CAL POLY HUMBOLDT

HEALTH, DINING, AND HOUSING BUILDING PROJECT

PROGRAMMING & FEASIBILITY STUDY REPORT

21 OCTOBER 2022

(This page intentionally left blank)

CAL POLY HUMBOLDT

HEALTH, DINING, AND HOUSING BUILDING PROJECT

PROGRAMMING & FEASIBILITY STUDY REPORT

1 SEPTEMBER 2022

(This page intentionally left blank)

TABLE OF CONTENTS

01
INTRODUCTION

1.1 EXECUTIVE SUMMARY

This feasibility study was commissioned by Facilities Planning, Design and Construction at Cal Poly Humboldt (CPH) to develop the vision pillars, project goals, evaluation criteria, space program, adjacency priorities and conceptual test-fits, and basis of design criteria for new construction of a singular building that will house three distinct program features: 1) Student Healthcare and Health Education Facilities, 2) Campus Dining and Retail Café/Bakery, and 3) 650 Bed Residence Hall with student resources and amenities. The contents of this document also include baseline performance requirements for each program element and the building to inform a Collaborative Design Build procurement.

OVERVIEW

With the State of California's historic $458 million investment in designating Cal Poly Humboldt as the third polytechnic institution within the California State University system, 27 new academic and experiential programs are expected to be added by 2029, beginning with 12 launching in 2023. This will be the catalyst for greater investments over the coming decade to fuel a vitally relevant polytechnic education in Northern California.

Beginning with a foundational core that combines the liberal arts with creative interdisciplinary approaches to solving real world problems facing our society, Cal Poly Humboldt will prepare a new generation of resilient thinkers and doers to lead a restorative future centered on environmental and social justice.

As an institution dedicated to under served student identities, many Cal Poly Humboldt students bring powerful assets to campus for interdisciplinary success from their lived experiences and community-based knowledge such as multi-lingual skills, cross-cultural competencies, and intersectional thinking. Utilizing a strength-based model that honor's cultural wealth will amplify these skill sets through place-based learning communities. Curricula and pedagogies that validate these assets, identities and cultural backgrounds will not only foster inclusive student success, but also will propel all students to cultivate agile mindsets, adaptive thinking, and critical persistence skills necessary to advance their careers and overall quality of life.

PROJECT SCOPE OVERVIEW

In this context, the project will propel Cal Poly Humboldt's Polytechnic implementation goals by providing a visionary building that coalesces an ecosystem of programs and functions that will enrich the student experience and bolster persistence goals. The hybrid building (approximately 200,000 GSF) will create a welcoming hub for student life and resources that center justice, equity, belonging, holistic sustainability and healthy living. Major program areas include:

1. A new student health center (approximately 35,000 GSF) that will provide medical health services, counseling and psychological services and health education
2. A new hub for campus dining services including a café/bakery, (approximately 35,000 GSF) that

supports holistic wellness, dignified, diverse food access to address basic needs including a food pantry program and demo kitchen connected to student health education

3. A 650 bed residence hall that centers belonging and community - includes a mix of units (doubles, double suites, and singles) with social amenities and services that cultivate learning communities.

The project site is prominently located near Library Circle, with Plaza Avenue as the southern extent, LK Wood Boulevard as the western boundary, Sunset Court as the eastern boundary and northern boundary parallel to Sunset Avenue. There are several existing buildings on the site that will require relocation or demolition. An existing access road – Mill Street may be modified as well.

VISION PILLARS AND PRIORITIES

Based on strategic stakeholder engagement workshops conducted at the beginning of the Feasibility Study process, the following vision pillars and priorities were defined for this project. In the Visioning phase of feasibility, stakeholders were asked to consider these framework areas in determining project goals, challenges, metrics of success, and success factors. These vision pillar definitions are in alignment with the Cal Poly Humboldt Prospectus and Implementation strategic plans.

- **Innovative Excellence** – Develop human-centered innovative learning environments that support engineering and technology that aligns with social, economic, and environmental priorities; Applied problem solving with direct relevance to real world challenges with purpose and impact.
- **Future Ready Resilience** – Engage and retain students with hands on learning opportunities that prepare them for a rapidly changing and challenging future. Flexible spaces that support interdisciplinarity and mixed methods of research and instruction to bridge the gap between hardware, software, and convening.
- **Student Persistence** – Create a welcoming and inclusive learning community that is a valued resource and actively demonstrates sustainability practices. Educational environments and student support spaces foster collaboration, mentorship and applied learning opportunities that parallel development of identity, confidence, holistic belonging, and well-being.
- **Social and Environmental Justice Leadership** – Demonstrate commitment to sustainability where growth meets social, economic, and environmental balance, as well as achieves Carbon Net Zero and LEED Gold. Provide a place that prioritizes human centered and ecologically restorative practices including and community resilience.
- **Future Proofing** - Provide Infrastructure that is flexible and adaptable to support microgrid testing and an evolving industry.

Additionally, the student-centered quality of life focuses on the 8 dimensions of wellness, these definitions are paired and support student persistence goals. In the Visioning phase of feasibility, stakeholders were asked to consider these framework areas in determining project goals, challenges, metrics of success, and success factors.

- **Physical / Environmental** – Encompasses the symbiotic relationship between Physical health of human body, Environmental impacts on our Physical well-being and healthy stewardship of our environmental realms - natural and built

- **Spiritual / Emotional** – Encompasses the symbiotic relationship between well-being of spiritual aspects of meaning, purpose, and connection to something greater than ourselves, with emotional aspects of navigating, managing, and adapting to stresses and adverse situations.
- **Financial / Occupational** – Encompasses the symbiotic relationship between well-being of career aspirational aspects including career development, skill resiliency, and academic persistence with financial aspects of economic literacy, planning and resiliency.
- **Social / Intellectual** – Encompasses the symbiotic relationship between well-being of social aspects including belonging, relationships, and living authentically with Intellectual aspects including cognitive and creative exploration and growth.

1.2 PROCESS + FRAMEWORK

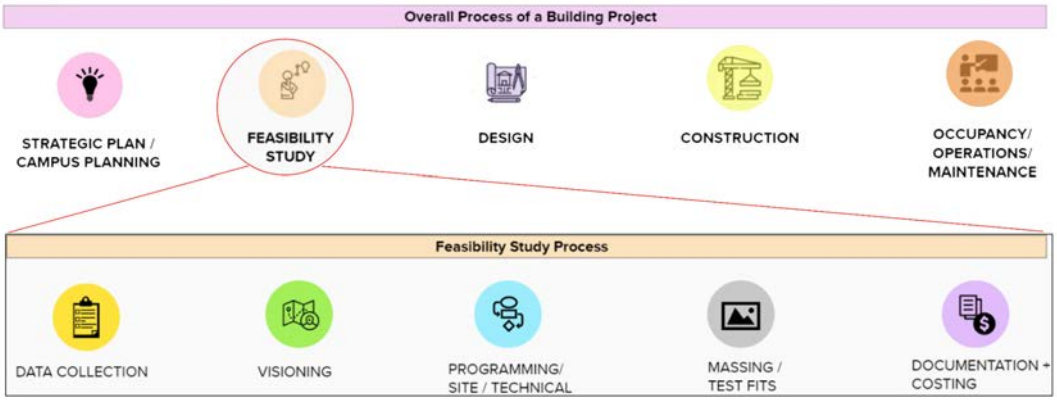
The hybrid Health, Dining, Housing Building Feasibility Study summarizes the results of a visioning, programming, and planning efforts for Cal Poly Humboldt. The process of this study also introduces a new framework of stakeholder engagement that embodies the values and culture while also supporting the goals identified in Cal Poly Humboldt Future Forward Strategic Plan 2021-2026, Cal Poly Humboldt Prospectus, and Cal Poly Humboldt Implementation Plan.

The Feasibility Study scope includes the following sections:

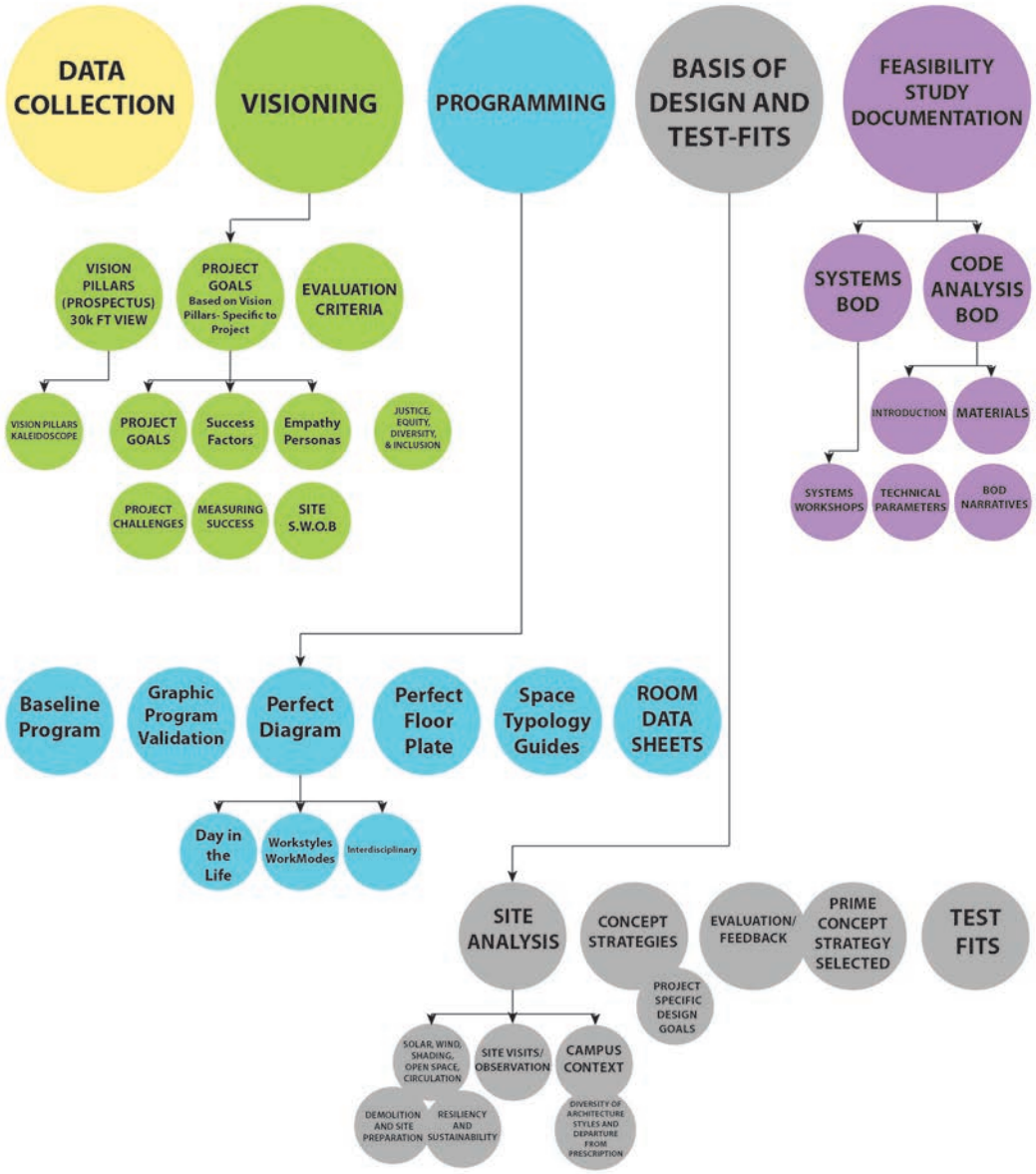
- Project Vision Pillars, Goals
- Space Program Requirements
- Site Analysis and Concept Test Fits
- Design Process Framework
- Integrated Sustainability Approach
- Systems criteria outlines for Civil, Architecture, Laboratory Planning, Structural, Mechanical, Plumbing, Electrical, Audio-Visual and Telecommunications
- Building Code Analysis

The feasibility study process for this project started with a comprehensive strategic visioning framework in alignment with Cal Poly Humboldt newly adopted Future Forward Strategic Plan 2021-2026, Cal Poly Humboldt Polytechnic Prospectus, and Implementation plans. The feasibility consultant team hosted several workshops to define project specific vision pillars, understand the program's goals and challenges, site related issues, success factors, metrics of success and empathy building. The goal of these workshops was to strengthen stakeholder engagement, trust and understanding while also defining project priorities and building consensus. The Cal Poly Health, Dining, Student Housing and Facilities working group members collectively determined a clear set of evaluation criteria based on the declared vision pillars and project priorities. Subsequently, the evaluation criteria are leveraged to streamline decision making during the concept test fits strategies and constraints – promoting discussion and health debate about advantages and unresolved challenges of each concept.

PROJECT PROCESS DIAGRAM



FEASIBILITY STUDY STRUCTURE



1.3 FEASIBILITY STUDY TEAM

Campus Teams

Student Housing and Dining

- Steve St. Onge
- Todd Larsen
- Donyet King
- Yashvin Madhak
- James Richards
- Sydney Barnes
- Mariano Lalica
- Shane Olinger
- Paul Sullivan
- Matthew Richter
- Sydney Barnes

Student Health Center

- Jennifer Sanford
- Chia Chen
- Elizabeth McCallion
- Mira Friedman
- Karen Selin
- Ravin Craig

Facilities

- Michael Fisher
- Kassidy Banducci
- Howard Maxwell

Office of Sustainability

- Katy Koscielak
- Morgan King
- Jennifer Ortega
- Andrea Alstone

Project Team

Architecture - Suarez-Kuehne Architecture

- John Suarez

Architectural Consultant - SmithGroup

- Rosa Sheng
- Laura Allen
- Rich Kirr
- Bill Katz
- Diane Kase
- Jason Campbell
- Siyu Chen
- Aaron Fu
- Rishika Gokhale
- Andrew Thurlow

Civil Engineering - Sherwood

- John Leys
- Andy Leahy
- Andrea Fortun
- Maika Nicholson

Landscape - SmithGroup

- Todd Kohli
- Meghan Storm

Structural - Rutherford & Chekene

- David Bleiman

Mechanical - SmithGroup

- Stet Sanborn
- John McDonald

Plumbing - SmithGroup

- Jennifer Ma

Electrical - SmithGroup

- Harold Pintes

Energy-Grid Consulting - SmithGroup

- Katrina Kelly-Pitou

AV / IT - Salter

- Kenneth Graven
- Ryan Raskop

Telecom - TEECOM

- Adam Wrzeski
- Arnel Avila
- Lloyd Ranola

Lighting - SmithGroup

- Matt Aleman
- Nathan Sharnas

Acoustic - CSDA

- Randy Waldeck
- Aditya G Balani

Life Safety - H & S Associates

- Hans Hennerbeque

Food Service - NG Associates

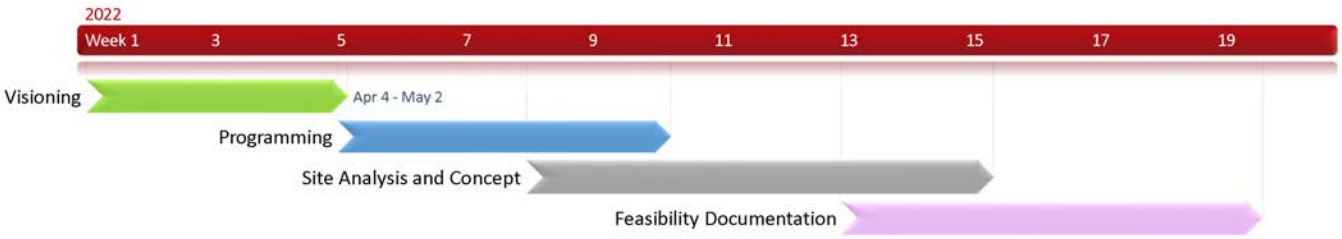
- Nahum Goldberg
- Bryan Sherburn

Cost - OCMI

- Conor Clarke
- Heike Salewski
- Abdullah Al-hourani

1.4 SCHEDULE

The Feasibility Study was a 8-month process commencing in February 2022 and concluding in October 2022. Following the Feasibility Study, the Health, Dining, and Housing building is anticipated to be delivered via Cal Poly Humboldt's (CPH) Collaborative Design-Build delivery method.



02
PROJECT VISION

2.1 VISIONING SUMMARY

The feasibility study process for this project started with a comprehensive strategic visioning process in alignment with Cal Poly Humboldt Future Forward Strategic Plan 2021-2026, the Cal Poly Humboldt Prospectus and Cal Poly Humboldt Implementation. The feasibility consultant team hosted several workshops to define project specific vision pillars, understand the program's goals and challenges, site related issues, success factors, metrics of success and empathy building. The goal of these workshops was to strengthen stakeholder engagement, trust and understanding while also defining project priorities and building consensus. From these early workshop sessions, the Cal Poly Humboldt Housing, Dining and Health working group members collectively determined a clear set of evaluation criteria based on the declared vision pillars and project priorities as defined in Section 01: Vision Pillars and Priorities.

2.2 ALIGNMENT OF PURPOSE

In defining the work and alignment of vision and goals for this project, it is important to understand and combine the purpose and vision of the prime project stakeholders at various levels – Cal Poly Humboldt at the institutional campus level, Student Health & Wellbeing Services, Counseling and Psychological Services (CAPS), and Housing, Dining & Residence Life at the project scope level.

2.2.1 CAL POLY HUMBOLDT – A POLYTECHNIC VISION

The purpose of Cal Poly Humboldt is: To provide the highest quality and affordable college education built on the contributions of diverse students, staff, and faculty who are committed to a just and sustainable world.

> **The Diversity, Equity & Inclusion Council recommended a change of Humboldt's "Mission" to "Purpose" to acknowledge that Humboldt sits on unceded land initially occupied by the first people of this area. The word "Mission" for many connotes colonial language.*

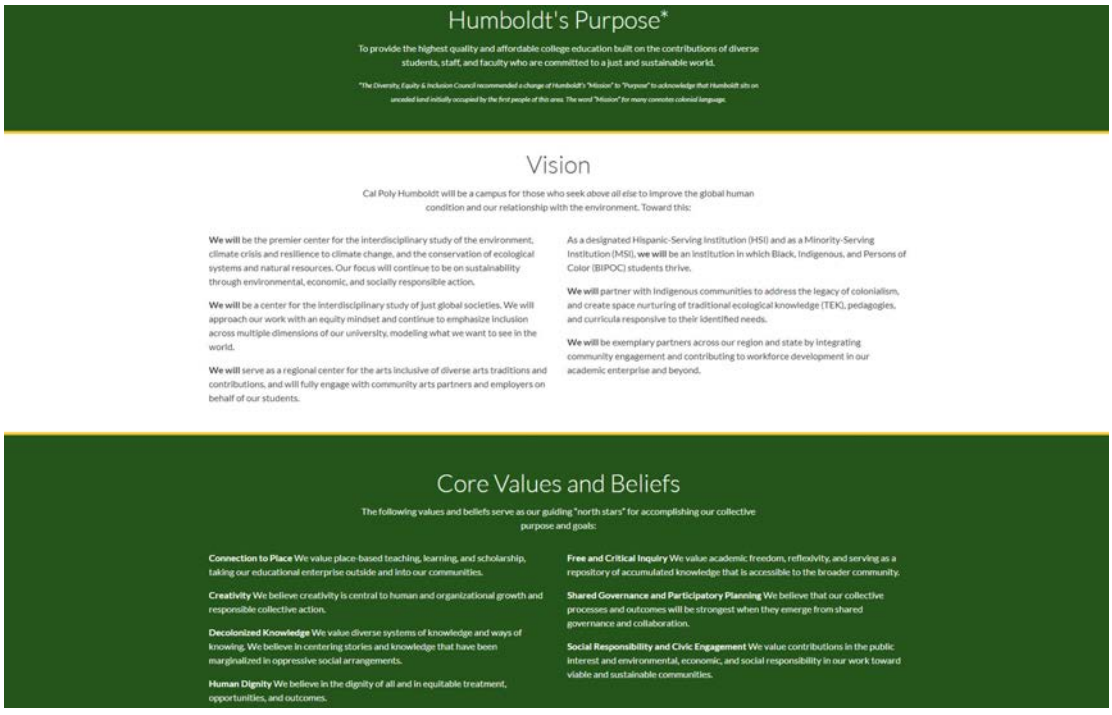
Since its beginning in 1913, California State Polytechnic University, Humboldt (referred to as Cal Poly Humboldt) has provided generations of students with unique educational experiences built upon the motto, Discere Faciendo or Learning by Doing in a place-based, inclusive learning community of faculty, staff, and students who live, work, and study within a residential Northern California setting. Today, Cal Poly Humboldt is a comprehensive university serving not only the local region, but also the state, the nation, and the world, through instruction, research, and public service.

Cal Poly Humboldt's "Future Forward: 2021-2026 Strategic Plan," outlines the University's purpose, values, and goals, as well as the University's vision "to be a campus for those who seek, above all else, to improve the global human condition and our relationship with the environment."

To support that vision, the University has established six key themes:

- **Academic Roadmap**: Providing recommendations for advancing academic excellence and access. The Humboldt Academic Roadmap promotes distinctive, innovative academic programs and ways of instruction centered on the curricular needs for well-prepared students, including our support and development of programs that assist Humboldt in achieving the polytechnic designation.
- **Community Collaboration & Shared Success**: Working together, sharing resources, communicating openly, and creating an inclusive and welcoming environment.
- **Employee Engagement & Success**: Ensuring all Humboldt employees—faculty, stateside and auxiliary staff, administrators, and student employees—have what they need to be involved in, enthusiastic about, and committed to their work and to Humboldt.
- **Future Proofing Humboldt**: Creating the type of university that can adapt and thrive in the future and respond effectively to internal and external challenges and opportunities.
- **Resources Stewardship & Sustainability**: Promoting goals that appropriately generate, manage, and invest resources toward the purpose of the University and its adopted guiding plans, through the common lens of "student first," equity, inclusivity, and sustainability.
- **Student Experience & Success**: Identifying and building strategies that promote positive and meaningful student engagement experiences and success.

Figure 2.2.1 - Humboldt Purpose, Vision, and Core Values and Beliefs

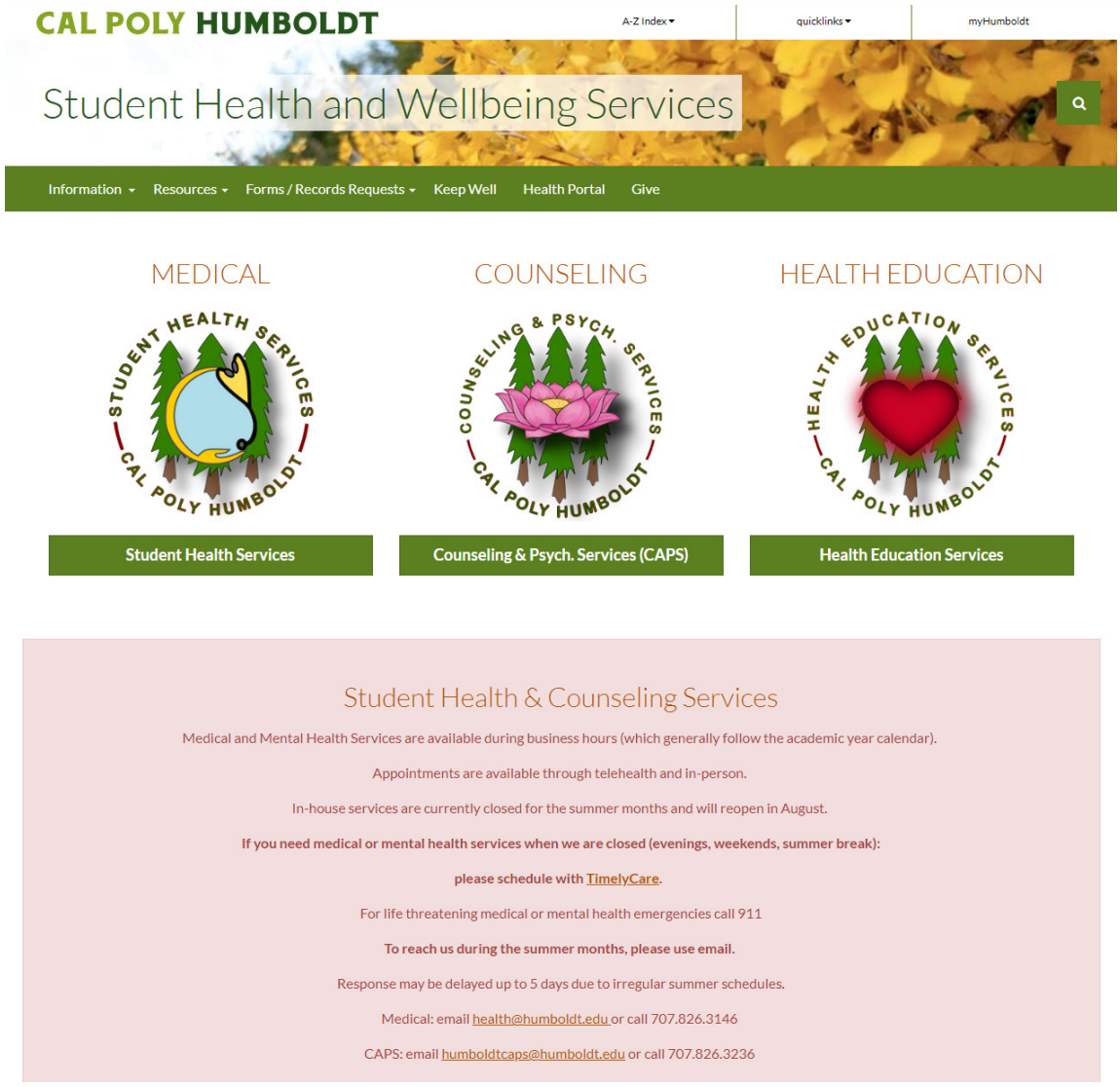


2.2.2 STUDENT HEALTH AND WELLBEING SERVICES PURPOSE

Student Health and Wellbeing Services (SHWS) supports the academic goals of the university by assisting students to strive toward an optimum level of personal health and wellbeing and is comprised of Medical Services, Counseling and Psychological Services, and Health Education. The purpose of each is further defined as follows:

The Health Medical Services is an accredited outpatient ambulatory care facility which serves enrolled Humboldt students. Basic medical services are available at no charge and elective services are available at low cost. The Student Health Center's medical professionals are dedicated to meeting the health needs of the student community, promoting wellness and independence, and collaborating with local and regional resources to provide access to comprehensive services.

Figure 2.2.2.1 - Student Health and Wellbeing Services



The Counseling and Psychological Services strive to enhance the academic environment of the university by promoting the wellbeing of all students, offering a range of services that include counseling, consultation, outreach, research, education, and the training of new professionals. Counseling services are offered with

recognition and appreciation of each student's individual and unique personality. The group strives to create and maintain an environment that is warm and welcoming, values diversity and difference, provides a feeling of safety, and promotes intellectual and emotional growth while fostering personal and social learning and development. Additionally, it aspires to be a highly visible and appreciated member of the broader university community by serving the campus outside of our offices and being accessible to all facets of university life. Their mission of promoting mental health (through education and outreach) care, and treatment of mental health problems (through counseling, consultation, and referral). We believe we play an important role in helping to create a campus climate that fosters emotional, psychological, intellectual, and interpersonal growth. (https://counseling.humboldt.edu/mission-values)

Health & Wellness education currently provides a multifaceted approach to health promotion and communication. The philosophy of Humboldt's health education program is one that centers the connections between health, our identities, and to the physical place in which we live. Because of this we need to take in to account the vast diversity of our student body and the ways in which intersecting oppression, place-based learning, and systems of power and privilege relate to that way we communicate and receive information on health & wellness. It is by this process that we are creating a sustainable and adaptable health education program that is built on empowerment, liberatory education, agency, and the capacity to both recognize and meet the needs of a diverse array of people and communities. Central to this concept is the empowerment of students' voices and needs. All of this highlights the first steps towards challenging the damage of health education that relies on fear, shame, and guilt to influence behaviors.

Health and wellness are crucial to the success of college students--students cannot be successful in their academic career or moving forward if they don't have their basic need met. Health education in colleges and universities has the potential to assist students who are systemically disadvantaged in a university setting. By shifting away from a model that is rooted in systemic oppression to one that is dedicated to fostering radical wellness and critical hope we can carve out spaces for student success until a time comes where when are able to re-envision the entire system. (https://healtheducation.humboldt.edu/)

2.2.3 HOUSING & RESIDENCE LIFE PURPOSE AND VISION

Cal Poly Humboldt aspires to create a true student-centered approach to living, growing, and learning on our campus. We believe in the importance of connections to communities (campus, regional, tribal), and that it is imperative our students have a quality education where they engage in intellectual and professional work in and beyond the classroom, so they feel connected to their discipline and gain essential academic, job, and life skill that transcend beyond the classroom and into their daily lives. Humboldt students will have the opportunity to thrive, contribute, and feel connected to the many communities in which they interface and explore the social and environmental justice values in which they align. To have a positive and meaningful Humboldt student experience, we will have transparent, accessible systems in place to support their holistic growth and wellbeing.

Additionally, dedicated educators and students come together to build community in the residence halls by providing fun and educational programs (events), enforcing community guidelines, and providing access to helpful resources. Living on campus will be some of the most memorable times in a student's life; Residence Life will help make it a positive experience.

Figure 2.2.3.1 - Housing & Residence Life Purpose and Vision

Commitment to Academics

Recognizing the connections between holistic well-being and education persistence while practicing the necessary skills to be successful in and out of the classroom. Key objectives for residents include:

- Identify available campus resources to assist in their academic success
- Apply academic knowledge to out-of-the-classroom experiences and career aspirations
- Implement a personal set of academic skills and study techniques

Social Justice

Valuing social justice means gaining the knowledge to support and promote allyship and advocacy for a more equitable society; and being the voice for change within your community. Key objectives for residents include:

- Access available campus and community resources to address incidents of bias and to support mental and physical health
- Engage in dialogue about systems of power, oppression and intersectionality
- Develop an understanding of one's own identity in social contexts and the impact this has on their communities

Environmental Justice

Honoring our environment means acknowledging that Humboldt sits on unceded land belonging to the Wiyot Tribe; framing our education and learning within that context; and working towards lessening our footprint on the land through individual actions. Key objectives for residents include:

- Incorporate different strategies and resources to help them live a more sustainable and environmentally conscious life

Community Engagement

Engaging in the community means making an effort to be an active participant in the community around you; recognizing the positive and negative impact that your actions may have on others; and making your mark. Key objectives for residents include:

- Identify campus resources that exist to further connect them to the campus and local community
- Practice holding themselves and others accountable for their actions and the impact on the larger community

- Actively engage in their housing and/or university communities

Holistic Health

Holistic health is defined as acquiring skills to be independent and build resiliency; reflecting on and developing your identities, values, and goals; and implementing self-care strategies. Key objectives for residents include:

- Engage in critical reflection as a means for personal and professional growth
- Set goals and develop strategies to achieve them
- Utilize strategies to ensure self-care and balance

2.3 POLYTECHNIC VISION

A focus on applied learning is what sets a polytechnic university apart from a traditional university. Also known as experiential learning, it combines the in-depth study found at universities with practical, technology-based skills training. Polytechnic institutions specialize in STEM courses, providing students with hands-on learning and educational experiences in addition to a strong liberal arts foundation.

In preparation to becoming a polytechnic university, Cal Poly Humboldt was required to submit an in-depth and honest look at strengths and aspirations. The community worked together on a comprehensive self-study – the Polytechnic Prospectus, conducted with critical input and collaboration from staff, faculty, students, alumni, and stakeholders.

Recognizing the impact of the California State University on the state's economy and workforce, the State of California made a significant investment of $458 million in the 2021-22 state budget to help propel Humboldt State University's transition to become a polytechnic university. The funding will enable California State Polytechnic University, Humboldt to add new academic programs that will help fill workforce gaps, modernize existing facilities, and build new infrastructure and increase access for the state's students seeking science, technology, engineering, and math (STEM) degrees.

After the self-study process was completed and the polytechnic prospectus was submitted to the CSU Board of Trustees, an unprecedented effort began. Working groups were charged with the Polytechnic Implementation of the University's polytechnic vision with bold, innovative, and forward-looking plans.

Figure 2.3 - Positioning Statement

2.4 PROJECT PARAMETERS

As part of the Polytechnic Implementation plan, an important consideration is providing adequate student housing, dining and holistic health services that will serve the significant increase in the campus residential population based on enrollment projections and increased program offerings. The new project will serve a range of needs that supports student wellbeing and holistic persistence that is complimentary to the placed based learning community approach that helps students achieve academic success in this new polytechnic environment. Envisioned as a welcoming front porch of campus, the project site is prominently located near Library Circle on the western edge. The hybrid nature of the project is intentional to bolster student success by creating a well-being ecosystem that combines three distinct programs – comprehensive student health services and student residential life and dining into a singular building (approximately 200,000 GSF). In this place – students will cultivate a sense of belonging and community while exploring key aspects of justice, equity,holistic sustainability and healthy living in their academic journey.

Major program areas include:

1. A new student health center (approximately 35,000 GSF) that will provide medical health services, counseling and psychological services and health education
2. A new hub for campus dining services including a café/bakery, (approximately 35,000 GSF) that supports holistic wellness, dignified, diverse food access to address basic needs including a food pantry program and demo kitchen connected to student health education
3. A 650 bed residence hall that centers belonging and community - includes a mix of units (doubles, double suites, and singles) with social amenities and services that cultivate learning communities.

2.5 VISION PILLARS AND SUPPORTING GOALS

In the visioning section of the feasibility study, the Housing, Dining, and Health working group's stakeholders were prompted with a series of workshop exercises that captured the collective goals and challenges, success factors, metrics of success, and observational strength, weaknesses, opportunities and barriers attitudes about the project's proposed site location. As defined in Section 1, the Vision Pillars for Health, Dining, and Housing were used to frame the exercises for Project Goals, Challenges, Metrics of Success and Success Factors respectively for the building's needs. The building Visioning exercise was to best serve the program development. The pie diagram represents the culmination of responses gathered from the following exercises which are also summarize by each workshop process conducted and key outcomes to note in the above-mentioned areas.

Figure 2.5 - Vision Pillar Strategic Goals

2.5.1 EXERCISE 1: PROJECT GOALS AND CHALLENGES

PURPOSE

This exercise supported stakeholders in voicing their aspirations and concerns about the project in a crowdsourced format on virtual post-its followed by discussion. The format promotes interdisciplinarity, allows for transparent discussion in a safe forum while maximizing feedback and promoting healthy debate and listening to differing points of view. The exercise was conducted virtually, and participants were asked to populate the board with multiple goals and challenges prior to the discussion.

SUMMARY OF PRIORITIES

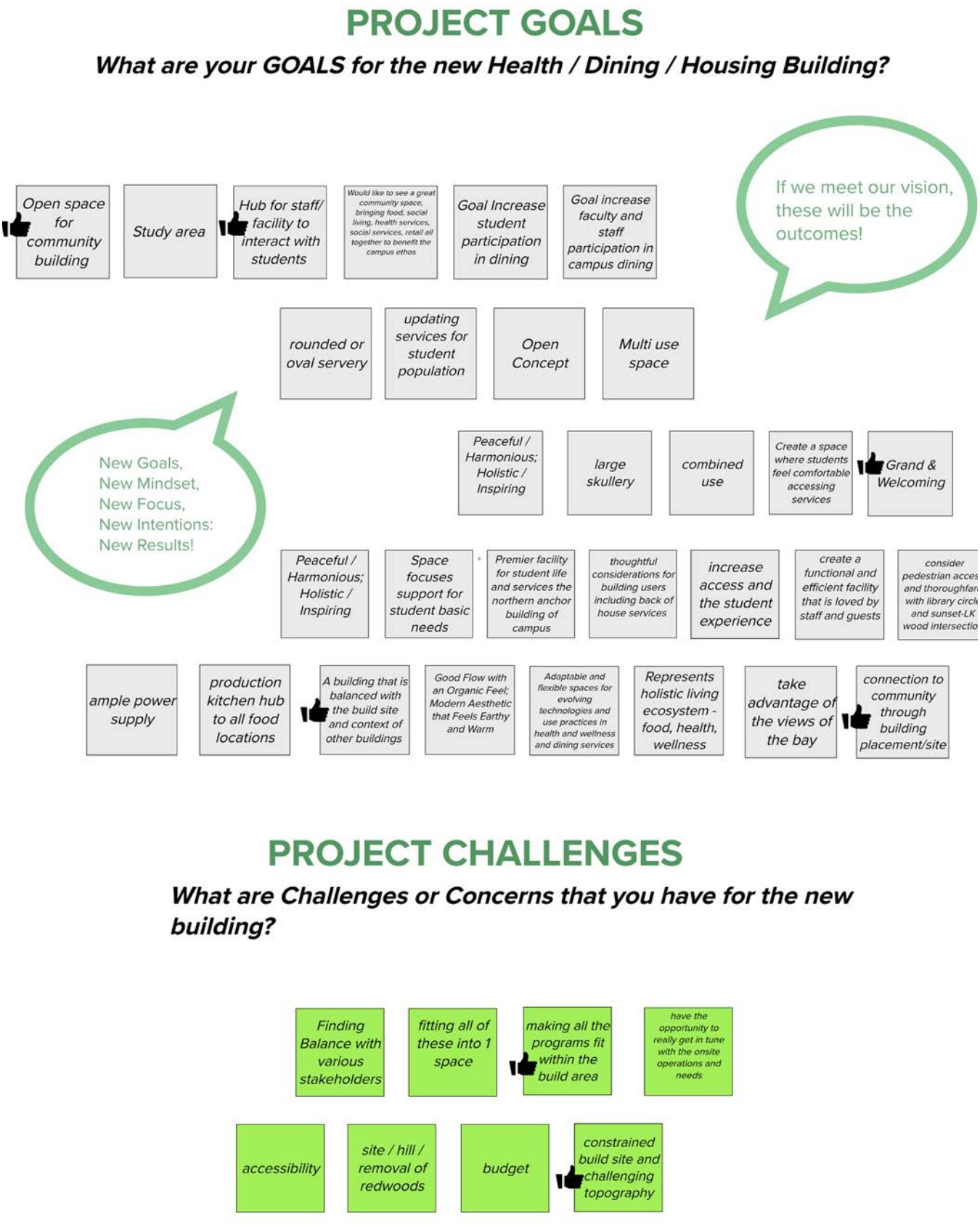
Key project GOALS for the group include the following:

- Premier facility for student life and services the northern anchor building of campus
- A great community space, bringing food, social living, health services, social services, retail all together to benefit the campus ethos
- Create a functional and efficient facility that is loved by staff and guests
- A building that is balanced with the build site and context of other buildings
- Adaptable and flexible spaces for evolving technologies and use practices in health and wellness and dining services

Key project CHALLENGES for the group include the following:

- Finding balance and meeting the needs of various stakeholders
- Constrained build site and challenging topography
- Making all the programs fit within the build area while navigating the impact to the hilly site.
- Loading access from LK Wood and daily operational logistics of 3 unique programs.

Figure 2.5.1 - Project Goals and Challenges



2.5.2 EXERCISE 2: SUCCESS FACTORS AND MEASURING SUCCESS

PURPOSE

This exercise built upon the established project goals and challenges and asked the working group stakeholders to provide more detailed descriptions of success factors and metrics of success that would begin to shape ideas of physical characteristics of spaces within the program. The success factors and metrics would also be leveraged to make connections between vision pillars, goals/challenge to establish criteria for creating program adjacency priorities and evaluating concept test fit options.

