CONTENTS

PROJECT TEAM 3
APPLICABLE CODES 4
PROJECT SUMMARY AND GOALS 5
  PROJECT DESCRIPTION 5
  BUILDING PROGRAM 5
  PROJECT JUSTIFICATION 5
PROGRAMMING DESIGN 6
  SITE DESIGN 6
  ARCHITECTURAL DESIGN 7
  COST MODELS 12
  STRUCTURAL DESIGN 19
  FIRE PROTECTION DESIGN 20
  HVAC DESIGN 20
  PLUMBING DESIGN 20
  ELECTRICAL DESIGN 21
PROJECT TEAM

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY TEAM

**College of Arts, Sciences, and Business**
118 Fulton Hall
301 W 14th Street
Rolla, MO 65409
Point of Contact: Dr. Kate Drowne

**College of Engineering and Computing**
305 McNutt Hall
1400 N. Bishop
Rolla, MO 65409
Point of Contact: Dr. Richard Wlezien

**S&T Design, Construction, and Space Management**
120E General Services Building
901 Facilities Avenue
Rolla, MO 65409
Points of Contact: Fred Stone, Pat Litty

DESIGN TEAM

**BNIM Architects**
2460 Pershing Road
Suite 100
Kansas City, Missouri 64108
Point of Contact: Joe Keal, Sarah Murphy, Jeremy Kahm

**Structural Engineer**
Bob D. Campbell & Co.
4338 Belleview Avenue
Kansas City, MO 64111
Point of Contact: Richard Crabtree

**MEP Consultant**
McClure Engineering
1000 Clark Avenue
St. Louis, MO 63102
Point of Contact: Philip Wentz

**Cost Estimation Consultant**
Construction Management Resources
5201 Johnson Drive, Suite 330
Mission, KS 66202
Point of Contact: Michael Orel
APPLICABLE CODES

All work shall be done in accordance with all applicable local, state, and federal codes. The following codes, standards, and guidelines will be used for the design and construction as applicable or as directed by the authorities having jurisdiction:

International Mechanical Code (2018)
International Plumbing Code (2018)
2010 ADA Standards for Accessible Design (Department of Justice)
City of Rolla Municipal Code
PROJECT SUMMARY AND GOALS

PROJECT DESCRIPTION

The new Student Experience Center is intended to be a “home” for S&T undergraduate students. It is a dynamic, iconic building that is not only a highly functional place to foster academic excellence, but also a source of pride and emotional connection for current and former students. This type of space does not currently exist on campus. In addition to a new, purpose-built structure, the project also includes select renovations to the adjacent Havener Center to extend the relevancy of its spaces for student-focused use.

BUILDING PROGRAM

The program of the Student Experience Center is shaped around collaboration spaces of various sizes – from large (1,500 sf), lively open study areas to small (100 sf) rooms that accommodate smaller groups. These spaces are augmented by loosely-programmed areas that serve a variety of needs, such as a generous lobby lounge and a multipurpose space. Spaces for AR, VR, and Maker areas acknowledge the growing role these modes of learning have in students’ academic experience. Four active learning classrooms form the actively-scheduled component which will give first-year students a shared experience in the building. These classrooms are meant to tie the building to the student’s academic career and be used for foundational courses that are more general and non-specialized in nature. Finally, the program for the project includes new and renovated spaces to house many of S&T’s Centers: Student Advising, Wellness, Writing, and Student Success. Collocation of these Centers gives students a one-stop-shop for their academic needs.

The Student Experience Center will be located in the new campus Arrival District, making it a prominent and highly visible building that will be a tangible symbol of Missouri S&T’s high aspirations for the future. The building will be situated along the main formal vehicular entry to campus, just south of the Havener Center. An optional wide, programmed bridge structure has the potential to physically connect the Student Experience Center with Havener, while also helping to screen the latter’s existing loading dock from view. The entry to the Havener dock and service area will be reconfigured to enter from Bishop Avenue/US 66 as part of this project to ensure safe separation of these services from areas of pedestrian activity. Within the Student Experience Center, programs and uses will be organized around a large central atrium that will serve as a multifunctional “living room” for students.

