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Overview
Vision and Intent of Study

EXECUTIVE SUMMARY

HED was tasked with the programming and planning of a new 525-bed student residence hall, termed Residence Hall #4, for the University of Tennessee Knoxville (UTK). The original parameters (as defined by the UT System) were as follows:

- Construction of a 525-bed residence hall, located on Site 9, as identified in the Student Housing Master Plan Amendment dated January 24, 2022
- Programming and planning of the entire site to accommodate all potential utilities, hardscape, green-scape and other logistical requirements
- Consideration of the topographical change between the existing, adjacent Magnolia Courtyard, Andy Holt Avenue and 20th Street
- Consideration of the connection between the project site and the existing, adjacent Magnolia and Dogwood Halls
- A general office component for Housing Offices to be accommodated in the programming and planning of the building
- The original anticipated budget was as follows: Residence Hall #4 - $92,000,000

The project team has approached the residential design with the following key fundamentals in mind:

Fostering Community

Community is at the center of all successful student life facilities. Previous successful examples on UT’s campus, as well as peer institutions, have the ability to act as catalysts for community centered residence hall design, we have included project precedents of other relevant community spaces on similar projects. The ability for students to transform their space and ‘place-make’ is important, and flexibility of space, above all, should be a design goal. Varied spaces for study, socialization, gaming, eating and relaxation are examples of strong ‘neighborhood’ programming.

This community atmosphere should extend beyond the internal confines of the residence hall as well. It’s crucial that the dynamics which make for a successful neighborhood approach are also realized in the courtyard and outdoor zones. The intent is to provide a multitude of options and flexibility that allow for varying levels of socialization, study, and student security.

Neighborhood zones placed at the center and ends of the building floor plans may be implemented with the following programmatic features:

- Studies offering space for independent and group assignments
- Learning rooms with digital interface and ALC (Active Learning Classroom) capability
- Group kitchens
- Laundry facilities
- Recreation & Gaming

Security

Security is a key priority in this residential hall design. The main building entry requires all residents to move through one point at the Reception area. The mail and package areas are also adjacent to the reception and office administration areas, allowing additional ‘eyes’ for added security. In addition to resident sequencing and circulation, spaces on the periphery of the building have been designed with security in mind. Maximizing views and enhancing sight lines are a critical part of this strategy.

Balancing Costs

HED coordinated with a cost consultant (CCS) to develop a budget strategy with itemized categories for UTK cost exercises. This strategy is represented in this document and may be referenced as needed.

Unit Design

Unit programming is based on semi-suite-style configurations with double occupancy units. Double (shared) occupancy units consist of one shared bedroom space with a shared bathroom. The bathroom consists of one toilet and one shower, and directly outside the bathroom is an open lavatory area. The units are designed to provide for one twin XL bed, one open closet, one dresser, one desk, and one mobile pedestal per resident; one combination microwave-refrigerator is provided per room. The target (ideal) RA to student ratio is 40 students to one (1) RA. RA’s live in a single occupancy semi-suite-style unit configuration, identical to the standard student room.
Programming Context

Process

The design team developed a participatory process to engage University stakeholders and ensure that all voices were heard. The programming process began with a review of the existing Residence Halls on campus in order to familiarize the team with current resources and trends. This review, in conjunction with benchmarking of other relevant residence hall projects, allowed the team to identify needs and opportunities that influenced the direction of the programming for Residence Hall #4.

Through a series of focused programming meetings, the team evaluated different program options. The evaluation considered the organization of the residential floor programming in reference to the University’s housing goals, as well as the impact different strategies have on the financial outcome of the project. Throughout the process, the design team worked in a shoulder-to-shoulder manner with project stakeholders while confirming requirements, exploring ideas and reaching consensus to advance the UT Knoxville Residence Hall #4 Programming Study.
ON-SITE PROGRAMMING MEETING | 03.17.2022

Summary
The design team met with the primary project stakeholder groups for the Residence Hall #4 Programming Study. The project stakeholders participated in workshops in the following groups: (1) Facilities & IT; (2) Office of the Campus Architect; (3) Housing & Student Life Leadership. The purpose of the workshops was to establish the project vision and goals for Residence Hall #4, as well as collect relevant project information. The team reviewed the scope of the programming study and the process through which the design would be developed. The initial programming assumptions are as follows:

- Residential unit to be a shared semi-suite configuration, similar to the units at Magnolia and Dogwood Residence Halls.
- Target of 525 new student beds
- Location to be Site 9, as identified in the Student Housing Master Plan Amendment, dated January 24, 2022
- Residence Hall #4 to house a Living Learning Community
- Initial project budget set at $92,000,000
- Office space, to accommodate Student Tours, IT, Student Life and Maintenance staff, to be studied as a programmatic component to the residential program

Existing Site Considerations
The short edge of the Residence Hall #4 site runs parallel to Andy Holt Avenue, a major campus thoroughfare that culminates at the recently completed Pedestrian Mall. The site is adjacent to a pair of existing residence halls: Magnolia and Dogwood Halls. Residence Hall #4 will serve as a completion to the courtyard configuration that is formed by Magnolia and Dogwood Halls.

Campus & Residence Hall Tours
The design team toured existing Residence Halls with key project stakeholders to gain an understanding of how the University operates their current facilities. This provided an opportunity to discuss the strengths and challenges that exist within their current housing ecosystem. The following Residence Halls were toured:

- Magnolia Hall – focus on student semi-suite rooms, staff apartments, community spaces, residential support spaces and Housing & Student Life office space
- Geier Hall – focus on academic spaces
- Fred D. Brown Hall – focus on student semi-suite rooms, community spaces and residential support spaces
Summary
The purpose of this meeting was to seek alignment on building program massing strategies on site. The massing strategies presented were designed to complete the existing courtyard configuration that is defined by the siting of Magnolia and Dogwood Halls. In addition, each massing configuration has a defined Central Neighborhood zone, which is envisioned as the “heart” of the community—a place for students to gather outside of the privacy of their semi-suite rooms.

Option 01 Massing
The Option 01 Massing maximizes the built footprint on the site and does not include a breezeway pass-through. The new courtyard is contiguous with the existing courtyard at Magnolia Hall, however there is not direct access into the courtyard for the public from the corner of 20th Street and Andy Holt Avenue. Access to the courtyard would require students to walk around the new building footprint or travel through the new building lobby.

Option 02 Massing
The Option 02 Massing incorporates a breezeway connection through the Central Neighborhood community zone. This connection allows students to travel from the corner of 20th Street and Andy Holt Avenue into the new courtyard and to the existing Magnolia and Dogwood Halls beyond.

Option 03 Massing
The Option 03 Massing incorporates a breezeway connection adjacent to the Central Neighborhood zone of the building. This breezeway connection allows students to traverse the site without interior access, similar to Option 02. The location of the breezeway outside of the Central Neighborhood allows for a clear programmatic separation between the Residential Lobby and the General Office Suite along Andy Holt Avenue.

Option 04 Massing
The Option 04 Massing incorporates a larger breezeway connection below the Central Neighborhood zone of the building. This connection allows students to traverse the site without interior access, similar to Option 02 and 03. The location of the breezeway below the Central Neighborhood prevents the Residential Lobby from being located within the Central Neighborhood, which may have less visual clarity.

Key Takeaways:
- Option 02 Massing is the preferred direction for programmatic development.
PROGRAMMING MEETING | 04.07.2022

Summary
The purpose of this meeting was to seek alignment on program strategies within the preferred building massing option. The focus of the programming was on the typical residential floor layout.

Typical Residential Floor
Each typical floor of the building has 109 student beds (56 bedroom units), divided into three (3) RA groups. The program layout on each floor is comprised of two (2) residential wings that are bifurcated by a Central Neighborhood community zone. The location of the Central Neighborhood forces one (1) RA group to be divided by the common program, which may not be ideal.

Main Entry – Level 1
The ground floor of the building is divided into two wings, physically separated by the breezeway. To the north of the breezeway, the new residential lobby and circulation can be accessed directly off the central courtyard. The lobby is connected to the residential support programs, staff residences, and MEP/service spaces. The general office suites are located to the south of the breezeway, with a dedicated entry located near the corner of 20th Street and Andy Holt Avenue.

Key Takeaways:
- RA locations need to be located for students of the RA group to pass by, prior to arriving at their individual semi-suite room.
- The location of the Central Neighborhood is preferred, even though it bifurcates a RA group.
The purpose of this meeting was to seek alignment on program strategies within the Central Neighborhood zone of the building. This communal area is meant to encourage socialization amongst all students of a particular floor.

Option 01
The programming for Option 01 contains a Kitchen, Laundry and Gaming/Tech room on every floor. The Lounge space connects two (2) levels of the residence hall, creating a large gathering area that encourages increased interaction amongst students between floors. The connection between floors occurs via a communicating stair within the double-height Lounge space.

Option 02
The programming for Option 02 is designed for two (2) levels of students to share one larger Kitchen and one larger Laundry area, rather than having these spaces occur every floor. Similar to Option 01, the Lounge space also connects two (2) levels of the residence hall, creating a large gathering area that encourages increased interaction amongst students between floors.

Key Takeaways:
- One Lounge per floor is preferable over a double-height Lounge that connects two (2) levels of students.
- The Gaming/Tech space is a programmatic element that could be further defined during the design phase through student focus-group engagement. This space may want to vary in programmatic function throughout the building, thus allowing it to meet the unique needs of the residential community.
Programming Context

Summary

The purpose of this meeting was to seek alignment on defined program adjacencies within the building massing. The focus of the program development was on Level 1, which includes the main entry lobby, common programs and general office suites.

Key Takeaways:
- This proposed programmatic development aligns with the goals of the project stakeholders, with minor modifications.
The purpose of this meeting was to seek alignment on further defined program adjacencies within the building massing. The focus of the program development was on Level 1, which includes the main entry lobby, common programs and general office suites.

**Key Takeaways:**
- This proposed programmatic development aligns with the goals of the project stakeholders, with minor modifications.
Programming Context
Student Focus Group Session Summaries

STUDENT FOCUS GROUP SESSION 01

Two focus group sessions were held by Housing and Student Life to gain an understanding of how current student residents value different programmatic and design elements within their residence halls. The first session was comprised of ten (10) participants that lived in Magnolia and Dogwood Halls at the time of the focus group. The following topics were covered:

**Bathroom Location**
10 out of 10 students voted for the bathroom to be located adjacent to the corridor side of the semi-suite unit. This is the location of the bathroom within their current units at Magnolia and Dogwood Halls.

- Provides more privacy
- Like the window in the main part of the bedroom
- Less disruption when roommate is on a different schedule
- Allows friends and individuals to use their bathroom without entering their bedroom space
- More convenient for housekeeping staff

**Flooring Material**
5 students voted for carpet; 5 students voted for LVT.

- Carpet – cozy, quieter, comfortable
- LVT – easy to clean, ability to pick own color of carpet
  - Wood-look preferred by 8 of the students
  - Stone-look preferred by 2 of the students

**Use of Study Lounges**
4 students use daily; 4 students use 1-3 times per week; 1 student uses 1-3 times per month; 1 student never uses.

- A place to study without bothering roommate
- Whiteboards
- Study with friends
- Like the large windows
- Designated space for studying – helps focus
- Like the orange walls

**Use of Lounge Space**
4 students use daily; 2 students use 1-3 times per week; 3 students use 1-3 times per month; 1 student never uses.