SUMMARY OF PRIORITIES

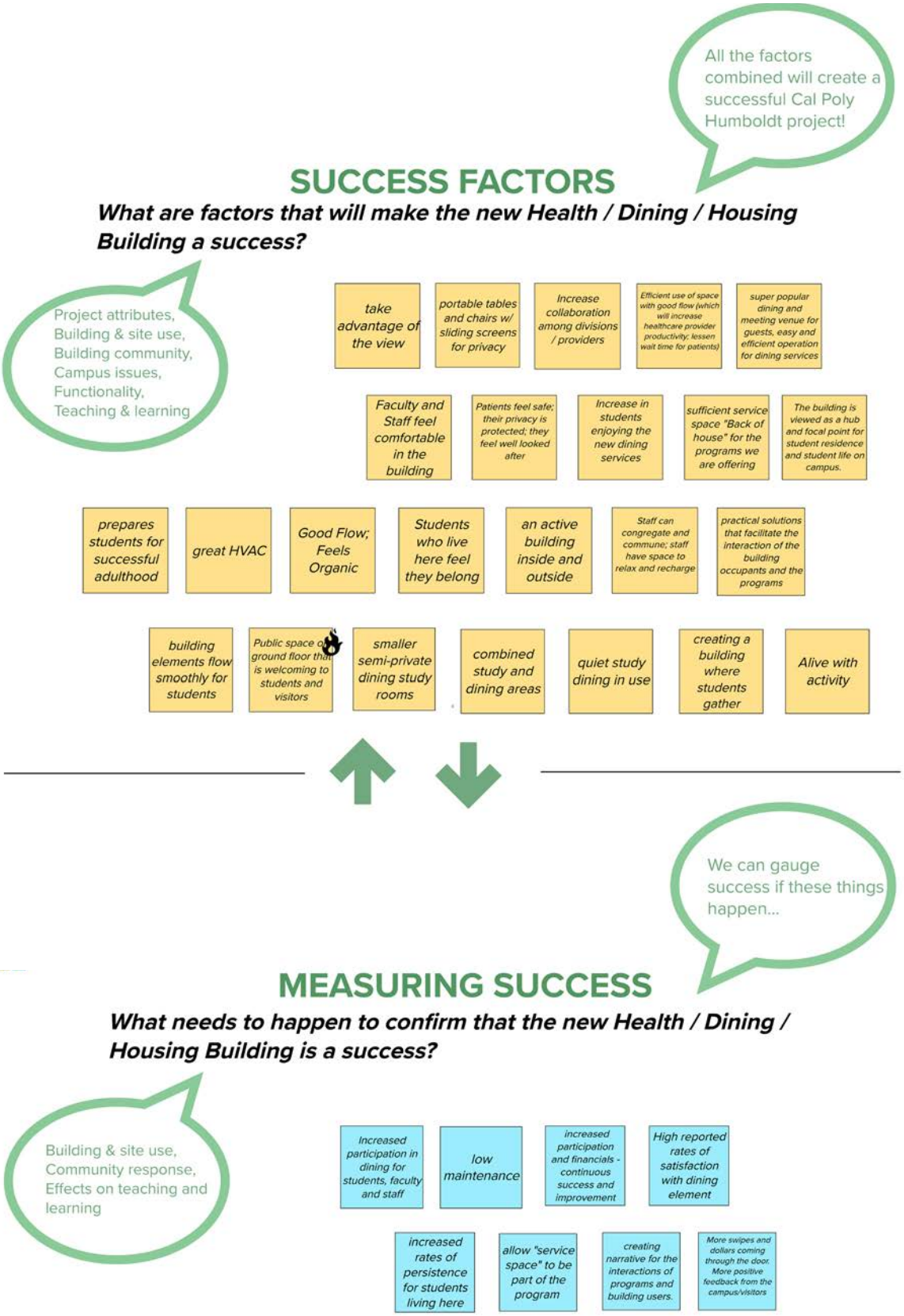
Key project SUCCESS FACTORS for the group include the following:

- Super popular dining and meeting venue for guests, easy and efficient operation for dining services.
- Practical solutions that facilitate the interaction of the building occupants and the programs.
- Public space on ground floor that is welcoming to students and visitors.
- Efficient use of space with good flow (which will increase healthcare provider productivity; lessen wait time for patients)

Key project METRICS OF SUCCESS for the group include the following:

- Data of satisfaction for students housed in this site compared to campus
- Creating narrative for the interactions of programs and building users.
- More positive feedback from the campus/visitors
- Increased rates of persistence for students living here
- Increased participation in dining for students, faculty, and staff
- High reported rates of satisfaction with dining element

Figure 2.5.2 - Success Factors and Measuring Success



2.5.3 EXERCISE 3: SITE STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND BARRIERS

PURPOSE

This exercise allowed for the working group stakeholders to assess, share, and discuss key perceptions about the site characteristics both in existing conditions and future potential for this project. Strengths and weaknesses provided focus on the current state of the site, while Opportunities and Barriers provided focus on the future state of the site. The exercise also encouraged the group to evaluate in the context of campus mobility, land uses, program adjacencies, ecology and orientation, and image/identity.

SUMMARY OF PRIORITIES

Key Perceived SITE STRENGTHS for the group include the following:

- Prominent location creating a major campus gateway, destination, and hub.
- Major access road (LK Wood Boulevard and Highway 101) allows for visibility and circulation.
- Proximate location to Library Circle, campus core, other residence halls, and student activity center

Key Perceived SITE WEAKNESSES for the group include the following:

- Risk of losing natural habitat and significant grade changes on the site.
- Limited Vehicular access on Sunset Court and lack of firetruck turnaround.
- Noise concerns for residential functions in predominantly academic core.
- Loading access and site mobility.
- Inaccessible

Key Perceived SITE OPPORTUNITIES for the group include the following:

- The project can transform the site to provide more accessible outdoor space.
- The centralized project site will really showcase student well-being and belonging.
- An opportunity to create a signature presence and welcoming hub at a main campus entry point.
- Increase housing access and support integration of holistic student needs, resources, and services

Key Perceived SITE BARRIERS for the group include the following:

- Loading access points for the buildings may be limited for all the program needs.
- The scale of surrounding buildings may not align with size of the new development.
- Complex site elevation transitions with the building height limit and dense program requirements.
- Mobility and connectivity of academic and housing with similar, potentially competing needs.

Figure 2.5.3 - SWOB Exercise

The **SWOB** analysis has been broken down into five topic areas:

1. **Circulation and Parking**: pedestrian, bicycle, public transit and vehicular mobility to/from the site and within the site.
2. **Land Uses, Architecture and Streetscape**: types of uses and activities; architectural details of the surrounding buildings; and streetscape amenities such as lighting and seating.
3. **Programs & Adjacent Buildings:** Synergies and relationships to adjacent sites and buildings and the existing and potentially new uses
4. **Environmental**: sunlight and wind, air quality, vehicle trip reduction and stormwater management.
5. **Image and Identity**: the unique qualities and characteristics of the site that will set it apart from other areas in the city and on campus.

2.5.4 EXERCISE 4: EMPATHY BUILDING

PURPOSE

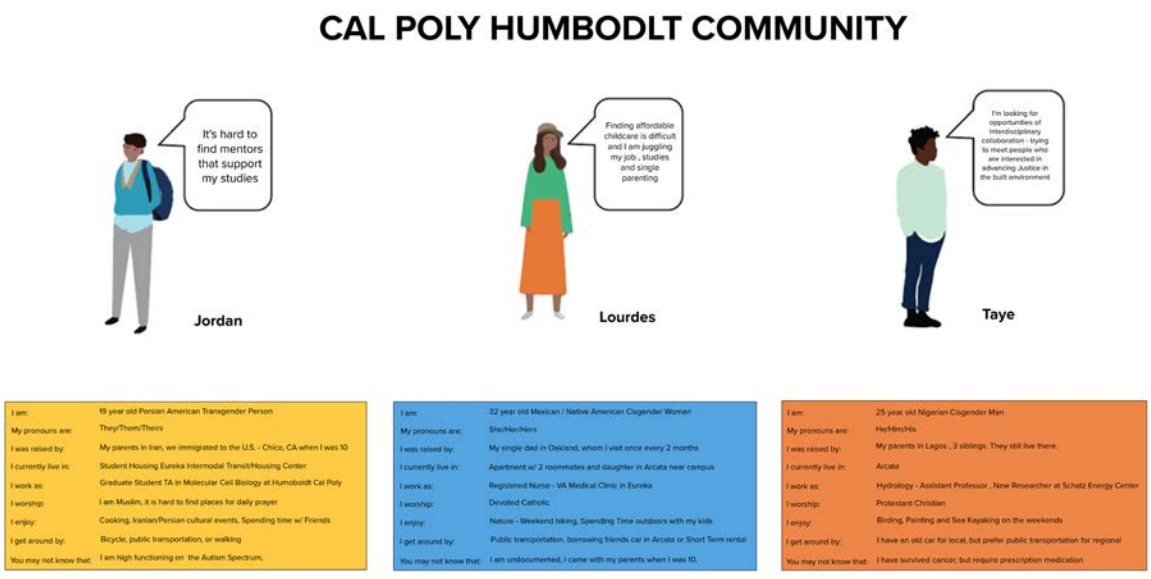
This exercise was conducted with stakeholders in person to gain insights of student perspectives prior to a larger outreach opportunity to gain student feedback. Each participant was asked to assume the identity of a student persona that highlighted intersectional identities and unique lived experiences which include a spectrum of implicit challenges and potential bias for these individuals. Based on their persona, each stakeholder was also asked to identify potential challenges and opportunities that the student may encounter in approaching and utilizing the resources of this project.

SUMMARY OF PRIORITIES

Key observations from the Empathy Building personas exercise:

- Concerns of Belonging for first generation students from a larger national and international reach coming to Cal Poly Humboldt.
- Accessibility and Mobility challenges given lack of existing accessible pathways, and grade changes around campus.
- Stigmas and bias about who may be perceived as belonging given the safety concerns for injury around engineering equipment and access for those who are non-staff members while trying to maintain the welcoming nature of the building.
- Provision of "third space" student study/collaboration space for students who don't have access to on-campus housing while balanced with the programmed functions that would promote learning communities.
- Addressing needs for a wide range of building users – i.e.., mother's room, all gender restroom accommodations, showers for non-vehicular commuters, quiet room for neurodiverse, etc.
- Increase access to affordable housing accommodations that support belonging of a range of student needs. Dignify housing and food access – create welcoming and inclusive spaces for both student residents, off campus students and community members.

Figure 2.5.4 - Empathy Building



2.6 EVALUATION CRITERIA

Based on the defined priorities from the Visioning workshop exercises and outcomes described above, the feasibility team facilitated the development of the evaluation criteria for the Health, Dining and Housing concept test fits. The following is a summary of the evaluation criteria priorities in four main areas based on the 8 dimensions of wellness: Environmental/Physical, Functional/Financial, Social/Intellectual, and Emotional/Spiritual.

1. Creates a strong gateway presence, welcoming to campus for visitors, and "Home away from Home" for residents.
2. Establishes strong visual and physical connections to neighboring buildings, respectful of natural campus context and user accessibility. Improves mobility, and circulation.
3. Design supports Sustainable goals in massing, orientation, relationship to the land, daylight, views and solar exposure, water management, indoor/outdoor connections.
4. Building design is centered on a "people first" mindset, optimizes the holistic quality of life for residents and community. Supports basic needs: food and housing dignity
5. Supports the Day-to-Day operations of Dining, Health and Residence Hall with efficiency, access, flow, and future flexibility.
6. Public face of Campus that is an economic driver for the community - i.e.., thriving dining and cafe/bakery will provide jobs for students/ Arcata, McKinleyville.
7. HEART Space - Creates a hub to support student belonging, engagement, and cultural exchange.
8. Learning Community - Program organization provides a variety of spaces for gathering, study, and collaboration
9. Alignment of Prospectus goals to support Place Based Learning Communities that cultivate social awareness and intellectual development
10. Promote balance of spaces for active social engagement and areas of retreat for quiet rest, reflection, and focus.
11. Community resources are easy to locate and highly visible areas for public gathering, sense of belonging and support
12. Spaces allow for people from diverse lived experiences to be their true authentic selves, feel safe and supported in their educational journey.

03
PROGRAM

3.1 PROGRAM DEVELOPMENT

The Health Dining Housing project programming process began with the Feasibility Team working closely with the working group stakeholders in a parallel process for the Visioning workshops to develop and align the Space Program. Through a series of workshops and meetings, initial assumptions were reviewed, tested and refined to arrive at the Space Program on the following pages. The initial program narratives and the resulting Space Program are described in further detail below.

3.2 INITIAL PROGRAM NARRATIVE

This project is unique in that there are three distinct program areas that will propel Cal Poly Humboldt's Polytechnic implementation goals by providing a singular visionary building that coalesces the distinct functions to support student persistence through supporting belonging. The welcoming and inclusive program functions will enrich the student experience and reinforce holistic wellness goals. The hybrid building (approximately 200,000 GSF) will create a welcoming hub for student life and resources that are centered around justice, equitable and regenerative values. Major program areas include:

1. A new student health center (approximately 35,000 GSF) that will provide medical health services, counseling and psychological services and health education
2. A new hub for campus dining services including a café/bakery, (approximately 35,000 GSF) that supports holistic wellness, dignified, diverse food access to address basic needs including a food pantry program and demo kitchen connected to student health education
3. A 650 bed residence hall that centers belonging and community - includes a mix of units (doubles, double suites, and singles) with social amenities and services that cultivate learning communities.

3.3 SPACE PROGRAM

3.3.1 PROCESS

During the programming process, adjustments to the initial program narratives were made in Working Group Meetings and reviewed and approved with the Stakeholder Working Group. An Overall Space Summary and Detailed Space List have been prepared and are included on the following pages.

3.3.2 DEFINITIONS

The space list uses the following terms or categories to describe the space requirements:

- Net or Assignable Area (ASF). The area of each space, as measured from interior wall to interior wall. Circulation space to or from the space is excluded, except at open workstations and enclosed offices that are part of a larger office environment or office suite.
- Building Gross Area (GSF). The total area of the building, including all primary circulation routes, shared vertical circulation, exterior walls and all mechanical shafts, plumbing chases, and telecommunications and electrical support spaces.

3.3.3 SPACE PROGRAM SUMMARY

The Space Program is organized around the following primary categories:

- Health
- Dining
- Housing

3.3.3.1 HEALTH PROGRAM SUMMARY

The Health Space Program Summary includes:

- Medical Health Services and support including pharmacy
- Counseling and Psychological Services (CAPS)
- Health Education Services including Food Pantry and Demo Kitchen

3.3.3.2 DINING PROGRAM SUMMARY

The Dining Space Program Summary includes:

- Dining Hall and Serveries
  - Original Assumption of 1585 meals planned throughput during baseline in March/April 2022.
  - Update Assumption of 1000 meals (220 meal increase in the current throughput number).
    - Fall 2022 Campus Population of 3,374 (4,324 total - 950 at Craftsmen)
    - 1000 meals / 2069 = X meals / 3,374
- Retail Café/Bakery
- Food Preparation Spaces
- Back of House Spaces

3.3.3.3 HOUSING PROGRAM SUMMARY

The Housing Space Program Summary includes:

- 650 Bed comprised of the following housing units – Singles, Doubles, Double Suites, Resident Advisors, and Resident Life Coordinator Apartments
- Resident Life Offices and Support
- Shared Student Resource Spaces

Figure 3.3.3.1 - Space Program Summary

Department	Functional Category							Feasibility	
	Classroom - 100	Office Facilities - 300	Study Facilities - 400	Special Use - 500	General Use (Food) - 600	Health Care - 800	Residential - 900	Total ASF	% ASF
Housing		6950					70,170	77,120	61%
Dining		400			21100			21,500	17%
Health		3900		4700		19170		27,770	22%
Function Subtotal	-	11,250	-	4,700	21,100	19,170	70,170		
% ASF	0%	9%	0%	4%	17%	15%	56%		
Total Area / Assignable Square Feet (ASF)								126,390	
Efficiency Factor								65.38%	
Total Area / Gross Square Feet (GSF)								193,311	

3.3.4 DETAILED SPACE LIST

The Detailed Space List further segregates the primary organizational components into each of its functional space types (e.g. Dormitory, Conference Room, Scholarly Activities, Office, etc.). Within each sub-group the following have been identified:

- room name
- quantity of each room
- student stations per room
- student stations total based on quantity of rooms
- ASF of each room
- ASF total based on quantity of rooms
- Module quantity (where occurs)

Figure 3.3.4.1 - Detailed Space List - Student Health

Space Catagory	No.	Stations	Total Stations	FTE	ASF	Total ASF	Total GSF
HEALTH PROGRAM							
STUDENT HEALTH						**27,770**	**44,079**
SHWS RECEPTION						**1,675**	**2,659**
Main Lobby	1				500	500	
Waiting Area - Scheduled Care	1	15	15		325	325	
Waiting Area - Acute Care	1	25	25		700	700	
Waiting Area - Pharmacy	1		0		150	150	
SHWS Check-In/Office						**1,650**	**2,619**
Private Office	2	1	2		**200**	400	
Check In / Immunization Workstation / 2 Billing Workstations	1	8	8		800	800	
Workstation	1	1	1		100	100	
IT Office	1	2	2		200	200	
Workroom/Copy	1				150	150	
Health Education						**3,800**	**6,032**
Food Pantry	1	1	1		1,000	1,000	
Food Pantry Storage / Sorting	1				300	300	
PHE / Check-IT Lead Office	1	1	1		150	150	
PHE / Check-IT Office	3	1	3		110	330	
PHE / Check-IT Meeting / Workspace	1		0		500	500	
Health Educator Lead Office	1	1	1		150	150	
Health Educator Office	2	1	2		110	220	
Student Assistant Workstation	1	1	1		150	150	
Demonstration Kitchen	1	4	4		1,000	1,000	
Counseling and Psychological Services						**5,150**	**8,175**
CAPS Reception/Waiting	1	2	2		500	500	
Director Office	1	1	1		175	175	
Clinical Coordinator Office	1	1	1		150	150	
ASC Office	1	1	1		100	100	
Training Coordinator	2	1	2		175	350	
Relaxation/Safe Space Room	1		0		300	300	
Practicum Trainee Therapy Office	8	1	8		125	1,000	
Trainee Workroom	1	7	7		200	200	
Staff Therapy Office	16	1	16		125	2,000	
Telehealth Room	3	1	3		125	375	

	Space Catagory	No.	Stations	Total Stations	FTE	ASF	Total ASF	Total GSF
HEALTH PROGRAM								
Wellbeing							**900**	**1,429**
Wellbeing Group Room		3		0		300	900	
Administrative Office							**610**	**968**
Executive Director Office		1	1	1		200	200	
Administrative Analyst Office		1	1	1		175	175	
Administrative Support Office		1	1	1		110	110	
Campus Advocate office		1	1	1		125	125	
Appointments - Scheduled & Walk Ins							**750**	**1,190**
Immunization Station		1	1	1		100	100	
Medical Providor Charting Station		1	1	1		200	200	
Medical Provider Charting Station		1	3	3		250	250	
RN Charting Station		1	1	1		200	200	
Medical Office Space							**6,645**	**10,548**
Medical Director Office		1	1	1		150	150	
Assoc. Medical Director Office		1	1	1		125	125	
Provider Offices		8	1	8		100	800	
Triage		1				80	80	
Triage Office		3				80	240	
Exam Rooms		24				125	3,000	
Treatment Room		2				200	400	
Treatment Room Workroom		1	1	1		150	150	
Ward A		1	1	1		150	150	
Ward A Bathroom		1				80	80	
Ward B		1	1	1		150	150	
Ward B Bathroom		1				80	80	
Isolation Room		3	1	3		150	450	
Isolation Room Bathroom		3				80	240	
PT/Exercise Room		1				200	200	
Multipurpose Treatment Room		2	1	2		125	250	
Ambulance Entry		1				100	100	
Hazmat Shower (exterior)		1				100		
Medical Services							**2,165**	**3,437**
Lab - Main		1				650	650	
Lab Office		1				100	100	
Microscope Area		1				175	175	
Lab check-in / waiting		1				100	100	
Phlebotomy Room		1				175	175	
Single Occupancy Restroom w/ specimen pass-thru		3				80	240	
Xray Processing Room		1				125	125	
Xray Room		1				225	225	
Xray Controller		1				65	65	
Single Occupancy Restoom		1				80	80	
Changing Room		1				80	80	
Casting Room		1				50	50	
Xray Waiting Area		1				100	100	
Pharmacy							**500**	**794**
Pharmacy Reception Area		1				300	300	
Pharmacy Shared Office		1	2	2		200	200	
Medical Auxiliary Spaces							**1,675**	**2,659**
Laundry		1				150	150	
Autoclave/Sterilization		1				150	150	
Haz Mat / Secure Medical Waste Storage		1				100	100	
Storage		4				200	800	
Storage CAPS		1	1	1		175	175	
Wellness / Lactation		1				100	100	
Shower		1				100	100	
Storage		1				100	100	
Shared Spaces							**2,250**	**3,571**
Kitchenette/Breakroom		1				550	550	
Large Multipurpose Room		1	20	20		1,000	1,000	
Medium Multipurpose Room		1	16	16		400	400	
Conference/Meeting Room		1				300	300	

Figure 3.3.4.2 - Detailed Space List - Dining

Space Catagory	No.			FTE	ASF	Total ASF	Total GSF
DINING PROGRAM							
DINING PROGRAM						**21,500**	**34,127**
Dining Room	1				9,000	9,000	
Bakery Café / Coffee / Grab and Go	1				2,800	2,800	
Servery	1				3,500	3,500	
Kitchen Preparation/Cooking	1				1,600	1,600	
Food Storage	1				1,500	1,500	
Warewashing / Utensil Storage	1				1,000	1,000	
Receiving	1				500	500	
Offices/Lockers	1				400	400	
Catering Support Pantry	1				300	300	
Vending	1				200	200	
Dock Receiving	1				400	400	
Dock Storage	1				300	300	

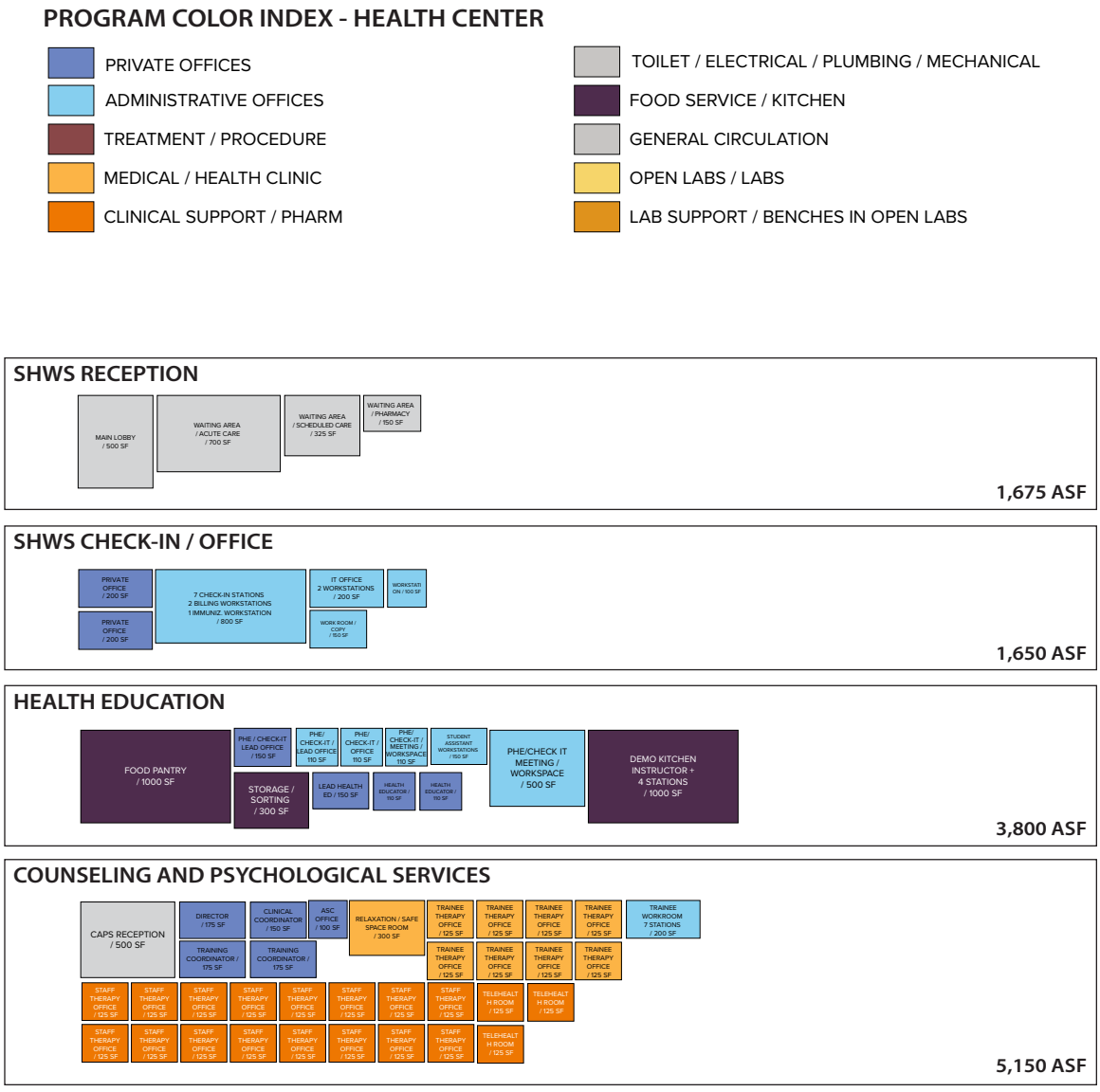
Figure 3.3.4.3 - Detailed Space List - Student Housing

Space Catagory	No.	Beds	Total Beds	FTE	ASF	Total ASF	Total GSF
HOUSING PROGRAM						**77,120**	**115,104**
RESIDENTIAL UNITS						**70,170**	**104,731**
Dormitory Units						**65,880**	**98,328**
Singles	24	1	24		120	2,880	
Doubles	240	2	480		180	43,200	
Doubles Ensuite	36	4	144		550	19,800	
Staff Residences						**4,290**	**6,403**
Resident Assistant (RA) Unit	15	1	15		180	2,700	
Resident Life Coordinator (RLC) Apartment	2	4	8		795	1,590	
SHARED RESOURCES						**6,950**	**10,373**
Student Shared Resources						**6,300**	**9,403**
Multipurpose Activity Room	1				2,000	2,000	
Medium Meeting/Study Room	2				250	500	
Student Lounge	4				600	2,400	
Mailroom	1				400	400	
Laundry	1				1,000	1,000	
Staff Shared Resources						**650**	**970**
Reception	1				150	150	
Staff Meeting Room	1				300	300	
Resident Life Coordinator (RLC) Office	2				100	200	

3.3.5 GRAPHIC PROGRAM

The following is a graphic depiction of the Program. Each shape indicates the size and number of each area of assignable square feet included in the program. The size of each space shown is proportional to the amount of area it occupies relative to the other areas in the building. For clarity, the graphic program is organized by the major program areas and color-coded to correspond to the Space Program as well as the planning test-fit in Section 4.

Figure 3.3.5.1 - Graphic Program - Health Center Program



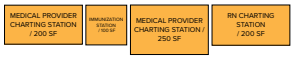
WELLBEING

900 ASF

ADMINISTRATIVE OFFICE

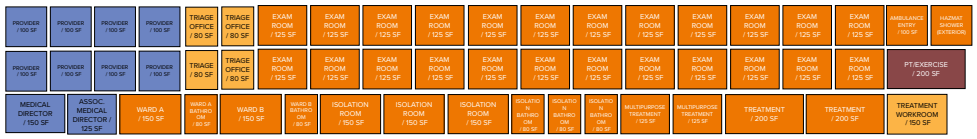
610 ASF

APPOINTMENTS - SCHEDULED & WALK INS



750 ASF

MEDICAL OFFICE SPACE



6,645 ASF

MEDICAL SERVICES

2,165 ASF

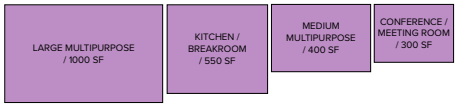
PHARMACY

500 ASF

MEDICAL AUXILIARY SPACES

1,675 ASF

SHARED SPACES



2,250 ASF

Figure 3.3.5.2 - Graphic Program - Dining Program

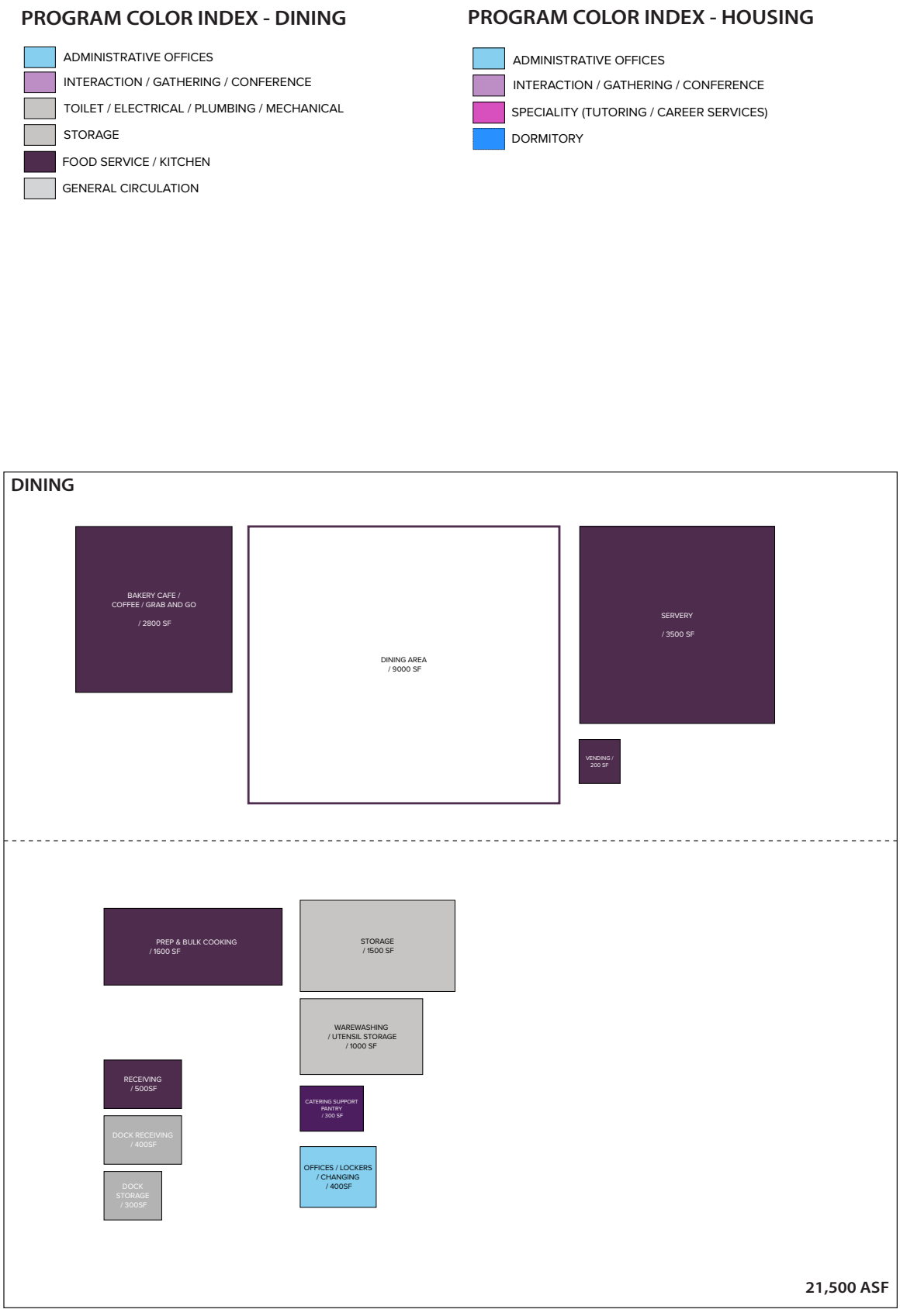
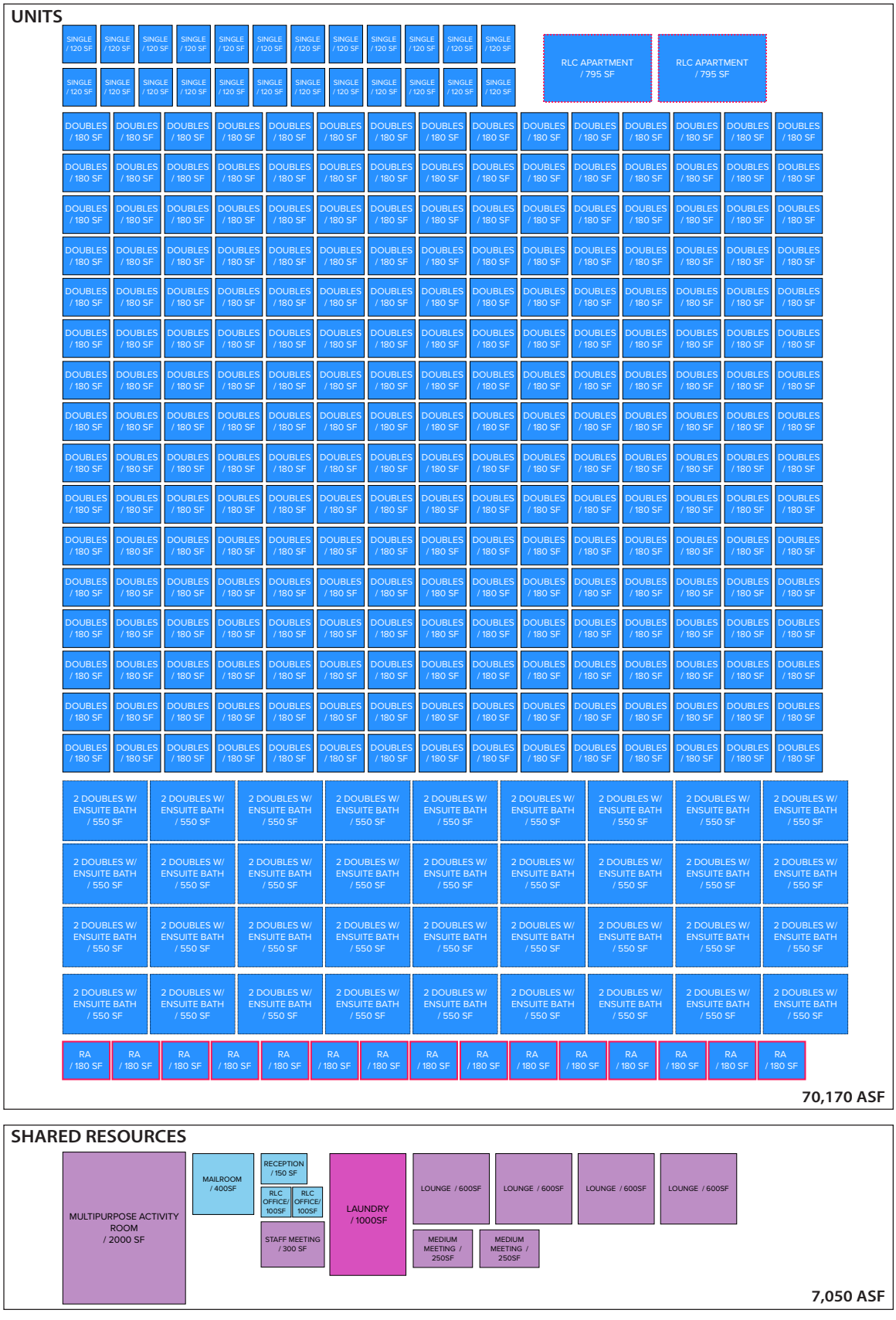


Figure 3.3.5.3 - Graphic Program - Housing Program

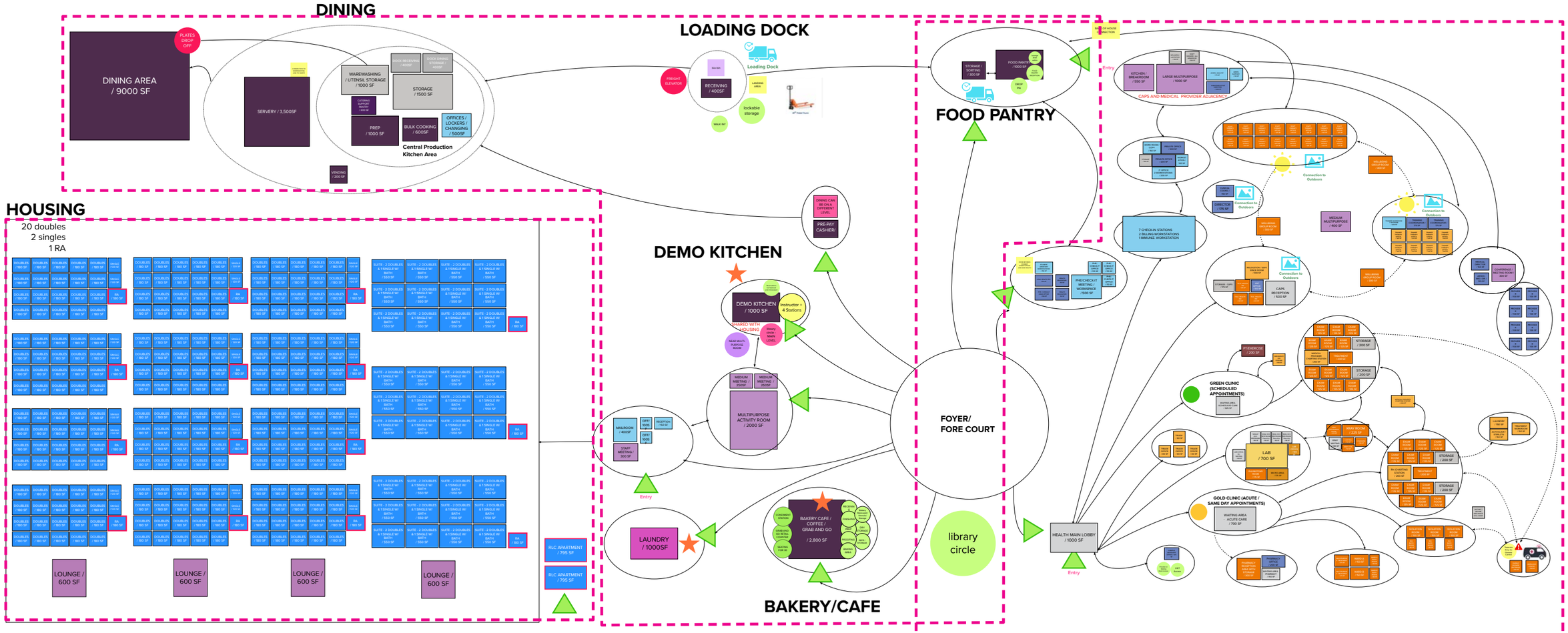


3.4 ADJACENCY WORKSHOP: THE PERFECT DIAGRAM

PURPOSE

The following workshop exercise was conducted to have working group stakeholders describe the key functions that would be conducted amongst the program spaces identified in an idealized "diagram" without the constraints of a physical reality. Key considerations of this exercise encouraged stakeholders to have a "blue sky" ideation mindset with "Yes, and" being the prompt to consider these factors; arrival sequence for different user types and purpose, primary and secondary adjacencies, direct access, indoor/outdoor relationships, presence and identity, acoustical separations, daylighting/orientation, transparency or privacy, security, loading, security, amenities and visibility. The exercises were conducted as an iterative process with the workshop and follow up meetings to validate the feasibility team's understanding of the desired adjacencies.