PROJECT JUSTIFICATION

S&T’s 2018 Strategic Plan includes five Compacts. The first of these is the Compact for Excellence in Student Success. The first Objective under this compact – “Increase the Quality of the Student Experience” – is in direct alignment with the purpose of the Student Experience Center. The new Center will provide student services and experiences to maximize career success, will enhance student access to quality health and wellness programs and services, and will improve the quality of the first-year experience.

The University has long lacked a singular hub for student academic experience. The Havener Center caters to many student needs but does not support non-departmental collaboration. Currently much of this function is housed in the Curtis Laws-Wilson Library. Because of this, the Library is not able to provide sufficient space for quiet, individual study. Construction of the Student Experience Center will help relieve the Library of the obligation to provide lively collaboration spaces and in turn allow it to better serve the quiet study needs of S&T’s students.
SITE DESIGN

Site Description
The Student Experience Center site is located in the planned Campus Arrival District that will serve as a new university threshold and promote a more iconic and thoroughly-organized arrival experience from the southwest. The new building is sited immediately to the south of the existing Havener and will serve to strengthen the street environment along Highway 63 as well as bridge the notion of arrival to a new campus pedestrian and automobile experience as well as weave together a new physical identity and connect to adjacent buildings such as the new Student Welcome Center and the Historic Rolla Building.

Open Space
The portions of the site not occupied by building or paving will be landscaped in accordance with Missouri S&T standards. Site walking pathways are planned and will be coordinated with the larger campus master planning efforts as well as uses specific to the program of the building. The eastern edge of the Student Experience Center is envisioned to be the primary entry, adjacent to the vehicular drop-off indicated in the in-progress Arrival District Master Plan, which will require upgraded hardscape and landscape strategies. The southern edge of the building, too, is conceived as a regularly-occupied exterior patio for building users.

Site Stairs and Rails
The exterior vertical circulation for the building will be accomplished with cast in place concrete stairs and ramps. Handrails will be constructed of stainless steel pipe.

Service Areas
The north side of the building will be designed to ensure the continued function of the Havener loading dock. A new vehicular service entrance for this dock will be provided from North Bishop Avenue. The existing concrete paving in this area will be adjusted so that the service yard can also serve a back of house area on the north side of the Student Experience Center as well as a maker space courtyard to the east. Screen walls and berms will be provided to shield the service area from public view.

Geothermal Loop
The existing campus geothermal system is at its designed capacity. Coordination with this system will be required in future design phases. The concept design assumes that the new Student Experience Center will not tie into the existing geothermal system. Refer to the Mechanical Systems narrative for additional information.

Site Lighting
The site and pathways may be illuminated using a combination of pole fixtures and bollards. All site lighting will ascribe to Missouri S&T campus standards. Building-mounted lighting is anticipated at all exterior doors and points of entry.
ARCHITECTURAL DESIGN

Enclosure Systems and Materials

Five Facades
Each of the four primary faces of the building (as well as the roof) will be tuned for optimized performance relative to its solar and thermal exposure. The facades also each do different work in projecting the identity of the building and the activity that takes place within. The south façade is envisioned to be the primary building face. Its job is to convey a welcoming presence, revealing the program behind in select areas, and admitting daylight while at the same mitigating heat gain during cooling months (summer) and allowing appropriate gain during heating months (winter). These dual purposes will likely lead to a glazed façade with a shading scrim or apertures, either applied to a framework held out from the glazing or incorporated within the façade, that includes shading elements to manage solar heat gain. The east and west facades are the short ends of the building. These exposures will receive harsh, low-angle sunlight that is difficult to control and best managed by vertical shading elements. We envision the east façade to be significantly opaque, and the west façade to receive shading elements. The north façade will include a small amount of transparency to take advantage of indirect, diffuse northern sunlight. The roof will be a combination of light-colored TPO membrane to reflect solar gain. The design intent is to provide building infrastructure that is PV-ready should the opportunity arise to procure and install photovoltaic panels in the future. Please refer to the exterior conceptual imagery included with this report for additional detail.