- Used more early on when getting to know floormates
- Love the location right off the elevators and adjacent to the central stair
- Good space to make friends
- Fellowship and community
- Love the cozy lighting and furniture

**Front Desk Placement (Students Must Pass By)**
2 students: absolutely; 7 students: very important; 1 student: little importance; 1 student: not important.

- Eye contact with students
- Can brighten a student’s day, familiar face
- Convenient for package and mail pick-up

**Recreation Room**
5 students use 1-3 times per month; 4 students never use; 1 student abstained from question.

- No strong feelings towards the space

**Fitness Room**
10 out of 10 students want an exercise room in the building, even with TREC adjacent to their current residence halls.

- Cardio equipment
- Weight machines instead of free weights
- Can use it in inclement weather, instead of going out
- Can use when TREC is not open
- Not a huge crowd

**Things Students like about their Residence Hall**
- Recess in the shower wall for bathroom items
- Lighting
- Large windows
- Drywall
- Mobile furniture
- Hammock stands

**Things Students would like to see in the New Residence Hall**
- Larger recess for bathroom items in shower
- A second recess area to put your foot for shaving
- Taller shower curb so water does not leak out in the bathroom floor
- More under-sink storage
- More storage
- More adjustable bed
- Larger desk with desk drawer
- Fitness room
- POD Market
- Thicker walls – too much sounds transference between rooms
- Operable windows
- Bathroom doors that open all the way
- Like the larger buildings – more students living in the residence hall
Student Focus Group Session Summaries

STUDENT FOCUS GROUP SESSION 02

The second session was comprised of eight (8) participants that currently live in Fred D. Brown Hall. The following topics were covered:

Bathroom Location
2 out of 8 students voted for the bathroom to be located adjacent to the corridor side of the semi-suite unit. The location of the bathroom within their current units at Fred Brown Hall is adjacent to the exterior wall.

Flooring Material
5 students voted for carpet; 3 students voted for LVT.
- Carpet – cozy, quieter, comfortable; do not have to purchase a rug; floor isn’t scratched by chair; LVT feels cold and shows more dirt
- LVT – easy to clean, ability to pick own color of carpet
  - Wood-look preferred by 3 of the students
  - Stone-look preferred by 5 of the students

Use of Study Lounges
3 students use daily; 3 students use 1-3 times per week; 2 student uses 1-3 times per month; 1 student never uses.
- Like the large windows
- Designated for studying – helps to focus
- Do not like that study lounges are all white; do not like direct lighting
- Like the location of study lounges, but prefer all to have doors (enclosed)

Use of Lounge Space
2 students use daily; 3 students use 1-3 times per week; 2 students use 1-3 times per month; 1 student never uses.
- Too crowded
- Too large

Front Desk Placement (Students Must Pass By)
5 students: absolutely; 2 students: very important; 0 student: little importance; 0 student: not important.
- Eye contact with students
- Can brighten a student’s day, familiar face
- Feels more secure

Recreation Room
1 student uses daily; 2 students use 1-3 times per week; 2 students use 1-3 times per month; 2 students never use.
- The group does not typically use the recreation room – feels it is too large

Fitness Room
7 out of 7 students want an exercise room in the building and would like a Fitness room that is larger than what they have at Fred Brown Hall.
- Less cardio equipment
- Weight machines instead of free weights

Things Students like about their Residence Hall
- Large windows
- Full size beds
- Carpet
- Temperature control
- Lavatory separate from bathroom
- Storage
- Closets
- Chair with release backs (Torsion)

Things Students would like to see in the New Residence Hall
- Large Fitness room
- Thicker walls – too much sound transference
- Operable windows
- Water fountain on every floor
- Ice machine
- Kitchens
- Large laundry
- More exterior benches
- More grass
The Residence Hall #4 site, "Site 9" is located within the Institutional District (INST). Institutional District Dimensional Standards are as follows:

- **Max Building Height:** 120’
- **Min Front Setback:** 20’
- **Min Interior Side Setback:** None
- **Min Corner Side Setback:** 20’
- **Min Rear Setback:** None
The residence hall site is located within the Institutional District (INST).

Approximate interior property lines are held back 30’ from adjacent buildings to avoid fire protection of openings.

**Approx. Site Area:** 67,000 GSF  
**Target Beds:** 525 Beds  
**Approximate Building Height:** 5 Stories
Site Considerations

Residence Hall Site Diagrams

The assumed buildable site area is represented by the shaded region within the site project boundary.

**Approx. Site Area:** 67,000 GSF
**Target Beds:** 525 Beds
**Approximate Building Height:** 5 Stories
Site Considerations
Residence Hall Site Diagrams

Adjacencies that will impact Site 9 building massing configuration.

**Approx. Site Area:** 67,000 GSF  
**Target Beds:** 525 Beds  
**Approximate Building Height:** 5 Stories
Site Considerations
Residence Hall Site Diagrams

Site constraints that will impact Site 9 building massing configuration.

Approx. Site Area: 67,000 GSF
Target Beds: 525 Beds

Approximate Building Height: 5 Stories

Potential Loading/Service Access
Campus-Facing Facades
Site Considerations
Illustrative Site Plan
Programming: Residence Hall

Organizing Concepts

The proposed Residence Hall #4 is located at the corner of Andy Holt Avenue and 20th Street and is bordered to the southwest by Magnolia and Dogwood Halls. The two existing residence halls frame an existing courtyard that is accented by a central lawn. The addition of Residence Hall #4 will allow the courtyard to expand onto the new site, resulting in a large continuous greenspace. The proposed massing of Residence Hall #4 incorporates a breezeway connection that facilitates circulation from the corner of Andy Holt Avenue and 20th Street to the central courtyard space. The new breezeway will allow students to access the lobby of Residence Hall #4 or to seamlessly pass through the site towards the courtyard and existing residence halls beyond.
Programming: Residence Hall
Organizing Concepts

The proposed massing of Residence Hall #4 references the iconic architecture of Ayres Hall, considered the landmark building of the university campus. The proposed massing for Residence Hall #4 is accented by a central tower, flanked on both sides by the building's residential wings. Programmatically, the central tower serves as the “Central Neighborhood” zone; it is composed of community spaces that reinforce both learning and socialization amongst the student residents.

The ground level of the Central Neighborhood contains a breezeway connection between the central courtyard and 20th Street. This pass through allows for students to access the single, secure, residential lobby or continue through to the central courtyard and beyond to Magnolia and Dogwood Halls.

The upper, typical residential levels of the Central Neighborhood contain shared social spaces, such as the community kitchen, laundry, lounge space, and studies. The central location of these areas and adjacency to the primary circulation core encourages interactions and informal meet-ups between students. The Central Neighborhood is envisioned as having a high amount of transparency to the exterior; this space should have ample views to the adjacent gathering area across 20th Street and onto the central courtyard.
PROGRAM ORGANIZATION

Residence Hall #4 is comprised of five (5) typical residential levels, located on levels 2-6. Each typical level has one central community zone (Central Neighborhood) flanked by two (2) residential wings. Each residential wing has two (2) smaller study spaces: one facing southwest towards the central courtyard and one facing northeast towards campus. Each floor is planned for three (3) RAs.

The breezeway divides Level 1 into two physically separate wings. To the north of the breezeway, the wing contains a central lobby and support functions for the residence hall. The wing to the south of the breezeway contains the general office suites. The location of the office program allows for increased visibility at the corner of Andy Holt Avenue and 20th Street and ease of access for residential tours.
Programming: Residence Hall
Building Blocks

**SEMI SUITE - 2 BEDS (SHARED)**

- Semi-Suite Area: 315 GSF (265 NSF)
- Fixture to Student Ratios:
  1:2 Lavatory; 1:2 Water Closet; 1:2 Shower

This semi-suite configuration, with two (2) beds sharing a bedroom, represents the majority of units in the proposed residence hall programming study. The suite has a bathroom with water closet and shower, however the lavatory is located outside the bathroom to maximize privacy and flexibility. Built-in closet space (one closet per student) is located across from the bathroom. The bathroom and closets create a spatial separation between the corridor and the bedroom, allowing for more privacy and sound reduction.

**RA SEMI SUITE - 1 BEDS (PRIVATE)**

- Semi-Suite Area: 315 GSF (265 NSF)
- Fixture to Student Ratios:
  1:1 Lavatory; 1:1 Water Closet; 1:1 Shower

The RA's receive the standard semi-suite configuration, however the RA's have a private bedroom.
Programming: Residence Hall

Building Blocks

ACCESSIBLE SEMI SUITE - 2 BEDS (SHARED)

Semi-Suite Area: 315 GSF (265 NSF)

Fixture to Student Ratios:
1:2 Lavatory; 1:2 Water Closet; 1:2 Shower

The accessible version of the standard semi-suite configuration, with two (2) beds sharing a bedroom, fits within the same unit footprint as the standard semi-suite unit. This should allow for planning flexibility; the accessible units do not rely on a unique unit footprint and can thus be dispersed throughout the building. The suite has a modified bathroom configuration that includes a roll-in shower. The lavatory (outside of the bathroom) allows for accessible clearances underneath the fixture.
Programming: Residence Hall

Building Blocks

RESIDENTIAL BLOCK (RA GROUP)

Number of Beds: 36 (+1 RA)

The typical residential floor is composed of two residential wings of semi-suites, separated by the Central Neighborhood.
RESIDENTIAL BLOCK (RA GROUP)

Number of Beds: 38 (+1 RA)

The typical residential floor is composed of two residential wings of semi-suites, separated by the Central Neighborhood.
Programming: Residence Hall

Design Program

TOTAL BEDS: 561
SHARED BEDS: 546
RA BEDS: 15
TOTAL AREA: 168,927 GSF
AREA/BED: 301 GSF/Bed
### UT Knoxville: New Residence Hall #4 Programming Summary

#### UT Knoxville: New Residence Hall #4 Programming

**General Office Suite**
- Reception: 806 ft²
- Executive Private Office - Customer Service: 160 ft²
- Executive Private Office - Outpatient: 160 ft²
- Open Office - GA Tours: 250 ft²
- Town Storage: 325 ft²
- Executive Office - IT Team Leader: 175 ft²
- Private Office - IT 1: 120 ft²
- Private Office - IT 2: 120 ft²
- Private Office - IT Workroom: 120 ft²
- IT Storage: 325 ft²
- General Office Suite Subtotal: 2,710 ft²

**Common Programs**
- Exercise: 1484 ft²
- Common Programs Subtotal: 1,484 ft²

**Staff Residential**
- Executive Private Office - Area Assistant Director: 140 ft²
- Private Office - Administrative Assistant for AAD: 130 ft²
- Private Office - Student Life Coordinator 1: 130 ft²
- Private Office - Student Life Coordinator 2: 130 ft²
- Private Office - Student Life Coordinator 3: 130 ft²
- Open Office - GA Res Life: 265 ft²
- Resource Room - RA's: 265 ft²
- Student Life Storage: 303 ft²
- General Use Subtotal: 685 ft²

**Residential Staff & Support Programs**
- Private Office - Hall Director: 160 ft²
- Private Office - Assistant Hall Director: 160 ft²
- Resource Room - RA's: 265 ft²
- Welcoming Room: 120 ft²
- Staff Laundry: 218 ft²
- Staff Kitchen/Breakroom: 338 ft²
- Staff All Gender Restrooms/Locker Room: 623 ft²
- Housekeeping Storage: 267 ft²
- Housekeeping Equipment Storage: 114 ft²
- Maintenance Workshop: 266 ft²
- Maintenance Storage: 266 ft²
- Staff Office: 272 ft²
- Pest Storage: 269 ft²
- Residential Staff & Support Subtotal: 2,564 ft²