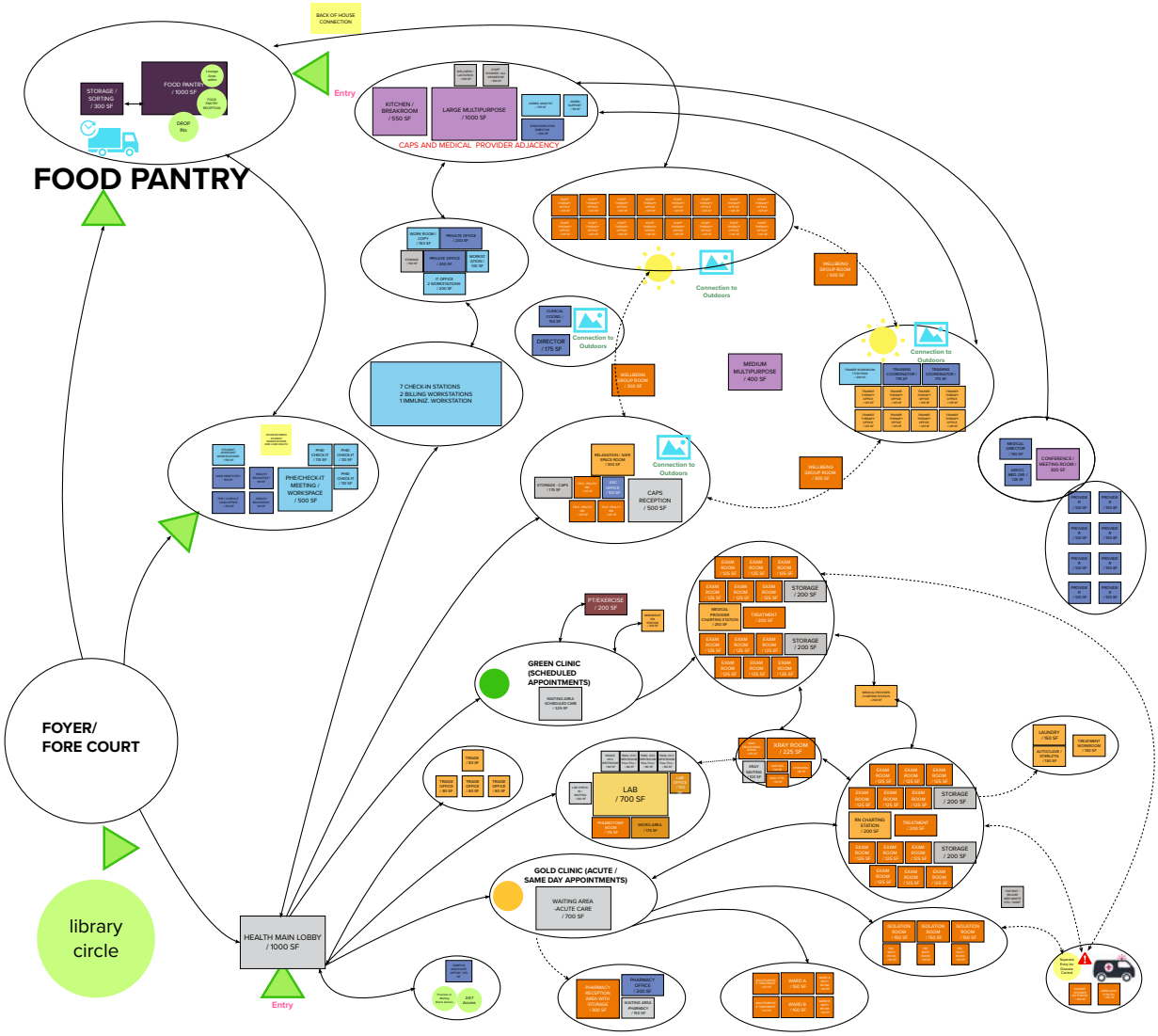
Figure 3.4.1 - Programmatic Adjacency Diagram - Overall



SUMMARY OF PRIORITIES - Student Health

- Provide welcoming face for healthcare access that is connected and integrated to health education, dining, and housing.
- Destigmatize access to the range of healthcare services including Medical, CAPS, or Health Education.
- Provide flexible, yet efficient operational flow that supports dignity and maintaining privacy of healthcare provisions while also optimizing healthcare services.
- Support Healthcare staff with environment that supports their wellbeing to sustain optimal care of student body.
- Optimize holistic health by providing access to daylight, views by strengthening indoor/outdoor adjacencies
- For additional information about healthcare priorities, please refer Section 4.5 Planning Test Fits - Level 4 and 6.

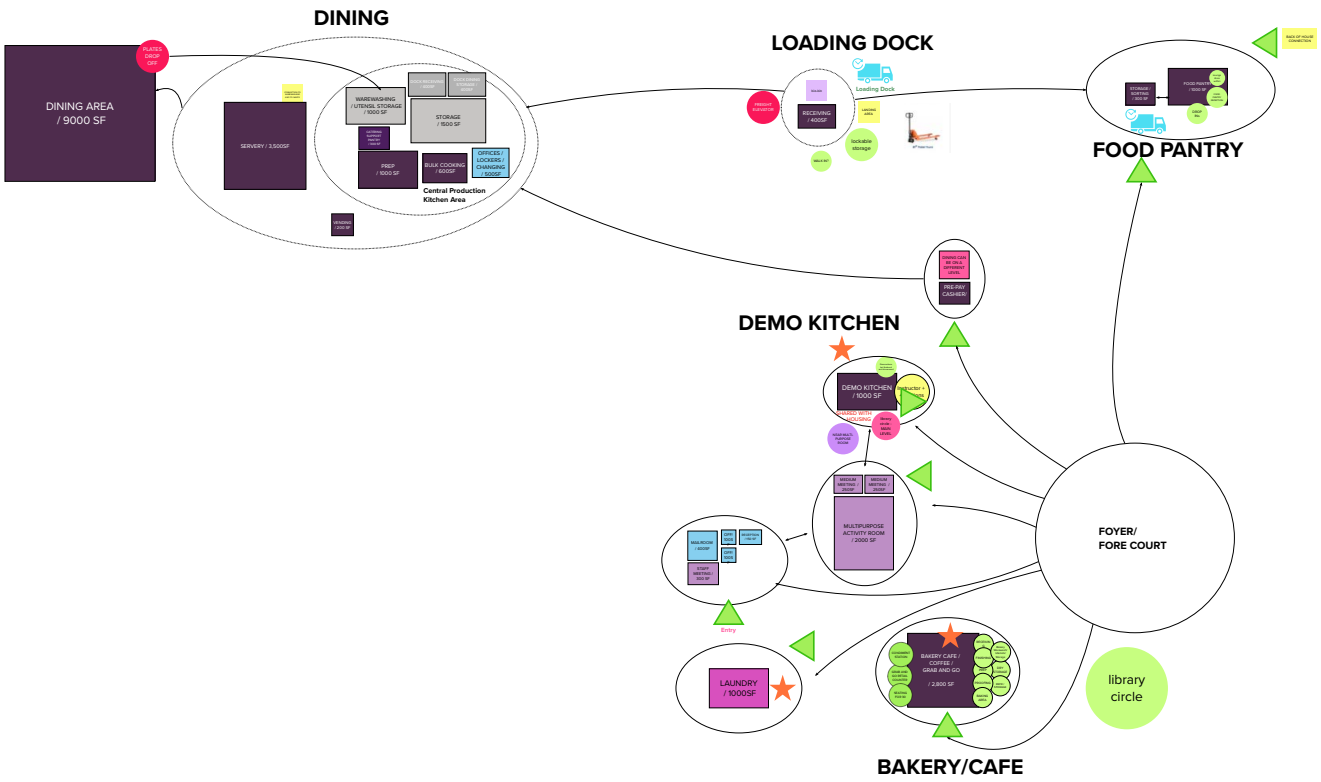
Figure 3.4.2 - Programmatic Adjacency Diagram - Health Center



SUMMARY OF PRIORITIES - Dining

- Establish a welcoming and inviting prime dining destination for the Cal Poly Humboldt campus community that embodies strategic goals of cultivating community through exploring nourishing and diverse food and culture.
- Create food dignity by meeting the spectrum of dietary needs and optimizing access for the campus community.
- Provide flexible and welcoming spaces that enrich and support student social and academic development.
- Optimize holistic food service operations and working environments that support Dining staff and retail café/bakery. Provide future flexibility to adapt to changing needs over time.
- Support health education goals by integrating and support principles of food sovereignty – food access, preparation, etc.
- Optimize holistic health by providing access to daylight, views by strengthening indoor/outdoor adjacencies

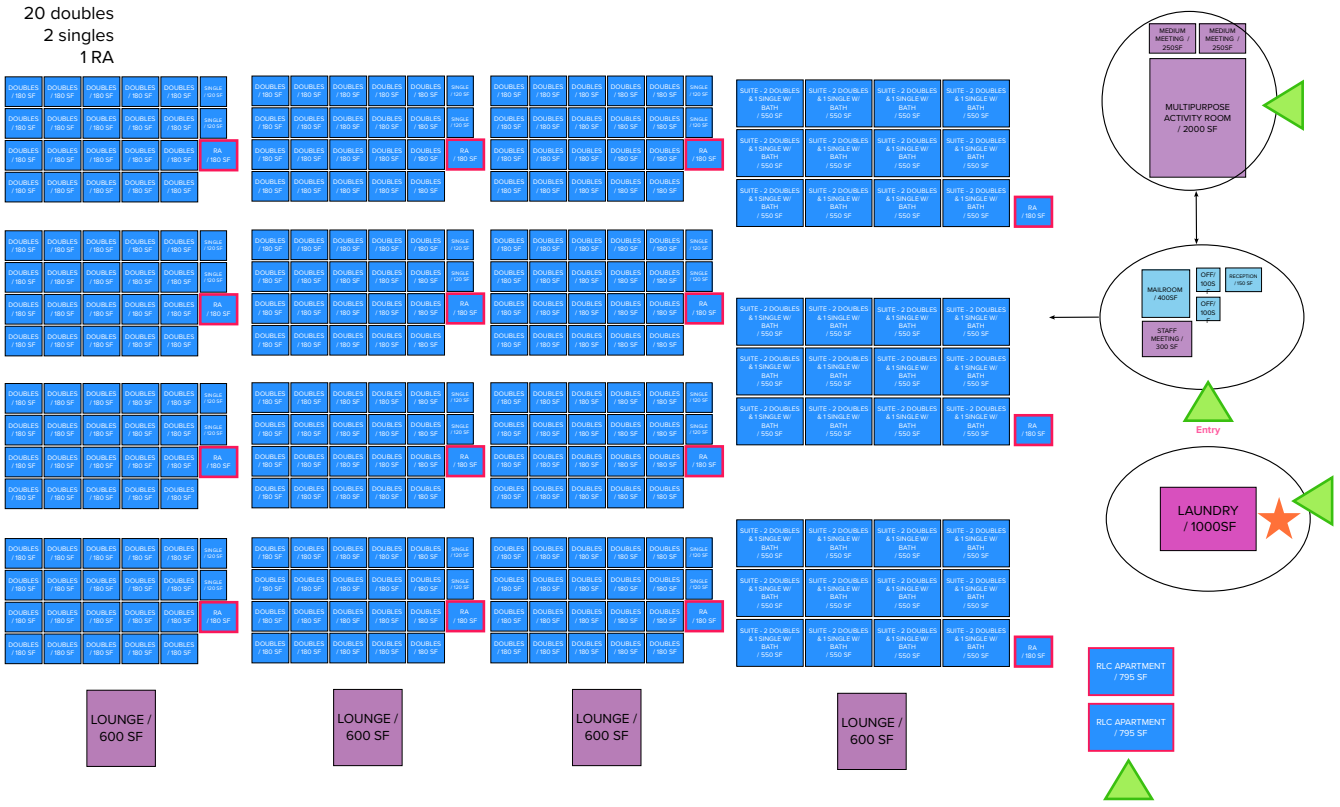
Figure 3.4.3 - Programmatic Adjacency Diagram - Dining



SUMMARY OF PRIORITIES - Student Housing

- Support residential goals of cultivating belonging in social and personal development goals.
- Provide welcoming and inviting scales "neighborhoods" of appropriate clusters - Double Suites, Doubles and Singles - to support learning community development and specific needs of students in their academic journeys.
- Amenities grouped to create welcoming hub for collaboration and learning communities including multi-purpose room, meeting room, laundry reception area with drop down seating and offices/mailroom and public restroom facilities for non-residents.
- Resident Life Coordinator Apartment desired to be more private with a separate entry point from main housing entry area.
- Integrate connections to access dining and student health services.
- Optimize holistic health by providing access to daylight, views by strengthening indoor/outdoor adjacencies

Figure 3.4.4 - Programmatic Adjacency Diagram - Housing



3.5 ROOM DATA SUMMARY MATRIX

The Room Data Matrix gives an overview of the functional and utility requirements for each of the typical room types described in the Space Program. The following Room Data Matrices provide a summary of the functional and utility design recommendations for both the buildings to be part of this Project; Not every individual space is accounted for, but the types of spaces have been captured in the matrices. Similar to the Space Program, the matrix is categorized by department.

The Room Data Summary Matrix was prepared initially by the design team based on experience with each room type from similar environmental systems buildings in the CPH system. It was then refined after being reviewed by the user groups and incorporating their comments.

The matrix tracks the following functional and utility requirements:

- Room Air
- Services
- Specialty Gases
- Power
- Communications
- Environment

Figure 3.5.2 - Room Data Matrix - Student Health Program

- □ Required for space
- ■ To be confirmed with final Design at time of Design-Build Project
- --- Not-Applicable

Room name	Room Air			Services										Power								Communications					Environmental			
	100% Exhausted	AC Rate Occupied (Minimum)	AC Rate Unoccupied (Minimum)	Safety Shower	Eye Wash	Hot & Cold (H/C) or Cold (C)	RO/DI Water	Process Cooling Water (CHWS&R)	House Vaccum (LV)	Compressed Air (15-30psi with Regulator) CA	Compressed Air (100psi with Regulator) CA	Specialty Gas	Medium Pressure Steam for Autoclave	120 V	120 V, Standby to generator	208 V, 1ph	208 V, 1ph, Standby to generator	208 V, 3ph	480 V	Ground	Dedicated Circuit	Video/ Cable	Data Connection	Audio System	Projection / Monitors	Wi-Fi	Required 24/7/365 HVAC	Temp - Winter (min.)	Temp - Summer (max.)	Relative Humidty (min)
Main Lobby / Waiting Areas	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	□	□	□	□	□	□	68°	75°	30%
Check In Stations	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Private Offices (100 sf - 124sf)	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Private Offices (125 sf - 200sf)	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	□	□	□	68°	75°	30%
Billing Workstations	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Immunization Workstations	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
IT Office	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	□	□	□	68°	75°	30%
Workroom / Copy	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Food Pantry Reception / Lounge	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	□	□	□	□	□	□	68°	75°	30%
Food Pantry Storage and Sorting Room	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	---	---	---	□	□	68°	75°	30%
Student Assistant Workstation	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	□	□	□	68°	75°	30%
PHE / Check-IT Meeting / Workspace	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	□	□	□	□	□	□	68°	75°	30%
CAPS Reception / Waiting	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	□	□	□	□	□	□	68°	75°	30%
Relaxation/Safe Space Room	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	□	□	□	□	68°	75°	30%
Practicum Trainee Therapy Office	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Trainee Workroom	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	□	□	□	68°	75°	30%
Staff Therapy Office	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Telehealth Room	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Wellbeing Group Room	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Campus Advocate Office	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Triage	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Triage Office	---	6	3	---	---	---	---	---	---	---	---	---	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Exam Rooms	---	6	3	---	---	H/C	---	---	□	□	---	□	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Treatment Room	---	6	3	---	---	H/C	---	---	□	□	---	□	---	□	---	---	---	---	---	---	---	---	□	---	---	□	□	68°	75°	30%
Treatment Room Workroom																														

- ☐ Required for space
- ■ To be confirmed with final Design at time of Design-Build Project
- --- Not-Applicable

Room name	Room Air			Services										Power								Communications					Environmental			
	100% Exhausted	AC Rate Occupied (Minimum)	AC Rate Unoccupied (Minimum)	Safety Shower	Eye Wash	Hot & Cold (H/C) or Cold (C)	RO/DI Water	Process Cooling Water (CHWS&R)	House Vaccum (LV)	Compressed Air (15-30psi with Regulator) CA	Compressed Air (100psi with Regulator) CA	Specialty Gas	Medium Pressure Steam for Autoclave	120 V	120 V, Standby to generator	208 V, 1ph	208 V, 1ph, Standby to generator	208 V, 3ph	480 V	Ground	Dedicated Circuit	Video/ Cable	Data Connection	Audio System	Projection / Monitors	Wi-Fi	Required 24/7/365 HVAC	Temp - Winter (min.)	Temp - Summer (max.)	Relative Humidty (min)
Charting Stations	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Ward Room	---	6	3	---	---	H/C	---	---	☐	☐	---	☐	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Ward Bathroom	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Isolation Room	---	6	3	---	---	H/C	---	---	☐	☐	---	☐	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Isolation Room Bathroom	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
PT/Exercise Room	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Multipurpose Treatment Room	---	6	3	---	---	H/C	---	---	☐	☐	---	☐	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Lab - Main	---	6	3	---	☐	H/C	---	---	☐	☐	---	☐	---	☐	☐	■	■	---	---	---	☐	---	☐	---	---	☐	☐	68°	75°	30%
Lab Offices	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	■	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Phlebotomy Room	---	6	3	---	☐	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Microscope Area	---	6	3	---	☐	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Xray Processing Room	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	☐	---	☐	---	---	☐	☐	68°	75°	30%
Xray Room w/ Controller	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	■	---	---	---	---	☐	---	☐	---	---	☐	☐	68°	75°	30%
Changing Rooms	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	---	---	---	☐	☐	68°	75°	30%
Casting Rooms	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	---	---	---	☐	☐	68°	75°	30%
Pharmacy	---	6	3	---	☐	H/C	---	---	---	---	---	---	---	☐	☐	---	■	---	---	---	☐	---	☐	---	---	☐	☐	68°	75°	30%
Pharmacy Shared Office	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	■	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Laundry	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	☐	---	---	---	---	☐	---	☐	---	---	☐	☐	68°	75°	30%
Autoclave/Sterilization	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	☐	---	---	---	---	☐	---	☐	---	---	☐	☐	68°	75°	30%
HAZMAT Storage spaces	---	6	3	☐	☐	C	---	---	---	---	---	---	---	☐	☐	---	---	---	---	---	☐	---	---	---	---	---	---	☐	68°	75°	30%
Wellness / Lactation	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	---	---	---	☐	☐	68°	75°	30%
Showers	---	6	3	---	---	H/C	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	☐	68°	75°	30%
Storage spaces	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	---	---	---	---	---	☐	68°	75°	30%
Kitchen / Breakroom	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	---	---	---	☐	☐	68°	75°	30%
Large Multipurpose Room	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	☐	☐	☐	☐	☐	☐	68°	75°	30%
Medium Multipurpose Room	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	☐	☐	☐	68°	75°	30%
Conference/Meeting Room	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	☐	☐	☐	68°	75°	30%

Figure 3.5.2 - Room Data Matrix - Housing and Dining Program

- ☐ Required for space
- ■ To be confirmed with final Design at time of Design-Build Project
- --- Not-Applicable

Room name	Room Air			Services										Power								Communications					Environmental			
	100% Exhausted	AC Rate Occupied (Minimum)	AC Rate Unoccupied (Minimum)	Safety Shower	Eye Wash	Hot & Cold (H/C) or Cold (C)	RO/DI Water	Process Cooling Water (CHWS&R)	House Vaccum (LV)	Compressed Air (15-30psi with Regulator) CA	Compressed Air (100psi with Regulator) CA	Specialty Gas	Medium Pressure Steam for Autoclave	120 V	120 V, Standby to generator	208 V, 1ph	208 V, 1ph, Standby to generator	208 V, 3ph	480 V	Ground	Dedicated Circuit	Video/ Cable	Data Connection	Audio System	Projection / Monitors	Wi-Fi	Required 24/7/365 HVAC	Temp - Winter (min.)	Temp - Summer (max.)	Relative Humidty (min)
HOUSING PROGRAM																														
Singles	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Doubles	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Two Doubles with ensuite bath	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
RA Unit	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
RLC Apartment	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Demonstration Kitchen	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	☐	---	☐	---	---	☐	☐	68°	75°	30%
Multipurpose Activity Room	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Medium Meeting/Study Room	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Student Lounge	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Laundry	---	6	3	---	---	C	---	---	---	---	---	---	---	☐	---	☐	---	---	---	---	☐	---	☐	---	---	☐	☐	68°	75°	30%
Mailroom	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Reception Desk	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Staff Meeting Room	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
RLC Office	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
DINING PROGRAM																														
Servery	---	6	3						■								■					---	☐	---	---	☐	☐	68°	75°	30%
Dining Area	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	---	---	---	☐	☐	68°	75°	30%
Bakery and Café	---	6	3						■								■					---	☐	---	---	☐	☐	68°	75°	30%
Offices, Lockers and Changing	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	---	---	---	☐	☐	68°	75°	30%
Prep / Bulk Cooking	---	6	3						■								■					---	---	---	---	☐	☐	68°	75°	30%
Catering Support Pantry	---	6	3						■								■					---	---	---	---	☐	☐	68°	75°	30%
Warewashing/Utensil Storage	---	6	3						■								■					---	---	---	---	☐	☐	68°	75°	30%
Receiving	---	6	3	---	---	C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Dock Receiving	---	6	3	---	---	C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Dock Dining Storage	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Vending	---	6	3	---	---	C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
IDF	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
MPOE / MDF	---	6	3	---	---	---	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%
Restrooms	---	6	3	---	---	H/C	---	---	---	---	---	---	---	☐	---	---	---	---	---	---	---	---	☐	---	---	☐	☐	68°	75°	30%

3.6 ROOM DATA SHEETS

A Room Data Sheet has been completed for most of the spaces identified in the Space Program. The Room Data Sheets are intended to be graphic representations of potential room layouts, including equipment, laboratory benches, office furniture, etc. Also indicated on each sheet are preferred overall room dimensions, shown to the inside face of each wall. Detailed room services, such as electrical and data outlets, are intentionally not shown at this time and will be developed during future design phases. These room diagrams are the basis for understanding the capacity of the space program as well as testing the program on the proposed site. They are not intended to be the final layout.

The Student Health Room Data Sheets as follows:

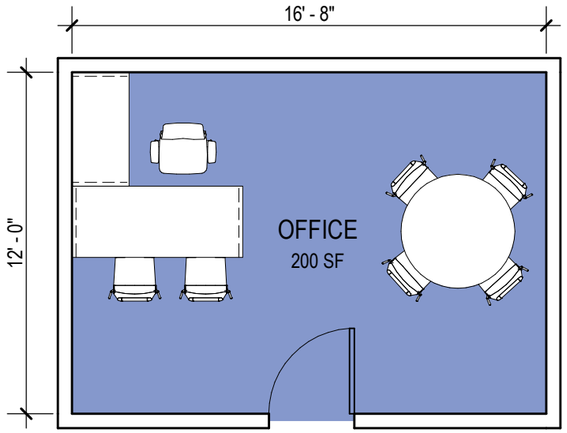
3.6.1 STUDENT HEALTH PROGRAM

- Office (200 SF)
- Director's Office (175 SF)
- Admin Analyst Office (175 SF)
- Training Coordinator Office (175 SF)
- Office (150 SF)
- Clinical Coordinator Office (150 SF)
- Assoc. Medical Director Office (125 SF)
- Office (110 SF)
- Office (100 SF)
- Campus Advocate Office
- Multipurpose Room - Large
- Multipurpose Room - Medium
- Kitchenette / Break Room
- Conference / Meeting Room
- Wellness / Lactation
- Caps Reception
- Check-In / Workstations
- IT Office
- Work Room / Copy
- PHE / Check IT Meeting / Workspace
- Student Assistant Workstation
- Food Pantry
- Demonstration Kitchen
- Triage
- Triage Office
- Immunization Station
- Exam
- Treatment
- Charting
- Medical Services
- Ward Room w/ Bathroom
- Isolation Room w/ Bathroom
- Multipurpose Treatment Room
- Sterilization
- X-ray
- PTE / Exercise Room
- Trainee Workroom
- Wellbeing Group Room
- Therapy Office

OFFICE (200 SF)

GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"



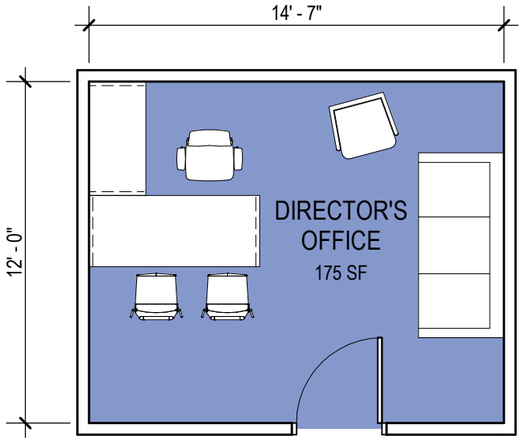
ROOM DIAGRAM APPLICABLE TO FOLLOWING PROGRAMS:

1) SHWS DIRECTOR OFFICE
2) ADMIN EXECUTIVE DIRECTOR OFFICE

DIRECTOR'S OFFICE (175 SF)

GUIDE PLATE - HDH - HEALTH

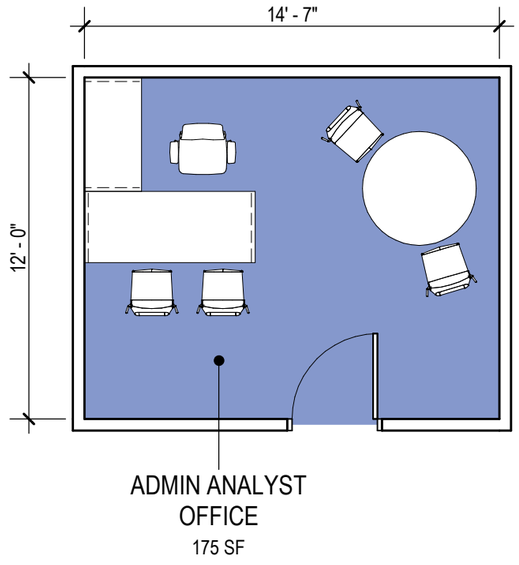
Scale: 3/16" = 1'-0"

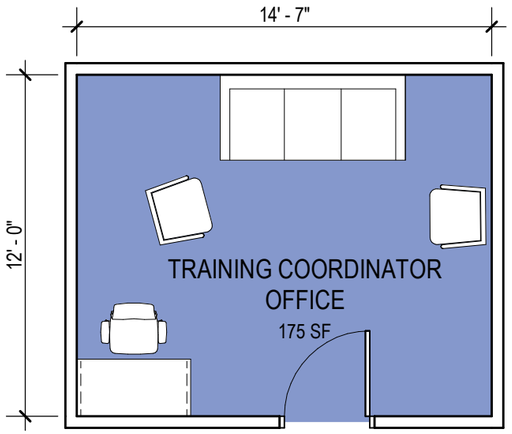


ADMIN ANALYST OFFICE (175 SF)

GUIDE PLATE - HDH - HEALTH

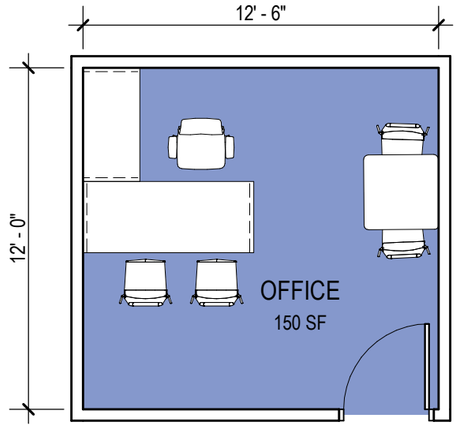
Scale: 3/16" = 1'-0"





TRAINING COORDINATOR
OFFICE (175 SF)
GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"

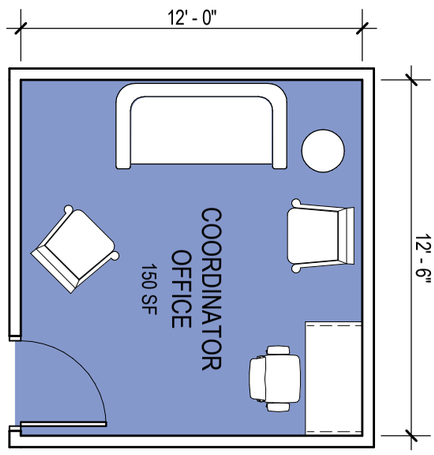


OFFICE (150 SF)
GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"

ROOM DIAGRAM APPLICABLE TO FOLLOWING PROGRAMS:

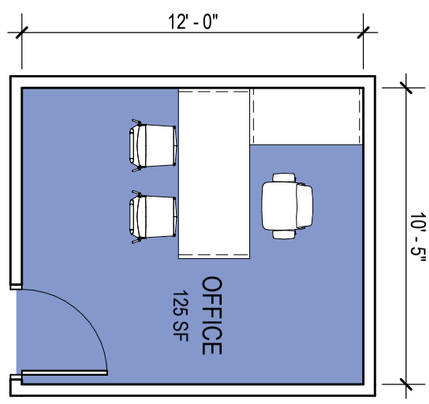
1) PHE / CHECK IT LEAD OFFICE (RAVIN)
2) LEAD HEALTH ED OFFICE
3) MEDICAL DIRECTOR OFFICE



Scale: 3/16" = 1'-0"

CLINICAL COORDINATOR OFFICE (150 SF)

GUIDE PLATE - HDH - HEALTH



Scale: 3/16" = 1'-0"

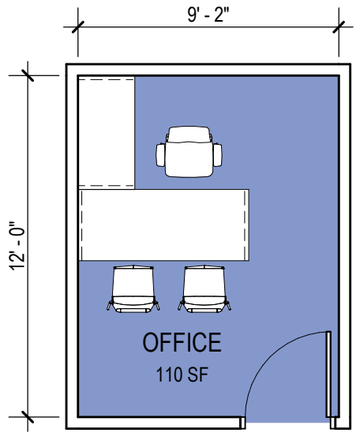
ASSOC. MEDICAL DIRECTOR OFFICE (125 SF)

GUIDE PLATE - HDH - HEALTH

OFFICE (110 SF)

GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"



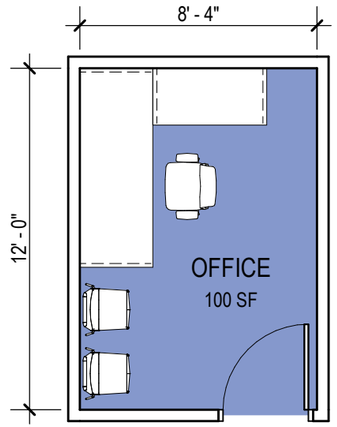
ROOM DIAGRAM APPLICABLE TO FOLLOWING PROGRAMS:

1) HEALTH EDUCATOR OFFICE
2) ADMINISTRATIVE SUPPORT OFFICE
3) PHE CHECK-IT OFFICE

OFFICE (100 SF)

GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"



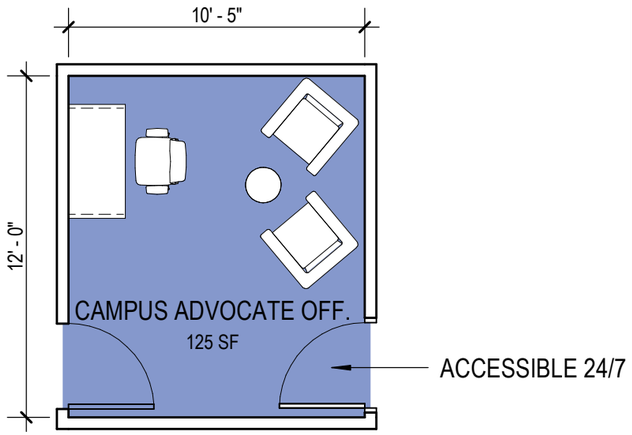
ROOM DIAGRAM APPLICABLE TO FOLLOWING PROGRAMS:

1) ASC OFFICE
2) PROVIDER OFFICES

CAMPUS ADVOCATE OFFICE

GUIDE PLATE - HDH - HEALTH

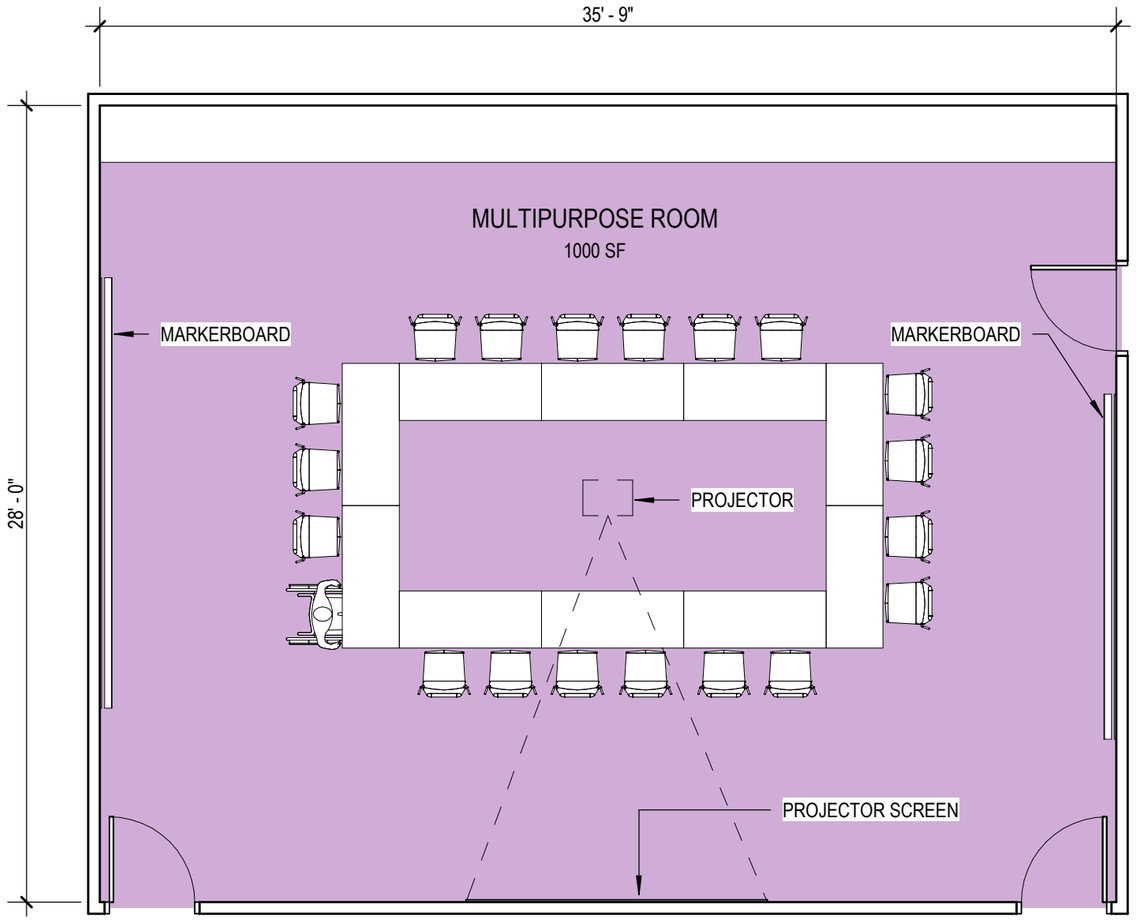
Scale: 3/16" = 1'-0"



MULTIPURPOSE ROOM - LARGE

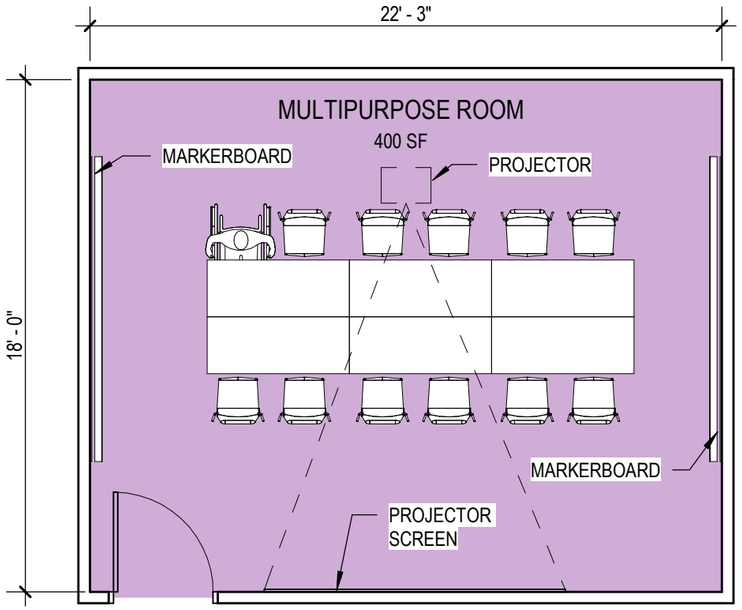
GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"

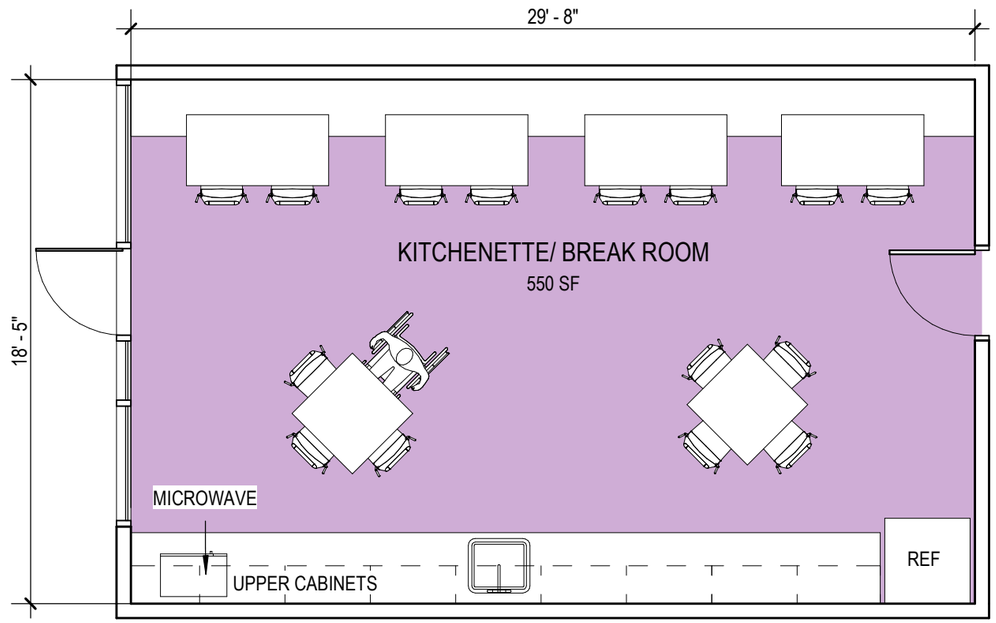


THE LARGE MULTIPURPOSE ROOM ALLOWS FOR THE FLEXIBILITY OF MULTIPLE USE TYPES:

1) MEETINGS
2) WELLNESS PROGRAMS



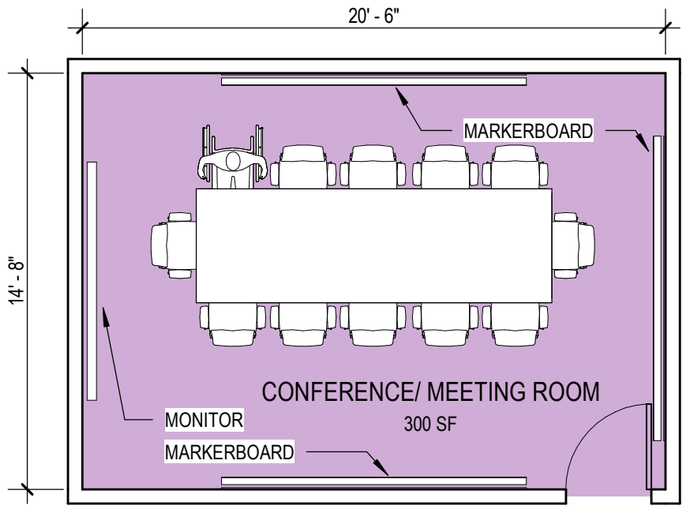
MULTIPURPOSE ROOM - MEDIUM
GUIDE PLATE - HDH - HEALTH
Scale: 3/16" = 1'-0"



KITCHENETTE/ BREAK ROOM
GUIDE PLATE - HDH - HEALTH
Scale: 3/16" = 1'-0"