Building envelope design for the Student Experience Center has not yet begun. The following descriptions are a representative list of exterior enclosure systems that are currently under consideration. They are intended to establish an anticipated level of quality for this portion of the project. The operative strategy in support of project budgeting is to establish a blended target cost per square foot for all exterior envelope components. The systems being considered will then be deployed in greater or lesser proportions to hit this target cost.

Curtain Wall
- Framing shall be a true thermally broken system by means of extruded structural thermal barriers. Horizontal and vertical framing members shall be extruded aluminum alloys having a nominal face dimension of 2-1/2 inches with depths of 4, 6 or 7-1/2 inches as required by loading. The system design will be stick built onsite. Basis of Design Product: YKK, YCW 750 XT, or Oldcastle Building Envelope Systems, Reliance HTC. Note: During Design Development some alternative non-framed systems will also be investigated.
- The system performance design goal is to achieve an overall glazing system U-factor of ≤ 0.38 with glass performance noted in this document.
- Entrance doors in exterior curtain wall systems, thermally broken and insulated medium style, 1" insulating glass typical glazing noted below. Basis of Design Product: YKK, Mega Therm, model 35 XT, or Oldcastle Building Envelope Systems-Thermal door systems.
- All exterior entrances at curtain wall systems will be equipped with vestibules.
- Exterior portions will be the same materials noted above. Interior portions will be storefront and entrance systems.
- Systems finish: Three coat High-Performance Organic coat fluoropolymer, AAMA 2605, 70 percent PVDF resin by weight.
**Exterior Storefront**
- All interior entrance vestibules only: Framing shall be thermally broken, center set, flush glazed storefront and entrance systems with 1” insulated clear glazing units. Basis of Design Product: YKK, YES 45TU or Oldcastle Building Envelope Systems-Series 3000 Thermal MultiPlane.
- Systems finish: Three coat High-Performance Organic coat fluoropolymer, AAMA 2605, 70 percent PVDF resin by weight to match curtain wall system.

**Glazing**
- Typical glazing unit. 1” insulating glass made up with ¼” ultra-clear glass exterior, low-e coating on the second surface, ½” argon filled space with stainless steel spacers and ¼” ultra-clear glass interior lite. Basis of Design Product: PPG ‘Solarban’ 90.
- The design goals for the glazing are a U-Value (winter) of 0.24 (maximum), a Solar Heat Gain Coefficient of 0.23 (maximum) and a Visible Light Transmittance of 54 (minimum).
- Acoustical glass units for less acoustically critical areas will be similar to the typical glazing units except one lite will be laminated two plies of 1/4 inch glass and a clear acoustical PVB inner layer.

**Wall Systems**

**Brick**
- True cavity wall consisting of:
  - Face brick complying with ASTM C 216
  - Mortar Consisting of Portland cement (ASTM C 150 Type I or II), Hydrated Lime (ASTM C207 Type S), and Aggregate (ASTM C 144).
  - Adjustable Masonry-Veneer Anchors
  - Embedded stainless steel flashing and rubberized asphalt flashing
  - Fluid-applied membrane on glass-mat gypsum sheathing on metal stud construction

Blended brick consistent with color palette of the S&T campus.