**Total Building GSF**
- 5,652 ft²

**Total Building NSF**
- 2,710 ft²

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**Residential Floor**

#### Residential Floor

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<th>Description</th>
<th>QTY</th>
<th>Bldg</th>
<th>NSF</th>
<th>OTH</th>
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<td>3-50 Students per Wing (Typ Floors)</td>
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<tr>
<td>Study - 4 per Room</td>
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<td>1,200 ft²</td>
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<tr>
<td>Sub Electrical Closet - 2 per floor</td>
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<td>1,250 ft²</td>
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<td>1,330 ft²</td>
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<td>Trash Room - 2 per floor</td>
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<td>AV Closet - 2 per floor</td>
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<td>7,098 ft²</td>
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#### Residential Neighborhood

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<tr>
<td>Private Office - Hall Director</td>
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<td>160 ft²</td>
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<tr>
<td>Private Office - Assistant Hall Director</td>
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<tr>
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<tr>
<td>Staff Kitchen/Breakroom</td>
<td>338</td>
<td>338</td>
<td>338 ft²</td>
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<tr>
<td>Staff All Gender Restrooms/Locker Room</td>
<td>623</td>
<td>623</td>
<td>623 ft²</td>
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<tr>
<td>Housekeeping Storage</td>
<td>267</td>
<td>267</td>
<td>267 ft²</td>
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<tr>
<td>Housekeeping Equipment Storage</td>
<td>114</td>
<td>114</td>
<td>114 ft²</td>
<td></td>
<td></td>
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<tr>
<td>Maintenance Workshop</td>
<td>266</td>
<td>266</td>
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<tr>
<td>Maintenance Storage</td>
<td>266</td>
<td>266</td>
<td>266 ft²</td>
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<tr>
<td>Staff Office</td>
<td>272</td>
<td>272</td>
<td>272 ft²</td>
<td></td>
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<tr>
<td>Pest Storage</td>
<td>269</td>
<td>269</td>
<td>269 ft²</td>
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<tr>
<td>Residential Staff &amp; Support Subtotal</td>
<td></td>
<td></td>
<td>2,564 ft²</td>
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**Total Building NSF**
- 2,710 ft²

**Total Building GSF**
- 5,652 ft²
Programming: Residence Hall
Design Program | Level 1 Floor Plan - Overall

GROSS BUILDING AREA

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>GROSS AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1</td>
<td>27,574 GSF</td>
</tr>
<tr>
<td>LEVEL 2</td>
<td>27,155 GSF</td>
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<tr>
<td>LEVEL 3</td>
<td>28,549 GSF</td>
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<tr>
<td>LEVEL 4</td>
<td>28,549 GSF</td>
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<tr>
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<td>28,549 GSF</td>
</tr>
<tr>
<td>LEVEL 6</td>
<td>28,549 GSF</td>
</tr>
<tr>
<td>TOTAL GROSS AREA</td>
<td>168,927 GSF</td>
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</table>
Programming: Residence Hall
Design Program | Level 2 Floor Plan - Overall

<table>
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<tr>
<td>LEVEL 1</td>
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</tr>
<tr>
<td>TOTAL GROSS AREA</td>
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</tr>
</tbody>
</table>

CIRCULATION & SUPPORT
COMMUNITY
NEIGHBORHOOD
SEMI-SUITE (SHARED)
SEMI-SUITE (PRIVATE) - RA
SUPPORT
Programming: Residence Hall
Design Program | Level 2 Floor Plan - Enlarged

Key Plan

1 Level 2 Floor Plan - Sector A
Programming: Residence Hall
Design Program | Level 2 Floor Plan - Enlarged

Key Plan

1 Level 2 Floor Plan - Sector B
Programming: Residence Hall
Design Program | Typical Floor Plan - Overall

### GROSS BUILDING AREA

<table>
<thead>
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</tr>
</thead>
<tbody>
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<td>28,549 GSF</td>
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<td>LEVEL 6</td>
<td>28,549 GSF</td>
</tr>
<tr>
<td>TOTAL GROSS AREA</td>
<td>168,927 GSF</td>
</tr>
</tbody>
</table>
Programming: Residence Hall
Design Program | Typical Floor Plan - Enlarged

Key Plan

1 Typical Floor Plan - Sector A
Programming: Residence Hall
Design Program | Typical Floor Plan - Enlarged

Key Plan

Typical Floor Plan - Sector B
SITE WORK

Introduction
This project will involve the construction of a new student residence hall with approximately 561 beds. The residence hall will be located at the northwest intersection of 20th Street and Andy Holt Avenue on the University of Tennessee campus in Knoxville, Tennessee. The project will include site demolition, building construction, sidewalks, walls, drainage, utilities and other infrastructure improvements.

Site Demolition
Prior to any construction activities, the contractor shall obtain all necessary permits (i.e., TDEC CQP SWPPP/NOC, utility, demolition, building). The contractor shall also contact Tennessee 811 for marking of the public utilities at least three days prior to the start of any construction activities. Demolition on the site shall consist of the removal of the existing gravel paving, asphalt paving, light poles, curb, sidewalks and trees as required for construction of the proposed buildings and site. Pavement demolition shall remove all layers of the existing gravel/asphalt parking areas, concrete drives, sidewalks, and curbs to subgrade.

Site utilities (water, sewer, gas, storm, etc.) removal will be done on an as-needed basis. All utility service connections to the original building shall be removed or capped appropriately. All above ground utilities are to be removed. Underground utilities shall either be removed or abandoned in place (filled with flowable fill and capped). All materials except that belonging to a public or private utility company shall become the property of the contractor and shall be disposed of off-site. Rubbish and debris will be removed from the site daily to avoid accumulation at the project site. The contractor will need to coordinate with the utility owners prior to demolition of utilities.

Site Layout
The project will consist of the site preparation and construction of the new residence hall building. The building and site improvements will be bound on the east by 20th Street, on the south by Andy Holt Avenue, on the north by the access driveway and on the west by the existing sidewalk network. Due to the elevation differences on the site, the building and site will be stepped using building and site retaining walls.

The site pavement will consist of new concrete pads (6” concrete with 4” base). The existing right-of-way curb and sidewalk will be replaced with 6-inch exterted curb and sidewalk (4” concrete with 4” base). Asphalt pavement will be replaced where necessary and shall match the existing section depth and shall be a minimum of 8-in base, 3-inch binder, and 2-inch surface.

Grading
Grading activities will commence once the site demolition is complete and all of the debris has been removed. The site shall be cleared and grubbed of all remaining surface materials. There shall not be boulders, stump or other obstructions remaining on the site. This type of unsuitable material shall be removed to a minimum depth of 2 feet below subgrade (or in accordance with the geotechnical engineer’s recommendations). Material that is not to be used during final construction is to be disposed of off-site. Any topsoil on the site shall be stripped to full depth and stockpiled at an approved location. The grading for the site shall be necessary in order to set the buildings and courtyards at the proper elevation. All areas to receive fill shall be proof rolled prior to placement. Any proof rolled area that exhibits weak or unsatisfactory material shall be undercut and backfilled using a method approved by the geotechnical engineer (e.g. #57 or #67 stone). Fill material shall be placed in lifts not exceeding 8 inches. Areas beneath the buildings shall be compacted to 100% maximum dry density. Where required, topsoil shall be placed a minimum of 6 inches in depth. During construction the contractor will be required to maintain a free draining site; water will not be allowed to accumulate on the site.

Storm Water System
Storm drainage on the site shall consist of swales, catch basins, areas drains, piping, and water quality structure. Drainage structures will be placed as required to keep the site free-draining. The pipe system within the site shall be 15-inch, 18-inch, and 24-inch HDPE or RCP pipe. Roof drainage from the buildings shall be connected together with downspout boots and minimum 8-inch PVC pipe and connected to the storm structures. The water quality structure will be a Downstream Defender, Model 8 or equivalent. UT's MS-4 permit requirements must satisfied using infiltration, stormwater treatment or other combination that is satisfactory to the campus.

Erosion Control Measures
A Storm Water Pollution Prevention Plan (SWPPP) will be developed to provide direction and instruction for maintaining appropriate erosion controls in accordance with the Tennessee Department of Environment and Conservation (TDEC) and the UT MS-4 permit requirements. During construction, measures will be taken to prevent unnecessary erosion of the exposed soil and to prevent sediment from leaving the site. These measures will include properly built construction access drives, storm sewer inlet protection and perimeter silt fence. Erosion and sediment preventative practices will be maintained by the contractor in effective operating condition. Temporary structural practices will be removed once the corresponding disturbed drainage area has been permanently stabilized, unless they are designed to remain in place.
Utilities

The water supply for the building will come from the existing water main on 20th Street. There will be two domestic service connection (6-inch) made with a tapping valve and sleeve, as well as corresponding KUB metering system. There will be one fire service connection, with a tapping valve and sleeve to serve the sprinkler system. There will be a post indicator valve (PIV) and a fire department connection (FDC) for the connection, either installed on each building or 40-feet away from the buildings. The contractor shall coordinate all taps with the Knoxville Utilities Board (KUB). The contractor shall be responsible for testing all new lines and connections.

The building's sanitary sewer line shall be either 6-inch or 8-inch PVC. This service line will connect to the sewer system located on Andy Holt Avenue. Each connection to the sewer system will be made at an existing manhole structure. All connections to a structure shall be watertight with a gasketed connection. Contractor shall coordinate the service connection with the KUB. The contractor is responsible for testing all proposed sanitary sewer lines and connections.
### Programming: Residence Hall
#### Design Program | Architectural Narrative

**Main MEP/Service Program**

On Level 1, the northernmost portion of the building is comprised of the main MEP and service programs; this area of the building is accessible to staff through a set of secure doors in the main corridor. The main MEP and service spaces are comprised of:

- **Staff Breakroom and Kitchen**
- **Staff Restroom and Locker room**
  - Incorporates a locker area and gender neutral toilet rooms
- **Accommodates two (2) maintenance staff and 12 housekeeping staff**
- **Staff Laundry**
  - 4 Washers/4 Dryers
- **Lactation room**
- **Housekeeping Storage**
- **Housekeeping Equipment Storage**
- **General Storage**
- **Main IDF room**
- **Main Mechanical Room**
  - Exterior Access
- **Main Electrical Room**
  - Exterior Access

The loading dock, located off the Service Drive to the north of the building, is directly adjacent to and accessible from the MEP and service spaces within the building.

**Staff Residential Program**

Two staff residences are located off the south wing of the building at Level 1. These residences are intended for the Hall Director and Assistant Hall Director. Each residential unit is to consist of two bedrooms, two bathrooms, kitchen, living room, and washer/dryer. These units are to have private access, separate from the main building entry. An exterior door leading from the adjacent corridor serves as an access point for the staff to enter their residential units.

**General Office Suite Program**

South of the exterior breezeway, the building program is comprised of general office suites that support University Housing and Student Life. The south wing of the building has a separate entry off the corner of Andy Holt Avenue and 20th Street; the entry is to be highly visible and properly identified as a separate function from the main residence hall entry. The office wing will be the future meeting point for Prospective Student campus tours.