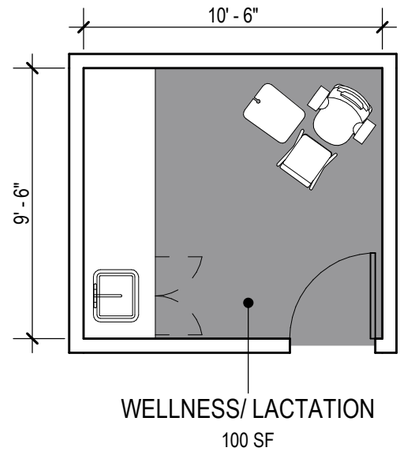
CONFERENCE/ MEETING ROOM
GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"



WELLNESS/ LACTATION
GUIDE PLATE - HDH - HEALTH

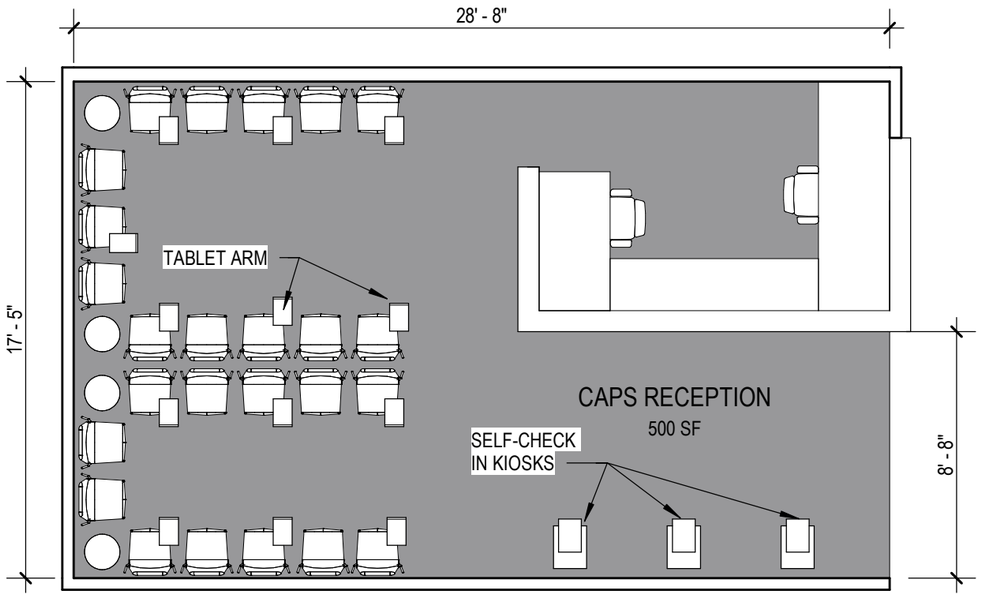
Scale: 3/16" = 1'-0"



CAPS RECEPTION

GUIDE PLATE - HDH - HEALTH

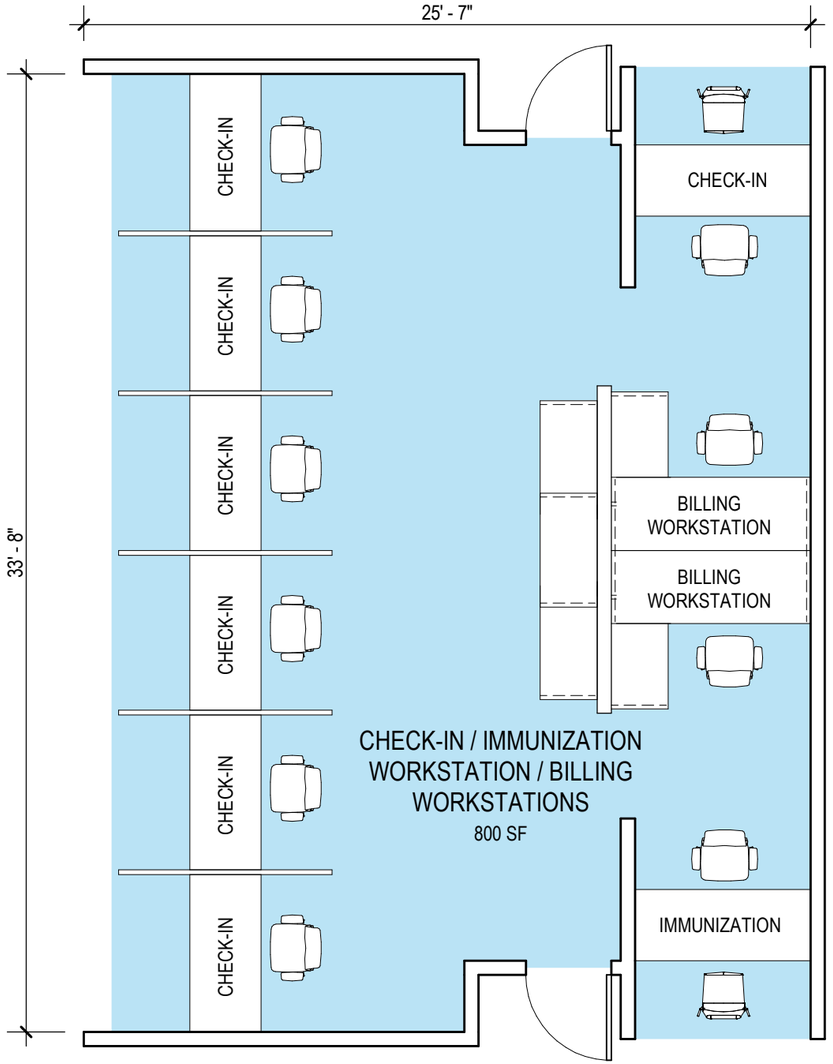
Scale: 3/16" = 1'-0"



CHECK-IN/ WORKSTATIONS

GUIDE PLATE - HDH - HEALTH

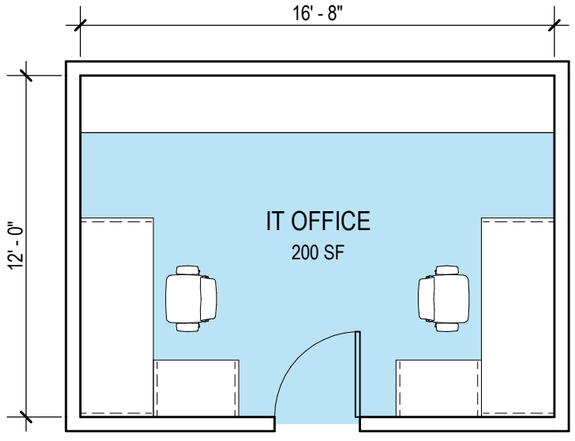
Scale: 3/16" = 1'-0"



IT OFFICE

GUIDE PLATE - HDH - HEALTH

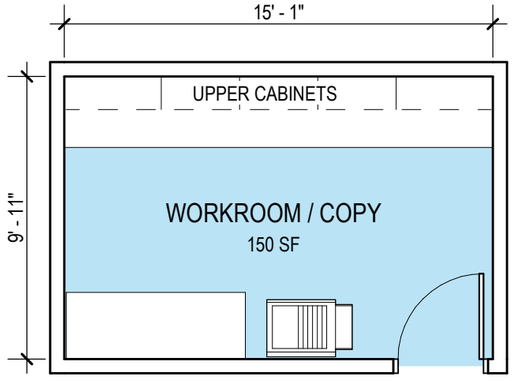
Scale: 3/16" = 1'-0"



WORK ROOM/ COPY

GUIDE PLATE - HDH - HEALTH

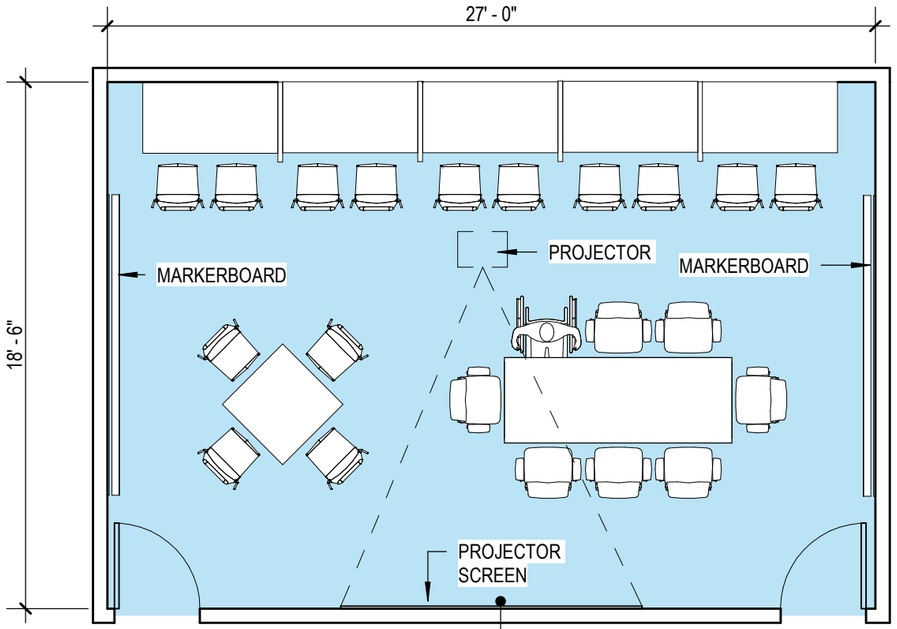
Scale: 3/16" = 1'-0"



PHE/ CHECK IT MEETING/ WORKSPACE

GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"



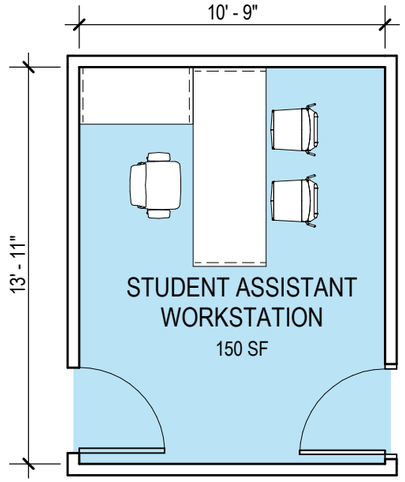
PHE / CHECK IT MEETING / WORKSPACE

500 SF

STUDENT ASSISTANT WORKSTATION

GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"



STUDENT ASSISTANT WORKSTATION

150 SF

FOOD PANTRY

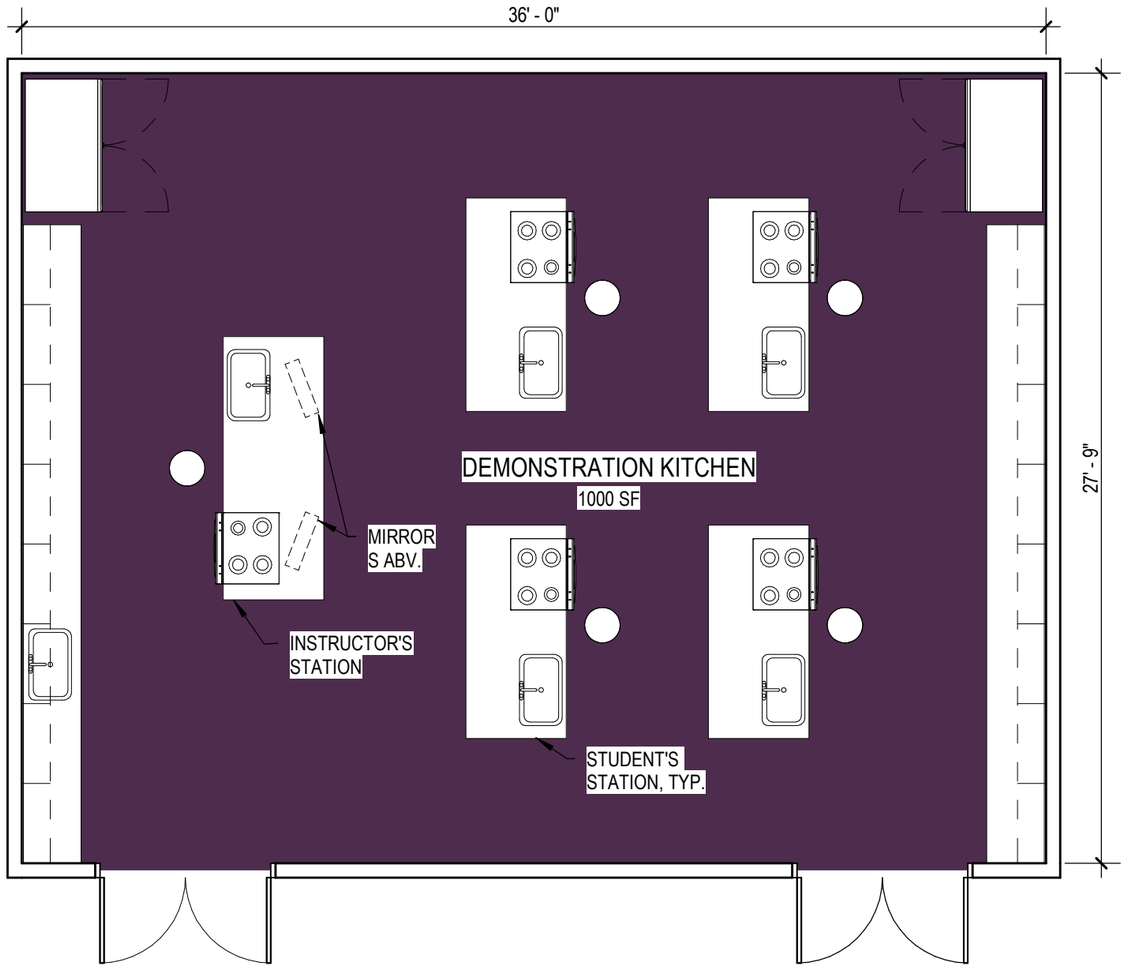
GUIDE PLATE - HDH - HEALTH

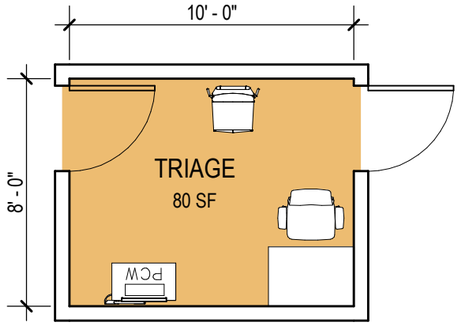
Scale: 3/16" = 1'-0"

DEMONSTRATION KITCHEN

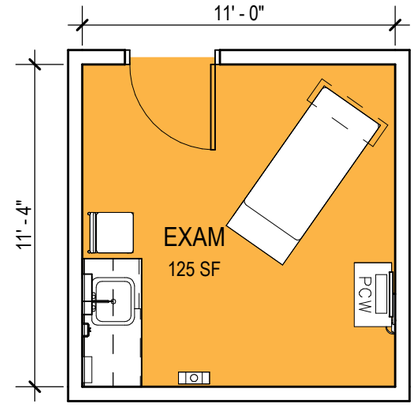
GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"

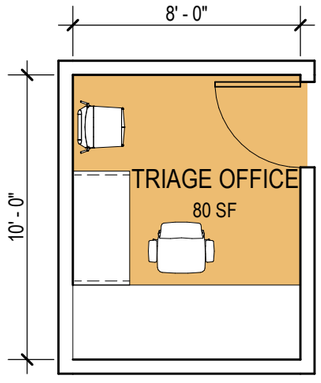




TRIAGE
GUIDE PLATE - HDH - HEALTH
Scale: 3/16" = 1'-0"



EXAM
GUIDE PLATE - HDH - HEALTH
Scale: 3/16" = 1'-0"

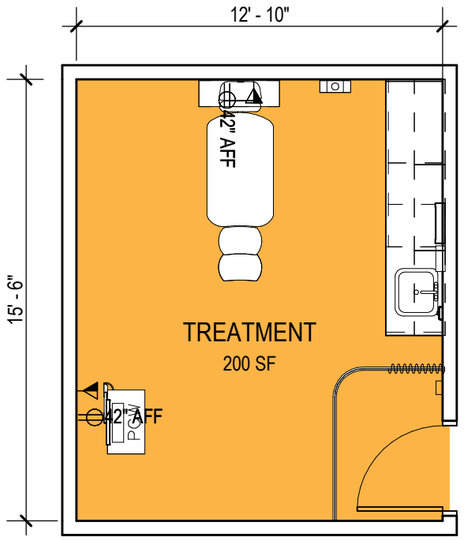


TRIAGE OFFICE
GUIDE PLATE - HDH - HEALTH
Scale: 3/16" = 1'-0"

TREATMENT

GUIDE PLATE - HDH - HEALTH

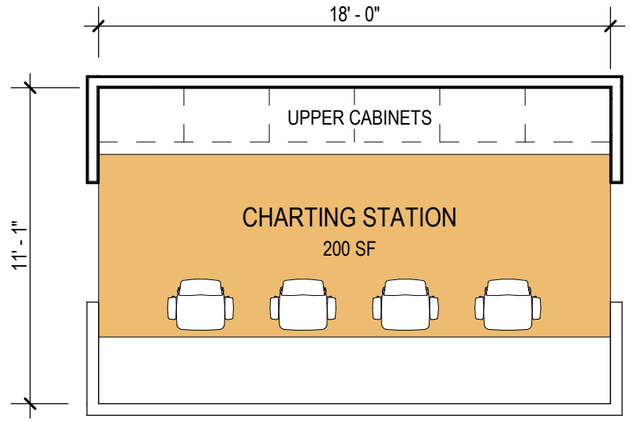
Scale: 3/16" = 1'-0"



CHARTING

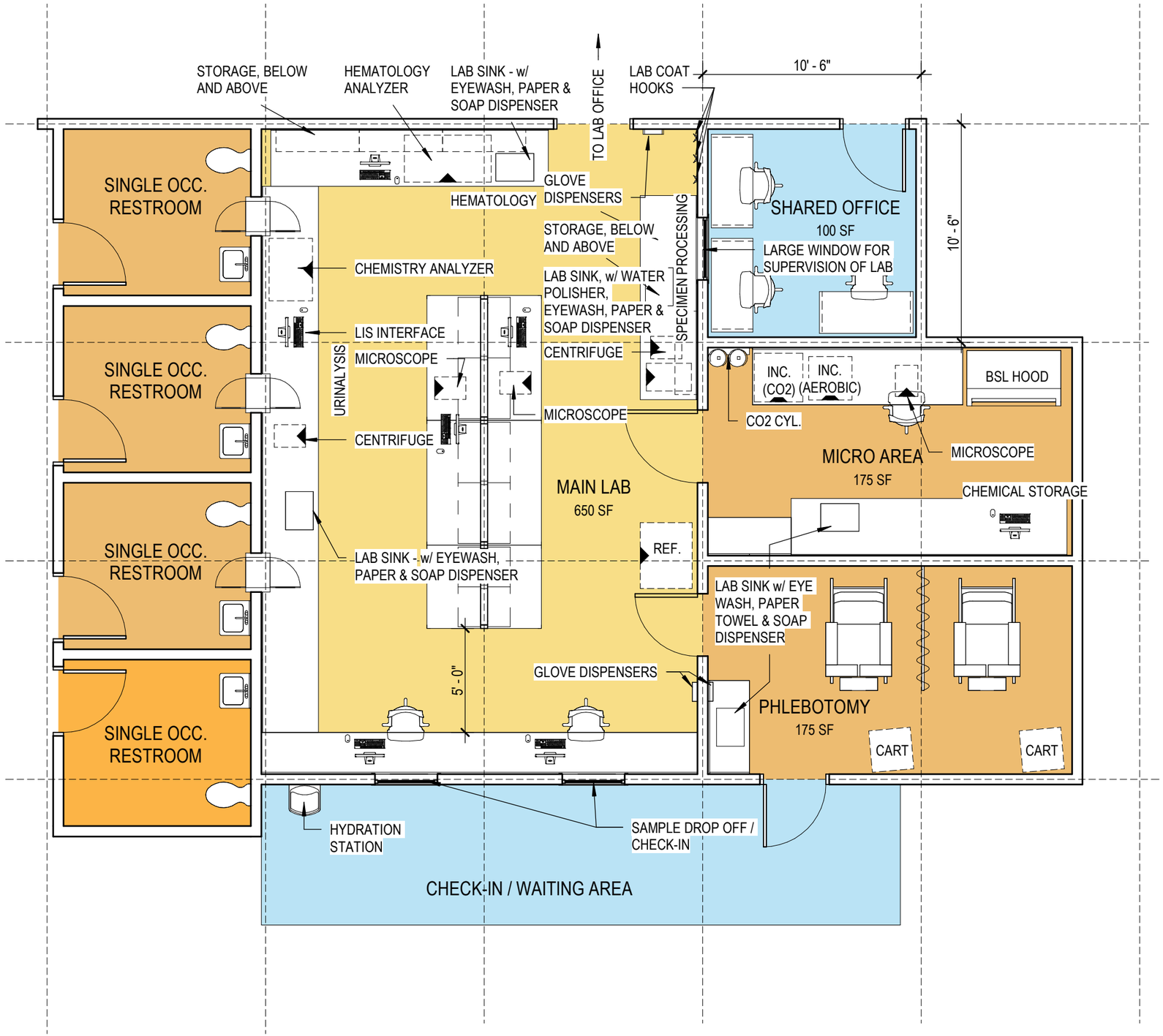
GUIDE PLATE - HDH - HEALTH

Scale: 3/16" = 1'-0"



ROOM DIAGRAM APPLICABLE TO FOLLOWING PROGRAMS:

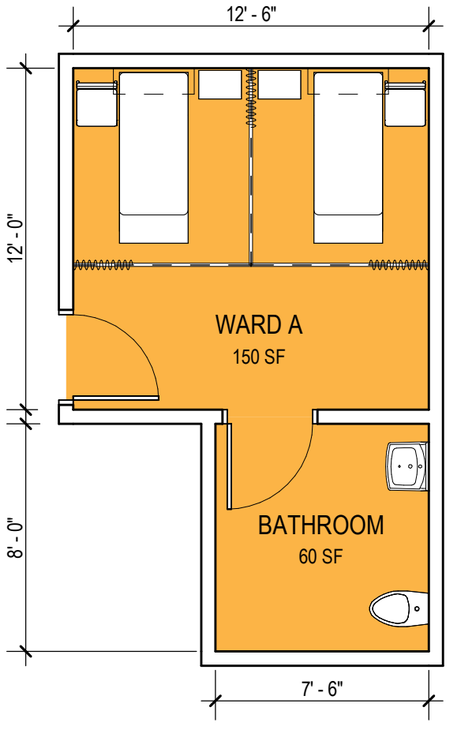
1) CHARTING STATIONS FOR RNs
2) CHARTING STATIONS FOR MEDICAL PROVIDERS



MEDICAL SERVICES

GUIDE PLATE - HDH - HEALTH

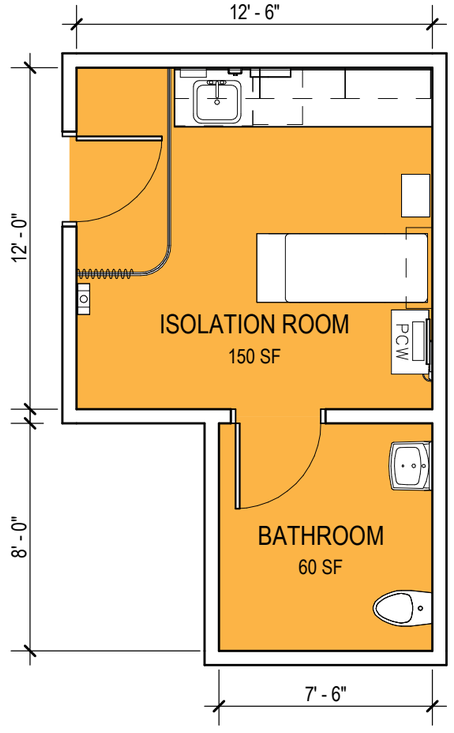
Scale: 3/16" = 1'-0"



WARD ROOM W/ BATHROOM

GUIDE PLATE - HDH - HEALTH

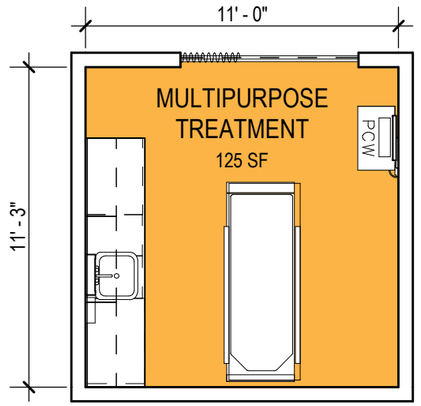
Scale: 3/16" = 1'-0"



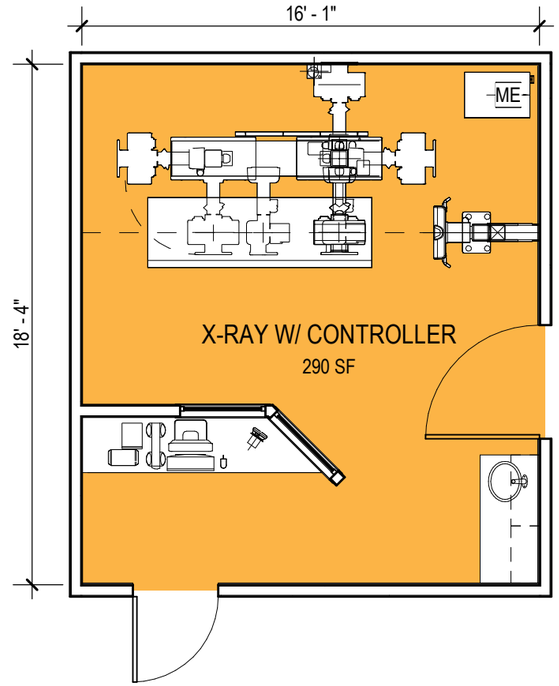
ISOLATION ROOM W/ BATHROOM

GUIDE PLATE - HDH - HEALTH

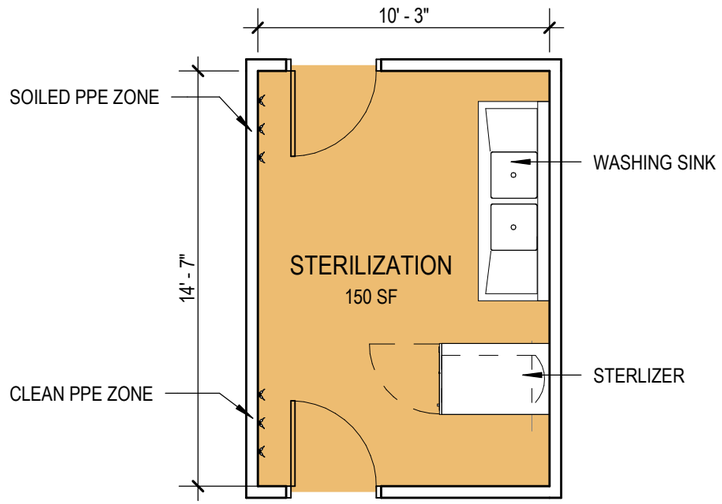
Scale: 3/16" = 1'-0"



MULTIPURPOSE TREATMENT ROOM
GUIDE PLATE - HDH - HEALTH
Scale: 3/16" = 1'-0"



XRAY
GUIDE PLATE - HDH - HEALTH
Scale: 3/16" = 1'-0"

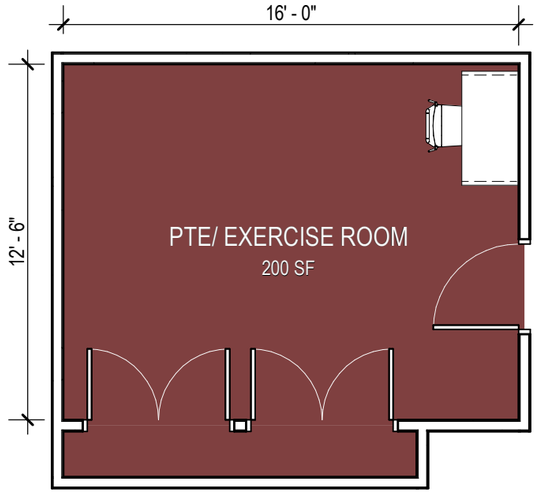


STERLIZATION
GUIDE PLATE - HDH - HEALTH
Scale: 3/16" = 1'-0"

PTE/ EXERCISE ROOM

GUIDE PLATE - HDH - HEALTH

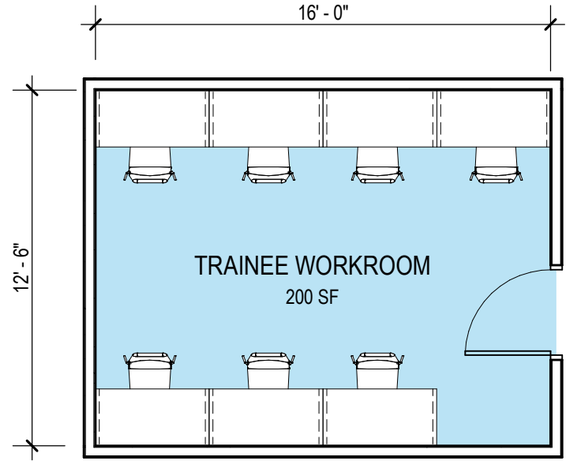
Scale: 3/16" = 1'-0"



TRAINEE WORKROOM

GUIDE PLATE - HDH - HEALTH

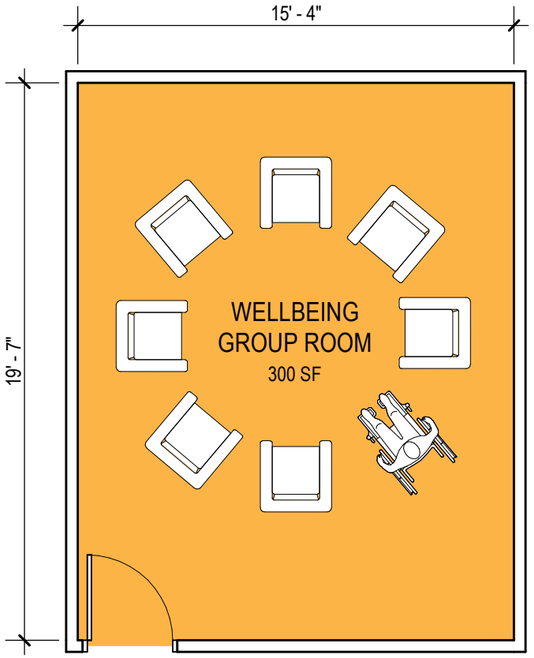
Scale: 3/16" = 1'-0"



WELLBEING GROUP ROOM

GUIDE PLATE - HDH - HEALTH

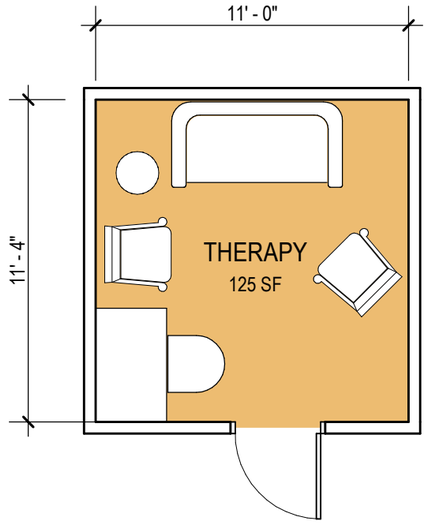
Scale: 3/16" = 1'-0"



THERAPY OFFICE

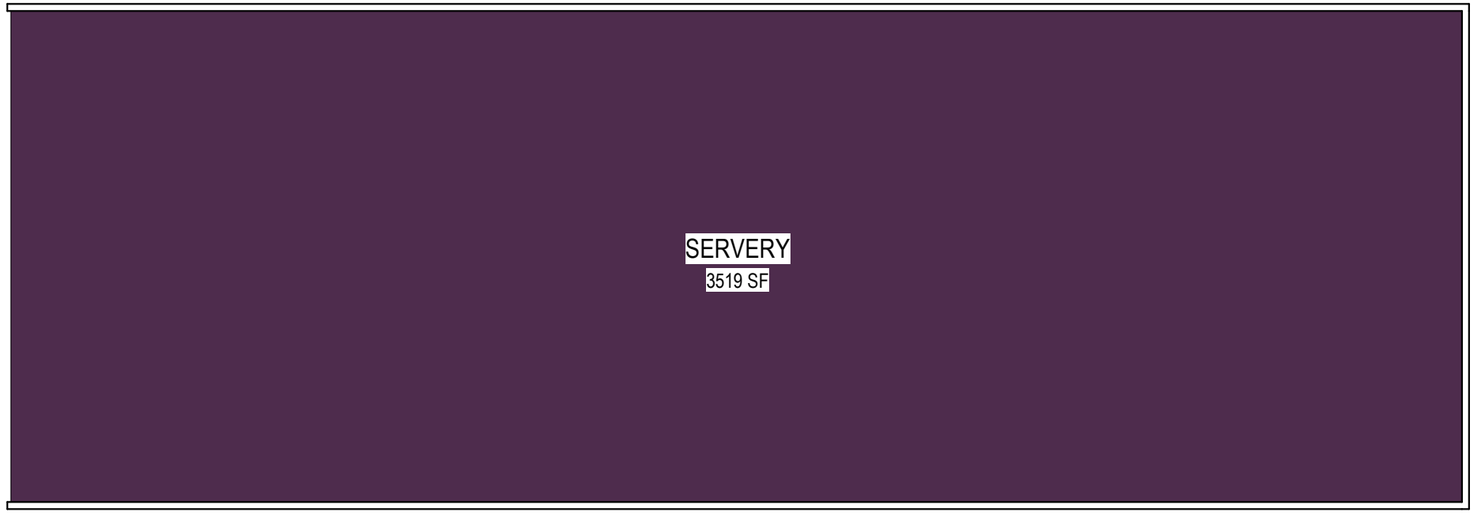
GUIDE PLATE - HDH - HEALTH

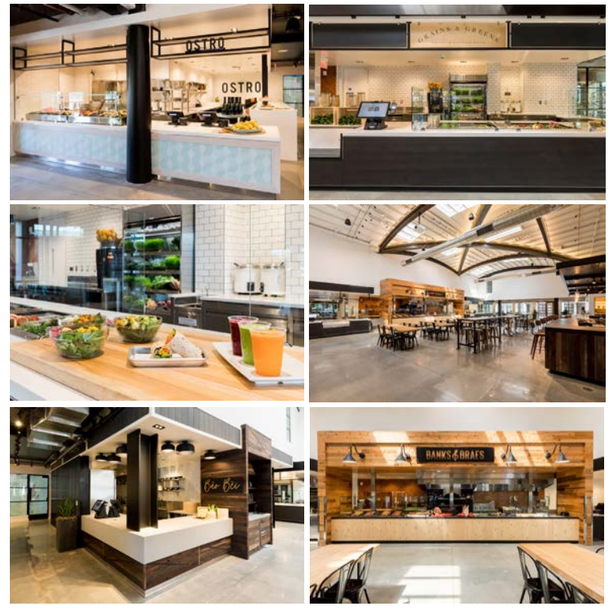
Scale: 3/16" = 1'-0"



ROOM DIAGRAM APPLICABLE TO FOLLOWING PROGRAMS:

1) STAFF THERAPY OFFICE
2) TRAINEE THERAPY OFFICE





SERVERY

GUIDE PLATE - HDH - DINING

Scale: NTS

3.6.2 DINING PROGRAM

- Servery
- Dining - Main Level
- Dining - Upper Level
- Bakery Cafe / Coffee / Grab and Go
- Office / Lockers / Changing
- Prep and Bulk Cooking
- Catering Support Pantry
- Warewashing / Utensil Storage

Narrative:
The concept for the servery captures a clean, timeless look and feel with a nod to industrial elements and authentic materials while maintaining a bright, clean, and minimal backdrop to showcase an array of culinary offerings to meet diverse needs.

Each station has its own feel, but under a comprehensive theme and common palate where all stations are directly supported by back of house prep and support spaces.

SERVERY – 3,500 asf

Concept Station 1 – Grill / Breakfast – 500 asf

Description: Concept Cooking Station.

Adjacencies: May be integrated with back of house for labor, equipment and other efficiencies.

Equipment/Requirements:

Exhaust Hood System/Demand Control
Charbroiler
Flat Top
Fryer Battery w/ integral filter and holding
Saute station
Combi Steamer
Refrigeration
Chef tables w/ sinks
Utensil Racks and Shelving
Hot holding
Plate/utensil storage
Internal utensil bussing
Dry storage
Floor Troughs
Hand washing
Stainless Steel Cabinet Base against G.C. Die wall
Hot/Cold Shelves
Order/Pickup window or pass arrangement
Breath Guards with Light and Heat Lamps
Plate Storage

Concept Station 2 – Hearth – 500 asf

Description: Concept Cooking Station.

Adjacencies: May be integrated with back of house for labor, equipment and other efficiencies.

Equipment/Requirements:

Exhaust Hood System/Demand Control
Stone Hearth 2-3 Deck Oven
Pasta Cooker
Fire and Ice Station
Landing/Cutting Table
Pizza Prep Table
Dough Mixer
Dough Rounder
Dough Press
Dough Storage
Baker's Table
Refrigeration
Chef tables w/ sinks
Utensil Racks and Shelving
Cart Stock
Hot holding
Plate/utensil storage
Internal utensil bussing
Dry storage
Floor Troughs
Hand washing
Stainless Steel Cabinet Base against G.C. Die wall
Hot/Cold Shelves
Order/Pickup window or pass arrangement
Breath Guards with Light and Heat Lamps
Plate Storage

Concept Station 3 – Global – 500 asf

Description: Concept Cooking Station.

Adjacencies: May be integrated with back of house for labor, equipment and other efficiencies.

Equipment/Requirements:

Exhaust Hood System/Demand Control

Stock Pot Range
Fryer
Pasta Cooker Battery
Flat top grill
Char broiler
Saute Station
Rotisserie Oven
Wok Range
Rice Cookers
Combi/Steamer (Rational)
Refrigeration
Chef tables w/ sinks
Utensil Racks and Shelving
Cart Stock
Hot holding
Plate/utensil storage
Internal utensil bussing
Dry storage
Floor Troughs
Hand washing
Stainless Steel Cabinet Base against G.C. Die wall
Hot/Cold Shelves
Order/Pickup window or pass arrangement
Breath Guards with Light and Heat Lamps
Plate Storage

Concept Station 4 – Vegan / Vegetarian – 500 asf

Description: Concept Cooking Station.

Adjacencies: May be integrated with back of house for labor equipment and other efficiencies.

Equipment/Requirements:

Exhaust Hood System/Demand Control
Charbroiler
Flat Top
Fryer Battery w/ integral filter and holding
Saute station
Combi Steamer
Refrigeration
Chef tables w/ sinks
Utensil Racks and Shelving
Cart Stock
Hot holding
Plate/utensil storage
Internal utensil bussing
Dry storage
Floor Troughs
Hand washing
Stainless Steel Cabinet Base against G.C. Die wall
Hot/Cold Shelves
Order/Pickup window or pass arrangement
Breath Guards with Light and Heat Lamps
Plate Storage

Concept Station 5 – Double Station – Salad – 750 asf

Description: Concept Salad Station some cooking for a flexible menu. High volume, popular station. Assume dual queues.

Adjacencies: Oriented for throughput, queuing and assume this one is an island station.

Equipment/Requirements:

Exhaust Hood System/Demand Control
Charbroiler/Flat top
Panini Presses
Rice Cooker
Microgreen display
Greens Display (72 Items Requested)
Automatic Slicer
Food Processors
Juicers
Ice Machine
Refrigeration
Chef tables w/ sinks
Utensil Racks and Shelving
Cart Stock
Hot holding
Plate/utensil storage
Internal utensil bussing
Dry storage
Floor Troughs
Hand washing
Stainless Steel Cabinet Base against G.C. Die wall
Hot/Cold Shelves
Order/Pickup window or pass arrangement
Breath Guards with Light and Heat Lamps
Plate Storage

Conception Station 6 – Allergen Free – 250 asf

Description: Concept Cooking Station.

