sufficient to provide emergency cooling if mechanical air-conditioning equipment cannot operate (could be ceiling fans, plug-in window fans, or fans integral with central air distribution).***
- ***Operation of water pumps if needed to make potable water available to occupants (if pumps are required for distribution of water within the building)***
- ***Lighting level a minimum of three (3) foot candles (32 lux) in all building spaces to define a path of egress to all required exits and to a distance of 10 feet (3 m) on the building exterior.***
- ***One location for every 500 square feet (46 m<sup2< sup="" style="box-sizing: border-box;">) that provides a minimum of 30 foot candles (320 lux) measured 30" (76 cm) above the floor.***
- ***At least one functioning electrical receptacle per 250 square feet (23 m2) of occupied space.***
- ***Operation of cable modem and wireless router or other means of providing online access within the building.***
- ***Operation of one elevator in building in hospitals (or in other buildings as per local code).***

Duration over which backup power must be provided: Backup power time durations for thermal safety and / or critical functions are identified in the Table 1. Meet the below requirements or meet requirements of local code, whichever is more stringent.

Back-Up Power Time Duration Table 1.

Facility Type	Time Duration for Back-up Power
Baseline Facilities	
Residential Buildings, lodging, hospitals, nursing homes, emergency shelters and emergency facilities: fire stations, 911 call centers, police stations and similar.	Four (4) Consecutive days, 24 hours per day.
Fundamental Community Service Organizations	
Pharmacies, convenience stores, grocery stores and facilities with significant stocks of refrigerated or frozen food and ATMs* (Automated Teller Machines) at these facilities	Four (4) Consecutive days, eight (8) hours each day during daylight hours for general operations. Refrigeration and freezers, four (4) consecutive days, 24 hours per day.
Gas Stations	Four(4) Consecutive days, 12-hour each day (or until fuel stocks are exhausted), primarily during daylight hours. Backup power or built-in hand pumps for fuel distribution.
*ATM's at banks, credit unions and other similar facilities such as malls	Powered during regular business hours.
Solar and Wind Electric Back-up Power Systems with Energy Storage	
For all facilities identified above, except hospitals, nursing homes and emergency facilities.	One-half (1/2) of the duration of backup power as identified as described above (excluding elevators) for solar or wind electric systems and battery storage. Gas stations must have built-in hand pumps for fuel distribution.

https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-data-47?return=/credits/New%20Construction/v4.1

Design for Enhanced Resilience

Intent: Design and construct buildings that can resist, with minimal damage, reasonably expected natural disasters and weather events (i.e. flooding, hurricanes/high winds, tornadoes, earthquakes, tsunamis, drought, wildfires, landslides, extreme heat, and winter storms).

Requirements: For any two of the top three hazard-related risks identified in the Hazard Assessment Prerequisite, IPpc98 - Assessment and Planning for Resilience, implement the mitigation strategy processes described below receiving one point per hazard for a maximum of 2 points. If more than two hazard-related risks are identified, project teams may at their option choose to include more than two however no additional points will be earned. Specific requirements for each hazard type are described below. Outside the United States, project teams may use the U.S. standards if applicable or local equivalent standards, whichever are more stringent, and document their equivalence. If the project team completed the Climate Related Risk Management Planning Option 1 in IPpc98, incorporate any agreed-upon parameters into the hazard mitigation strategies. See the referenced standards associated with specific credit hazards.

Tornado Areas

Option 1: Projects in FEMA Wind Zones III or IV with public/community uses and multifamily housing facilities must include safe rooms designed and constructed to standards detailed in *FEMA P-361, Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms, Third Edition (2015)*

Option 2: If a tornado shelter is installed, it is recommended that it meet the requirements of FEMA 320 "Taking Shelter From the Storm: Building a Safe Room For Your Home or Small Business," FEMA 361 "Design and Construction Guidance for Community Safe Rooms," or the International Code Council & National Storm Shelter Association (ICC/NSSA) - ICC-500 "Standard on the Design and Construction of Storm Shelters."

Earthquake

Design to meet at least a Silver rating using the Arup REDi Rating System: Resilience-based Earthquake Design Initiative for the Next Generation of Buildings. Provide a signed letter from a Licensed Engineer that describes how the project met or will meet the REDi Silver rating.