The entry to the office wing accesses a reception area that serves as a waiting space for tours and meetings. Adjacent to the reception area is a large Conference room, Multi-Purpose Meeting room, Multi-User Restrooms (Men’s and Women’s) and a Gender Neutral Toilet Room. The remainder of the program is accessible to staff only and is configured in two (2) office suites:

- **Combined Suite 1:**
  - Executive Private Office – Customer Service
  - Executive Private Office – Outreach
  - Open Office – GA Tours
  - Accommodates six (6) desks
  - Tours Storage
  - Executive Private Office – IT Team Leader
  - Private Office – IT (Quantity: 2)
  - Private Office – IT Workroom
  - IT Storage

- **Combined Suite 2:**
  - Executive Private Office – Area Assistant Director
  - Private Office – Administrative Assistant for AAD
  - Private Office – Student Life Coordinator (3)
  - Open Office – GA Residence Life
  - Accommodates six (6) desks
  - Resource Room – RA’s
  - Student Life Storage

**Support Programs:**

- Golf Cart Storage
- Garage Door Access
- Accommodates six (6) 4-person carts and one (1) 6-person cart
- Copy/Print/Mail
- Sub-Electric Room
- Sub-IDF Room
- Sub-Mechanical Room

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<table>
<thead>
<tr>
<th>Main MEP/Service Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Package room</strong></td>
</tr>
<tr>
<td>- Exterior access from the breezeway</td>
</tr>
<tr>
<td>- Accommodates a package locker system to facilitate package management efficiently</td>
</tr>
<tr>
<td><strong>RA Resource room</strong></td>
</tr>
<tr>
<td><strong>Post Office</strong></td>
</tr>
<tr>
<td>- Accommodates one (1) mailbox per residential unit in the building</td>
</tr>
<tr>
<td><strong>Two (2) Gender Neutral Toilet rooms</strong></td>
</tr>
<tr>
<td><strong>Multi-Purpose room</strong></td>
</tr>
<tr>
<td><strong>Fitness</strong></td>
</tr>
<tr>
<td>- Includes water fountain/bottle-filling station</td>
</tr>
<tr>
<td><strong>Residential Staff Offices</strong></td>
</tr>
<tr>
<td>- Hall Director Office</td>
</tr>
<tr>
<td>- Assistant Hall Director Office</td>
</tr>
<tr>
<td>- Conference room</td>
</tr>
<tr>
<td>- Sized to accommodate the residential staff (Hall Director, Assistant Hall Director, 15 RA’s)</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>General Office Suite Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Executive Private Office – Customer Service</strong></td>
</tr>
<tr>
<td><strong>Executive Private Office – Outreach</strong></td>
</tr>
<tr>
<td><strong>Open Office – GA Tours</strong></td>
</tr>
<tr>
<td>- Accommodates six (6) desks</td>
</tr>
<tr>
<td><strong>Tours Storage</strong></td>
</tr>
<tr>
<td><strong>Executive Private Office – IT Team Leader</strong></td>
</tr>
<tr>
<td><strong>Private Office – IT (Quantity: 2)</strong></td>
</tr>
<tr>
<td><strong>Private Office – IT Workroom</strong></td>
</tr>
<tr>
<td><strong>IT Storage</strong></td>
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<table>
<thead>
<tr>
<th>Support Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Golf Cart Storage</strong></td>
</tr>
<tr>
<td><strong>Garage Door Access</strong></td>
</tr>
<tr>
<td>- Accommodates six (6) 4-person carts and one (1) 6-person cart</td>
</tr>
<tr>
<td><strong>Copy/Print/Mail</strong></td>
</tr>
<tr>
<td><strong>Sub-Electric Room</strong></td>
</tr>
<tr>
<td><strong>Sub-IDF Room</strong></td>
</tr>
<tr>
<td><strong>Sub-Mechanical Room</strong></td>
</tr>
</tbody>
</table>

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**Main Entry – Level 1**

The main residential building entry is on the first level of Residence Hall #4 and is accessible from the breezeway that bisects Level 1 of the building. The breezeway is accessed from the corner of Andy Holt Avenue and 20th Street and connects into the central courtyard. This level is composed of 4 main program categories:

- Common Programs and Residential Access
- Main MEP/Service
- Staff Residential
- General Office Suites

**Common Programs**

The main entry accesses the lobby from the breezeway; the lobby has secondary access from the central courtyard. Within the main lobby, there is a 24-hour security desk, vending, water fountain/bottle-filling station and lounge space. The central circulation core, which contains two (2) MRL traction elevators and a stair, can be securely accessed within the main lobby by student residents with identification badges. Adjacent to the lobby are community support programs, which are comprised of:

- Package room
  - Exterior access from the breezeway
  - Accommodates a package locker system to facilitate package management efficiently
- RA Resource room
- Post Office
  - Accommodates one (1) mailbox per residential unit in the building
- Two (2) Gender Neutral Toilet rooms
- Multi-Purpose room
- Fitness
  - Includes water fountain/bottle-filling station
- Residential Staff Offices
  - Hall Director Office
  - Assistant Hall Director Office
  - Conference room
  - Sized to accommodate the residential staff (Hall Director, Assistant Hall Director, 15 RA’s)
RESIDENTIAL PROGRAM – LEVEL 2-6

Level 3-6 – Typical Floor

The third through sixth floors of the building are the typical residential floor layout. These floors are accentuated by a Central Neighborhood space at the center of the building (above the breezeway) that ties the two (2) residential wings together with community-focused program.

Residential

The residential portion of the typical floors is comprised of one “block” of semi-suites per wing. The north wing has 29 shared semi-suites and two (2) private semi-suites dedicated for RA’s. The south wing has 26 shared semi-suites and one (1) private semi-suite dedicated for an RA. Each floor is planned to support 110 student residents and three (3) RA’s.

Building Ends

A Study is positioned at the end of each residential wing, adjacent to the stairs. The space is intended to have a large amount of transparency to the exterior, providing a visual connection to the central courtyard. The location of the Studies at the building ends allows them to be showcased on the exterior. The Studies will provide a sense of activity and community to those passing and approaching Residence Hall #4.

Corner Studies

A second Study is positioned at the corner of each residential wing, along the east facade. These Studies are also envisioned as being highly transparent and will provide a sense of activity as students approach the main building entry. The new exterior gathering space and retention pond across 20th Street will provide views of nature and community activity.

Central Neighborhood

At the heart of each residential floor is the Central Neighborhood, meant to be the community hub that ties two residential wings together. Each Neighborhood has a group of community spaces, meant to foster gathering and socialization amongst the students living on the floor. These community programs are positioned around the building’s circulation core, which causes students to pass through the community space as they travel to their individual units. A water fountain/bottle-filling station should be located in close proximity to the circulation core.

The largest program element is the Community Lounge, which is intended to host gatherings of many types - from informal meetups to organized meetings amongst the entire floor. Adjacent to this social space is the Community Kitchen, which is equipped for light cooking and group dining, and the Laundry. It was important to integrate the Laundry into the community spaces and give students the opportunity to socialize while waiting for their clothing to wash. The Laundry is intended to have one (1) washer and one (1) dryer per 20 students.

Facing the courtyard are a set of more focused program spaces: an Open Lounge, Gaming/Technology and Study. The open lounge is composed of small seating groups that look out onto the courtyard. The Gaming/Technology space is intended to offer students an additional program element to support socialization and learning. This space should be further defined during the design phase of the project, preferably with input from student focus groups. As a technology focused space, it could facilitate group study and presentation preparation, as well gaming or entertainment streaming. The space could also be considered a program element that varies per floor throughout the building and supports a variety of activities – music, makerspace, art studio, meditation, e-sports, etc.

Support

The interior corners of each residential wing house a cluster of support programs that include:

- Trash room
  - Accommodates roll-away bins for trash and recycling
- Housekeeping Storage
- Sub-IDF Room
- Sub-Electrical Room

Level 2 – Modified Residential Floor

Level 2 of the building is a residential floor; however, it is not a typical floor due to the exterior double-height breezeway bisecting the building. This primarily impacts the Central Neighborhood spaces.

Residential

The north wing matches the typical floor layout and has 29 shared semi-suites and two (2) private semi-suites dedicated for RA’s. The south wing is modified by the breezeway and thus only has 24 shared semi-suites and one (1) private semi-suite dedicated for a RA. The second floor is planned to support 106 student residents and three (3) RA’s.

Central Neighborhood

At Level 2, the Community Lounge is reduced in size to accommodate the breezeway passing through the building. The Community Kitchen and Laundry remain the same size as the Typical Floors (Level 3-6). The Open Lounge space, looking out over the courtyard, bridges across the breezeway to allow for continuous circulation throughout the floor. Just south of the Open Lounge “bridge” is a large, enclosed Study. A water fountain/bottle-filling station should be located in close proximity to the circulation core.

The University of Tennessee at Knoxville | New Residence Hall 4 Programming Study | 07.08.2022
The Residence Hall #4 Programming includes a new 6-story building with 168,927 gross square feet. The building will have mechanical rooms, storage, multi-purpose rooms, conference rooms, laundry, staff residences, circulation, community, offices, kitchen, and bedrooms.

The building is located at the corner of Andy Holt Avenue and 20th Street. The existing grade slopes approximately 20 feet from the northeast corner of the site at 20th Avenue down toward the southwest corner of the site at Andy Holt Avenue. A temporary shoring wall may be required along 20th Street and along the Goodfriend Tennis Center access road to support roadway traffic during construction.

Concrete shear walls 8" thick could be used at the three stair towers and the double elevator shaft to support lateral loads. Additional 8" thick shear walls may be required and strategically located within demising walls and hallway walls.

The gable roof could be framed using light-gauge trusses spaced at 4'-0" on-center with 1-1/2" metal roof deck. Load-bearing light-gauge walls positioned along the corridors could be used to support the trusses. Light-gauge strap x-bracing could be used to transfer lateral loads from the roof structure to the concrete slab.

A 4" thick concrete slab-on-grade on compacted gravel and vapor barrier could be used in the lightly loaded areas of the buildings. Areas with storage and MEP may require an 8" thick concrete slab-on-grade over compacted gravel and a vapor barrier to support the heavy surface loading.

A geotechnical engineer will be required to perform a subsurface investigation of the proposed site and provide foundation recommendations along with site preparation requirements. However, deep foundations with tie beams and grade beams spanning between the deep foundations could be used to support the columns and walls.
GENERAL
This narrative encompasses the Mechanical scope of work for the new Residence Hall 4 for UTK. The Mechanical system will consist of horizontal water source heat pumps concealed in the ceiling to condition the spaces. A cooling tower and condensing gas boiler or a steam to hot water heat exchanger will provide the water source loop that the heat pumps will be connected to. During the SD phase, a feasibility study comparing a condensing gas boiler and a steam to hot water heat exchanger for building heat. The study shall provide costs comparisons associated with the install and operation of each system. The cost associated with this programming narrative is for a condensing gas boiler system.

Narrative is based on a 6 story building with a program area of 168,927 sf and 561 beds.

Reference UT Mechanical Design Criteria v4 2018 and UTK Facilities Services 2020 Design Guidelines and Preferences Feb 2020 for additional information and requirements.

CENTRAL HEATING AND COOLING SYSTEM
Loop water will be cooled from a grade mounted cooling tower and heated by a condensing gas boiler or a steam to hot water heat exchanger.