Adjacencies: Separated clearly from other stations and self-contained to prevent cross contamination of products.

Equipment/Requirements:

Exhaust Hood System/Demand Control
Charbroiler/Flat top
Panini Press
Rice Cooker
Greens Display
Automatic Slicer
Food Processors
Refrigeration
Chef tables w/ sinks
Utensil Racks and Shelving
Cart Stock
Hot holding
Plate/utensil storage
Internal utensil bussing
Dry storage
Floor Troughs
Hand washing
Stainless Steel Cabinet Base against G.C. Die wall
Hot/Cold Shelves
Order/Pickup window or pass arrangement
Breath Guards with Light and Heat Lamps
Plate Storage

Beverage Area – 300 asf

Description: Self Service Beverage Station.

Adjacencies: Located conveniently for guests to get beverages and refills while dining or using facility meetings and study.

Equipment/Requirements:

Ice and water station
Coffee and tea dispenser
Flavored waters/Spa water/Kombucha/Sodas (TBD)
Add Free Water Stations in Dining Areas

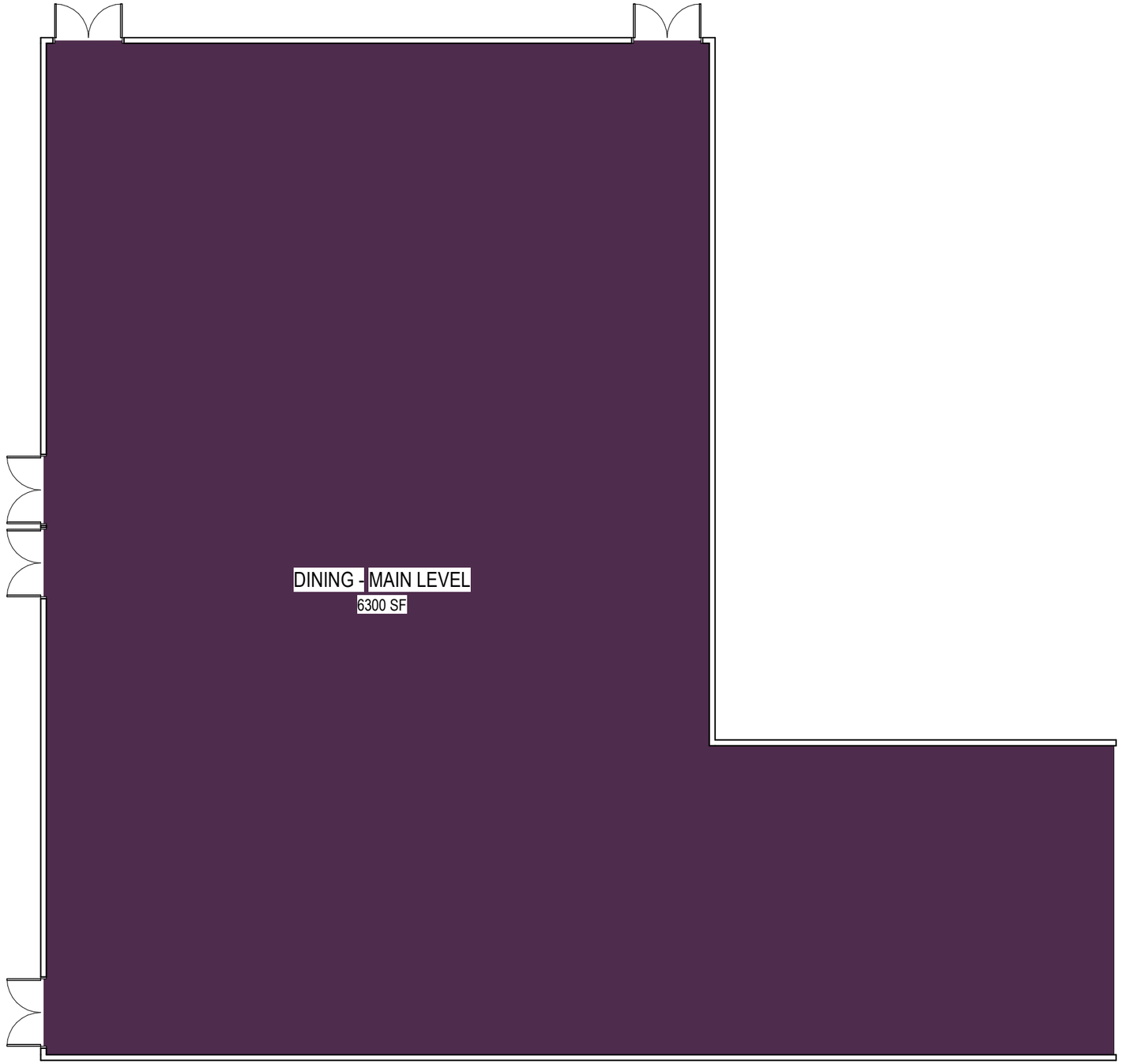
Dessert Area – 300 asf

Description: Self Service Dessert Station.

Adjacencies: Located conveniently for guests to dessert.

Equipment/Requirements:

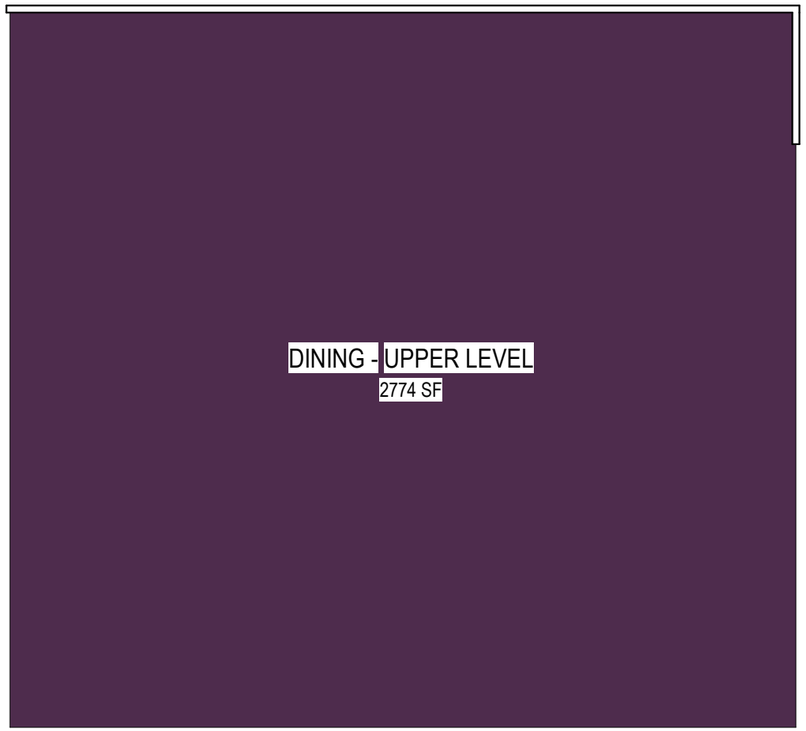
Hot/Cold Shelves
Refrigeration



DINING - MAIN LEVEL

GUIDE PLATE - HDH - DINING

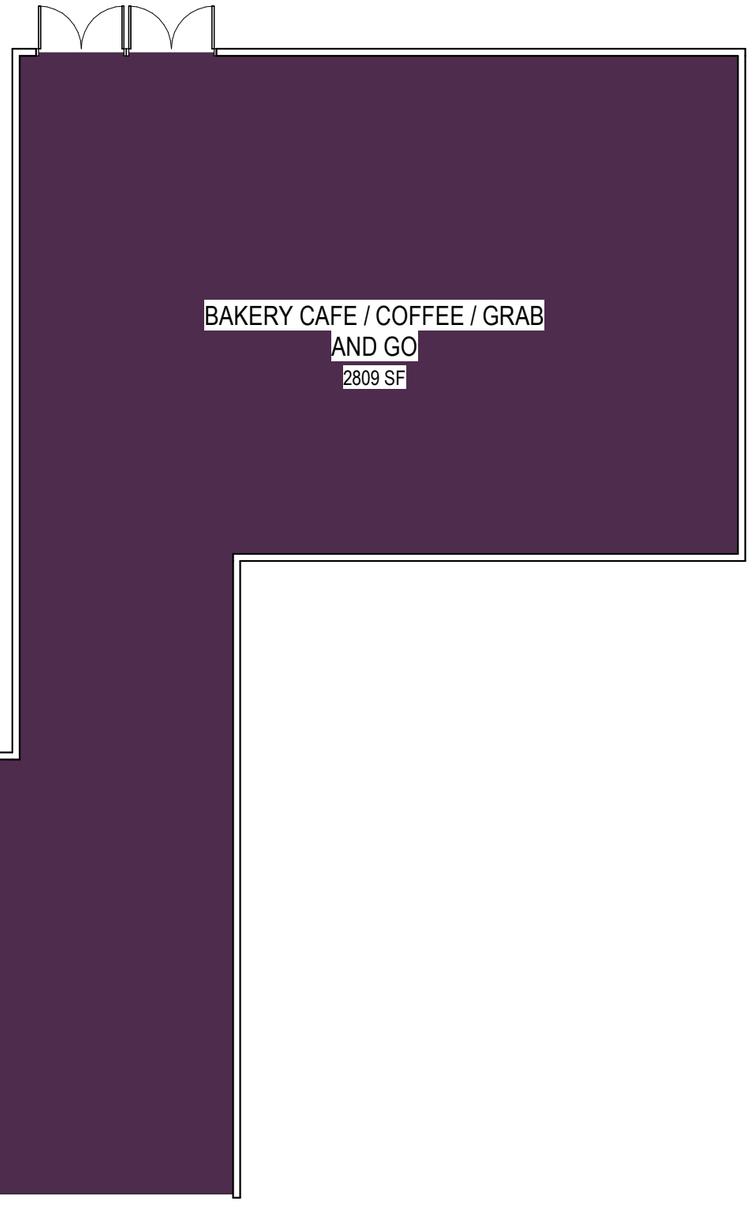
Scale: NTS

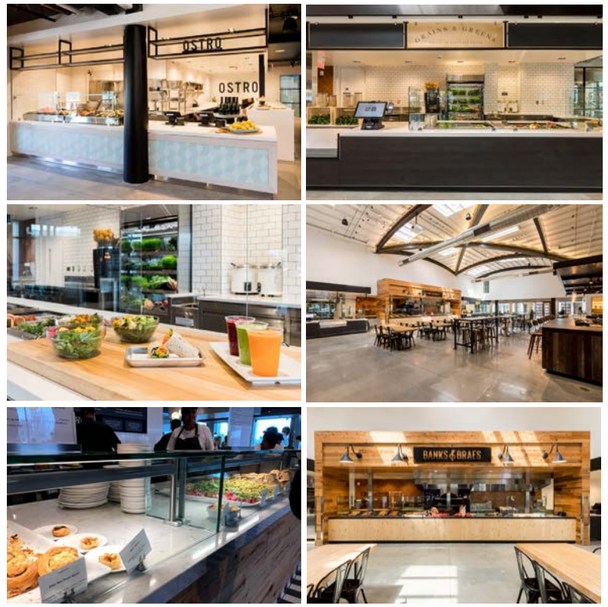


DINING - UPPER LEVEL

GUIDE PLATE - HDH - DINING

Scale: NTS





BAKERY CAFE / COFFEE / GRAB AND GO

GUIDE PLATE - HDH - DINING

Scale: NTS

Narrative:
The concept for the bakery/cafe captures a clean, timeless look and feel with a nod to industrial elements and authentic materials while maintaining a bright, clean, and minimal backdrop to showcase the craft of baking and coffee culture.

Baked goods and coffee products are strong visual components as well as the process of baking and coffee making on display

Bakery/Café - 2800 asf

Back of House

Description: Full service bakery equipped to prepare product for sale locally and around campus. Transparent and connected to the main areas for students, faculty and other guests.

Adjacencies: Attached to front of house retail space. Natural light through work space is desirable.

Equipment / Requirements:

Exhaust Hood System/Demand Control

Deck Oven w/ Loader

Rotating Rack ovens

Donut Fryer w/ Doser and Glazing table

Sheeter

Dough Divider

Dough Rounder

Baker's Table

Proofer/Retarder

Pastry Glazer

Automatic Pastry Injector

Large Mixer

Metering Faucet

Smaller mixers

Walk-in Cooler

Undercounter Refrigeration

Bread Slicer

Large Prep tables

Walk-in Cooler/freezer

Dunnage

Utensil Racks

Storage Shelving

Blast Chiller

Pot machine

Tall Door Type Dishmachine

Clean/Drying table

3-compartment sink - Powersoak or similar

Dish Storage

Plate/Glass rack dollies

Mop sink/cart washdown

Floor Trough

Hand sink

Front of House

Description: Full service espresso bar and bakery store front. Transparent and connected to the main areas for students, faculty and other guests.

Adjacencies: Attached to bakery production space with transparency to bakery work areas.

Equipment/Requirements:

Espresso Machines

Espresso Grinders

Drip Coffee Grinders

Drip coffee Brewers

Hot Water Dispenser for pour over

Pour-over Station w/trough and scales

Under counter refrigeration

Grab and go (Ambient)

Grab and go (Cold)

Turbochef

Merchandising Cases

Bread Display

Condiment Station

Refrigeration

Cart Stock

Hot holding

Plate/utensil storage

Internal utensil bussing

Dry storage

Hand washing

Stainless Steel Cabinet Base against G.C. Die wall

Hot/Cold Shelves

Order/Pickup window

Breath Guards with Light and Heat Lamps

Plate Storage

Offices/Changing – 500 asf

Description: Management office to accommodate kitchen operations staff. Changing room desirable in this areas.

Adjacencies: Near staff arrival areas, office partial windows for transparency to see kitchen servery areas depending on placement.

Equipment/Requirements:

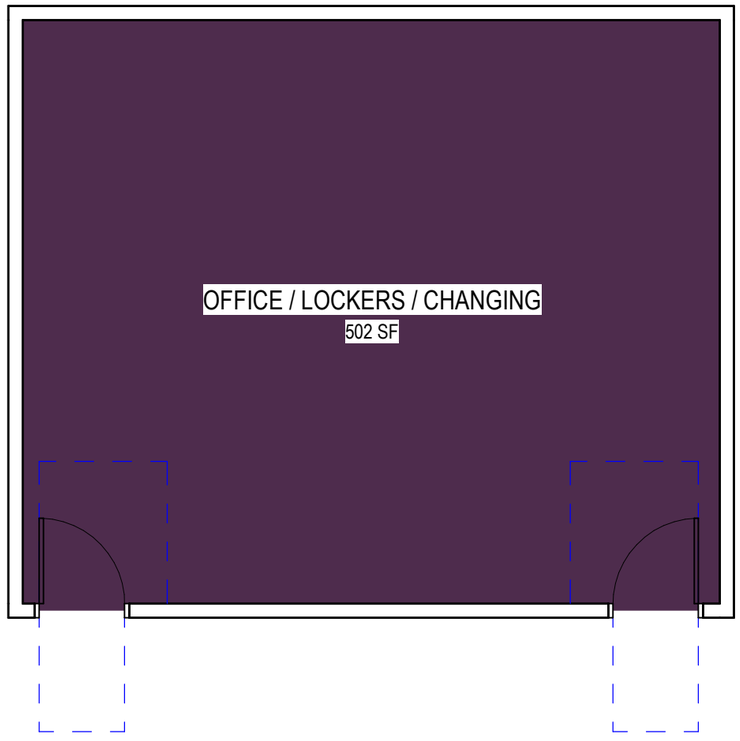
Office

Time clock

Changing room

Lockers

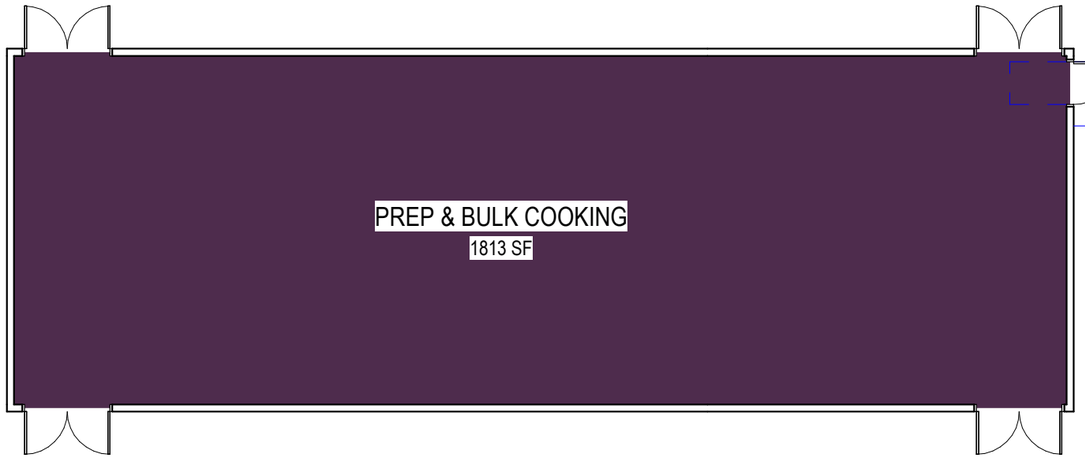
Uniform management



OFFICE / LOCKERS / CHANGING

GUIDE PLATE - HDH - DINING

Scale: NTS



Preparation Area and Bulk Cooking – 1,600 asf

Description: Area to accommodate sanitation of products and preparation for cooking and serving needs as well as primary cooking to support dining program.

Adjacencies: Ideally located between preparation areas and front of house servery. Possible integration with servery grill or other cooking concepts for labor efficiency. Adjacencies to allow stocking of servery concept stations. Natural light through work space is desirable.

Equipment/Requirements:

Work Tables
Tables w/sinks
Dry storage
Hot/Cold holding
Cold holding counters
Mixers
Food Processors/Slicers
Veg. wash system/dryer
Cart stock
Walk-in Refrigerator - Prepped food
Hand washing
Buffalo Chopper
Knife Storage
Exhaust Hood System/Demand Control
Tilt Kettles/Skillets
Pressure skillet
Convection Ovens
Combi Ovens (Rational)
Stock pot range w/ Pot filler faucet
Range/Flat top/Charbroiler
Blast Chiller (Cabinet Size)
Chef tables w/ sinks
Heated cabinets
Undercounter refrigeration
Utensil Racks and Shelving
Floor Troughs
Hand Washing

PREP AND BULK COOKING
GUIDE PLATE - HDH - DINING
Scale: NTS

Catering Support Pantry – 355 asf

Description: Accommodate Equipment and Supplies to Support Catering Functions

Adjacencies: Located between, in proximity of bulk storage areas and bulk cooking stations with some access to servery for restocking of servery concept stations. Natural light through work space is desirable.

Equipment/Requirements:

Shelving

CATERING SUPPORT PANTRY
GUIDE PLATE - HDH - DINING
Scale: 3/16" = 1'-0"

Warewashing – 1000 asf

Description:

Combined dish room for guest utensils and pot room for main back of house ware washing. Ensure Adequate Ventilation.

Adjacencies:

Conveniently placed for guest drop off at accumulator window. Adjacent to back of house main cooking and preparation areas.

Equipment/Requirements:

Accumulator or Conveyor w/ scrapping table

Conveyor Dish Machine W/ dryer

Clean/Drying table

3-compartment sink - Powersoak or similar

Dish Storage

Plate/Glass rack dollies

Mop sink/cart washdown

Floor Trough (Multiple)

Hand sink

WAREWASHING / UTENSIL STORAGE
GUIDE PLATE - HDH - DINING
Scale: NTS

ADDITIONAL SPACES

Receiving – 400 asf

Description: Area for receiving products prior to distribution to kitchen storage and use areas.

Adjacencies: Near receiving elevators or dock as applicable.

Equipment/Requirements:

Receiving scale

Desk

Dry Storage(High Density where applicable)

Transport carts(Mobile Dollies/Dunnage Rack)

Oil reclamation tank w/ Oil Caddy or delivery system

Storage – 1500 asf

Description: General Cold and Dry Storage areas.

Adjacencies: Conveniently located to Receiving areas and to Preparation areas. May be split to accommodate bulk and prepared items separately and in accordance with flow of the work spaces.

Equipment/Requirements:

Remote Refrigeration System

Walk-in refrigerated complexes w/ monitoring

Dry Storage

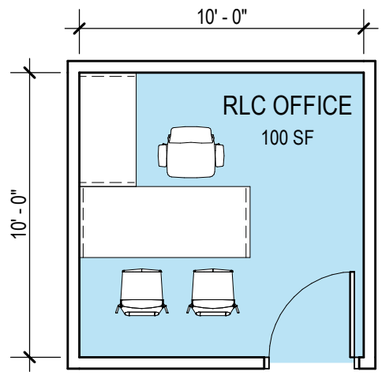
Storage shelving

Cart stock

Ice Machines/Transport System

3.6.3 HOUSING PROGRAM

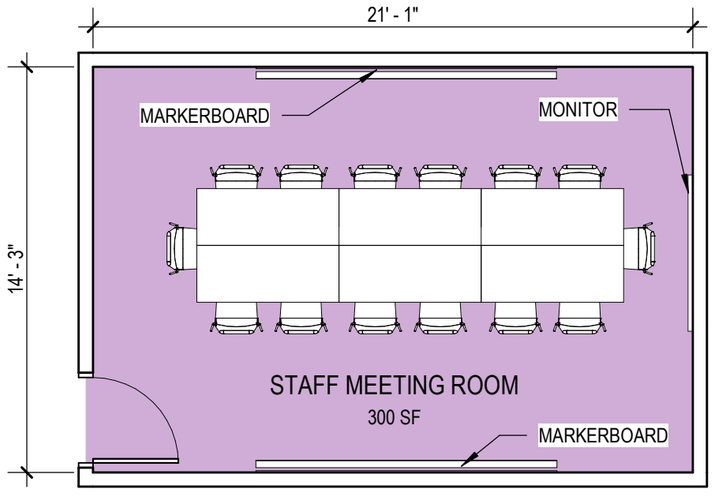
- RLC Office
- Staff Meeting Room
- Multipurpose Activity Room
- Medium Meeting / Study Room
- Student Lounge
- Laundry
- Mailroom
- Reception
- Single
- Double
- Double Ensuite
- RA Room
- RLC Apartment



RLC OFFICE

GUIDE PLATE - HDH - HOUSING

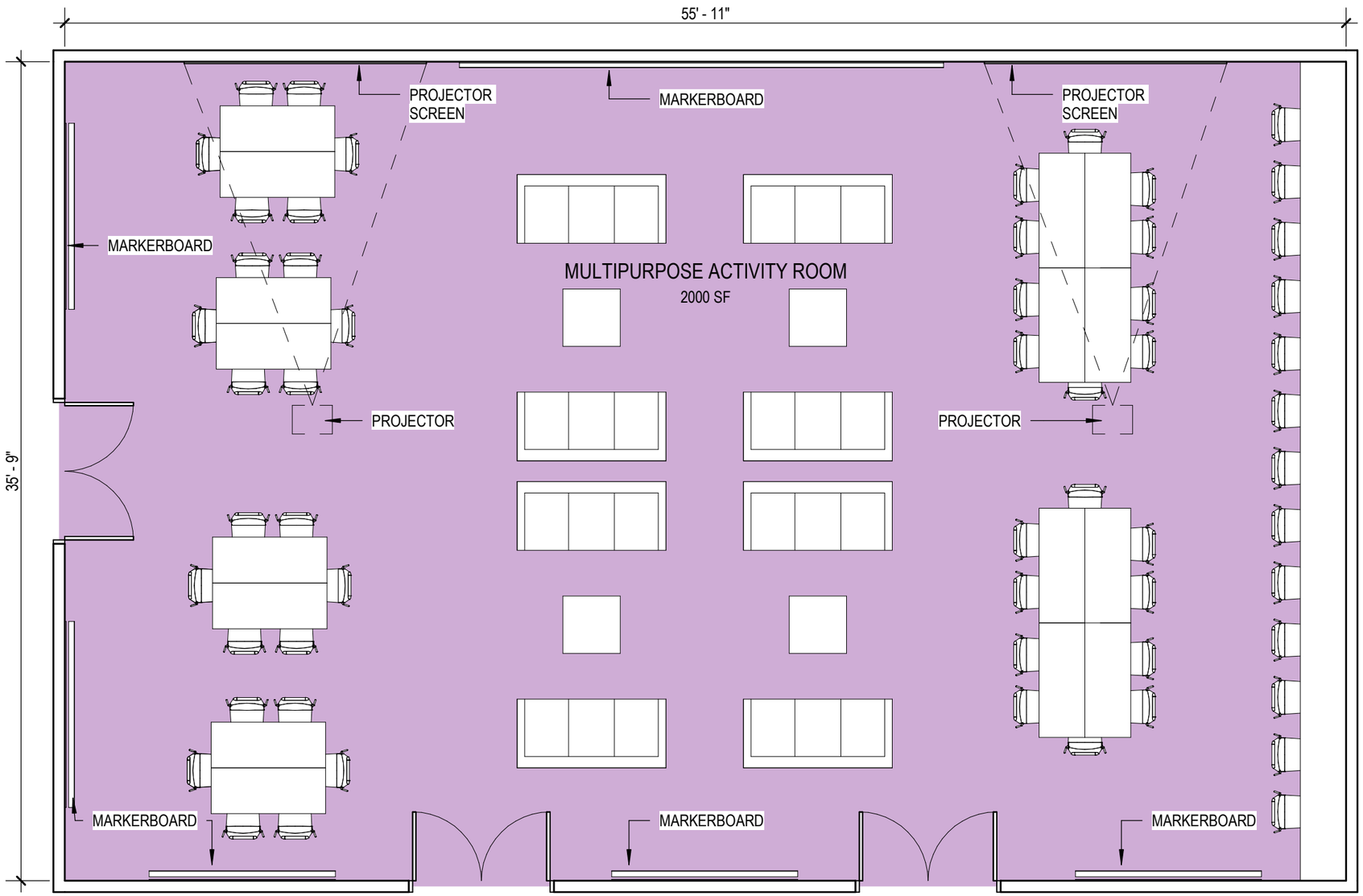
Scale: 3/16" = 1'-0"



STAFF MEETING ROOM

GUIDE PLATE - HDH - HOUSING

Scale: 3/16" = 1'-0"



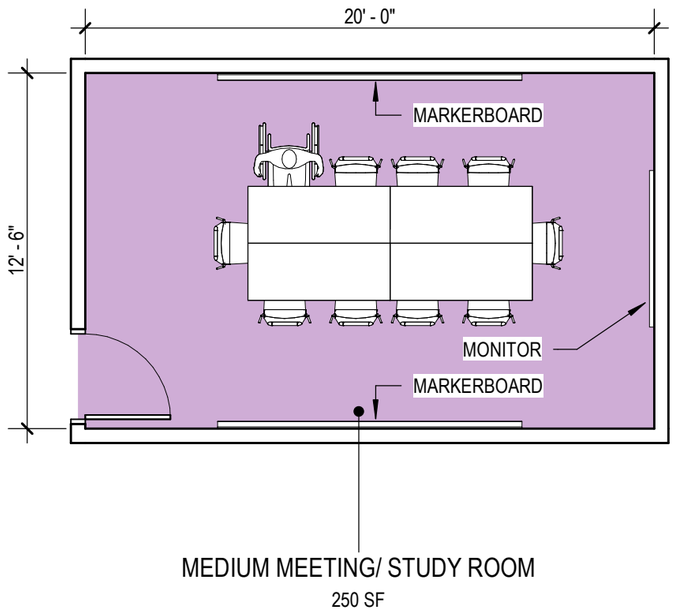
MULTIPURPOSE ACTIVITY ROOM
GUIDE PLATE - HDH - HOUSING

Scale: 3/16" = 1'-0"

MEDIUM MEETING/ STUDY ROOM

GUIDE PLATE - HDH - HOUSING

Scale: 3/16" = 1'-0"

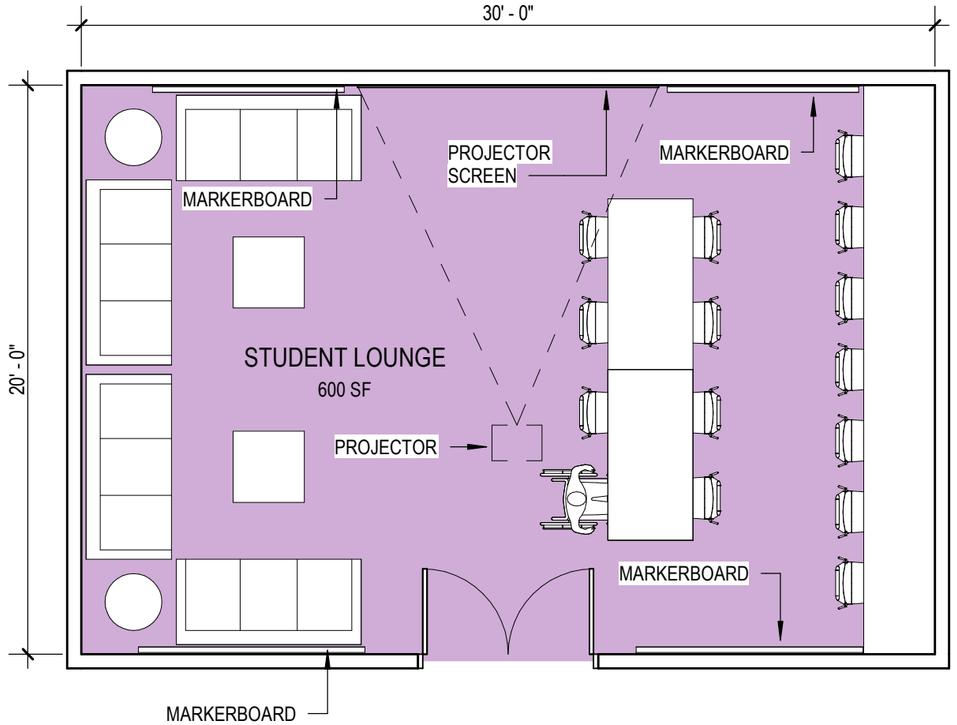


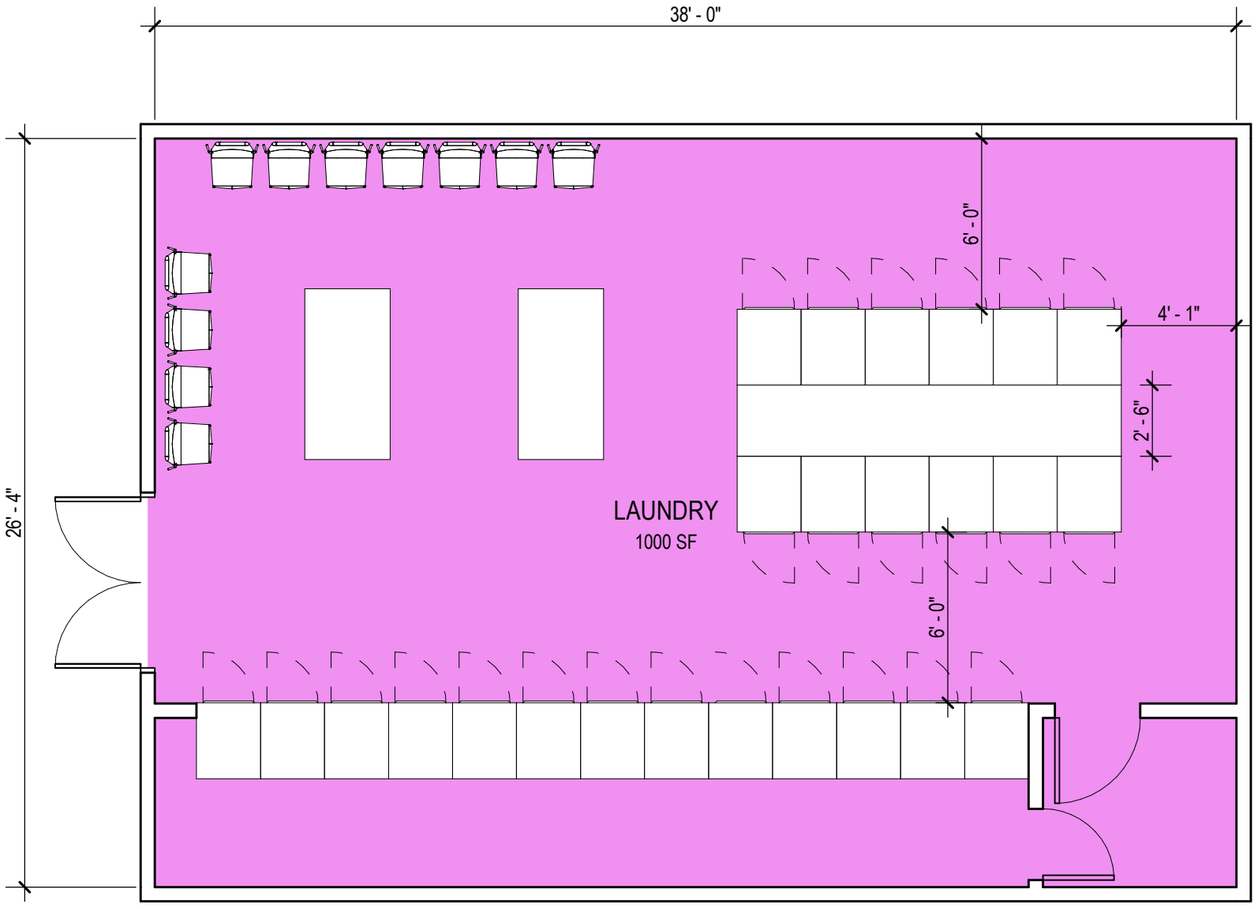
MEDIUM MEETING/ STUDY ROOM
250 SF

STUDENT LOUNGE

GUIDE PLATE - HDH - HOUSING

Scale: 3/16" = 1'-0"





LAUNDRY

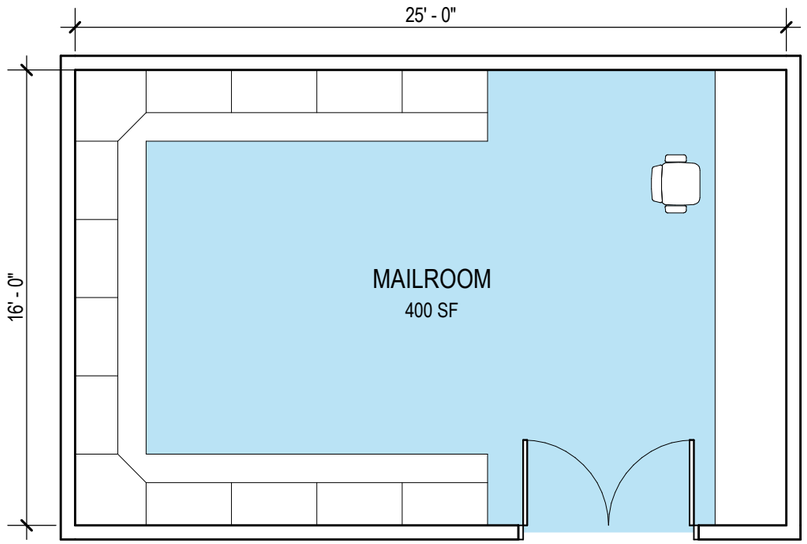
GUIDE PLATE - HDH - HOUSING

Scale: 3/16" = 1'-0"

MAILROOM

GUIDE PLATE - HDH - HOUSING

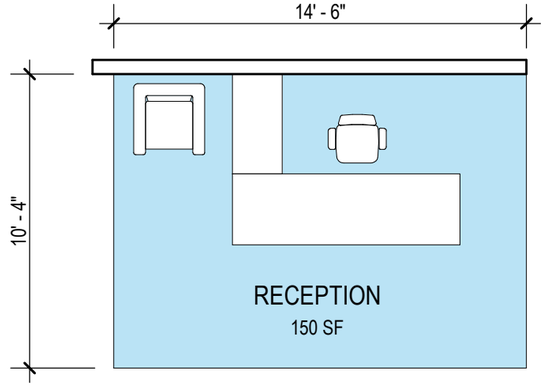
Scale: 3/16" = 1'-0"

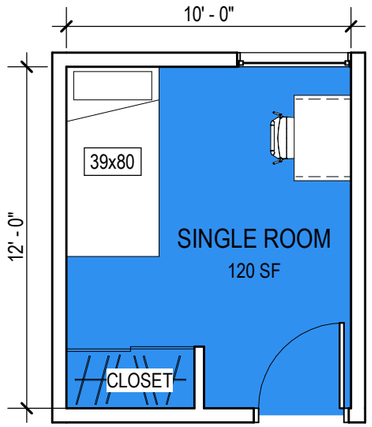


RECEPTION

GUIDE PLATE - HDH - HOUSING

Scale: 3/16" = 1'-0"

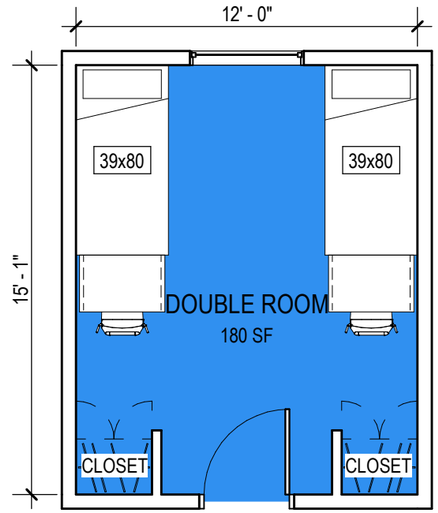




SINGLE

GUIDE PLATE - HDH - HOUSING

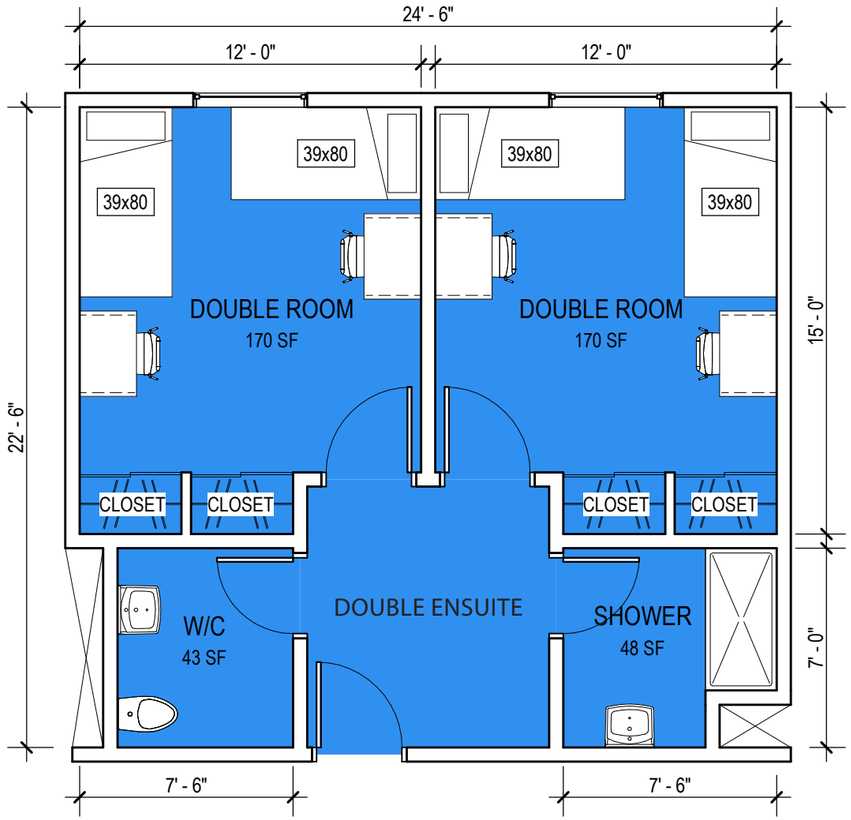
Scale: 3/16" = 1'-0"