**Precast Concrete Wall Panels (maximum U-value 0.05)**
Basis of Design: Precast Architectural Concrete Insulated Sandwich Panels with a total panel thickness of 12 inches and with the following features.
- Exterior concrete panel 4 inches thick with natural Portland cement and aggregate
- Exterior finish is to be acid-etched. Textures and Reveals to be determined during design.
- Interior concrete panel to be 4 inches thick of the same materials as the exterior panel and interior finish is to be light sandblast.
- Wythe Connectors: Panels will be designed as a composite system where both wythes of concrete are capable of bearing load. Wythe connectors will be chosen for both structural and thermal performance characteristics.
- Insulation: Extruded-Polystyrene Board Insulation; ASTM C 578, Type VI, 1.80 lb./cu. ft., with R-value of 20.0 and thickness of 4 inches.
- Typical joint construction will be 1 interior silicone sealant joint at the interior face of the concrete panel, continuous mineral wool fire-safing infill and 2 exterior silicone sealant joints (primary seal at interior face of exterior panel and secondary seal at the exterior face of the exterior panel). Final fire resistant joint assemblies to protect the internal panel foam will be submitted to the University for review and approval during the next phase of the design. Joints between interior wythes grouted if required for acoustical performance.
- The design intent is to have the wall panels dead load at the foundation or a floor level. Where structural slabs are left exposed, panel to floor connections are to be concealed in a recessed floor pocket and grout filled to floor level.
Metal Panel Rainscreen – Steel stud backup (maximum U-value 0.05)
- Metal Panel– Zinc rainscreen panel system. Basis of design product to be chosen during Design Development
- Mineral Wool Insulation: 5" thick, semi-rigid rock wool insulation board
- Air Barrier/Vapor Retarder: Fluid-applied acrylic or bituminous membrane air barrier system, 40 to 45 mils thick with a permeability of ≤ 0.1 perms.
- Glass matt gypsum sheathing, 5/8 inch thick.
- 6 inch deep steel stud framing.
- Interior gypsum board, 5/8" think with interior finish materials.

Terra Cotta Shading Devices and Cladding
- Sun control: NBK Keramik TerraArt Baguette with side-fixing substructure.
- Wall Panels: NBK Keramik TerrArt-Mid panels.

Below Grade Concrete Wall (maximum U-Value 0.05)
Basis of Design: Below grade walls conditions will be designed to resist thermal and moisture conditions with the following features:
- Waterproofing: Two-Component, unreinforced, rubberized asphalt water-proofing (vertical); thickness: 60 mils.
- Drainage: Molded-Sheet Drainage Panel; nonwoven geotextile-faced, molded sheet drainage panel: Composite subsurface drainage panel consisting of a studded, non-biodegradable, molded-plastic-sheet drainage core, with a nonwoven, needle-punched, geotextile facing.
- Perimeter foundation drainage system of perforated PE pipe and fittings and geotextile filter fabric wrap.

Roof Systems
Thermoplastic Polyolefin (TPO) roof system. Basis of Design System: Firestone Building Products Ultraply TPO Platinum, or equal from Carlisle, GAF, or Johns Manville.
- Fabric-reinforced TPO sheet, white.
- Solar Reflectance Index not less than 78.
- Manufacturer’s standard Sheet Flashing, Bonding Adhesive, Termination Bars, and Fasteners.
- Polysocyanurate Board Insulation per ASTM C 1289, Type II, Class 1, Grade 2, felt or glass fiber mat facer on both major surfaces.
- Flexible slip-resisting walkways around roof-mounted equipment and along primary paths of travel.

Vertical Circulation

Elevators
The building will be equipped with machine-roomless electric traction elevators. At least one elevator will be designed to accommodate freight loads. Elevators will be designed in accordance with ASME A17.1 – Safety Code for Elevators and Escalators. BNIM will coordinate the design and specification of elevating systems with the University’s selected elevator consultant.
Stairs
Two interior stairs and enclosures are part of the building exit egress system. The stairs will be constructed of unfinished structural steel plate stringers and shapes. Stairs are to be metal fabricated pan with concrete tread infill. Landings will be poured in place concrete slabs. Stair guardrails will be constructed of raw flat bar steel, and handrails will be constructed of raw steel pipe. The guardrail infill material will be raw perforated steel sheet metal. Additionally, one unenclosed monumental stair is located adjacent to the atrium to be used for convenience purposes. This stair will consist of a steel structure with wood overlays at the treads and risers. The guardrails for the monumental stair will be fully tempered, laminated ½” monolithic glazing.

Interior Materials and Systems
As with exterior systems, the interior portions of the project have not yet been designed. The following descriptions are a representative list of interior materials and systems that are typical to projects of this type and under consideration for the Student Experience Center building. They are intended to establish an anticipated level of quality for this portion of the project.