Cooling tower shall be sized for total building cooling capacity. Tower shall consist of multiple cells to operate at partial capacity if one cell is inoperable. Cooling tower shall be located on grade across the street. Piping main from the cooling tower shall be 8-inch and routed to the mechanical room on the first level.

If condensing gas boilers are used, the boiler shall provide heat input to the water source loop. Boilers shall be provided with either integral circulation pumps or separate pumps shall be interlocked with boiler operation.

If a steam to hot water heat exchanger is used, it shall provide heat input to the water source loop. Heat exchanger shall be skid mounted type consisting of heat exchanger, steam control valves, hot water circulation pumps, and controllers.

Loop water will be distributed to the building from the cooling tower via an 8-inch main. Loop water will be distributed through the building by (2) 750 gpm base mounted end suction pumps. An additional pump at 750 gpm shall be provided as standby. A single variable frequency drive (VFD) per pump shall be provided to vary pump speed based on reading from a remote differential pressure sensor.

Piping shall be welded steel 2.5” and above and copper 2” and below. Insulation shall be fiberglass with all service jacket, with insulation per UT Mechanical Design Criteria. Heating hot water system shall also have expansion tank and air/dirt separator, and makeup water connection.
SPACE COOLING AND HEATING

Loop water shall be routed to water source heat pumps throughout building. Piping chases shall be provided to route piping vertically to each floor with isolation valves at floor distribution. Zones with similar thermal load profile shall be served by a single water source heat pump with a duct mounted return air temperature sensor. Units shall include modulating hot gas reheat for humidity control.

Water source heat pumps shall be horizontally mounted above the ceiling or vertically mounted in mechanical closets as applicable. Route low pressure supply air ductwork from unit to supply diffusers in space. Return ductwork shall be low pressure routed from return air grilles with MERV-8 filters. Outside air shall be routed to return side of units and balanced to meet ASHRAE Standard 62. Units shall be manufactured by Aaon, Trane, Daikin, or Carrier. Each unit shall have DDC controls that are BACnet compatible and tied back to building and campus control system.

Student Bedrooms and Staff Residences shall have 1 WSHP per room. Rooms for other areas may be combined as larger zones.

Water Source Heat Pump Sizing

Water source heat pumps shall be sized to serve spaces at approximately the following rates:

- Student Bedrooms: 1 cfm/sf
- Staff Residences: 1 cfm/sf
- Lobby and Circulation: 1.3 cfm/sf
- Academic and Residence Support: 1.5 cfm/sf
- Study Spaces: 2 cfm/sf

Dedicated Outside Air Units

Building outside air and ventilation shall be provided through a dedicated outside air system (DOAS) to provide preconditioned / dehumidified outside air to each zone. Provide (2) 9,500 cfm units located at roof or attic level. Unit shall be water source heat pump air handling unit with exhaust energy recovery and modulating hot gas reheat. DOAS units shall be located at attic or roof level and route outside air and exhaust using low pressure sheet metal duct to rated shafts to feed each zone.

Ventilation air shall be sized to makeup for toilet exhaust, laundry exhaust and to meet ASHRAE 62 fresh air ventilation requirements. Shafts shall be provided at each level or shared between each zone to feed ventilation air to each zone and provide exhaust to each toilet and shower. Each exhaust and outside air penetration of the shaft will be required a combination fire smoke damper.

Miscellaneous

Provide the following additional systems or components:

- Duct all laundry exhaust to wall cap at nearest exterior wall
- Provide electric cabinet heaters in stairs for freeze protection
- Provide ventilation fans and electric or gas unit heater for fire pump room and all mechanical spaces
- Provide exhaust ventilation for all trash rooms and Janitor Closets
- Each IT closet and Electric room shall be provided with independent wall mounted mini-split unit equal to Mitsubishi PKA.
- Refer to figure X for typical ductwork routing from water source heat pumps serving bedroom suites.

HVAC CONTROLS

Connect all HVAC systems back to campus HVAC control system for monitoring and energy management. Controls shall be campus standard JCI or Schneider. All controls (to include duct temperature sensors) will report to BMS front end with graphical displays. Provide the following additional meters and monitoring points at the central BMS:

- Loop water flow and BTU monitoring
- BTU and Flow monitoring for Domestic hot water heating system
- Interface to building electric meter
- All private offices to have individual temperature controls.
Programming: Residence Hall
Design Program | Mechanical Narrative
Programming: Residence Hall
Design Program | Electrical Narrative

Provide all labor, materials, tools and services for a complete installation of equipment and systems specified herein. Principal features of work included are:

- Primary Electrical Distribution
- Switchboards
- Panelboards
- Power Wiring and Secondary Distribution
- Interior Lighting Fixtures and Control Equipment
- Exterior Lighting Fixtures and Control Equipment
- Convenience Outlets
- Telephone and Data Outlets and Wiring as required
- Electrical Control and Interlock Wiring as required by Mechanical Drawings, Specifications, or Manufacturer's Schematics
- Heating, Ventilating and Air-Conditioning Equipment Power
- Plumbing Equipment Power
- Standby Generator
- Automatic Transfer Switches
- TV Distribution Rough-in
- Elevators
- Lighting Protection
- Surge Protection Devices
- Ground Bars
- Fire Alarm System

Comply with applicable local, state, and federal codes. Comply with applicable requirements of recognized industry associations which promulgate standards for the various trades. Employ only qualified journeymen for this work. Employ a competent qualified mechanic to supervise the work. Perform work specified in Division 26 in accordance with standards listed in architectural narrative. All materials and equipment used in carrying out these specifications to be American made unless approved otherwise by the Engineer and to be new and have U.L. listing, or listing by other recognized testing laboratory when such listings are available. Construction materials shall meet Factory Mutual guidelines. Properly identify all starters, contactors, relays, safety switches, and panels with permanently attached black phenolic plates with 1/4 white engraved lettering on the face of each attached, with two sheet metal screws. Starters and relays connected by the electrical tradesman to be identified by him whether furnished by him or others.

Currently on the site for the new facility, is an existing Vista switch fed from the UTK campus distribution system. There is an existing high voltage duct bank that runs along Andy Holt Avenue feeding the existing Vista switch. A new duct bank will be installed to connect the existing Vista switch to a 2 new pad mount utility transformers.

Utility Transformer T1 will be a 13.2KV-480/277V 2000kVA pad mount transformer to serve the HVAC, Cooling Tower and other building infrastructure loads.

Utility Transformer T2 will be 13.2 KV-208/120V 2000 kVA pad mount transformer to serve the student dwelling spaces, office space and assembly areas.

From the secondary of the pad mounted transformer T1 the contractor shall provide 8 sets each: (4) #500MCM, 3 1/2" Conduit to a new 3000 amp, 480/277 volt, 3 phase, 4 wire main switchboard ‘MSB1’ located in the main electrical room

From the secondary of the pad mounted transformer T2 the contractor shall provide 11 sets each: (4) #500MCM, 3 1/2" Conduit to a new 4000 amp, 208/120 volt, 3 phase, 4 wire main switchboard ‘MSB2’ located in the main electrical room

120/208y/120V loads shall be fed from the new 208/120 switchboard MSB2. Panelboards shall be specified for sequence phase connection to evenly balance electrical loads on each phase. Bus bars shall be copper. Loads up to 400 amperes shall utilize panelboards. Loads 400 to 1200 amperes shall utilize distribution boards. Loads above 1200 amperes shall utilize switchboards. Circuit breakers to be molded case, bolt-on type. Panelboards shall have 15 percent spare capacity and 20 percent spare breakers. A detailed short-circuit analysis shall be prepared during the design phase, and all overcurrent devices shall be coordinated so that downstream devices will trip to clear any fault. The anticipated available fault current at the transformer secondary is 65,000 amps. Provide 3PH, 4W surge protection devices at the main service switchboard and panelboards that are connected to the secondaries of 208Y/120V transformers. An emergency standby engine generator system shall be provided. The system shall be completely automatic for unattended operation for the duration of any loss of normal utility power. System shall be capable of reaching operating range within 10 seconds of initial start signal. Unit shall be a continuous standby 600 KW/KVA capacity. Unit to meet the requirements of NFPA 110. Unit shall be equipped for outdoor installation. Unit to be equipped with a sound attenuated housing. Starting batteries to be heavy-duty lead acid type with an automatic battery charger. A double wall diesel belly tank shall be provided with 24 hours of run capacity. The system shall be provided with a generator control panel and a remote annunciator (remote annunciator to be housed in the building command center). Transfer switches shall be provided as indicated on the drawings. Switches to be double throw actuated by a single operator. Interlocked molded case circuit breakers, contactors or transfer devices with dual solenoid operators are not acceptable. Provide an automatic exerciser to operate the unit for a period of 30 minutes every 168 hours. The emergency system shall supply power to all life safety and equipment loads in the facility including the elevators.

Lighting systems for the facility shall consist of the following:

- Office: 2 x 4 direct/indirect, LED lay-in luminaire.
- Corridor, Lounge, and Bathroom: 2 x 4 direct/indirect, LED lay-in luminaires, LED can lights, and LED sconces.
- Storage, Mechanical, Electrical: 1 x 4 LED strip light.
- Dorm room: Surface mounted 2x4 LED panel.

Light fixtures shall be controlled via switches in combination with occupancy sensors.
Provide additional general use duplex outlets where required. Provide GFI duplex convenience outlets above counters in toilets. Provide quadraplex outlets to serve computers in the classroom and office desk locations. Receptacle circuits in sleeping and living areas shall be powered via arc fault breakers.

IT cabling shall be contractor furnished/contractor installed. All data outlets will be new and shall be located at computer stations in the office desks, each dorm room and in public gathering areas within the building. Wireless access points shall be provided throughout the facility as required. Service for the new facility shall originate from a telecommunication manhole located on campus routed to the new building via 3-4” conduits. All work shall be done per the latest UTK IT standards.

Provide starters as shown on mechanical drawings and scheduled on electrical drawings. Division 23 to furnish and install line- and low-voltage control wiring including conduit, conductors, and terminations for same. Starters used on 480V systems shall have individual 480/120V control transformer with two cartridge fuses in the primary and one in the secondary. Starters used inside to have NEMA-1 enclosures, starters used in damp locations or exposed to weather to have NEMA-3R enclosures.

Conductors and cables utilized for interior building installation shall be copper. Temperature rating of conductors shall be 90 degrees C. Insulation shall be THHN, THHW, or XHHW, 600 volt rated, 90 degrees C. Branch circuit wiring for all dimming systems will be required, one neutral per circuit, no common neutrals allowed. Raceways used in building interiors shall be rigid metal. The minimum conduit size shall be 1/2”. The entire system of raceways and equipment shall be grounded in accordance with Article 250 of the NEC. The main service switchboards shall be bonded to the street side of first flange or coupling of the incoming water line in accordance with Article 250-80 of the NEC, sized in accordance with Article 250-94 of the NEC. An additional ground wire shall be run to a tripod grounding rod system outside the building foundation. Building steel shall be connected to the building switchboard and the grounding systems shall be bonded to the lightning protection system. Separate green grounding conductors shall be installed in all feeder and branch circuits in accordance with Table 250-95 of the NEC.

Contractor to provide a functional unobtrusive system of air terminals, conductors, grounds, and other necessary components necessary for the protection of the building against damage by lightning. The lightning protection system shall be completely concealed where possible with only air terminals visible. The system shall comply with Underwriter’s Laboratories, Inc., #UL96A and NFPA-780. Upon completion of the installation, the contractor shall complete the application for the U.L. “Master Label” and forward to the manufacturer for processing. A copy of the application shall be made a part of the project closing files.