DOUBLE

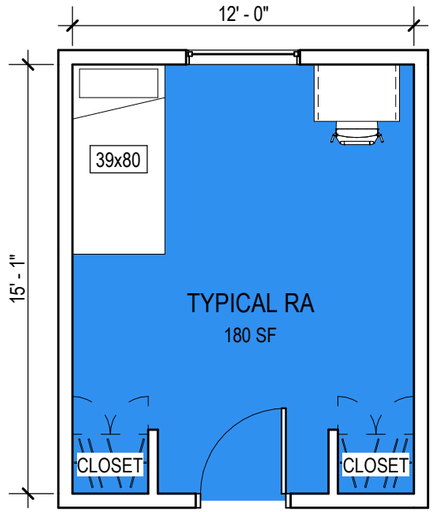
GUIDE PLATE - HDH - HOUSING

Scale: 3/16" = 1'-0"



DOUBLE ENSUITE
GUIDE PLATE - HDH - HOUSING
Scale: 3/16" = 1'-0"

ASF: 550 SF

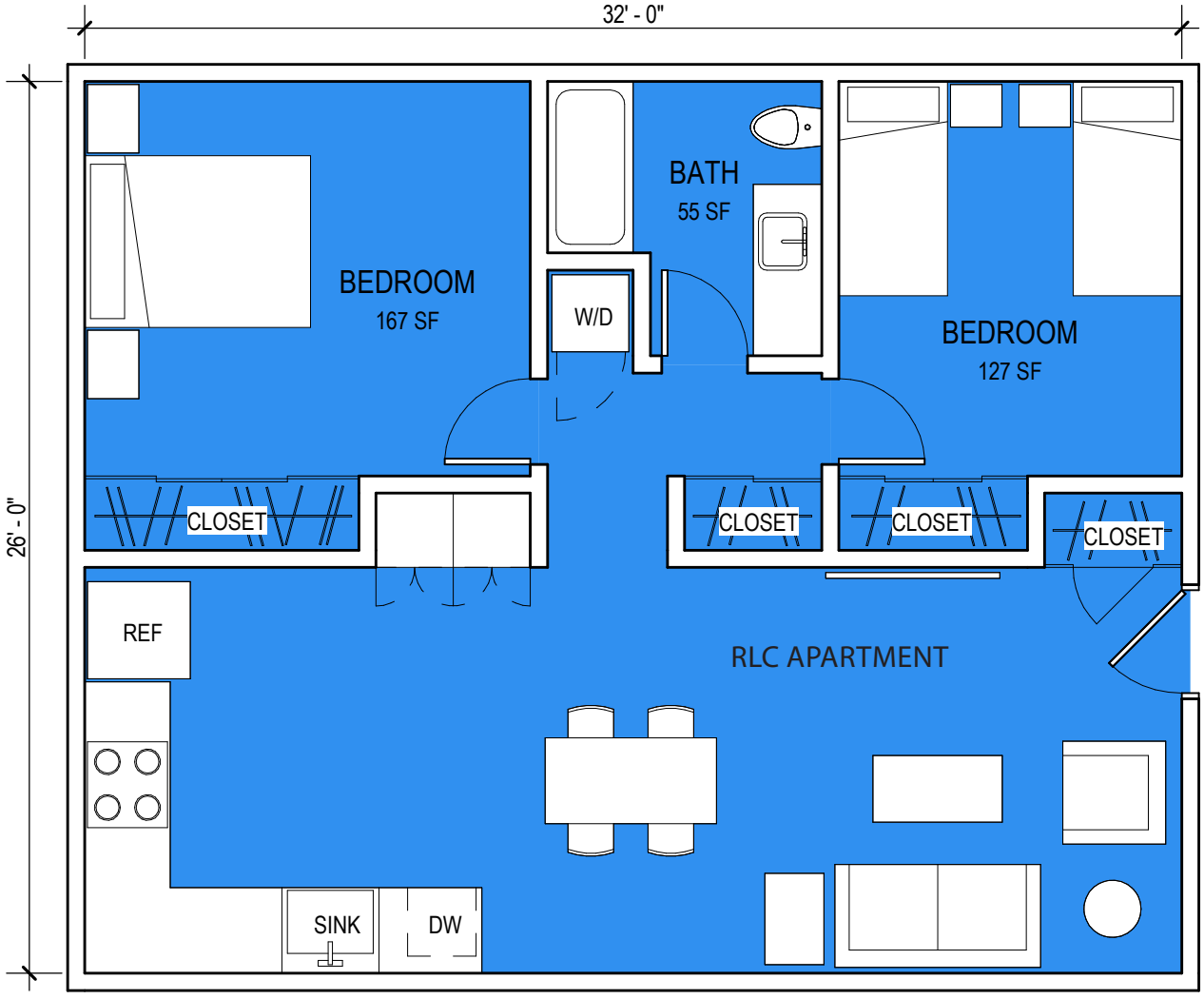


RA ROOM
GUIDE PLATE - HDH - HOUSING
Scale: 3/16" = 1'-0"

RLC APARTMENT

GUIDE PLATE - HDH - HOUSING

Scale: 3/16" = 1'-0"



ASF: 795 SF


HUMBOLDT AMBASSADORS

04

SITE CONTEXT AND CONCEPT TEST FITS

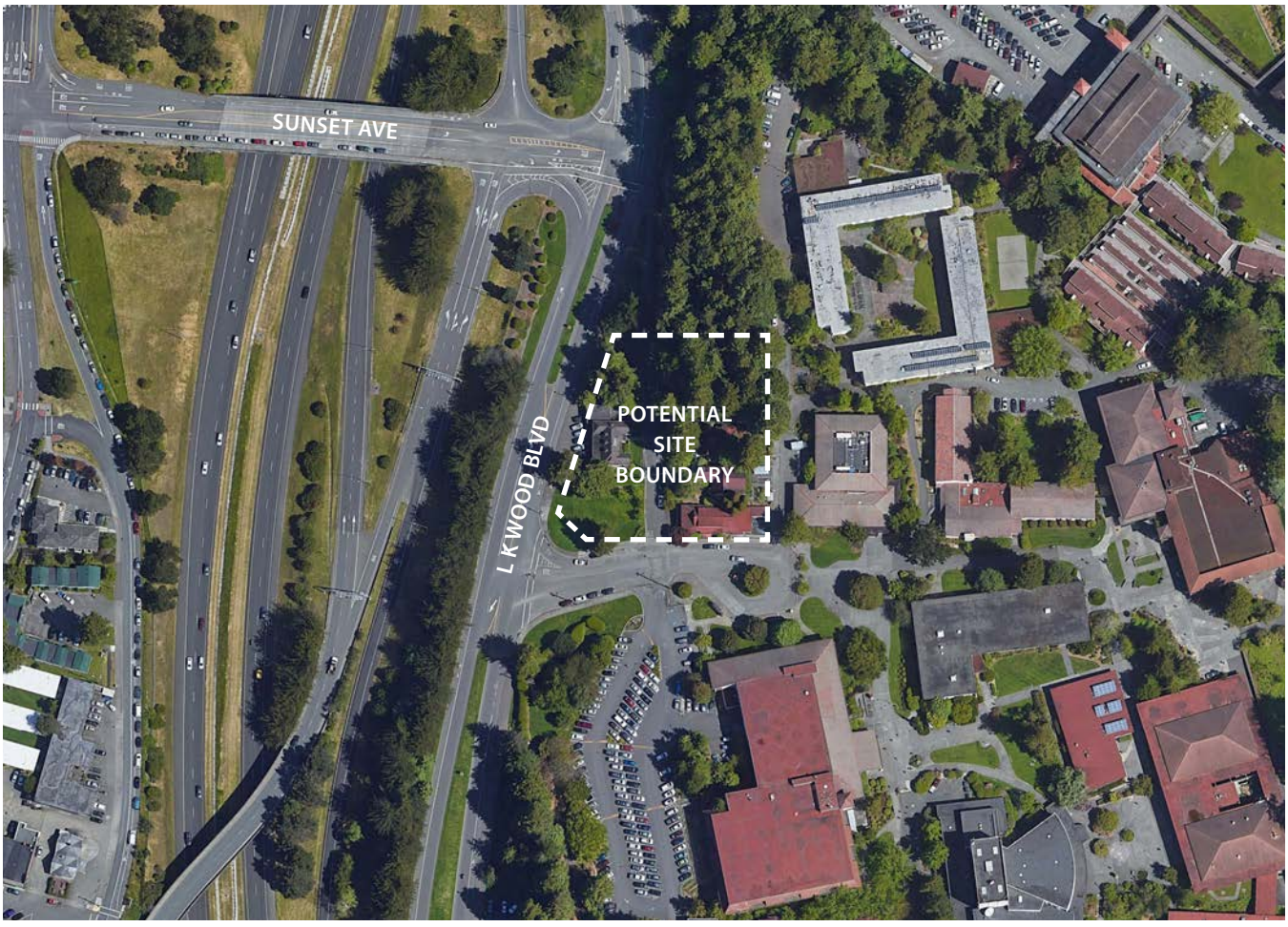
4.1 SITE ANALYSIS

4.1.1 SITE LOCATION AND CONTEXT

The site for the mixed-programmed Health, Dining and Housing Building sits at a gateway to campus from the west, adjacent to the busy Redwood Highway. This topographically complex site represents a highly utilized access point to the heart of the Cal Poly Humboldt campus with pedestrian access from downtown Arcata across Sunset Avenue and vehicular access from L. K. Wood Boulevard on Plaza Avenue. It is bounded by L. K. Wood Boulevard on the west, Sunset Circle on the east, and Plaza Avenue and Library Circle to the south (Figure 4.1.1). The existing Health Center sites adjacent across Sunset Court. Directly across Library Circle is the Cal Poly Humboldt main campus Library. Mill Street, a small dead-ended access road off of Plaza Avenue, currently bifurcates the project site.

The Diagram below highlights the potential site boundary for the Health, Dining and Housing Building.

Figure 4.1.1.1 - Campus Events Field Site Aerial Photo

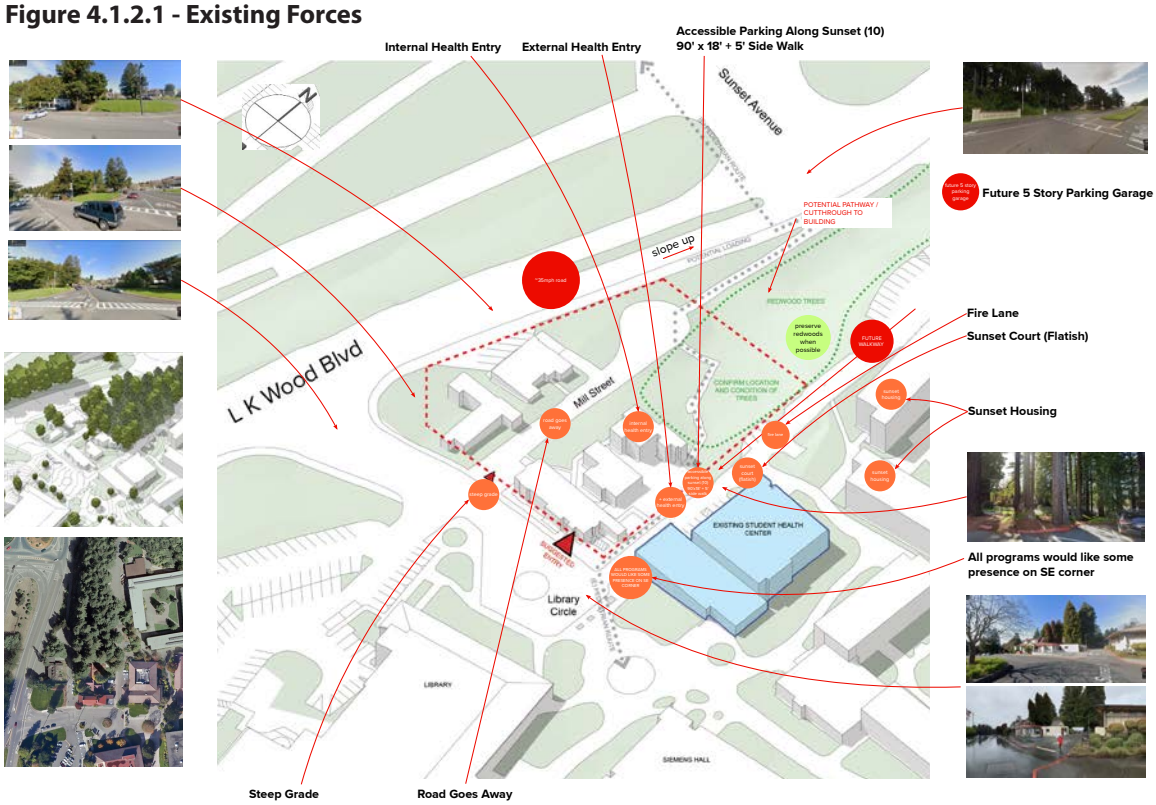


4.1.2 SITE OBSERVATIONS

The southern portion of the Health, Dining and Housing Building project site is currently occupied by several residential buildings converted for campus use including the Feuerwerker House, Brero House, Hagopian House and the Little Apartments building. The dead-end Mill Street off of Plaza Avenue sits adjacent to the houses. The northern portion of the Health, Dining and Housing Building site is partially occupied by mature redwood trees. A highly utilized pedestrian access stair meanders through the redwoods, providing access from L. K. Wood Boulevard at the lowest edge of the project site up to Sunset Court, the highest edge of the project site. The suggested main project entry should be at or near the southeast corner of the site at Library Circle. Additional building access points can and should occur in locations that coordinate with the three main program locations in the building complex (Housing, Dining & Health).

Dining and the associated Bakery/Café space, along with the Health program areas, should be located in a way that give them a visible and prominent role at Library Circle. This desired adjacency will help to animate and activate the Library Circle campus gateway. Mill Street can be retained or removed as needed for the new project massing. While the existing meandering staircase through the redwoods can be removed, it should be replaced in some form as part of the new project to retain this important pedestrian access route. While it is understood that some of the site's redwoods will be lost due to the size of the project, an effort to retain as many as possible should be followed. Sunset Court may need to be adjusted to assure proper pedestrian, vehicular, fire truck and ambulance access as needed. It is understood that a reconfiguration of the intersection of Sunset Avenue at L. K. Wood Boulevard is planned. The new project should plan for these adjustments and coordinate project loading and access solutions accordingly.

Figure 4.1.2.1 - Existing Forces



4.1.3 CLIMATE FACTORS

The temperature in Arcata is mild with highs in the upper 60s in the summer and lows in the winter in the lower 40s. Typically, the change in temperature over a given day is 15 degrees. The summer is mostly clear of clouds, but in the winter, the sky is cloudy up to 67% of the time. Rain is frequent in Arcata in the fall, winter, and spring. Arcata gets 46 inches of rain on average per year; the US average is 38 inches. The rain reaches a peak in December with an average of 15 days of rain in the month and a volume of 9 inches.

Figure 4.1.3.1 Historical Diurnal Temperature Range, Arcata, CA

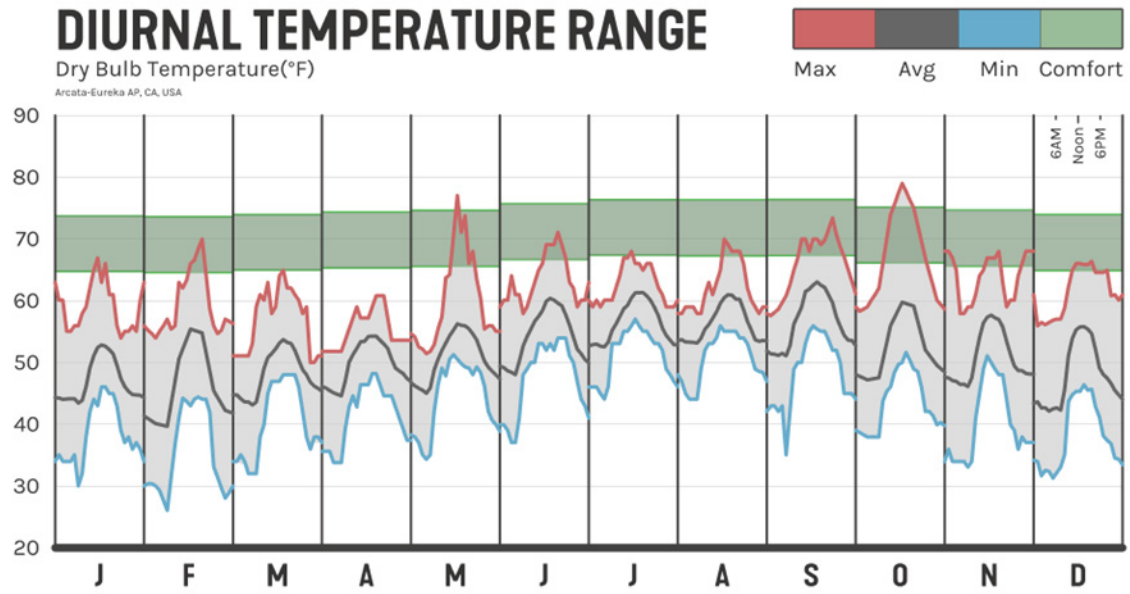
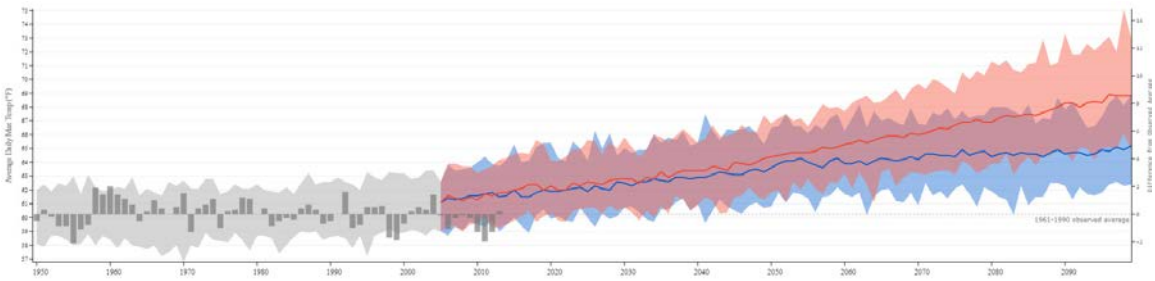


Figure 4.1.3.2 Anticipated Future Temperature Ranges
Under a high and low Global Emissions Model for Arcata, CA



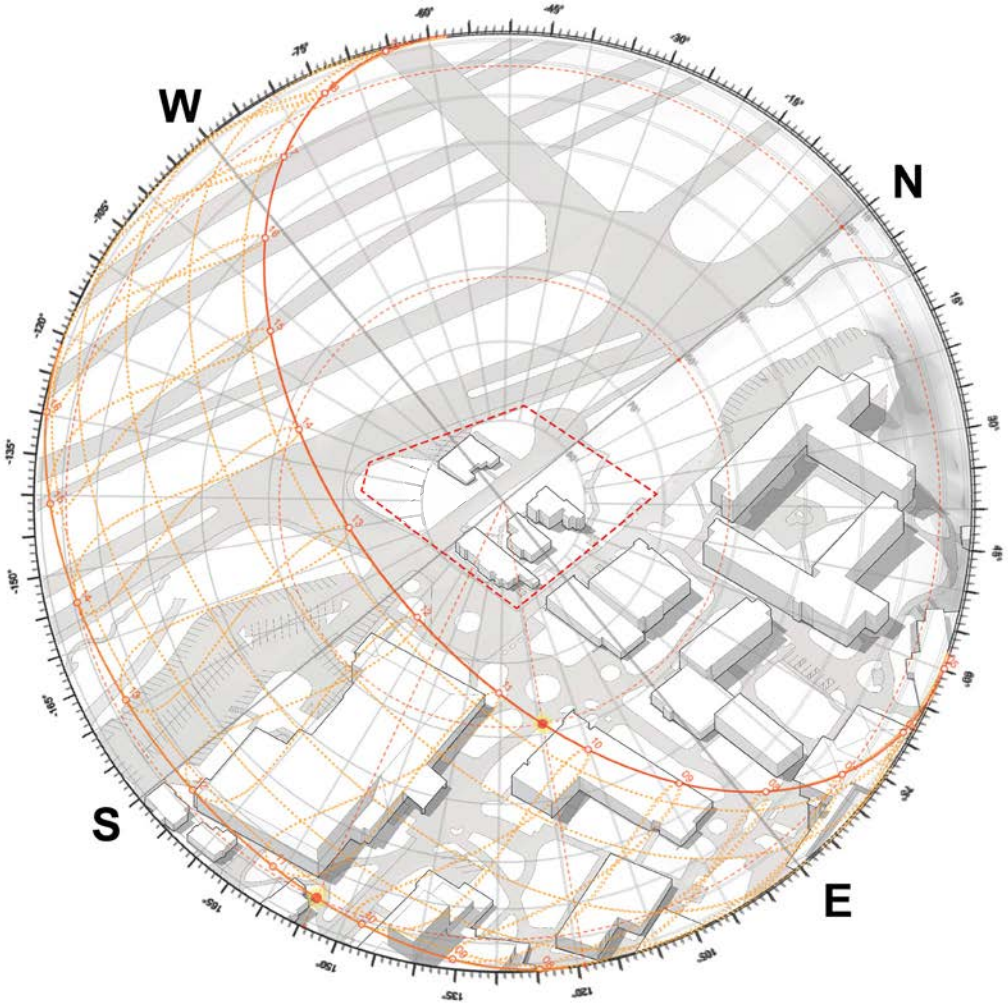
(This page intentionally left blank)

4.1.4 SITE SOLAR CONDITIONS

As shown in the solar diagram (Figure 4.1.4.1), the project site receives most of its sunlight from the south-southwest, along the parking lot access road to Library Circle, and L K Wood Boulevard. Given the current open condition character of the site and low percentage of tree coverage, the site receives a generous amount of sunlight from all sides. During the summer and winter months, early morning and late afternoon sun will reach all portions of the site. The current site has a few mature trees located toward the west, and a larger number to the north. Depending on how many of the existing trees located to the west of the site are retained, portions of the open areas of the site to the north and east will receive less direct sun for brief time spans throughout the day.

https://weatherspark.com/y/310/Average-Weather-in-Arcata-California-United-States-Year-Round#Sections-Sun

Figure 4.1.4.1 - Solar Diagram - Summer and Winter Solstice

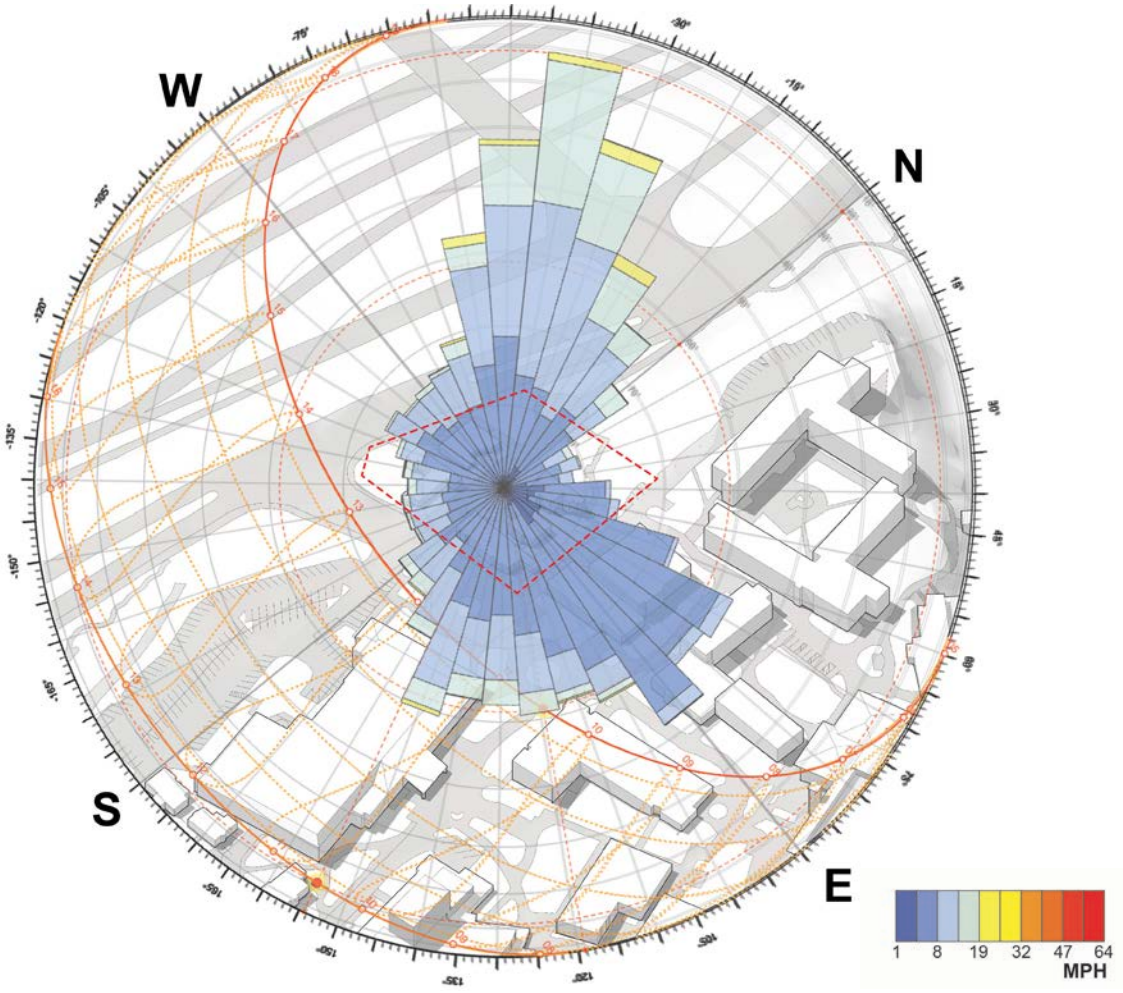


4.1.5 SITE WIND CONDITIONS

The wind analysis diagram (Figure 4.1.5.1) shows that the prevailing winds during both the summer and winter months are out of either the northwest or southeast. The large cluster of trees to the northern portion of the site—and the alley of trees running parallel to L K Wood Boulevard located across from the site to the west — will mitigate the amount of wind that the sloped topography of the site will receive. This large tree cluster to the north and the alley of trees to the west, create wind breaks, sheltering the site from the prevalent north-westerly winds.

https://weatherspark.com/y/310/Average-Weather-in-Arcata-California-United-States-Year-Round#Sections-Wind

Figure 4.1.5.1 - Annual Wind Diagram



4.1.6 SITE CONTEXT

The academic context surrounding the site is varied both in terms of program and character. The complex site topographically is one of the main site characteristics effecting access, views and building-to-building relationships.

Figure 4.1.6.1 - Surrounding Context

13 Feuerwerker House
91 Hagopian House
93 Brero House
71 Little Apartments
61 The Hill - Sunset Hall
60 The Hill - Redwood Hall
42 Student Health & Counseling
46 Nelson Hall West
14 Nelson Hall East
41 Library
1 Siemens Hall
27 Student Activity Center
56 Hadley House
55 Balabanis House
54 Telonicher House
10 Theatre Arts
8A Music A
8B Music B

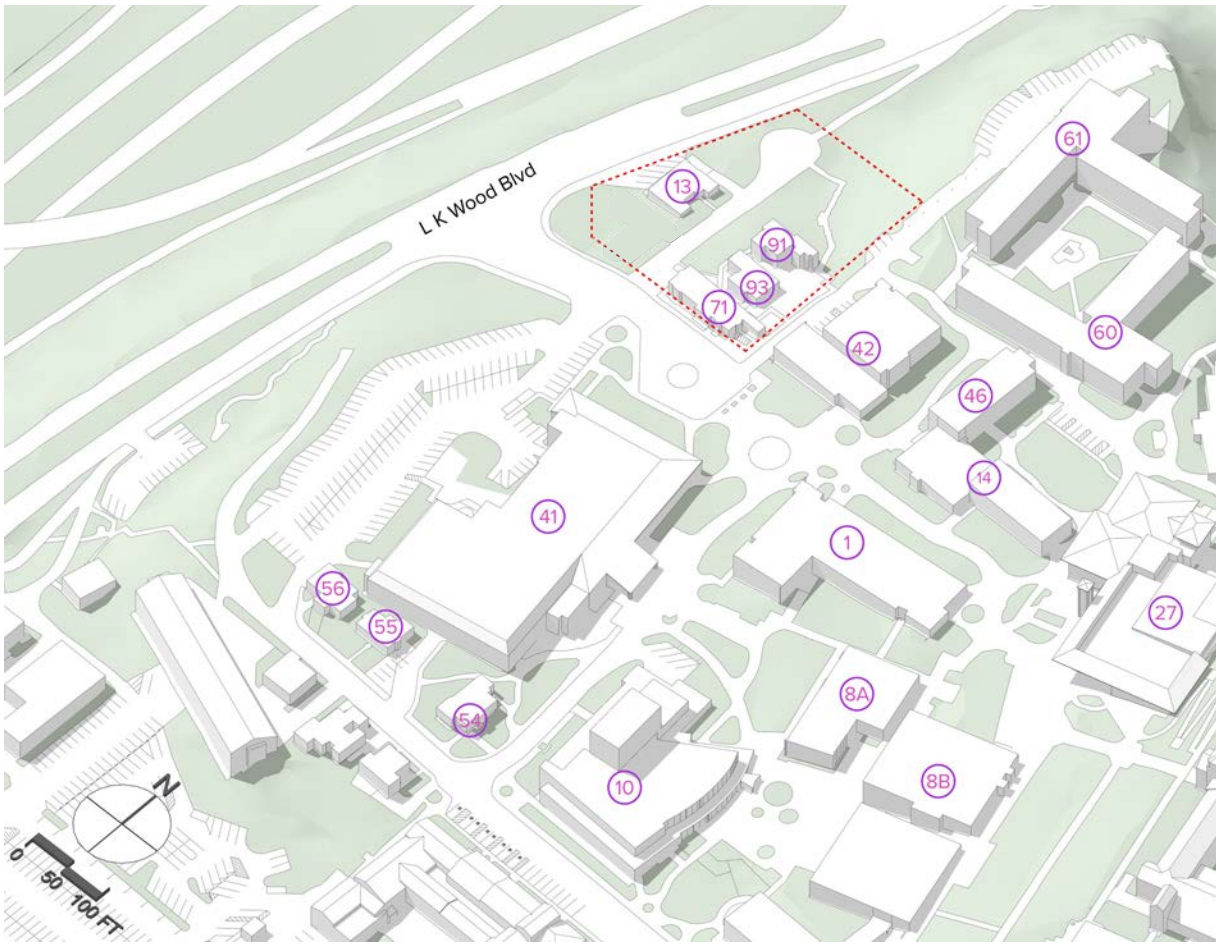


Figure 4.1.6.2 - Surrounding Context

13 Feuerwerker House

91 Hagopian House

93 Brero House

71 Little Apartments

61 The Hill - Sunset Hall

60 The Hill - Redwood Hall

42 Student Health & Counseling

46 Nelson Hall West

14 Nelson Hall East

41 Library

1 Siemens Hall

27 Student Activity Center

56 Hadley House

55 Balabanis House

54 Telonicher House

10 Theatre Arts

8A Music A

8B Music B

4.1.7 SITE TOPOGRAPHY

The topography of the site is a sloped area that rises from the northwest corner of the site to the southeast corner, and which contains a variety of mature tree species located to the north of the site, and across L K Wood Boulevard to the west. There is a 45-foot differential in grade change across the site, that rises from the northwest corner of the site to the southeast corner.

https://weatherspark.com/y/310/Average-Weather-in-Arcata-California-United-States-Year-Round#Sections-Topography

Figure 4.1.7.1 - Site Sections

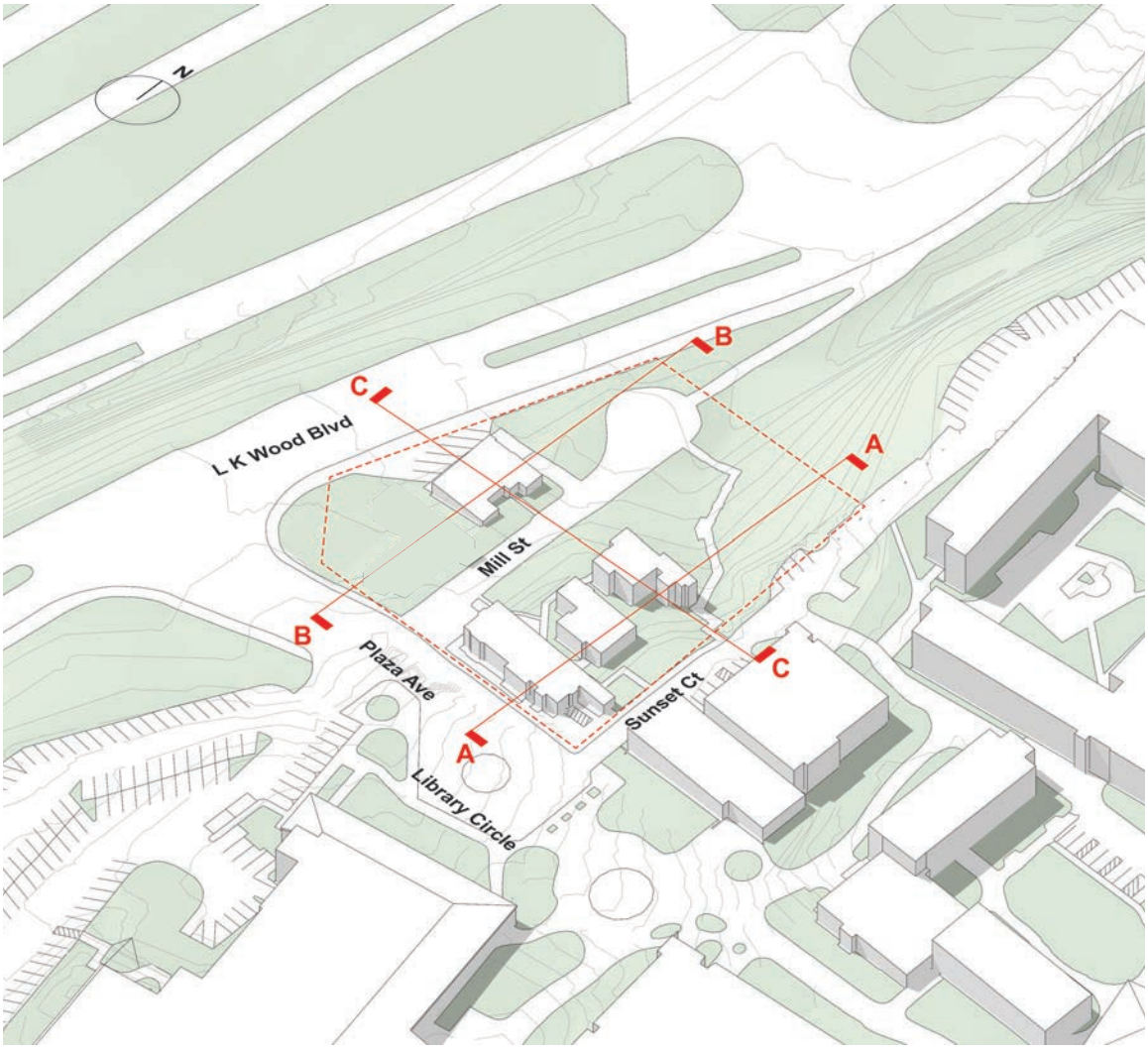


Figure 4.1.7.2 - Site Section A - A (North - South)

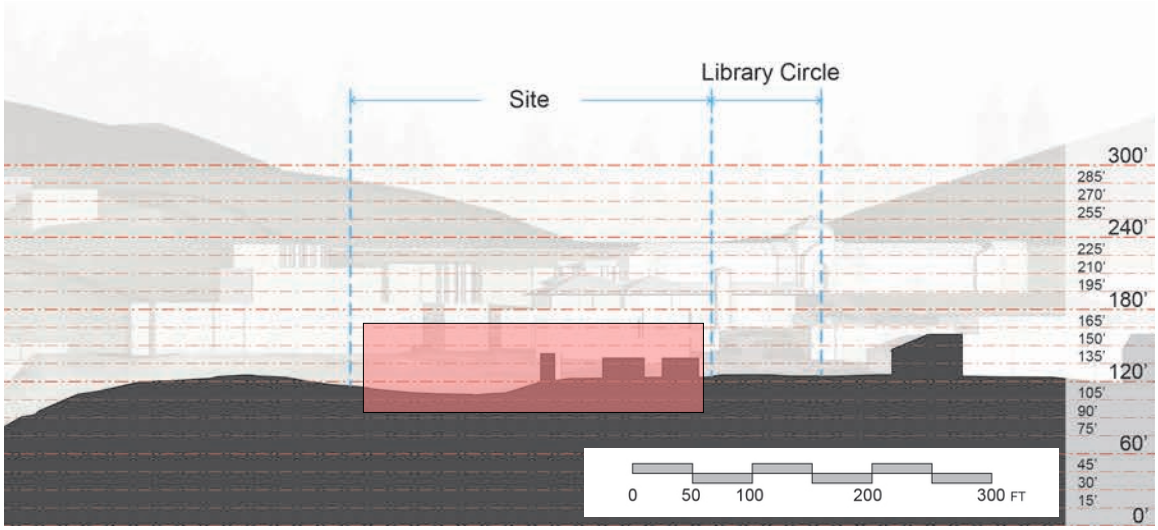


Figure 4.1.7.3 - Site Section B - B (North - South)

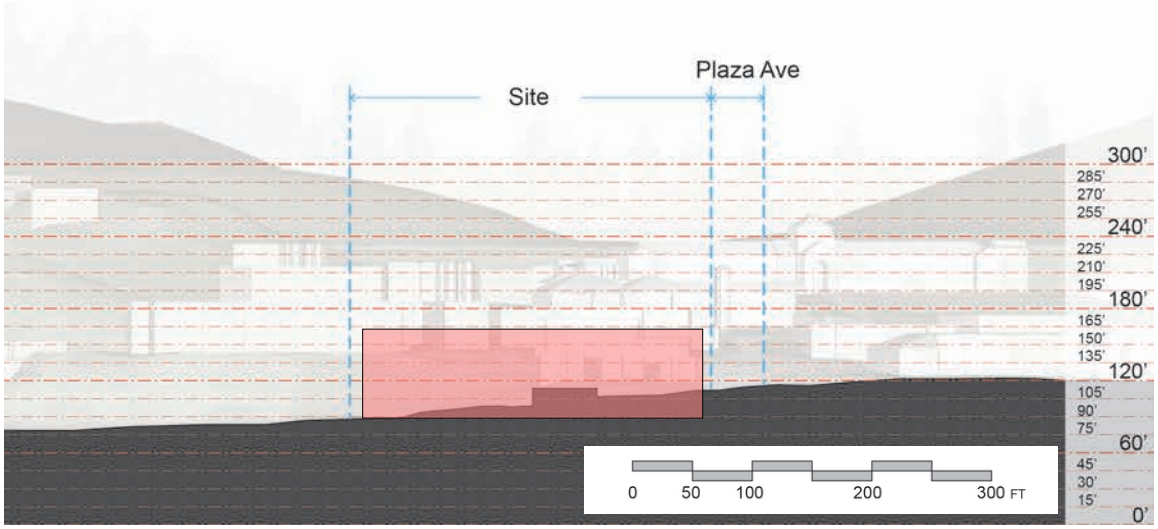
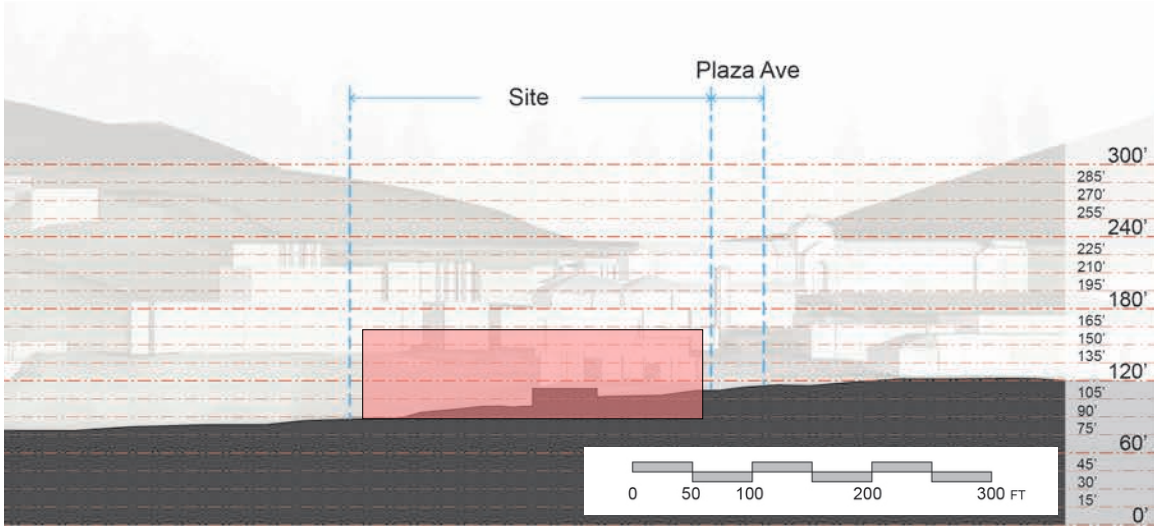


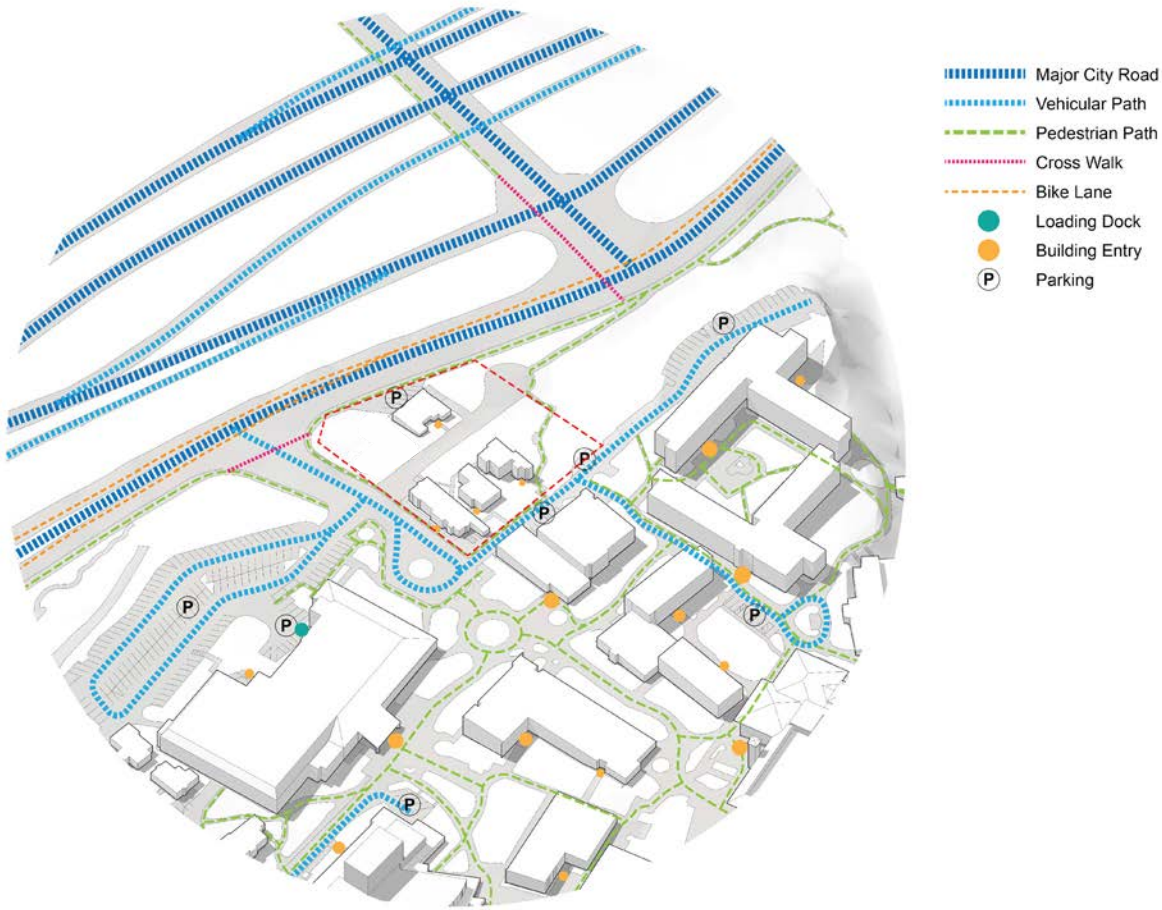
Figure 4.1.7.4 - Site Section C - C (East - West)



4.1.8 SITE CIRCULATION

The location of the site is near the northwest portion of the main campus. The site sits at a main gateway to campus well served by a variety of transportation modes. The varied topography does affect some site access, especially for pedestrians and larger trucks. As shown in the Site Circulation Diagram (Figure 4.1.8.1), the site is located at the edge of the busy L K Wood Boulevard and the adjacent Redwood highway. Pedestrians are able to cross both precariously where they intersect Sunset Avenue. A highly utilizes pedestrian stair meanders through the norther part of the site. This stair will need to be replaced in a new configuration as part of the site development. Main vehicular access comes from Plaza Avenue, leading to Library Circle. Sunset Court extends off of Library Circle, allowing access to the norther part of the site as well as the adjacent campus buildings in the area. This roadway may need enhancements/adjustments to accommodate required access, loading, accessible parking and fire truck access.