Wildfire

Demonstrate compliance with ICC's 2012 International Wildland-Urban Interface Code (IWUIC) or 2013 NFPA 1144. Provide a signed Executive Summary from a report from a Licensed Design Professional that describes how the project met or will meet ICC's 2012 IWUIC and/ or 2013 NFPA 1144.

Drought

Reduce the project's landscape water requirement by at least fifty percent (50%) per the LEED Water Efficiency (WE) Outdoor Water Use Reduction credit and use non-potable or non-municipal water sources as outlined in the WE credit. In addition, reduce flush and flow fixture water use per the LEED Water Efficiency (WE) Indoor Water Use Reduction (excluding appliance and process water) by at least forty percent (40%). Follow the requirements of the LEED Water Efficiency (WE) Outdoor Water Use Reduction and LEED Water Efficiency (WE) Indoor Water Use Reduction credits to demonstrate compliance with the stated thresholds of this pilot credit.

Hail

Hail-Specific design measure

Meet the FORTIFIED Commercial High Wind and Hail" Specific Design Requirements for Hail.

- Reference: "FORTIFIED Commercial High Wind and Hail"

Flooding

Option 1: Flooding-Specific design measures

RELi V2.0 Standards Provide permanent back-up power, switching gear and / or power hook-ups and infrastructure for temporary generators to provide power for critical utilities such as HVAC and boilers. Locate equipment and infrastructure above the 500-year floodplain. For existing facilities with switch gear, infrastructure and / or fuel storage located below the 500-year floodplain elevation, develop a detailed flood protection plan and provide on-site supplies and infrastructure for protecting electrical switch gear / critical infrastructure from flood water. Modify existing infrastructure in combination with the protection plan if needed to ensure protection. If the equipment is not sufficiently elevated as described as above, then dry flood protection such as flood gates, walls, doors and/ or inflatable barriers must be provided to prevent water intrusion into these vulnerable areas. Flood depth, duration, velocity, and condition of water should be considered (including floating debris). Flood protection must be provided at least the 500-year flood level height if known, otherwise 3 ft. (91 cm) above the known Base Flood Elevation (100-year flood level) or Advisory Base Flood Elevation.

Floodplain: Avoid areas within 500-year floodplain.

Sites Not Permitted: Building on green field sites below the 500-year floodplain is not permitted. For new facilities on previously developed locations and / or within existing built environments such as cities or towns located below the 500-year floodplain: Provide a permanent flood control mitigation system protecting the entire facility and / or protect critical infrastructure and locate key functions and service areas above the 500-year floodplain to provide for business continuity. If the 500-year floodplain is not available/has not been mapped for your location, use the 100-year floodplain and add three feet (1 meter) to that measurement. If neither floodplain is available, a civil engineer/engineering team must conduct an analysis to determine the 500-year floodplain. For existing facilities with switch gear, infrastructure and / or fuel storage located below the 500-year floodplain elevation, develop a detailed flood protection plan and provide on-site supplies and infrastructure for protecting electrical switch gear / critical infrastructure from flood water. Modify existing infrastructure in combination with the protection plan if needed to ensure protection. For all new structures: prevent sewage backflow

OR

Option 2: Flooding-Specific design measures

The lowest occupied floor's lowest horizontal structural member must be a minimum of three feet (1 meter) above the FEMA-defined base flood elevation (BFE+3), as defined for FEMA NFIP Zone V and recommended for Coastal Zone A. As an alternative, in commercial projects only, dry flood-proofing practices may be followed and certified by a Licensed Engineer for any spaces located below BFE+3. OR Meet *Executive Order (EO) 13690 Federal Flood Risk Management Standard*. But flood elevation must be at least 3 feet (1 meter) above the known Base Flood Elevation (100-year level flood). Foundations in the Coastal Zone A shall be the same as required in the Coastal Zone V. Primary mechanical and electrical equipment, including HVAC equipment, water heating equipment, electrical panels, and generators, must follow FEMA 55 guidelines and FEMA Technical Bulletins and Advisories for wet and dry flood-proofing. All sewer connections must include sewer backflow preventers at the point of entry into the building on the main discharge sewer line.

[1] Meeting minimum regulatory and code requirements for the siting, design, and construction of a building does not guarantee that the building will be safe from all hazard effects. Risk to the building still exists. It is up to the designer and building owner to determine the amount of acceptable risk. FEMA Publication 55 – Coastal Construction Manual

https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-27?return=/credits/New%20Construction/v4.1