Interior Storefront
Interior storefront systems will be used at office fronts, classroom entries, and other areas where visual security and connection are needed. Basis of Design: iSeries 400 1 ½” face profile system by Western Integrated Materials, or equal by RACO or Wilson Partitions.

Interior Glazing
All glass systems will be used for special but limited applications for locations such as entrances into office suites, and other areas where we may need to bring natural light deeper into the building. Basis of Design: Systems comprised of 1/2” or 3/4” thick clear safety glass to meet loading requirements, butt glazed and sealed sidelights, floating transoms, manual swing doors and recessed floor mounted closers. Support channels and door hardware shall be aluminum finished to match aluminum framing systems. Basis of Design Products: Dorma Pure, Blumcraft of Pittsburg 1301 series or Oldcastle Building Envelope – All glass entrance systems.

Stud and gypsum board wall systems
Most non-bearing interior partitions will be constructed of gypsum-faced cold formed metal stud walls. Typical gypsum board thickness is 5/8”. Partitions will be designed with acoustic batt and in some cases resilient channels as necessary to achieve necessary criteria for sound transmission and fire resistance rating.

Acoustical ceilings
Lay-in acoustical ceilings will be used in classrooms and office spaces, with vector grid systems or narrow-profile grids and tegular tiles. Acoustical ceiling clouds will be used in larger user-facing spaces. The auditorium will require a detailed acoustical analysis to determine appropriate sound control strategies and other finishes.

Carpet tile
Carpet tile will be provided for spaces that require it for acoustical deadening, such as some classrooms and office spaces. Carpet tiles may be specified with a cushion back to aid in acoustics.
**Polished Concrete Floor**
Concrete slabs will be polished and left exposed in select public areas and spaces that don’t require other flooring materials for aesthetic or acoustical reasons.

**Wood/Terrazzo**
Wood is a material that is being considered to highlight spaces of particular significance in the building. Wood may consist of wall panels and/or tongue and groove wood flooring, particularly in the Multipurpose Event Space.

**Debris Management**
Integrated walk-off systems will be utilized at all public entries to manage debris entering the building. These may be inset tray-type metal systems, or inset fiber systems such as looped tile-type or coconut fiber mats.

**Atrium**
The conceptual building plan diagrams include three levels of interconnected, non-separated space. By code this is classified as an atrium, which will require computational fluid dynamic analysis during design to prove tenability as well as smoke evacuation fans for atrium exhaust.
PROGRAM LAYOUT
01. EVENT LEVEL

LEGEND
01. Active Learning
02. Study Spaces
03. "Lighthouse" program
04. Writing Center
05. "Lighthouse" offices
06. Building Core + Services
07. Primary Circulation

WELCOME CENTER
ROLLA BLDG

HAVENER CENTER

WELCOME CENTER
ROLLA BLDG

CIRCLE DRIVE
SERVICE DRIVE
HWY 63
PROGRAM LAYOUT
02. SECOND LEVEL

LEGEND

01. Active Learning
02. Group Study | S + M
03. Open Study | Quiet
04. Individual Study
05. Wellness Center
06. Student Advising Center
07. Phone | Interview Rooms
08. [Alternate] Bridge to Havener

Study Spaces

Wellness Center

Primary Circulation

Active Learning

Group Study | S + M

Open Study | Quiet

Individual Study

Phone | Interview Rooms

[Alternate] Bridge to Havener

WELCOME CENTER

ROLLA BLDG
VIEW FROM SOUTHWEST - ENTRY TO ARRIVAL DISTRICT
VIEW FROM SOUTHEAST - NEW PORCH CONNECTION TO CAMPUS CORE
VIEW FROM SOUTHWEST - ENTRY TO ARRIVAL DISTRICT
STRUCTURAL DESIGN

EXECUTIVE SUMMARY – The new Student Experience Center is proposed to be framed as a composite steel building. Lateral loads are proposed to be resisted by a combination of steel x-braces and moment frames. Foundations are proposed to consist of shallow spread footings on native soil mitigated with rammed aggregate piers (RAP). Schematic level structural framing plans accompany this narrative. These plans incorporate generic opening layouts and x-brace and moment frame configurations and are intended only to provide a conceptual depiction of an idealized building.