Figure 4.1.8.1 - Site Circulation Diagram



4.1.9 SITE OPEN SPACE

The site includes a large area of open space populated with mature redwood trees. Some of this will need to be cleared to provide space for the new structure. The adjacent Library Circle is currently surrounded by smaller outdoor spaces associated with the nearby campus buildings. The southern edge of the site should be developed to create additional inviting/pedestrian-friendly open space that ties to the new building. The building should also embrace the remaining northern sloped open space and celebrate the existing redwood trees with the new reconfigured pedestrian access stair. The project configuration may also create internalized open spaces in the form of plazas or courtyards. All open spaces created or developed with the project should keep in mind the local climate and the need for direct solar access to make them successful and populated.

Figure 4.1.9.1 - Open Space Connection Diagram

4.1.10 RESILIENCY & SUSTAINABILITY

The projects will be designed with the following site sustainability metrics in consideration:

- LEED v4.1 New Construction - Gold
- AASHE – STARS- Gold (Sustainability Tracking, Assessment and Rating System)

The project team shall review best practice sustainable goals include a project that will be evaluated with the project budget for implementation. Areas for consideration include:

- Designed to maximize natural lighting and passive solar heating
- Zero net energy/all-electric
- Rainwater catchment
- Greywater treatment
- Rain gardens to capture run-off
- Living wall
- Solar array on roof

4.1.11 SITE PREPARATION

4.1.11.1 SITE IMPROVEMENTS

Preparation of the site for the Health-Dining-Housing Building and associated site improvements within the project area will require building demolition of 4 wood framed structures as well as Mill Street and accompanying utilities. Although the building's design takes the existing slope into consideration, there is expected to be excavation to allow for the new design and to open the site to the west along LK Wood. These improvements include outdoor plaza areas, bike parking and minor service/loading areas. Existing streetscape improvements along LK Wood, Plaza Avenue, and Sunset Court may include the sidewalk, possible minor retaining walls pending final design, and the street lights.

A new stair path is expected to join LK Wood to Sunset Court on the north side of the building.

Consideration should be given to meet the local fire department dead-end and turning requirements that may be required. It is encouraged that the Design Team engage with local fire authorities early in design.

More information on site demolition can be found in the Section 5 Civil narrative.

4.1.11.2 SITE UTILITIES

The existing project site contains relatively few existing utilities. The normal power to the building will be served from an existing Central Utility Plant. See Section 5 additional information on the existing electrical systems and requirements for ensuring capacity for this and future building projects. See the Section 5 Civil narrative for a description of the utility extensions required to provide water supply to the site.

4.1.11.3 SITE PREPARATION

A geotechnical report has not yet been prepared for the site. Preparation of the site should follow the requirements outlined in the forthcoming geotechnical report to be prepared for the project. Prior to starting demolition and site preparation, the site should be fenced and appropriate pedestrian and traffic controls put in place. More detailed information on site preparation can be found in the Section 5 Civil narrative.

4.1.12 SITE VISIT / OBSERVATION

The following photographs represent some of the most prominent architectural features of the campus context.

Figure 4.1.12.1 - Campus Vocabulary


BEHAVIORAL

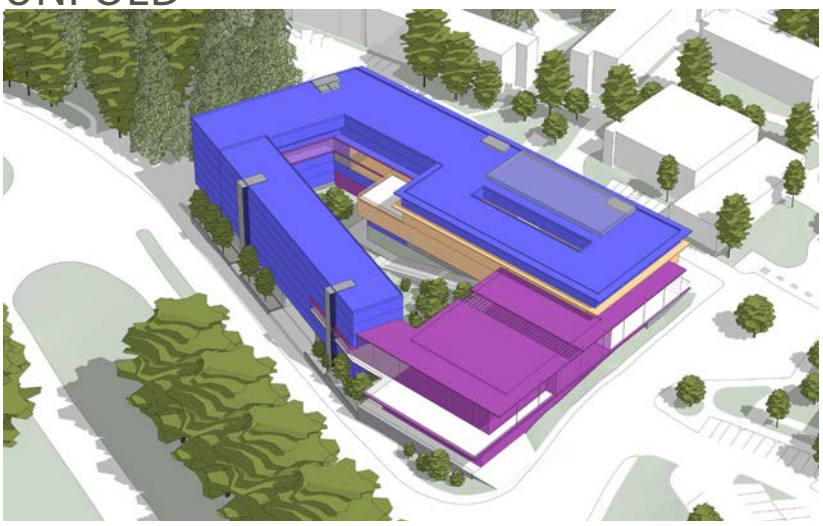
4.2 CONCEPT STRATEGIES

For the purposes of the feasibility study, three conceptual test-fit options were presented for consideration to address visioning goals and challenges for this program, understanding adjacencies, and site related factors. Each option also provided analysis diagrams that covering various project topic areas including Site Context, Function, Staff/Student User Experience, and Community. These diagrams explored mobility/flow, open space, connections between major program areas and indoor/outdoor relationships. Concept options were then assessed and reviewed on how they addressed the evaluation criteria topic areas based on the 8 Dimensions of Wellness: Physical/Environmental, Spiritual Emotional, Financial/ Occupational & Social Intellectual.

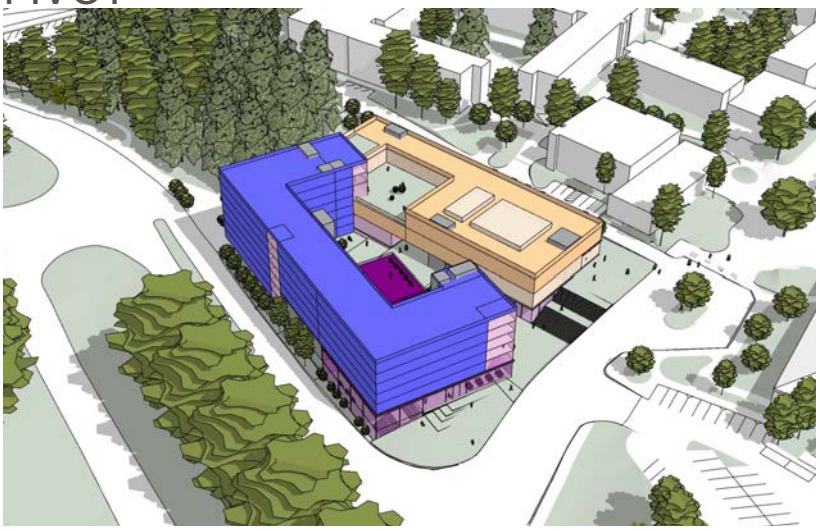
Figure 4.2.1 - Existing Site and Generic Massing

Figure 4.2.2 - Massing Scenarios

UNFOLD



PIVOT



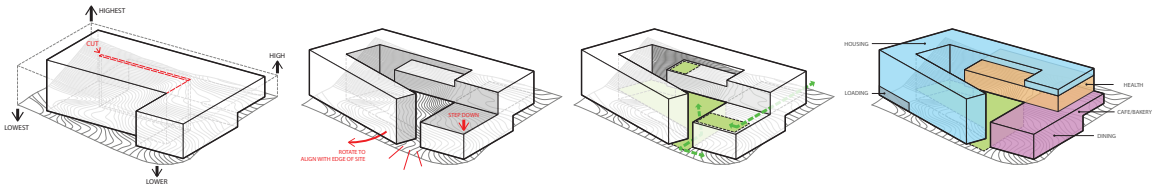
PROMENADE

4.2.1 UNFOLD

Concept: The Unfold concept massing unwraps around the perimeter of the project site, adapting and transforming to site features and topography while responding to campus context cues related to community and access. A communal exterior courtyard space is created in the center which adapts to the main three surrounding programs (Housing, Dining & Health) to provide exterior spaces addressing additional needs of the adjacent interior programs.

1. The Dining & Café/Bakery spaces fronts onto Library Circle and step down the sloping site, creating an inviting community amenity at the campus gateway at Plaza Avenue. This area acts as a "front porch" collecting people along the norther edge of Library Circle and also acts as the building's "living room" connecting all three main program areas together.
2. The Health Center holds the prominent southeast corner of the project site, sharing the "front porch" access to the south. Visitors are drawn along the western edge along Sunset Court for specific Health Center access needs.
3. The housing surrounds the northern portion of the site with wings wrapping around the east and west edges creating a light scoop allowing for south and southwestern to penetrate deep into the communal courtyard space.
4. Other defining features for comparison:
    - Varied outdoor terrace spaces accessible from the three program areas.
    - A through-access rout from Library Circle to the courtyard through the shared Café/ Bakery.
    - Main building loading on the western lower level at L K Wood Boulevard.
    - An outdoor stair runs along the slope of the northern edge of the building providing pedestrian cross-site connection at the edge of the redwood trees.

Figure 4.2.1.1 - Massing Scenario : Unfold



CONCEPT GENERATION

Site Flow **Program Identity** **Interior**

CONCEPT ANALYSES **3D VIEW IN PROGRAM COLORS**

Note: Levels 6 + 7 are not shown in preliminary concepts

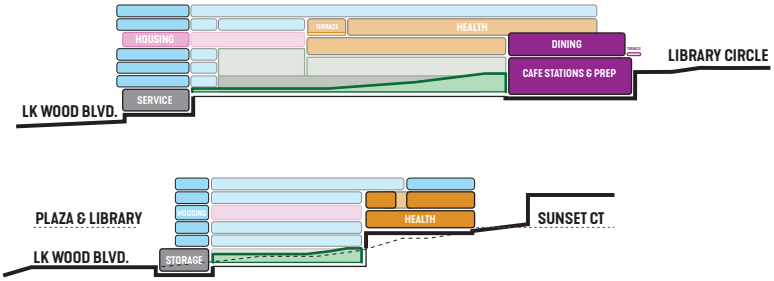


Figure 4.2.1.2 - View from above looking southwest

Figure 4.2.1.3 - View looking north at the Plaza Avenue entry

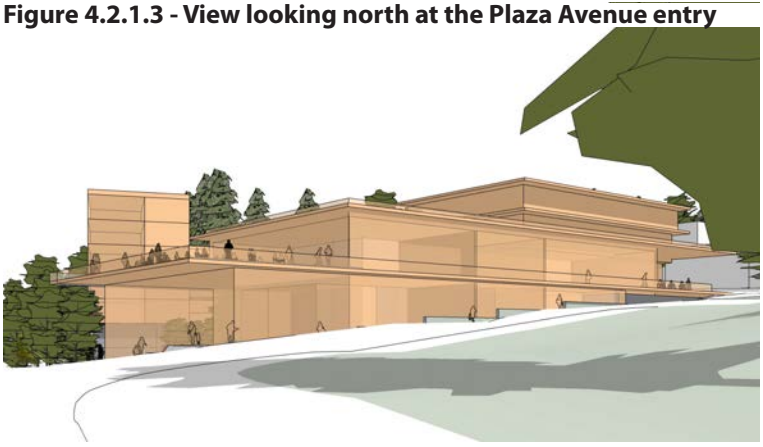


Figure 4.2.1.4 - Inner courtyard view looking south

LEVEL 5

LEVEL 4

LEVEL 3

LEVEL 2

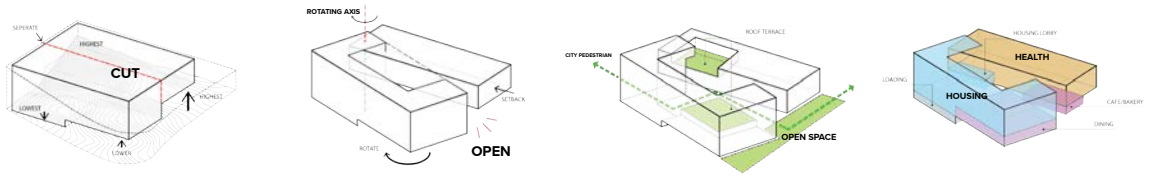
LEVEL 1

4.2.2 PIVOT

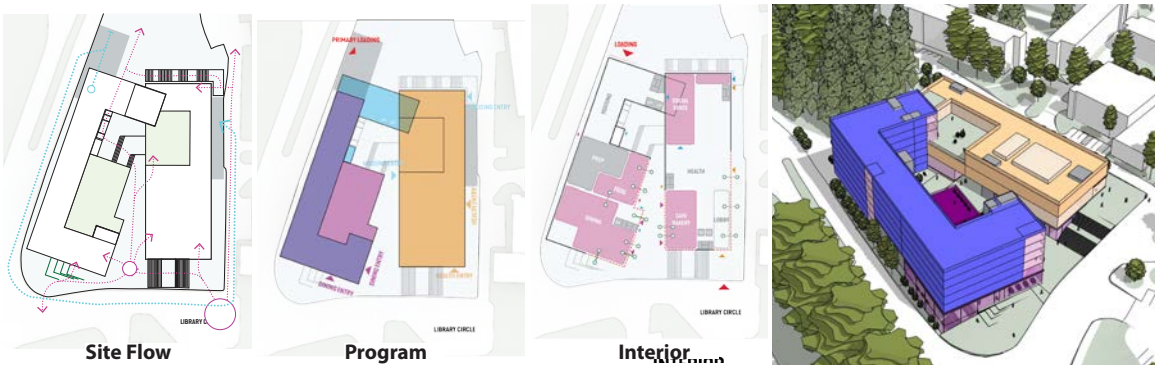
Concept: Pivot's massing started with two parallel massing blocks, Housing to the east and Health to the west, that pivot apart at the south creating a shared outdoor plaza space in the center that opens up to the Library Circle to the south. The open space continues along the southern part of the project site, creating an active edge for occupants to gather at this new campus hub. The lower level of the two pivoted blocks is where the Dining and Café/Bakery is located, creating an inviting draw into the open courtyard.

1. Housing and Health are separated in this option, meeting only at the northern pivot point.
2. The C-shaped housing wing runs the full length of the western built site area.
3. A varied outdoor zone along Library circle includes stepped gathering zones.
4. Other defining features for comparison:
    - Dining and the Café/Bakery are shown separated, connected through the outdoor Plaza area.
    - Outdoor dining occurs at the Plaza level, while outdoor terraces for Housing and Heath are located at upper levels.
    - Main building loading on the western lower level at L K Wood Boulevard.
    - An outdoor stair runs along the slope of the northern edge of the building providing a pedestrian cross-site connection at the edge of the redwood trees.

Figure 4.2.2.1 - Massing Scenario : Pivot



CONCEPT GENERATION



Site Flow **Program** **Interior** **3D VIEW IN PROGRAM COLORS**

CONCEPT ANALYSES

Note: Levels 6 + 7 are not shown in preliminary concepts

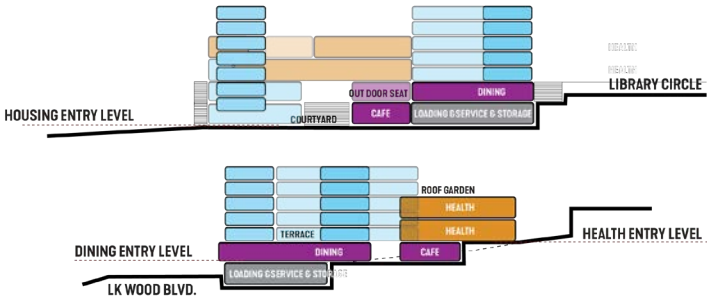
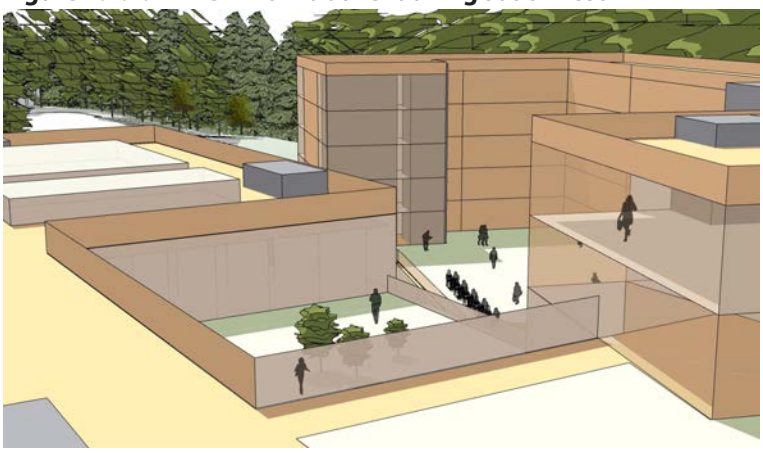
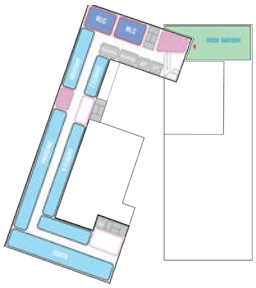


Figure 4.2.2.2 - View looking north from Library Circle

Figure 4.2.2.3 - View looking east from across L K Wood Blvd

Figure 4.2.2.4 - View from above looking southwest



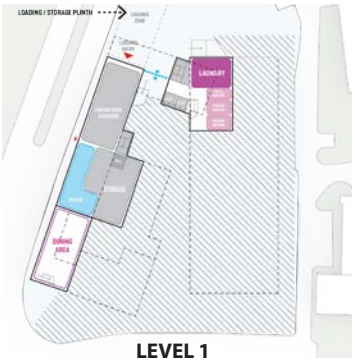


LEVEL 5

LEVEL 4

LEVEL 3

LEVEL 2



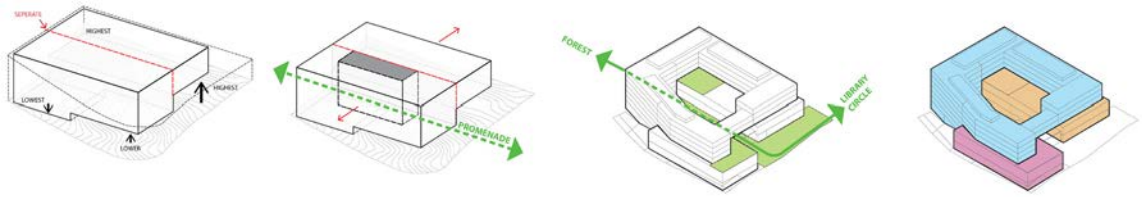
LEVEL 1

4.2.3 PROMENADE

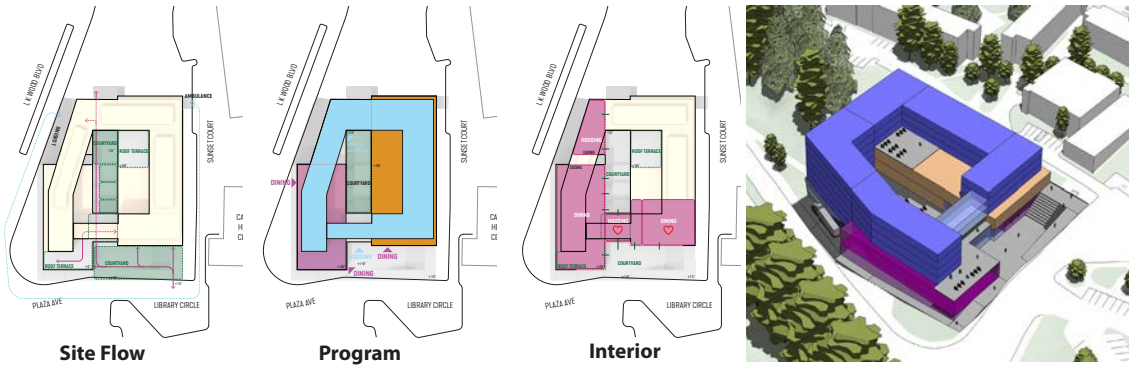
Concept: The Promenade massing is a fully enclosed Housing courtyard building, wrapping on the sides of the built site at the upper levels. Just below this ring of housing is the lower levels, created by two distinct volumes for Dining to the west and Health to the east. Openings at lower levels between the two volumes accommodate courtyard access from the north and south and building loading from the west. These openings create a north-south promenade that passes through the building, filled with terraced outdoor community areas for programs to spill outside.

1. Outdoor terraces are created where the lower-level volumes extend outside of the housing ring above.
2. A varied outdoor zone along Library circle includes stepped gathering zones.
3. A lobby connecting the Dining and Café'/Bakery spaces to the south.
4. Other defining features for comparison:
    - Main building loading on the western lower level at L K Wood Boulevard.
    - An outdoor stair runs along the slope of the northern edge of the building providing a pedestrian cross-site connection at the edge of the redwood trees.
    - Compact building massing.

Figure 4.2.3.1 - Massing Scenario : Promenade



CONCEPT GENERATION



Site Flow **Program** **Interior**

CONCEPT ANALYSES

3D VIEW IN PROGRAM COLORS

Note: Levels 6 + 7 are not shown in preliminary concepts

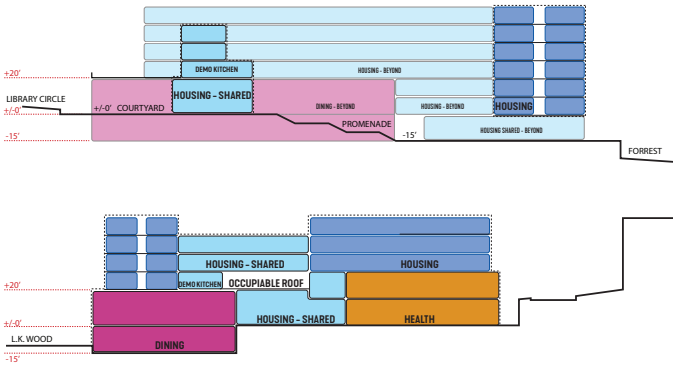
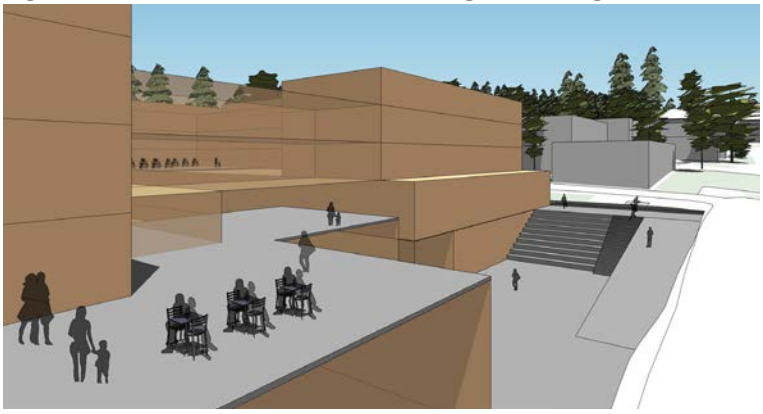
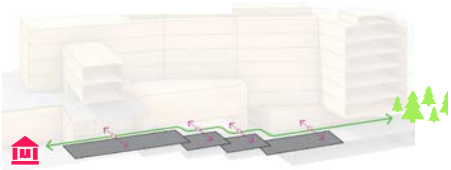


Figure 4.2.3.2 - View looking north from Library Circle

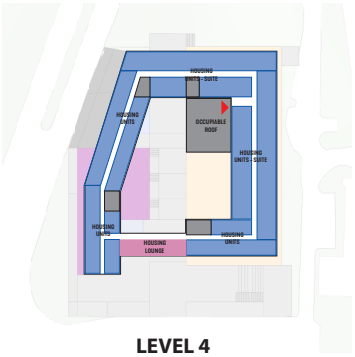
Figure 4.2.3.3 - View looking west from Library Circle

Figure 4.2.3.4 - View from above looking east along Plaza Avenue





AXIS OF PROMENADE



LEVEL 4

LEVEL 3

LEVEL 2

LEVEL 1

4.3 CONCEPT EVALUATION CRITERIA / FEEDBACK

The 3 Massing Scenarios were evaluated using criteria in four areas: Environmental/Physical, Functional/ Financial, Social/Intellectual and Emotional/Spiritual with the specific priorities identified below. Then, through a process of voting on the options based on the criteria topic and providing detailed notes that influenced their decisions – the data results and comments were revealed to the group for further discussion and consideration.

1. Creates a strong gateway presence, welcoming to campus for visitors, and "Home away from Home" for residents. (Environmental/Physical)
2. Establishes strong visual and physical connections to neighboring buildings, respectful of natural campus context and user accessibility. Improves mobility + circulation. (Environmental/Physical)
3. Design supports Sustainable goals in massing, orientation, relationship to the land, daylight, views and solar exposure, water management, indoor/outdoor connections. (Environmental/ Physical)
4. Building design is centered on a "people first" mindset, optimizes the holistic quality of life for residents and community. Supports basic needs: food and housing dignity. (Functional/Financial)
5. Supports the Day-to-Day operations of Dining, Health and Residence Hall with efficiency, access, flow, and future flexibility. (Functional/Financial)
6. Public face of Campus that is an economic driver for the community - i.e., thriving dining and cafe/bakery will provide jobs for students/ Arcata, McKinleyville. (Functional/Financial)
7. HEART Space - Creates a hub to support student belonging, engagement, and cultural exchange. (Social/Intellectual)
8. Learning Community - Program organization provides a variety of spaces for gathering, study, and collaboration. (Social/Intellectual)
9. Alignment of Prospectus goals to support Place Based Learning Communities that cultivate social awareness and intellectual development. (Social/Intellectual)
10. Promote balance of spaces for active social engagement and areas of retreat for quiet rest, reflection, and focus. (Emotional/Spiritual)
11. Community resources are easy to locate and highly visible areas for public gathering, sense of belonging and support. (Emotional/Spiritual)
12. Spaces allow for people from diverse lived experiences to be their true authentic selves, feel safe and supported in their educational journey. (Emotional/Spiritual)

The following 8 pages show the results of the evaluation for the 3 concept strategies presented based on the criteria defined above. From the voting outcomes it is important to note that the prevailing option that was selected for each criteria prompt was only half of the answer. The detailed reasons for these preferences were very effective in communicating nuanced attitudes and concerns about each proposed option that prompted productive discussion with the stakeholders.

Figure 4.3.1 - Concept Option Evaluation

ENVIRONMENTAL / PHYSICAL

1.Creates a strong gateway presence, welcoming to campus for visitors, and "Home away from Home" for residents.

2. Establishes strong visual and physical connections to neighboring buildings , respectful of natural campus context and user accessibility. Improves mobility + circulation.

3. Design supports Sustainable goals in massing, orientation, relationship to the land, daylight, views and solar exposure, water mngmt, indoor/outdoor connections.

FUNCTIONAL / FINANCIAL

4. Building design is centered on a "people first" mindset, optimizes the holistic quality of life for residents and community. Supports basic needs: food and housing dignity

5. Supports the Day to Day operations of Dining, Health and Residence Hall with efficiency, access, flow, and future flexibility.

6. Public face of Campus that is an economic driver for the community - ie., thriving dining and cafe/bakery will provide jobs for students/ Arcata, McKinleyville.

SOCIAL / INTELLECTUAL

7. HEART Space - Creates a hub to support student belonging, engagement and cultural exchange.

8. Learning Community - Program organization provides a variety of spaces for gathering, study, and collaboration

9.Alignment of Prospectus goals to support Place Based Learning Communities that cultivate social awareness and intellectual development

EMOTIONAL / SPIRITUAL

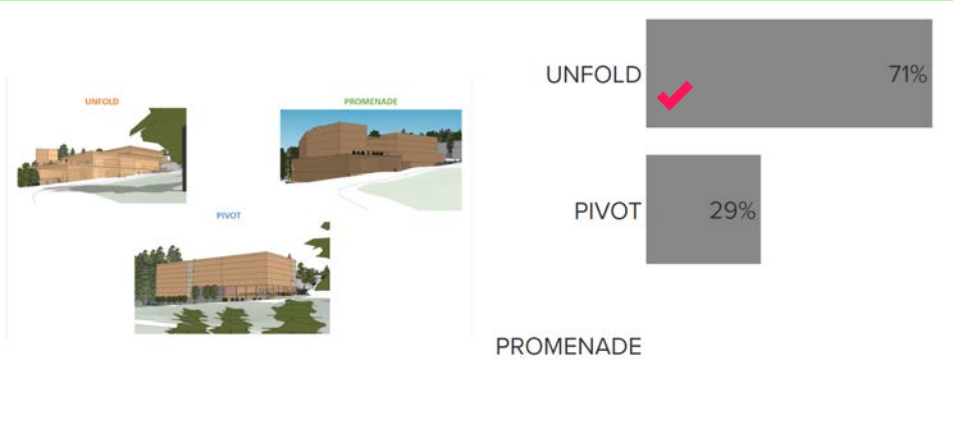
10. Promote balance of spaces for active social engagement and areas of retreat for quiet rest, reflection and focus.

11. Community resources are easy to locate and highly visible areas for public gathering, sense of belonging and support

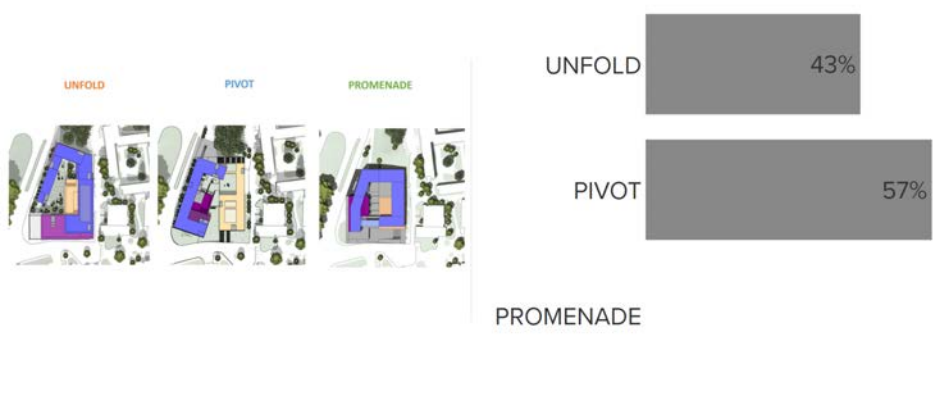
12. Spaces allow for people from diverse lived experiences to be their true authentic selves, feel safe and supported in their educational journey.

4.3.1 ENVIRONMENTAL/PHYSICAL

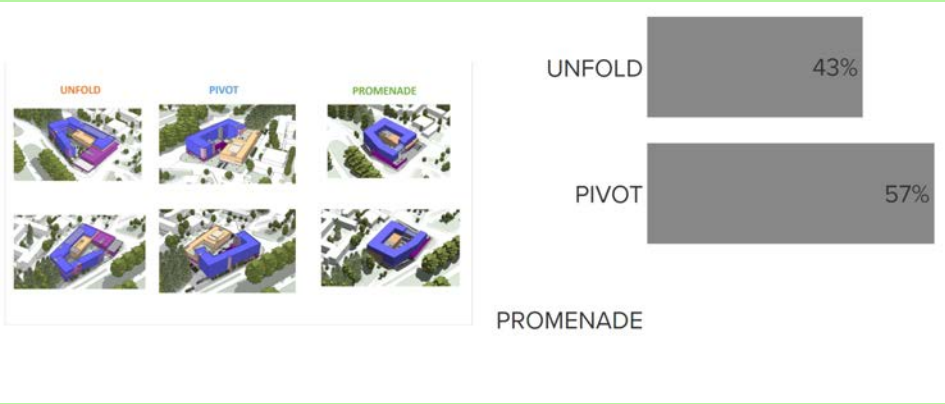
1. Creates a strong gateway presence, welcoming to campus for visitors, and "Home away from Home" for residents.



2. Establishes strong visual and physical connections to neighboring buildings, respectful of natural campus context and user accessibility. Improves mobility + circulation.



3. Design supports Sustainable goals in massing, orientation, relationship to the land, daylight, views and solar exposure, water management, indoor/outdoor connections.



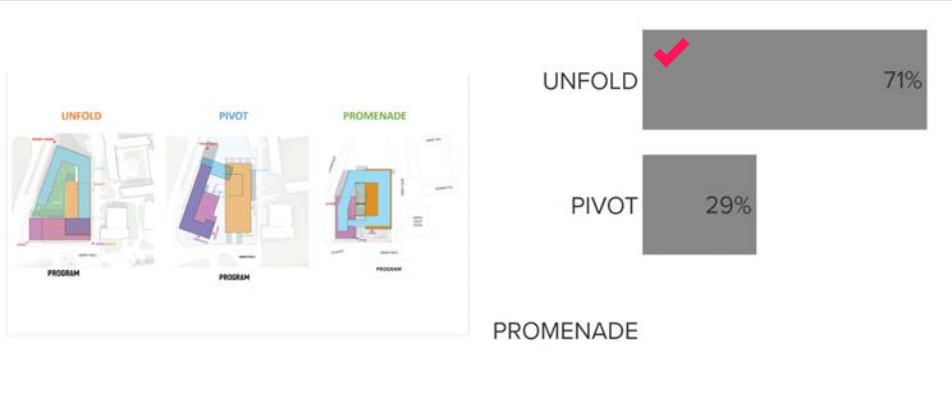
- The separation of health provides greater anonymity for students which is most welcoming.
- Same as my first answer. If I were a resident, I would probably be most drawn to this design in terms of residential living. But, from the perspective of non-resident students who would be accessing dining and health services, I like the second concept best.
- While this is not my preferred design, I do think it has the most organic (non-institutional) feel. It provides nice outdoor spaces.
- The building is more visually appealing to me.
- view looking northeast from LK Wood rendering
- the building breaks down the scale of the hill in which it sits, has a subtle stepping up towards an important promenade of campus
- striking visual, good use of dining as the overlap on the conceptual venn diagram
- The scale of the "step down" at the dining component, south west corner, with the rooftop terrace seems open, connected to LK wood and welcoming. Having the dining area on the south side ad transparency/connection to the approach up Plaza drive towards the library.
- Looks more welcoming, not as monolithic.

- Appears to be easiest access for medical and counseling emergencies
- I like that the eastern facing aspect of the building has visual appeal with a lower height footprint. I like that there is basically a "food court" area with the bakery and dining services across from each other and with glass walls. Students in housing will have nice views. CONFIRM UNFOLD?
- student access from west and east, ease of access to dining and student health services due to grade break down
- Multiple entry points for students. Sunset entry on the east and the open courtyard entry on Plaza Ave connect the building to the surrounding campus buildings and pathways. This plan has a good flow to and through the spaces. CONFIRM PIVOT?
- More opening at south end is appealing.