Provide electrical connection to projection screens and all A/V equipment per manufacturer’s recommendations.

Provide electrical connection to parking equipment and car chargers as required.
Programming: Residence Hall
Design Program | Plumbing Narrative

GENERAL
This narrative encompasses the plumbing scope of work for the new Residence Hall 4 for UTK. Narrative is based on a 6 story building with a program area of 168,927 sf and 561 beds.
Reference UT Mechanical Design Criteria v4 2018 and UTK Facilities Services 2020 Design Guidelines and Preferences Feb 2020 for additional information and requirements.

PLUMBING SYSTEMS
Sanitary Waste and Vent Systems
The building will be provided with a complete sanitary waste and vent system utilizing Schedule 40 PVC pipe and fittings. Sanitary waste and vent piping shall be routed to all plumbing fixtures. Floor or wall-mounted cleanouts will be provided every 50’ within the buildings. Heavy-duty couplings shall be installed at the lower three floors of construction, and at the base of all waste stacks. Sanitary waste mains shall be routed to the site sanitary waste system. Exposed piping and p-traps subject to freezing shall be heat traced. Waste stacks, vent stacks, and stack vents shall be routed vertically from the top floor to the bottom floor to drain and vent bathroom groups common to each floor.

Storm Water Systems
The buildings will be provided with a complete storm water system utilizing Schedule 40 PVC pipe and fittings. The roof will be provided with cast-iron roof drains and overflow drains. The roof drains will be collected and piped to exterior storm mains on site. Overflow drains shall be routed to ground level and discharged to grade. Provide 6” roof drains for every 6,000 square feet of drainage area. Heavy-duty couplings shall be installed at the lower three floors of construction, and at the base of all rainwater stacks. Elevator pits shall be provided with duplex 50 GPM pumps with oil smart systems. The elevator sump pump discharge shall drain to storage barrels.

Domestic Cold Water Systems
Two (redundant) 4” water services will be provided from two separate KUB water mains (if possible) and will enter at the main level in the MEP Service Room. It is currently anticipated that building backflow preventers will be located in the MEP Service Room. Provide redundant backflow preventers per UT requirements (two total RPBPs). An end suction triple type pump will be used to boost the water pressure for the building. Booster pump shall be equal to a Grundfos Model CRE32-MLE. The domestic water booster pump shall be located in the MEP Service Room. The booster pump shall be equipped with a variable frequency drive. Domestic cold water will be distributed throughout the buildings to service the plumbing fixtures and equipment as required.

Piping shall consist of insulated Type “L” copper. Shutoff valves will be provided to isolate all fixtures and equipment. Shock absorbers will be provided at all flush valve fixtures and all other quick closing valves. All cold water lines shall be insulated per UT Mechanical Design Criteria. Non freeze wall hydrants spaced 150 ft. apart shall be provided around the perimeter of the buildings. Exposed piping subject to freezing shall be heat traced.

Domestic Hot Water Systems
The domestic hot water for the facility will be provided from a condensing gas hot water heater with storage tank or a steam to hot water heat exchanger. Refer to mechanical narrative for heat exchanger details.

NATURAL GAS SYSTEM
The building will be provided with a natural gas service. The gas meter shall be located outside. Gas shutoff valves, dirtleg, and unions will be provided at all equipment.

Natural gas shall be routed to (condensing gas hot water boiler and condensing gas domestic hot water heater) gas unit heaters in the MEP services room.

PLUMBING FIXTURES
All plumbing fixtures shall be low flow type. Water closets in residences shall be floor mounted tank type. Water closets in public spaces shall be flush valve type. Refer to architectural and campus standards for specific plumbing fixture types and manufacturers.
FIRE PROTECTION SYSTEMS

Buildings will be 6 floors. Based on building height and use, there will be automatic sprinkler & standpipe systems boosted by fire pump to comply with national and local codes. City water will be used to supply the building fire protection system.

The building will be fully covered by an automatic sprinkler system. All systems to be hydraulically designed per NFPA 13 and insurance underwriter requirements. System to be complete with Siamese connection, alarms, and all related appurtenances. Pipe shall be Schedule 40. Entire system to meet all requirements of NFPA 13 and 14. A fire pump and jockey pump will be provided. The size of the fire pump selected will meet the full fire demand of the building sprinkler and standpipe systems per NFPA 13 and 14. Fire pump shall be equipped with service entrance rated soft start/ATS with minimum 100 KAIC rating. Fire pump will be located in a dedicated 2 hour fire rated reinforced masonry construction fire pump room and accessible from the exterior from a doorway on grade. The sprinkler heads will be white, semi-recessed, quick response type for all finished areas. Sprinklers in monolithic ceilings shall be concealed with factory-painted white cover plate or white recessed sidewalls depending on architecture. Utilize brass upright heads for all areas without finished ceilings.

Class I standpipes shall be provided. Each egress stair shall have a NFPA 14 compliant fire protection standpipe, one of which shall extend to the roof with a 2 ½” fire hose connection. All standpipes shall be interconnected. Each standpipe shall have a 2 ½” fire hose connection and capable of providing 100 PSI at each stair landing. Additional fire department valves shall be located to provide access within 200’ travel distance. Pressure reducing fire department valves and automatic sprinkler zone control valves shall be provided as required by system pressures. Each floor shall be equipped with sprinkler zone control assembly (located in central stair) with flow switch, tamper switch, inspector test station. A 3” sprinkler drain will be provided at each stairwell equipped with pressure reducing valves. All flow and tamper switches shall be connected to the building fire alarm system.

Fire extinguishers of ABC type with UL rating 4A:80B; C in aluminum cabinets shall be located throughout the facility. Locate so that a maximum of 75 feet of travel to any space will be provided. Wall-hung fire extinguishers equal to ABC type with UL rating of 4A:80B: C shall be located in all mechanical spaces.
Cost Analysis

**PROCESS**
The following cost analysis is based on the program data and conceptual floor plans for the Design Program.

**Assumptions**
- Normal market conditions
- Five or more qualified Subcontractors competitively bidding on bid packages for this project
- Design Bid Build approach
- June 1, 2023 as start of construction
- June 30, 2025 as substantial completion of construction

**Exclusions**
- Professional fees, testing, moving expense for Owner’s account
- FF&E
- Premium costs for work done in phases, out of sequence or out of standard working hours
- Owner provided items
- Hazardous material removal and abatement
- Construction contingencies
- Any soil issues with compaction or hazardous soils
- Any existing road work around site
- Any off-site infrastructure for utilities to site
## Cost Analysis Program

### Systems Cost Analysis

**Parameter Costing Model**
University of Tennessee - Knoxville - Residence Hall Building 4

### Cost Summary

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Cost</th>
<th>Rate/SF</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROSS AREA</strong>: 169081 SF</td>
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### Foundations

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<td>01- Special Foundations</td>
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### Substructure

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<tr>
<td>02- Slab on Grade</td>
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<td>02- Basement Excavation</td>
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<tr>
<td>02- Basement Walls</td>
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### Superstructure

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<td>03- Floor Construction</td>
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<tr>
<td>03- Roof Construction</td>
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<tr>
<td>03- Stair Construction</td>
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### Exterior Closure

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<tr>
<td>04- Exterior Walls</td>
<td>$4,717,125</td>
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<tr>
<td>04- Exterior Doors &amp; Windows</td>
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### Roofing

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<tr>
<td>05-</td>
<td>$685,920</td>
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### Interior Construction

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<tr>
<td>06- Partitions</td>
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<tr>
<td>06- Interior Finishes</td>
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<td>06- Specialties</td>
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### Conveying Systems

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<tr>
<td>07-</td>
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### Mechanical

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<td>08- Plumbing</td>
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<tr>
<td>08- HVAC</td>
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<tr>
<td>08- Fire Protection</td>
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<td>08- Special Systems</td>
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### Electrical

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<tr>
<td>09- Service &amp; Distribution</td>
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<tr>
<td>09- Lighting &amp; Power</td>
<td>$3,719,782</td>
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<tr>
<td>09- Special Systems</td>
<td>$2,874,377</td>
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### General Conditions & Profit

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<td>10-</td>
<td>$7,267,980</td>
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### Equipment

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<tr>
<td>11- Fixed &amp; Movable Equipment</td>
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<tr>
<td>11- Furnishings</td>
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<tr>
<td>11- Special Construction</td>
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### Site Work

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<tr>
<td>12- Site Preparation</td>
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<tr>
<td>12- Site Improvements</td>
<td>$573,425</td>
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<tr>
<td>12- Site Utilities</td>
<td>$1,077,230</td>
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<tr>
<td>12- Off-site Work</td>
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### Contingencies

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<td>13- Design</td>
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<tr>
<td>13- Escalation</td>
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### Total Project Construction Cost

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<tr>
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<tr>
<td>Total</td>
<td>$76,151,674</td>
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### Notes

- **GROSS AREA**: 169081 SF
- **Cost Summary**
- **Total Project Construction Cost**: $76,151,674
- **Net Project Construction Cost**: $59,426,409
- **Net Building Construction Cost**: $55,969,139
- **Design Program**
- **Cost Analysis**
- **Systems Cost Analysis**

Cost Analysis
Design Program

SITE COST ANALYSIS

**SITE PREPARATION**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
<th>UM</th>
<th>UNIT COST</th>
<th>ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip Soils &amp; Stockpile for reuse - Allowance</td>
<td>1</td>
<td>LS</td>
<td>$100,000.00</td>
<td>$100,000</td>
</tr>
<tr>
<td>Demo Buildings - Allowance</td>
<td>1</td>
<td>LS</td>
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<td>$150,000</td>
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<tr>
<td>Demo Trees / Landscaping - Allowance</td>
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<td>LS</td>
<td>$5,000.00</td>
<td>$5,000</td>
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<tr>
<td>Demo Paving/Sidewalks - Allowance</td>
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<td>LS</td>
<td>$30,000.00</td>
<td>$30,000</td>
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<tr>
<td>Misc. Demolitions Site Prep - not required per client direction</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Shoring to existing site for new structure (anticipate aver of 20’-0” high) - Allowance</td>
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<td>Disconnect of Utilities to Existing Buildings - Allowance</td>
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<tr>
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<td>$10,000</td>
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<tr>
<td>TOTAL</td>
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<td>$1,820,000</td>
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**SITE IMPROVEMENTS**

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<th>DESCRIPTION</th>
<th>QUANTITY</th>
<th>UM</th>
<th>UNIT COST</th>
<th>ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitework - incl: landscape, hardscape, streetscape, furniture as outlined in plan provided by Architects and additional photos of existing facilities on campus</td>
<td>34,895</td>
<td>SF</td>
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<tr>
<td>Concrete Retaining walls w/ footings - per Ardurra Review drwg - approx 20’ High - Allowance</td>
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**SITE UTILITIES**

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<tr>
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<th>QUANTITY</th>
<th>UM</th>
<th>UNIT COST</th>
<th>ESTIMATED COST</th>
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</thead>
<tbody>
<tr>
<td>Electrical - Allowance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Primary Feeder Duct Bank Connected to Vista Switch</td>
<td>1</td>
<td>LS</td>
<td>$127,500.00</td>
<td>$127,500</td>
</tr>
<tr>
<td>(2) Utility Transformer Pads</td>
<td>1</td>
<td>LS</td>
<td>$17,850.00</td>
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</tr>
<tr>
<td>(2) 2000VA Transformers</td>
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**TOTAL SITE COSTS:**

- Total Site Preparation: $1,820,000
- Total Site Improvements: $673,425
- Total Site Utilities: $877,230
- **$3,370,655**
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## Cost Analysis

**Design Program**

### ROOM TYPOLOGY COST ANALYSIS

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**GROSS SF** 169081

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<td>ESCALATION 11.43%</td>
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**TOTAL PROJECT CONSTRUCTION COST** $76,151,674 $450.39

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Design Guidelines
Architectural Expression

UNIVERSITY DESIGN GUIDELINES & PREFERENCES
Refer to the "2020 Design Standards and Guidelines" for the "basis of design" standards and design preferences for new capital construction on the main University of Tennessee Knoxville (UTK) Campus.