FOUNDATIONS- The existing Havener Center is founded on shallow spread footings capable of safely supporting 2,500 psf. If the same foundation system were provided for the Student Experience Center, the footings would be very large due to the high column loads that come from the large bay spacing utilized in the Student Experience Center. Additionally, settlement of up to one inch would be anticipated for a shallow spread footing system on native soils. This could be especially problematic where the Student Experience Center abuts Havener Center.

Therefore, it is recommended that the foundations for the new Student Experience Center consist of shallow spread footings on native soil mitigated with rammed aggregate piers (RAP) to safely support 5,000 psf. This option will reduce footing sizes and, to a lesser extent, anticipated settlement. This option is reflected in the accompanying Foundation/Level 00 Plan.

Alternatively, the building could be founded on piers in order to essentially eliminate any differential settlement between the new Student Experience Center and Havener Center. Available borings taken during the Havener Center project do not extend deep enough to locate the rock below and so no further information about a potential pier option is available at this time.

FLOOR FRAMING – The floor framing will consist of a concrete slab acting compositely with steel beams. This type of framing has significantly better vibration characteristics than a typical bar joist floor and is more economical than a cast in place structure, especially for the long spans proposed. The floors will consist of a 3” concrete slab on 3” x 18 gage composite deck. This deck will span to beams at approximately 9'-0” on center. Floors will be designed to accommodate a reducible live load of 100 psf. This framing is reflected in the accompanying Level 01 and Level 02 plans.

LATERAL LOADS – Lateral loads are intended to be resisted by a combination of steel x-braces and moment frames. The accompanying framing plans show a typical layout of how these lateral load resisting elements could be configured. The final layout of these elements would be configured as design progresses.

NOTE: BDC had included plans but they are the old plans with smaller footprint and broader bridge. Are we asking them to revise? Or are we choosing not to include?
FIRE PROTECTION DESIGN

The Student Success Center will include a dedicated fire water service to supply a wet pipe sprinkler system throughout the entire building. Fire protection piping will be grooved connection schedule 40 steel with fast acting pendant style sprinklers. A fire department connection will be located near the main entrance and Class I standpipes will be installed in stairwells.

A pressure boosting fire pump is unlikely for the building, but further field investigations will need to confirm adequate water pressure.

HVAC DESIGN

The Student Experience Center will be served by VAV (Variable Air Volume) air handlers with hydronic reheat. Ventilation air will be conditioned and dehumidified via a DOAS (dedicated outside air handler). The system will include occupancy and CO2 sensors for demand control ventilation. All controls will be DDC (direct digital controls) type and connected to the campus BMS (Building Management System).

Two building chilled water pumps and two building heating water pumps will serve the air handlers and reheat coils.

If the building were to utilize conventional chillers and boilers a 500 ton chiller and two cell stainless steel cooling tower would be installed for cooling loads and two (2) 2,000 MBH boilers for heating loads.

The campus has been transitioning buildings to utilize the new geothermal heating and chilled water loops. This is the recommended approach for the Student Success Center as it provides the most energy efficient and sustainable system while providing the redundancy of a campus loop system. Geothermal chilled water lines are nearby at Havener Center and heating water lines are available at the McNutt plant or West of Schrenk Hall at State Street.

To support the additional loads of the building the geothermal system will require the addition of a 4th geothermal plant. The plant could be integrated into the Student Experience Center or tied to an existing building.

PLUMBING DESIGN

The domestic heating water system will be served by gas domestic water heaters, recirculation pump, and mixing system. Domestic water lines will be brazed copper. Sanitary and storm lines will be SCH 40 PVC underground and no-hub cast iron above ground.