ARCHITECTURE
All elements of the project should be designed to promote student life, culture and community. From landscape to interiors, the project will strive to be an asset to the university functionally and aesthetically.

The buildings shall be contextual with the primary goal of complementing the campus. In accordance with the Campus Master Plan, UTK buildings are designed in a collegiate gothic style consisting primarily of brick and stone exterior façades of which to represent a feeling of stability and permanence. Other prominent characteristics include the use of arches, punched openings, accentuated entrances and steep sloped roofs.

Residence Hall #4 is directly adjacent to two existing residence halls: Magnolia and Dogwood. The architecture of Residence Hall #4 should be cohesive with that of Magnolia and Dogwood Halls.

The new residence hall will enclose a central courtyard space that is to be shared by the three residential buildings.

Exterior Materiality
Given its use on campus, its durability and its affordability, Brick should be designated as a primary material. Brick size and detailing should be considered carefully as both can enrich the facade and impact scale. Limestone is to be considered around key entrances and community areas.

High Density Fiber Cement panels are acceptable as an accent material to complement the brick. Refer to the Fiber Cement board- and-batten detailing and coloration at Magnolia and Dogwood Halls.

Natural light and visibility to and from interior spaces are both valued, so areas of glass are also encouraged where appropriate. Residence hall rooms will have inoperable Windows per university standards. They will be punched by nature and should be considered thoughtfully to produce a rhythm and balance on the facade.

The new roof should complement those of Magnolia and Dogwood Halls, both in slope geometry, articulation and materiality.

Building proportions are important and the facade should strive toward a harmony of elements. Scale and massing of elements can be skillfully employed to help breakdown the scale of building. A contemporary expression of details and construction with a respect for historical context is a goal of design and materiality. To that end, the use of quality materials is paramount. Pay special attention to color selection and the architectural profile of key elements. Ensure that color selection complements the adjacent Magnolia and Dogwood Halls. To the degree possible, the design should minimize roof elements, penetrations, etc. Where they do occur, they should be grouped or organized as to not look haphazard.

LANDSCAPE
Residence Hall #4 defines the central courtyard space, which expands the existing Magnolia Hall courtyard onto the new site.

The new courtyard will be strategically landscaped to create a great space and community areas on the residential floors should be similar to those described above for the Lobby and Public spaces.

The mature height of trees should be proportional to the courtyard space and be in dialogue with the existing trees at Magnolia and Dogwood Halls. Consider species that don’t produce nuisance seeds, leaves, sap, etc. Select trees that are native and habitat reinforcing. They should be drought tolerant if possible with high limbs or limbs that can be pruned high to allow visibility at the understory.

The interior of the building should encourage a warm, welcoming, healthy and contemporary environment. Materials should be high quality, durable, recyclable and low maintenance. Where cost is a constraint, it is particularly important that durable materials are used in public and community areas that see the highest levels of use.

Lobby and Public Spaces
The spaces at the main entry to the building will see the highest level of activity and use. Accent materials should be considered to create an impactful first impression of the residential community; these materials should also perform well in terms of durability and acoustics. Examples of accent materials include: areas of carpet tile over polished concrete or terrazzo flooring, acoustic panels at the ceiling with integrated lighting. Interior glass partition systems should also be a consideration to allow for daylighting and increase openness, connections and community. Examples of appropriate locations for interior glass partitions are the office spaces and Multi-Purpose rooms. Fitness room to have rubber sports flooring.

The main MEP and service spaces should be composed of extremely durable, low maintenance materials. Where possible, the concrete structure should be exposed for durability and cost considerations. Trash rooms are to have coved base.

Residential Floors
Bedroom Suites
The interior of the suites should be simple, functional, durable and low maintenance. Material suggestions include:
- Walls: high-impact gypsum board, epoxy paint, rubber coil base
- Floor: carpet tile in bedrooms; resilient sheet flooring and coved base in bathrooms
- Ceiling: paint
- Solid surface vanity counter

Community Spaces
The finishes in the Central Neighborhood spaces and the community areas on the residential floors should be similar to those described above for the Lobby and Public spaces.

Acoustics
Special attention should be given to architectural acoustics to help control noise transference throughout the building, primarily between student units. Controlling noise helps to create a calm, peaceful environment for students. Interior sound must be managed and controlled; this applies to mechanical and plumbing equipment noise and vibration. Isolation pads and hangers should separate the mechanical equipment from the building structure. To prevent sound transmission between student rooms, proper separation of ductwork, fully ducted return air and appropriate wall and door construction must be considered. Proper compliance with code requirements for the minimum 50 STC rating will improve the overall acoustic environment; increasing the separation to STC 55 or 60 between community spaces and bedrooms will increase the isolation and improve the acoustic performance of the building.
Small “nooks” provide a great space for students to focus and study within a community environment.

Informal lounge or living area that encourages students to socialize in small groups or to study within a community environment.

An informal lounge or living area that offers seating arrangements for small groups. The access to views and daylighting encourages students to leave the private space of their room to study or gather with friends.

Community living or lounge space that incorporates seating for different postures (bar-height, lounge, table-height) and group sizes. Students can come to socialize or study due to the variety of seating options. This space also incorporates abundant daylighting, natural materials (wood) and inviting lighting and textures (carpet, furniture textiles in warm colors and prints.)

Design Guidelines

Architectural Expression | Interior Precedents - Study
Laundry rooms that are adjacent to the Central Neighborhood living and lounge areas give students a place to spend time while waiting for their laundry. Ideally, these rooms have visibility to the adjacent spaces.

Group seating within the Community Kitchen space encourages students to have meals with their neighbors, as well as an additional space to study.

The Community Kitchen space provides students a communal place to eat within the Central Neighborhood of their floor.

Within the Central Neighborhood space of the building, recreational gaming tables can be a way to enhance community within the Community Living area.

Architectural Expression | Interior Precedents - Play, Laundry, Dining
Design Guidelines

Architectural Expression | Interior Precedents - Learn

A flexible studio space that can be used for various types of active learning and making.

A smaller learning space that incorporates technology and has abundant access to daylighting and views.

An Active Learning Classroom (ALC) located within a Residence Hall.

An Active Learning Classroom (ALC) within a residence hall that has direct access to daylighting and views. With movable furniture, this space is multi-function.

A flexible studio space that can be used for various types of active learning and making.
Design Guidelines

Architectural Expression | Interior Precedents - Corridors, Exterior Gathering

The use of varying colors and patterns can provide a sense of identity to the distinct residential floors with the Residence Hall.

Exterior gathering spaces can give students a sense of connection to nature and to the external campus community.

Hammock stands in exterior gathering spaces encourage students to socialize and study outside.
Design Guidelines
Architectural Expression | Interior Precedents - Office

A conference space with a large group gathering table and presentation screen.

Open office space bordered by perimeter private offices.

A private office with ample access to natural light, storage and seating for visitors.

A multifunction meeting and presentation space with flexible/movable furniture.
Design Guidelines
Architectural Expression | Interior Precedents - Fitness

A dedicated weight lifting area within the gym.

A grouping of treadmills for indoor cardio workouts.

A grouping of ellipticals for indoor cardio workouts.

Within the fitness space, a multi-function workout space can be used for a variety of group activities, including yoga, dance, pilates, or barre.
Design Guidelines

Architectural Expression | Interior Precedents - Gaming / Technology

A maker space containing, desktop 3D printers, model-making tools, and space for working, with high visibility to the common area.

A small group study space with white board walls for sketching and note taking.

A flexible lounge space with movable furniture.

An example of a sound studio for recording audio and visual content.
# Acknowledgments

## PROGRAMMING ADVISORY COMMITTEE

**Name**
- Rodney Combs, UTK, Assistant Director for Facilities and Services
- Keith Paul Downen, UTK, Project Manager - Design Services
- Eric Ducote, UTK, Project Manager - Design Services
- Benjamin Luttrell, UT System, Architect/Project Manager - Facilities Planning
- Chandra Myrick PhD, UTK, Associate Vice Chancellor for Student Life

## CONSULTANT TEAM

<table>
<thead>
<tr>
<th>Department</th>
<th>Name</th>
</tr>
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<tbody>
<tr>
<td>HED (Harley Ellis Devereaux)</td>
<td>Scott Corey, Taylor Hess, Jon Howard, AIA, Katherine Kalant, AIA, Victor Rivera, AIA, Enrique Suarez, AIA, Scott Whitebone, AIA</td>
</tr>
<tr>
<td>IC Thomasson Associates</td>
<td>Stephanie McKenzie, Bennie Pandorf, Jr., PE, Zach Rose, PE</td>
</tr>
<tr>
<td>RBA Structural Engineering</td>
<td>Brent Thorton, PE, SE</td>
</tr>
<tr>
<td>Fulghum MacInode &amp; Associates</td>
<td>Aaron Gray, PE</td>
</tr>
<tr>
<td>CCS International</td>
<td>Clive Bransby</td>
</tr>
</tbody>
</table>
Enrollment at UT Knoxville continues to increase more than expected, creating the need for additional bed capacity for undergraduate students. Undergraduate applications for Fall 2022 have increased by over 30% from last year. UT Knoxville enrolled almost 6,000 new first-time students this fall, and our enrollment management team is projecting that enrollment could increase to 6,200 - 6,300 incoming students for Fall 2022.

First-time students are required to live on campus their first year in college to increase student success and retention. However, the increase in first-time student enrollment will significantly limit on-campus bed availability for continuing students. Historically, nearly 2,300 continuing students live on campus. Based on current enrollment projections, less than 1,000 continuing students will be able to live on campus for Fall 2022, representing a 50% decrease in on-campus options for continuing students.
Appendix
Exhibit A | Student Housing Master Plan Amendment

Projected Housing Need

University Housing has an immediate need to construct new residence halls to help mitigate the current campus housing shortage and to take aging residence halls offline for renovation and/or replacement. The current housing capacity on campus is 8,326. The current capacity was achieved by converting communal spaces, such as floor lounges, into student rooms.

The 2016 Master Plan identified the West Campus Housing Redevelopment within the near-term projects. This precinct is roughly bounded by Volunteer Blvd and the west campus garage to the west, Florence Street to the east, Andy Holt Avenue to the south and Caledonia Avenue on the north. Projects identified both demolition and new construction along with the construction of a new dining hall. Two residence halls were proposed south of the tennis complex. Critical to the infrastructure of the precinct, a stormwater management area has been constructed on the parcel north of Andy Holt Avenue and south of Robinson Hall. The Site plan on page 4 indicates the extents of the stormwater management area.

Much progress has been made to realize the redevelopment envisioned in the 2016 plan. The West Campus Dining hall has opened, and two residence halls have been constructed – Dogwood and Magnolia halls, in the site south of the tennis complex. Critical to the infrastructure of the precinct, a stormwater management area has been constructed on the parcel north of Andy Holt Avenue and south of Robinson Hall. The Site plan on page 4 indicates the extents of the stormwater management area.

This amendment proposes solutions to meet the immediate needs for more beds while still supporting the vision identified for this precinct of campus. Two strategies are employed to accelerate bringing new beds online, proposing construction on vacant sites and renovation of existing buildings. In lieu of renovation, two existing buildings could be razed and rebuilt.

Proposed Building Renovations or Replacement

Reese and Carrick Halls are two older residence halls that were constructed in the early 1960s, and are in need of major renovation or replacement. The ceiling heights and room configurations of these residence halls make renovations difficult and are unappealing to today’s college student. These buildings are currently requested by students as a last option and will likely include a significant volume of concerns and dissatisfaction from the students and families of the students assigned to these buildings. Comprehensive infrastructure and architectural renovations are needed to address the unsatisfactory status of these buildings for current students. Renovation versus replacement of these buildings will be evaluated further during the design process.

Proposed New Construction

The first project proposed to increase capacity is the construction of a new residence hall near Dogwood and Magnolia Halls on the remaining site of the West Campus Redevelopment near Twentieth Street. This building will have approximately 525 beds. The layout will be double occupancy rooms with a shared bath and comparable amenities to other residence halls on campus. This building will also include some classrooms and offices to assist with campus needs.

The second new student housing building is proposed on the site located between Caledonia and Terrace Avenues, just east of the Athena House. This building will have approximately 750 beds. The proposed unit layout will be double occupancy rooms with a shared bath and comparable amenities to other residence halls on campus. This building will also include some classrooms and offices to assist with campus needs.

Fall 2021 Residence Hall Occupancy

<table>
<thead>
<tr>
<th>Residence Hall</th>
<th>Residents</th>
<th>Beds</th>
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<tr>
<td>Dogwood Hall</td>
<td>1072</td>
<td>461</td>
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<td>Reese Hall</td>
<td>376</td>
<td>126</td>
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<td>Volunteer Hall</td>
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<td>706</td>
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<td>South Carrick Hall</td>
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<td>Stokely Hall</td>
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<td>Vo Condos</td>
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Legend:
- New Residence Halls
- West Campus Dining

2016 Master Plan Figure 2.12 West Campus Housing

STUDENT HOUSING MASTERPLAN AMENDMENT 3
1. SUMMARY

People flow in RH4 Student Housing is analyzed. The building has 5 floors and the travel height is 51 (ft) 0 (in). The assumed population is 464 persons.

BUILDING TYPE: Residential

1.1. ELEVATOR ANALYSIS

ELEVATOR GROUP: Duplex 3500# 350fpm GROUP CONTROL: FULL COLLECTIVE CONTROL

<table>
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<tr>
<th>No of Elevators</th>
<th>Floors/Stop</th>
<th>Rated Load (lbs)</th>
<th>Rated Capacity (persons)</th>
<th>Passenger Capacity (persons)</th>
<th>Speed (ft/min)</th>
<th>NTT (s)</th>
<th>Population</th>
<th>Car Capacity Factor (CCF)</th>
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<td>2</td>
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<td>3500</td>
<td>21</td>
<td>16</td>
<td>350</td>
<td>8.7</td>
<td>464</td>
<td>80%</td>
</tr>
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Traffic Type Demand (% / 5 min) - Demand (persons / 5 min) - CCF at Demand (%) - Interval (s) - Meets Criteria

- Up-peak: 10% - 46 persons - 37% - 37.7 s - Yes

ELEVATOR GROUP: Triplex 3500# 350fpm GROUP CONTROL: FULL COLLECTIVE CONTROL

<table>
<thead>
<tr>
<th>No of Elevators</th>
<th>Floors/Stop</th>
<th>Rated Load (lbs)</th>
<th>Rated Capacity (persons)</th>
<th>Passenger Capacity (persons)</th>
<th>Speed (ft/min)</th>
<th>NTT (s)</th>
<th>Population</th>
<th>Car Capacity Factor (CCF)</th>
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<td>3500</td>
<td>21</td>
<td>16</td>
<td>350</td>
<td>8.7</td>
<td>464</td>
<td>80%</td>
</tr>
</tbody>
</table>

Traffic Type Demand (% / 5 min) - Demand (persons / 5 min) - CCF at Demand (%) - Interval (s) - Meets Criteria

- Up-peak: 10% - 46 persons - 18% - 18.9 s - Yes

DISCLAIMER

The results of the report are valid exploring theoretical vertical-traffic planning scenarios which involve KONE products, services, and people flow planning tools. The results of the report are sensitive to the parameter values used and data which is used as input, and are applicable only with the input values shown in the report. Therefore, results should not be interpreted as an actual representation or warranty of the performance of any actual elevator installation. KONE shall not be liable for any damage caused by or incurred in the use of the report. The user shall have no right to make copies of, or reproduce, disassemble, decompile, reverse engineer or modify the results of the report or disclose it to any third party.

2. BUILDING DATA

Assumed population is 464 persons

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<th>Floor</th>
<th>Comment</th>
<th>Height (ft)</th>
<th>Travel (ft)</th>
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<th>Entry %</th>
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<td>51</td>
<td>0</td>
<td>116</td>
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3. ELEVATORS

3.1. ELEVATOR PARAMETERS

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<td>Triplex 3500# 350fpm</td>
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</tr>
<tr>
<td>No of Elevators</td>
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<td>Rated speed (ft/min)</td>
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<td>Acceleration (ft/s²)</td>
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<td>Jerk (ft/s³)</td>
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<tr>
<td>Rated Load (lbs)</td>
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<td>Rated Capacity (persons)</td>
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<td>Passenger Capacity (persons)</td>
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<td>Average Person Weight (lbs)</td>
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<table>
<thead>
<tr>
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<th>Door Parameters</th>
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<td>Type</td>
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<td>Opening time (s)</td>
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<td>Two-way transfer times per passenger</td>
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<td>Photocell delay (s)</td>
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<td>Start delay (s)</td>
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<td>Distance (ft)</td>
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<tr>
<td>Speed (ft/min)</td>
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3.2. SPEED SELECTION
Appendix

Exhibit B | Elevator Traffic Analysis

**RECOMMENDED SPEEDS**

- **Duplex 3500# 350fpm**
  - Satisfactory: 59 ft - 98 ft (per min)
  - Good: 98 ft - 118 ft (per min)
  - Excellent: 118 ft - 157 ft (per min)

- **Triplex 3500# 350fpm**
  - Satisfactory: 59 ft - 98 ft (per min)
  - Good: 98 ft - 118 ft (per min)
  - Excellent: 118 ft - 157 ft (per min)

**RATED SPEED CLASSIFICATION**

<table>
<thead>
<tr>
<th>Elevator Group Name</th>
<th>Duplex 3500# 350fpm</th>
<th>Triplex 3500# 350fpm</th>
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</thead>
<tbody>
<tr>
<td>Rated Speed</td>
<td>350 ft/min</td>
<td>350 ft/min</td>
</tr>
<tr>
<td>Travel Height</td>
<td>51 ft 0 in</td>
<td>51 ft 0 in</td>
</tr>
<tr>
<td>Populated Floors</td>
<td>2 - 5</td>
<td>2 - 5</td>
</tr>
<tr>
<td>Nominal Travel Time</td>
<td>8.7 s</td>
<td>8.7 s</td>
</tr>
<tr>
<td>Minimum Flight Distance where full speed is reached</td>
<td>21 ft 6 in</td>
<td>21 ft 6 in</td>
</tr>
</tbody>
</table>

Nominal travel time graph for Duplex 3500# 350fpm:
- NTT = 8.7 s
- Flight time = 12.43 s
- v = 350 ft/min
- a = 2 ft/s²
- j = 2.6 ft/s³
- Total travel = 51 ft 0 in

Nominal travel time graph for Triplex 3500# 350fpm:
- NTT = 8.7 s
- Flight time = 12.43 s
- v = 350 ft/min
- a = 2 ft/s²
- j = 2.6 ft/s³
- Total travel = 51 ft 0 in

---

Appendix

Exhibit B | Elevator Traffic Analysis

The University of Tennessee at Knoxville | New Residence Hall 4 Programming Study | 07.08.2022
3.3. ELEVATOR CALCULATION RESULTS

OVERALL CLASSIFICATION
- Target design criteria KONE - Good
- Overall performance Duplex 3500# 350fpm - Excellent
- Triplex 3500# 350fpm - Excellent

UP-PEAK RESULTS

<table>
<thead>
<tr>
<th>Elevator Group Name</th>
<th>Handling Capacity (HC5)</th>
<th>Relative Handling Capacity (%)</th>
<th>Average Round Trip Time</th>
<th>Average Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplex 3500# 350fpm</td>
<td>75.4 persons / 5 min</td>
<td>16.2% / 5 min</td>
<td>101.9 s</td>
<td>Excellent</td>
</tr>
<tr>
<td>Triplex 3500# 350fpm</td>
<td>113.1 persons / 5 min</td>
<td>24.4% / 5 min</td>
<td>101.9 s</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

Note: Handling capacity, interval and round trip time are only for Full collective control.

PERFORMANCE GRAPH - FULL COLLECTIVE CONTROL

4. TERMS

- **Handling Capacity (HC)** is 80% of the theoretical Transportation Capacity considering randomness in passenger arrivals and saturation in queuing.
- **Transportation Capacity (TC)** is the theoretical number of persons per hour the system can transport.
- **Car Capacity Factor (CCF)** is the maximum load in percent of nominal load reached during elevator round trip.
- **Utilization Factor (UF)** is the actual demand in percent of transportation capacity.
- **Level of Service (LOS)** shows the pedestrian space around, classified to A-F. Level A is spacious, level F is very tight.
- **Interval** shows how often elevators leave the lobby during up-peak.
- **Nominal travel time (NTT)** is obtained by dividing the travel height by the elevator rated speed.
- **Average waiting time (AWT)** is the time from when a passenger either registers a landing call, or joins a queue, until the responding elevator begins to open its doors at the boarding floor.
- **Average time to destination (ATTD)** is the time from when a passenger either registers a landing call or joins a queue until the passenger alights at the destination floor.
- **Percentage of long waits** is the proportion of passengers whose waiting time exceeds 60 seconds.
- **Percentage of long journeys** is the proportion of passengers whose Time to destination exceeds 120 seconds.
- **Average queue length (AQL)** shows the line of people with constant traffic.
- **Full Collective (FC) control** with up and down call buttons at landings and elevator serves the landing calls according to the running direction.
- **Destination Control System (DCS)** with Destination Operation Panels at the landings and people with the same destination calls are allocated in the same car.
- **Destination Operation Panel (DOP)** is a keypad at a landing where passenger can directly give the destination floor call to the elevator group.
- **Brake to brake** begins when the elevator car starts to move and ends when the elevator car has stopped after the run.
- **Door closed to brake closed** begins when the door is closed and ends when the elevator car has stopped after the run.
- **Door closed to beginning of door opening** begins when the door is closed and ends when the door starts to open near the end of the run before the car has stopped.
- **Door to door performance time** begins when the door starts to close and ends when the door is 800 mm open after the run.
Appendix
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