Water closets will be wall mounted rear discharge with 1.6 GPM sensor operated battery powered flushometer. Urinals will be wall hung with .5 GPM siphon jet sensor operated flushometer. All lavatories will be sensor operated battery powered.
ELECTRICAL DESIGN

ELECTRICAL POWER SERVICE AND DISTRIBUTION

The building will be served from a new 12.47KV delta to 480V/277 300 KW transformer feed from an existing pad mounted switch at Havener. The main 800 amp service shall be 480/277V, three (3) phase, four (4) wire which will feed new pumps, air handling units, and miscellaneous mechanical equipment in the addition mechanical space, as well as the addition lighting. The 208/120V three (3) phase, four (4) wire service will be used to serve the building convenience power and miscellaneous mechanical equipment.

Digital customer metering will be included for use by the school.

Fuses will be used in all switchboards and panelboards serving mechanical equipment. Circuit breakers and copper buss will be used for panelboards and switchgear feeding lighting and convenience loads. Switchboards and panelboards may be located in either mechanical or electrical rooms as practical. Branch panelboards will be located in dedicated electrical rooms/closets or mechanical spaces not readily available to students or general public.

Aluminum cable will not be used.

Square D will be the basis of design but will not be sole sourced. GE, Cutler-Hammer and Siemens will be considered as equivalents.

Transient Voltage Surge Suppression (TVSS) will be provided at the service entrance, and at panels serving high electronic equipment loads. Variable Frequency Drives (VFD’s) will be by Toshiba, ABB, Danfoss or other manufacturers to be discussed at a later time.

LIGHTING

General ambient lighting will consist of campus standard LED 2x2’s, 2x4’s, and downlights in most student spaces and corridors. Linear direct/indirect fixtures may be utilized in Lobby/Lounge areas. Target light levels will be in accordance with IES recommendations for maintained foot-candles. Ease of maintenance will be considered in the selection and placement of light fixtures.

Generally, preliminary light fixture selections will be made by the Architect. The Engineer will make every effort to achieve proper quality of light with these or comparable fixtures and will work with the Architect to explore other options when required.

Exit lighting will be accomplished with LED exit lights.

Emergency/Egress lighting will be accomplished with battery packs integral to the fixture types listed above. These fixtures will also serve as night light fixtures where necessary. Emergency lighting will be included outside of every building emergency egress/exit point. A light fixture and receptacle will be furnished in any plumbing chases.

Lighting control in public areas and corridors will be accomplished with the use of a digital, programmable lighting control system. The system will allow additional switches/control points/zones to be added over the years as the building operations philosophy changes both upon initial use of the building and in the future.
The system will initially be setup to provide separate zones of control for areas such as; public spaces, private spaces, site, and classrooms. Control stations will be provided for manual control of the system while occupancy sensing will be integrated as necessary to meet energy code requirements. Daylight harvesting and plug load controls will be discussed as the final design is developed.

The State Energy Code requirements will be addressed and ASHRAE 90.1-2016 (or later) requirements will be complied with as a minimum.

WIRING DEVICES

All wiring devices will be specification grade and will be Leviton or Hubbell. No quick-disconnect receptacles will be permitted. Occupancy sensors will be considered for use in offices, toilets, storage rooms, and similar spaces. Digital count-down timers will be considered for use in mechanical rooms.

Wiring Methods
It is preferred that conduit not be installed in concrete slabs.

All above-grade exposed, and concealed wiring will be installed in EMT conduit. Below-grade wiring will be installed in PVC conduit. All wiring will be copper. #12 and #10 wire shall be stranded. Low voltage systems will be installed as open-type plenum rated cables.

Snowmelt Systems
Snow melt systems will not be provided.

Lightning Protection
Lightning protection will be provided.

TELEPHONE AND DATA SYSTEMS
Communications cabling will be Category 6 plenum rated cabling. Rough-ins will be included, and two (2) cables furnished and terminated at all locations.

AUDIO AND VIDEO (AV) SYSTEMS
Rough-in including power and network data for video monitors with a local video signal input plate shall be in all meeting rooms, group study, active learning classroom, maker workshop, and lobby.

ACCESS CONTROL
Perimeter door detection and alarm will be included. Two (2) exterior entry doors shall have campus standard card readers.

FIRE ALARM
An addressable fire alarm system will be installed with audio-visual notification devices meeting building code and ADA requirements for voice evacuation.

END DESIGN NARRATIVE