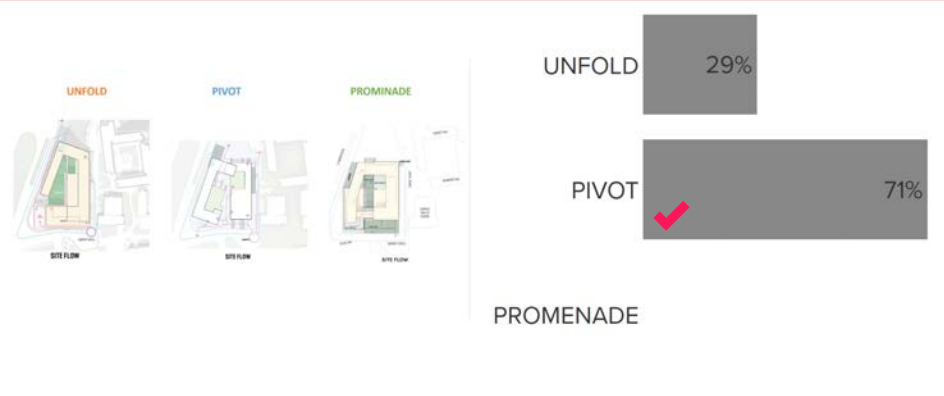
- Would give most light exposure
- I prefer the low height at the eastern section of the build. I like the open airy courtyard with better sunlight into the building. The first two designs have better indoor/outdoor connections, a more op feel, than the third. The pivot design offers the most security, privacy, infection control ELABORATE?
- efficiencies in the simplified stacking of the housing element Selective access to health
- The "step down" at the dining space opens up the courtyard to the southern light. The massing seems appropriate for the topography. I like the way it steps up from LK Wood along Plaza.
- Seems like better light access from sun.

4.3.2 FUNCTIONAL/FINANCIAL

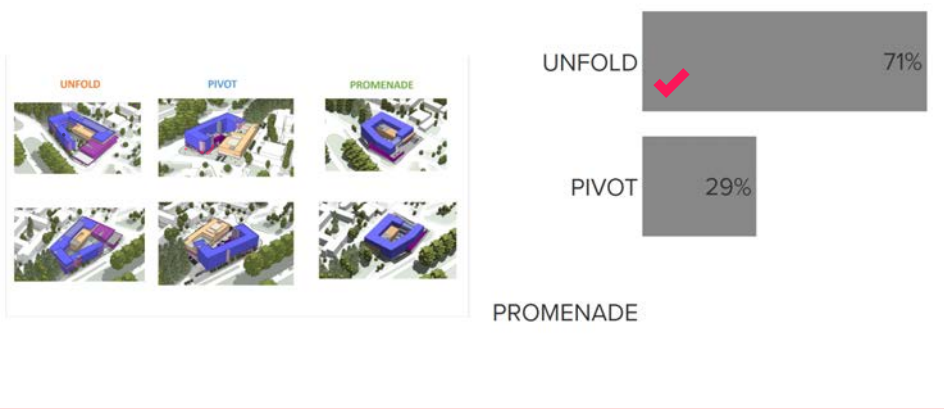
1. Building design is centered on a "people first" mindset, optimizes the holistic quality of life for residents and community. Supports basic needs: food and housing dignity.



2. Supports the Day-to-Day operations of Dining, Health and Residence Hall with efficiency, access, flow, and future flexibility.



3. Public face of Campus that is an economic driver for the community - i.e., thriving dining and cafe/ bakery will provide jobs for students/ Arcata, McKinleyville.



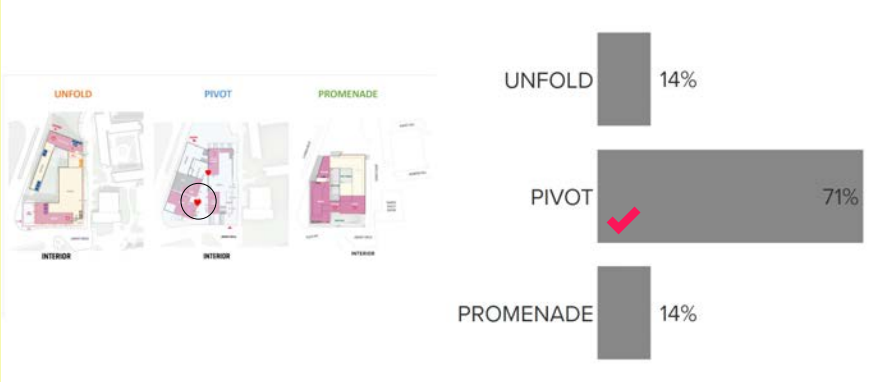
- Most private and anonymous, respects privacy of both living space and health space
- The first two designs do this well. I like that the food pantry is co-located with other food services in the first design and is external facing. **Co-mingling of services of the site**
  - the (3) programs are most integrated in interlocking tiers of the building stepping up along the hill
  - I like the way the pieces all connect through a dining area - a shared point of focus for the project
- No only will the building residents have easy access to dining and health care but the layout also creates good access for the general student population.
  - Like the Dining feature out front and at main library circle entry.

- Clear flow and access
- The second design offers the best functionality for Health services with better privacy, security, infection control possibilities. I also like the layout of food services. The demo kitchen and multipurpose room ar in a good spot for sharing between Health and Housing. I like the terrace spaces. ELABORATE?
- The bit more separation of Health services provides more patient privacy, security and infection control.
- shortest distance from the loading dock to the most northern portion of the dining block
- Multiple entry points. Open courtyard. Loading dock connection to dining.
- Like Dining being featured on the campus drive in entry.

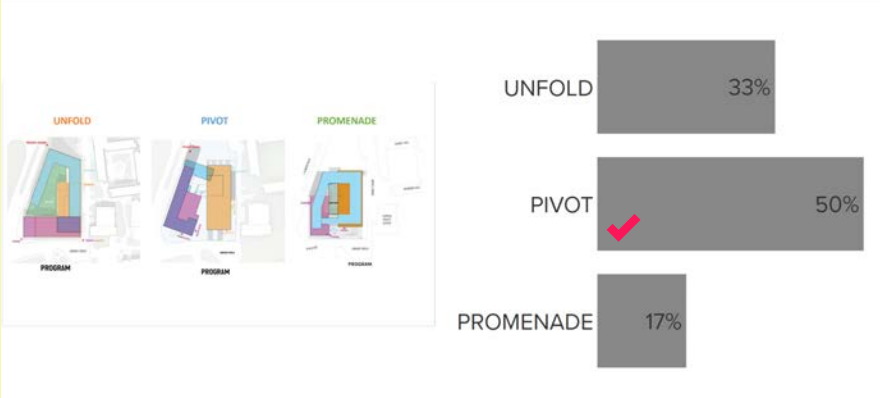
Clearly shows that we have a strong health center to students and families who are visiting and want to make sure that our campus will support their health. Especially important in rural area if sending children from a more urban setting

4.3.3 SOCIAL/INTELLECTUAL

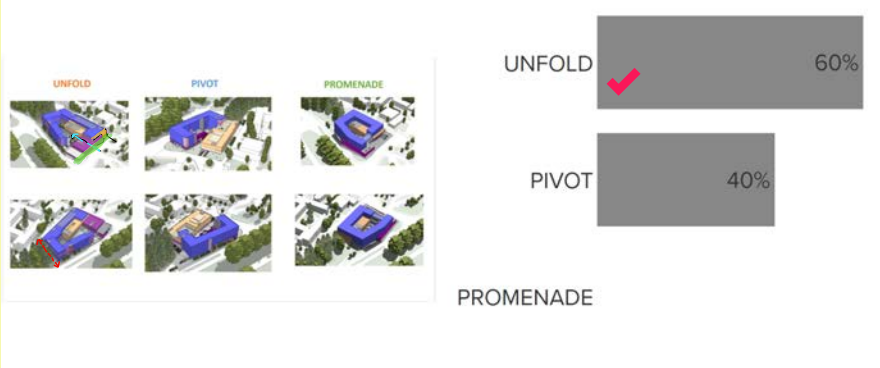
1. HEART Space - Creates a hub to support student belonging, engagement, and cultural exchange.



2. Learning Community - Program organization provides a variety of spaces for gathering, study, and collaboration.



3. Alignment of Prospectus goals to support Place Based Learning Communities that cultivate social awareness and intellectual development.



I appreciate indoor and outdoor places to congregate, including an area located within many different dining / food options. Food choices are easily accessible. The terrace space on the health space is conducive to staff wellness -- many of our staff have stressed the importance of breaks outside.

connection between heart spaces and interior courtyard - this is the way to a successful, semi-enclosed courtyard. Need the energy of heart spaces to connect to the outdoor spaces

The dining and laundry/multipurpose housing layout looks best.

I really don't know. I imagine that there would be several study spaces in this design. I would need to hear more about each design and what is planned for such spaces.

most variety of indoor and outdoor space connections

I like the Housing layout better.

I have no idea.

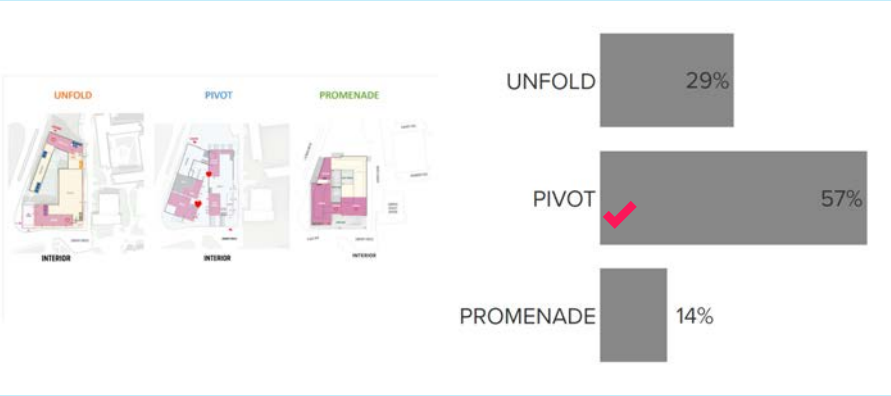
courtyard is most inviting as it opens to the south. feels that it would engage more people and provide a welcoming presence

Tough to answer this one as all the options succeed in this respect. I chose the Unfold because the interplay of the massing elements.

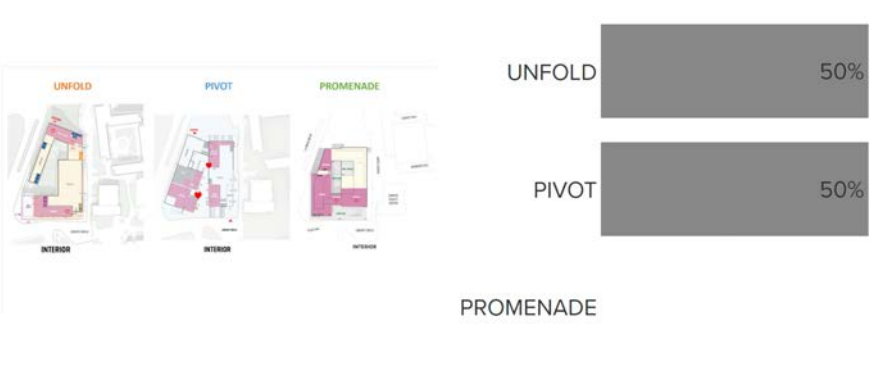
no standout.

4.3.4 EMOTIONAL/SPIRITUAL

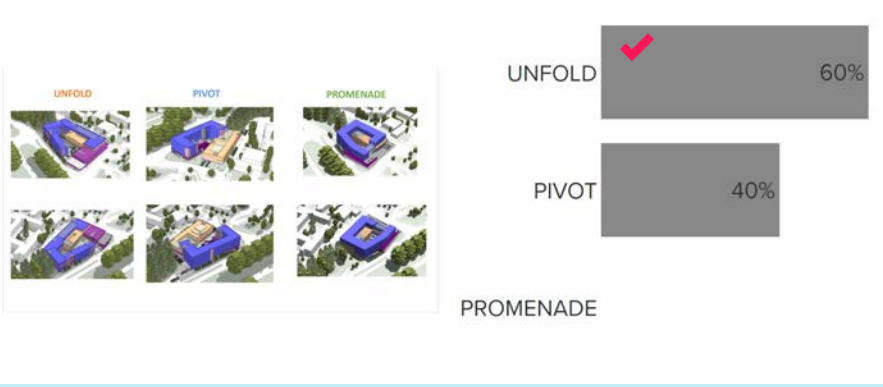
1. Promote balance of spaces for active social engagement and areas of retreat for quiet rest, reflection, and focus.



2. Community resources are easy to locate and highly visible areas for public gathering, sense of belonging and support.



3. Spaces allow for people from diverse lived experiences to be their true authentic selves, feel safe and supported in their educational journey.



- Either of the first two designs work well for this.
- ★ again, strong heart spaces connected to outdoor space. opportunities to find a suitable space to disconnect from the buildings while still being within the complex
- ★ Plan offers opportunities for various social interaction at the courtyard area as well as the roof terraces.
- Hard to tell.

- I view Pivot as the most private, secure space with the best ease of access.
- ★ the health program seems to be wrapped/hugged by the student housing program and dining.
- I prefer the separate layout of housing, dining and health.

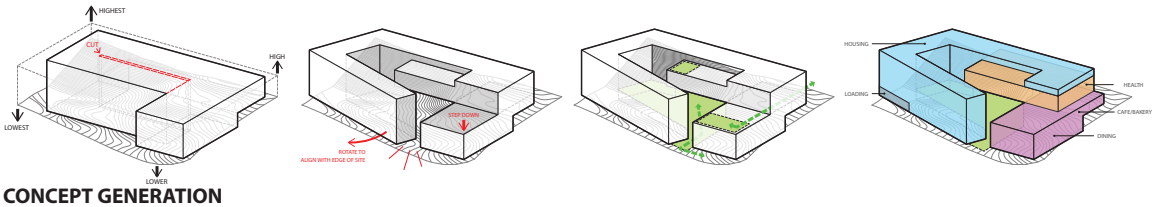
- No idea
- ★ integration of programs/building massing
- Having the courtyard entry on Plaza instead of LK Wood creates a feeling of safety and comfort.
- Hard to tell.

4.4 PRIME CONCEPT STRATEGY SELECTED

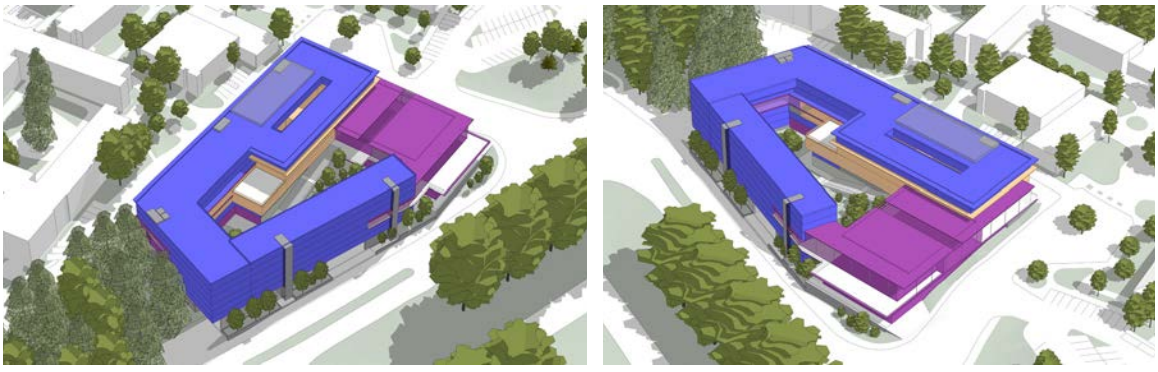
Based on the data from the evaluation criteria polling and discussion of detailed drivers behind the selections, the massing option labeled "UNFOLD" was selected for the most successful delivery of desired criteria goals including those listed below. It was determined through polling results and related discussions that both the UNFOLD and PIVOT options resolved various project goals successfully. The design team made adjustments to the chosen UNFOLD option that incorporated the best solutions from both options. This updated UNFOLD option is represented in the final images below and the subsequent planning test fits.

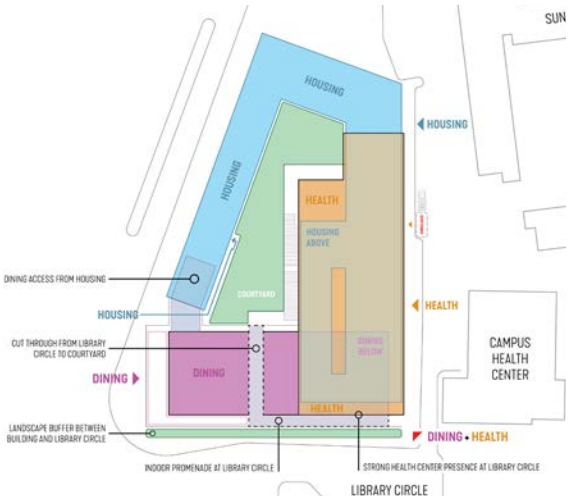
- The concept clearly represents the distinct services of each major program (Housing, Dining & Health), but also connects /coalesces in a way that models the holistic ecosystem of student life and wellness.
- The solution best breaks down the scale of the new building on the sloped site, creating a welcoming expression toward the campus gateway.
- The concept massing creates a strong and dynamic connection between the new building and Library Circle.
- The design solution addresses access and building entries in an intuitive way that celebrated the entry process for each individual program while celebrating the inner connections between them. The solution also expresses an understanding of the need for privacy for areas of the Health Clinic and Housing.
- The concept includes a strong relationship of outdoors to indoors, creating successful outdoor community gathering spaces activated by adjacent indoor programs for all three main entities, Housing, Dining & Health.
- The option represents a successful integration of program and building massing. The result is an inviting building that feels at scale with the existing campus context.
- Areas of improvement requested include providing more identity for Healthcare on Plaza Avenue and connecting Health Education – including Food Pantry and Demo Kitchen in a more intentional, dignified way to the dining program.
- Stakeholders also asked for more direct connection between the main entry to the courtyard and also stronger connections of the housing program to dining and health.

Figure 4.4.1 - UNFOLD Massing Scenario

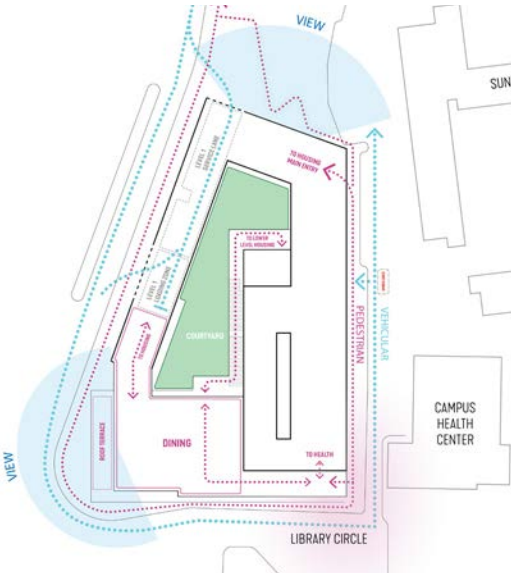


CONCEPT GENERATION

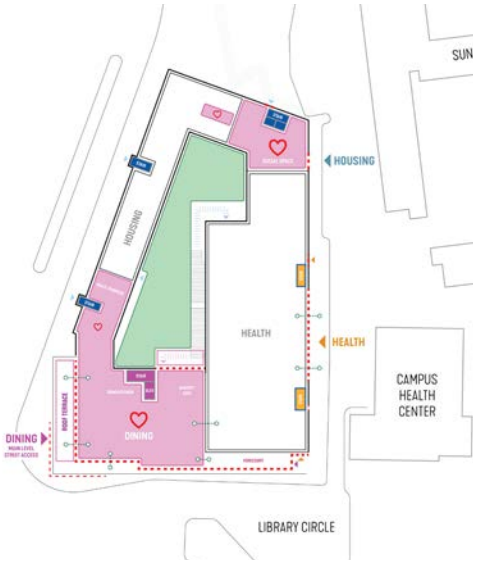




PROGRAM IDENTITY



SITE FLOW



INTERIOR

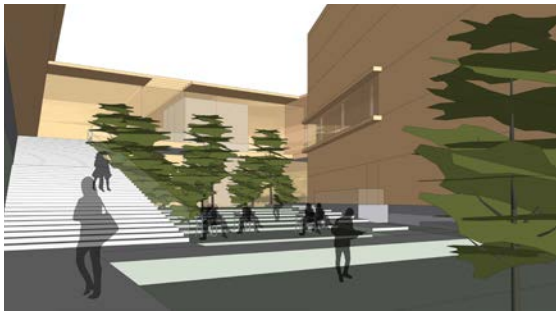
Figure 4.4.2.1 - View from above looking southwest

Figure 4.4.2.2 - View looking north at the Plaza Avenue entry

Figure 4.4.2.3 - View along L K Wood Blvd

Figure 4.4.2.4 - View looking west from Library Circle

Figure 4.4.2.5 - Inner courtyard view looking south

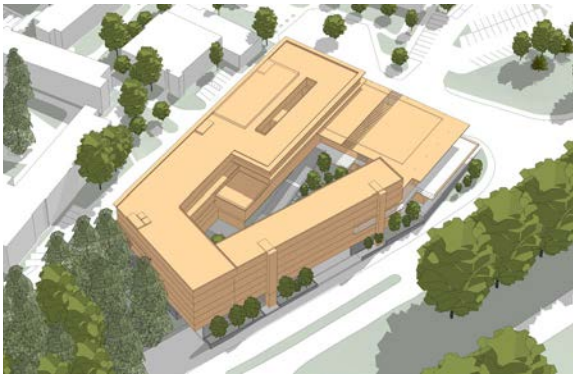


4.5 PLANNING TEST FIT

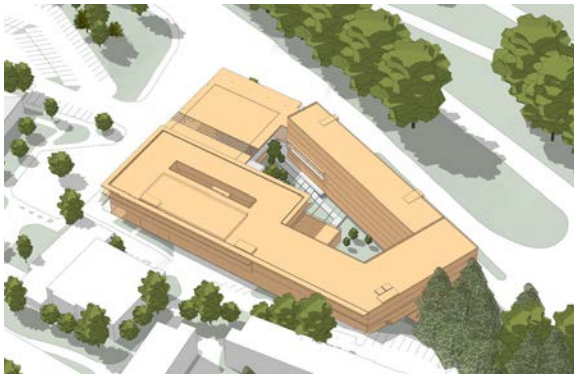
In order to validate the proposed space program, a departmental test-fit diagram was completed based on the "UNFOLD" massing scenario (Figure 4.2.1.1). With priorities identified by the working group stakeholders during Visioning and Programming sections of this study the following planning concepts were derived.

The following break-out descriptions of the seven levels from the planning test fit strategies identifies additional priorities of the upgraded UNFOLD concept in further detail.

Figure 4.5.1 - 3D Views

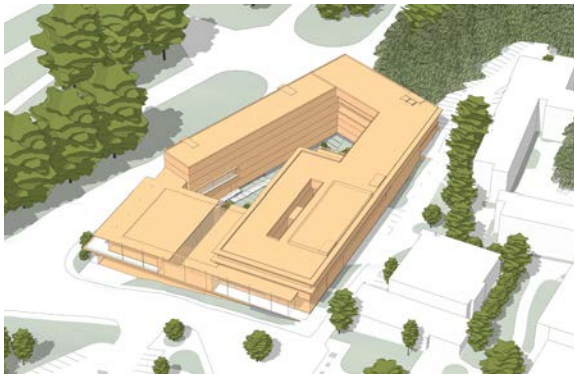


Northwest Corner



Northeast Corner

Southwest Corner



Southeast Corner

HEALTH, DINING & HOUSING BUILDING - TEST-FIT LEVEL 1

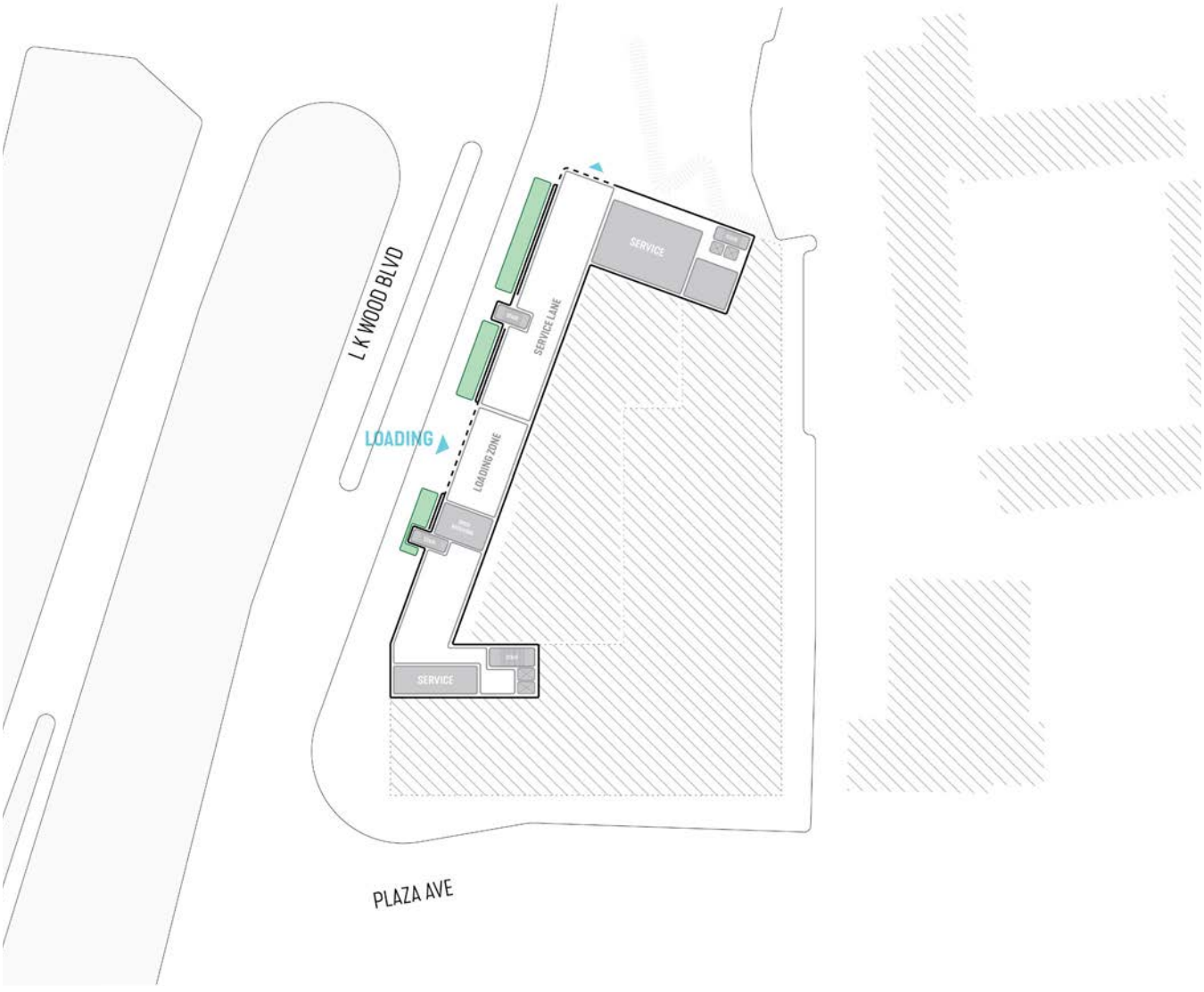
Key strategies of the detailed plan test-fit explored in this option include:

A service programmed LEVEL 1 that runs along L.K. Wood Boulevard with vertical circulation at the north and south ends. A service lane and loading area for large and small trucks is located with direct access off of L K Wood Boulevard with the ability to unload and exit in an efficient way.. Service for both housing and dining provides ample space at key access points for loading and unloading.

Key Adjacency Highlights:

- Service and Loading access from LK Wood Blvd. for both Dining and Housing without impacting vehicular traffic.
- Potential Fire truck access point if needed

Figure 4.5.2 - Test Fit Diagram: Level 1



HEALTH, DINING & HOUSING BUILDING - TEST-FIT LEVEL 2

LEVEL 2 is split into two parts with the lowest level of housing sitting to the north and the lower level of Dining located to the south. Direct access to the outdoor courtyard is located in between the north and south building areas. This lower level of the Dining program includes the main servery area, and the adjacent dining seating area with access and views to the west and south. The lower level of the Housing program includes RLC apartments, doubles and laundry facilities adjacent to the courtyard.

Key Adjacency Highlights:

- Secured direct entry point to the courtyard from LK Wood Blvd.
- Service elevator from loading level supports Dining Back of House Operations
- Housing units have daylight and views, and laundry has direct connection to outdoors

Figure 4.5.3 - Test Fit Diagram: Level 2

HEALTH, DINING & HOUSING BUILDING - TEST-FIT LEVEL 3

Key strategies of the detailed plan test-fit explored in this option include:

LEVEL 3 is an intermediate level for the housing program consisting of doubles and resident advisors that includes a community lounge area to the north. Access to daylight bookends the double loaded corridors and each room has direct access to the courtyard or the view towards the west over LK Wood Blvd.

Key Adjacency Highlights:

- Access to the Level 4 via stairwells provides a direct connection to Dining and adjacency to Student Health entry points.

Figure 4.5.4 - Test Fit Diagram: Level 3

HEALTH, DINING & HOUSING BUILDING - TEST-FIT LEVEL 4

LEVEL 4 is the buildings main entry level, providing access to the building from Library Circle to the south and Sunset Court to the east. A "front porch" entry is celebrated off Library Circle through a shared forecourt space. The upper Dining level includes a pass-through café/bakery providing access to the inner courtyard while the upper dining area acts as the buildings "living room", connecting to both the Health programs and the shared Housing programs. This level also includes an outdoor dining terrace at the prominent corner of Plaza Avenue and L K Wood Boulevard.

The Housing portion of this level is similar to layout for level 3, including the community lounge area to the north. The Healthcare Center entry level includes three main points of entry- one at Library circle, a second entry along Sunset Court for the main patient care waiting area, and a third for triage and ambulance pick-up.

The greater health program shares a common lobby / waiting area where patients are escorted through triage into the controlled-access medical areas. The administrative areas are generally located to occur between the waiting areas and the back of house medical spaces. Other areas such Laboratory and Pharmacy both have direct connections to front and back of house so that patients have access to these services without being required to enter controlled areas. Provider offices with meeting space are located so that this area can remain separated but have immediate access to patient spaces. The Provider offices are also located in close vicinity to the breakroom on the level above.

Separately, the Food Pantry is located to be very accessible to students and entered from Library Circle and is collocated with the Peer Health Education (PHE) Program so that students can access the PHE area through the Food Pantry spaces.

Key Adjacency Highlights:

- Multiple points of access for all 3 programs on Level 4 with direct connections between Housing and Dining at the Southwest corner via elevated walkway that is programmed as a multipurpose living room. Health education which includes the food pantry and demo kitchen is directly adjacent to the dining programs.
- The PHE program shares a controlled access back of house connection.
- The medical spaces are all controlled access from the front of house waiting areas.

Figure 4.5.5 - Test Fit Diagram: Level 4

HEALTH, DINING & HOUSING BUILDING - TEST-FIT LEVEL 5

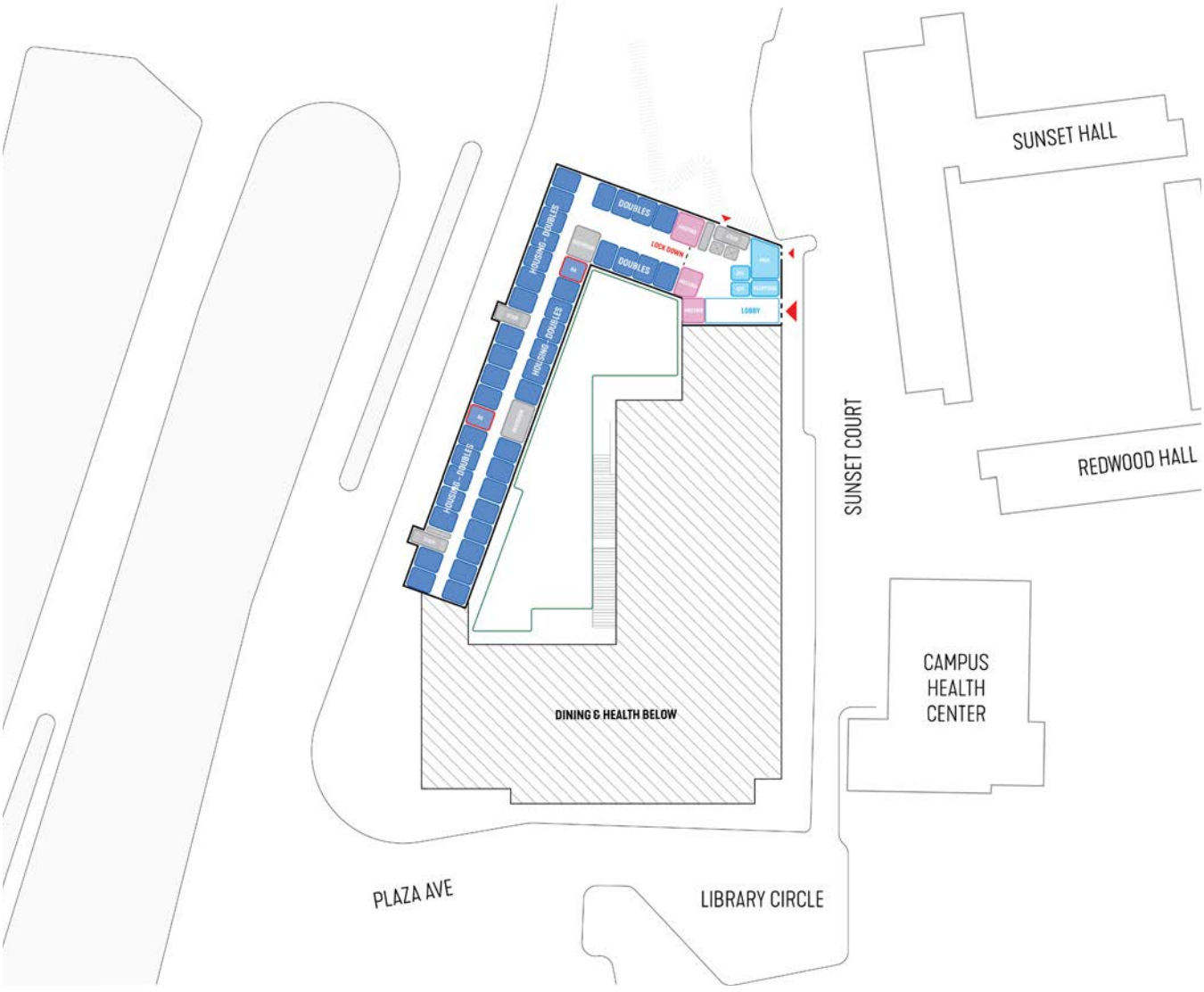
Key strategies of the detailed plan test-fit explored in this option include:

LEVEL 5 is an intermediate level for the housing program consisting of doubles and resident advisors and also represents the main housing entry level with access off of Sunset Court at the northeast corner. Housing Reception, mailroom, meeting rooms and RLC office are located off Sunset Court's northeastern corner across from other residence halls. Access to daylight bookends the double loaded corridors and each room has direct access to the courtyard or the view towards the west over LK Wood Blvd.

Key Adjacency Highlights:

- Access to the Level 4 via stairwells provides a direct connection to Dining and adjacency to Student Health entry points.
- Health education which includes the food pantry and demo kitchen is directly adjacent to the dining programs.

Figure 4.5.6 - Test Fit Diagram: Level 5



HEALTH, DINING & HOUSING BUILDING - TEST-FIT LEVEL 6

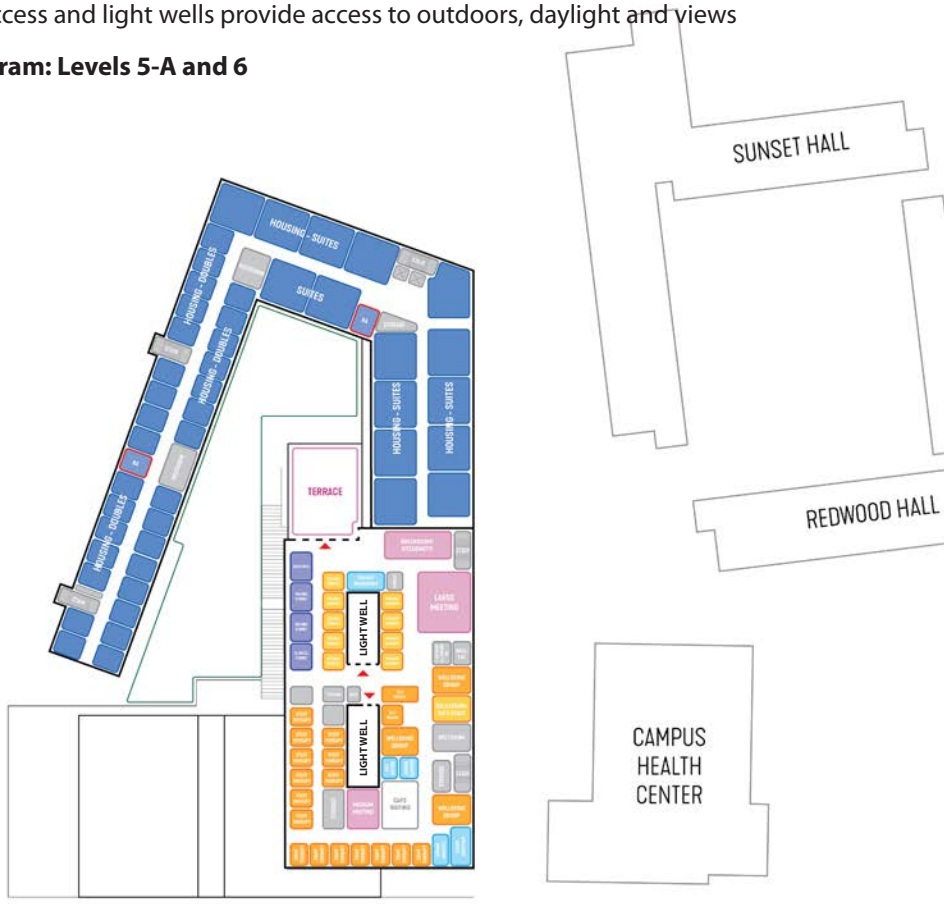
LEVEL 6 includes program areas for both Housing and Health. The housing portion is another stacked level of units of doubles, double suites and resident advisors. The health portion of this level represents the upper level of the two-story Health Center.

The Counseling and Psychological Services (CAPS) program is located directly above the medical program. Patients arrive to CAPS through the main medical level waiting area. All patients (acute medical, scheduled medical, and CAPS) access the controlled back of house spaces through the same door on the medical level; this is to reduce the feeling of stigma students may feel as they arrive for services as opposed to having a dedicated public entrance for CAPS. A dedicated back of house elevator will take patients up to the CAPS floor. Once on the CAPS floor, therapy rooms are generally collocated with the SHWS Director and the associated waiting space creating a 'quiet wing'. The intent is to provide natural light to all of the staff therapy rooms as well as the trainee rooms, executive offices, and larger gathering spaces. The breakroom is shown to have access to a private terrace for staff at the upper level.

Key Adjacency Highlights:

- A dedicated back of house elevator will take patients up to the CAPS floor.
- Outdoor Terrace access and light wells provide access to outdoors, daylight and views

Figure 4.5.7 - Test Fit Diagram: Levels 5-A and 6



HEALTH, DINING & HOUSING BUILDING - TEST-FIT LEVEL 7

Key strategies of the detailed plan test-fit explored in this option include:

LEVEL 7 is the top level of the building and includes only Housing program. The Housing units of singles and doubles, and double suites on this level fold around the site and extend over the Health program below. A large light well in the layout allows natural light to reach the inner housing units and bring light down to the Health Center below, as it aligns with the level 6 light wells.

Key Adjacency Highlights:

- Top floor increases access to daylight and views in addition to windows as bookends the double loaded corridors and each room has direct access to the courtyard or the view towards the west over LK Wood Blvd.

Figure 4.5.8 - Test Fit Diagram: Level 7

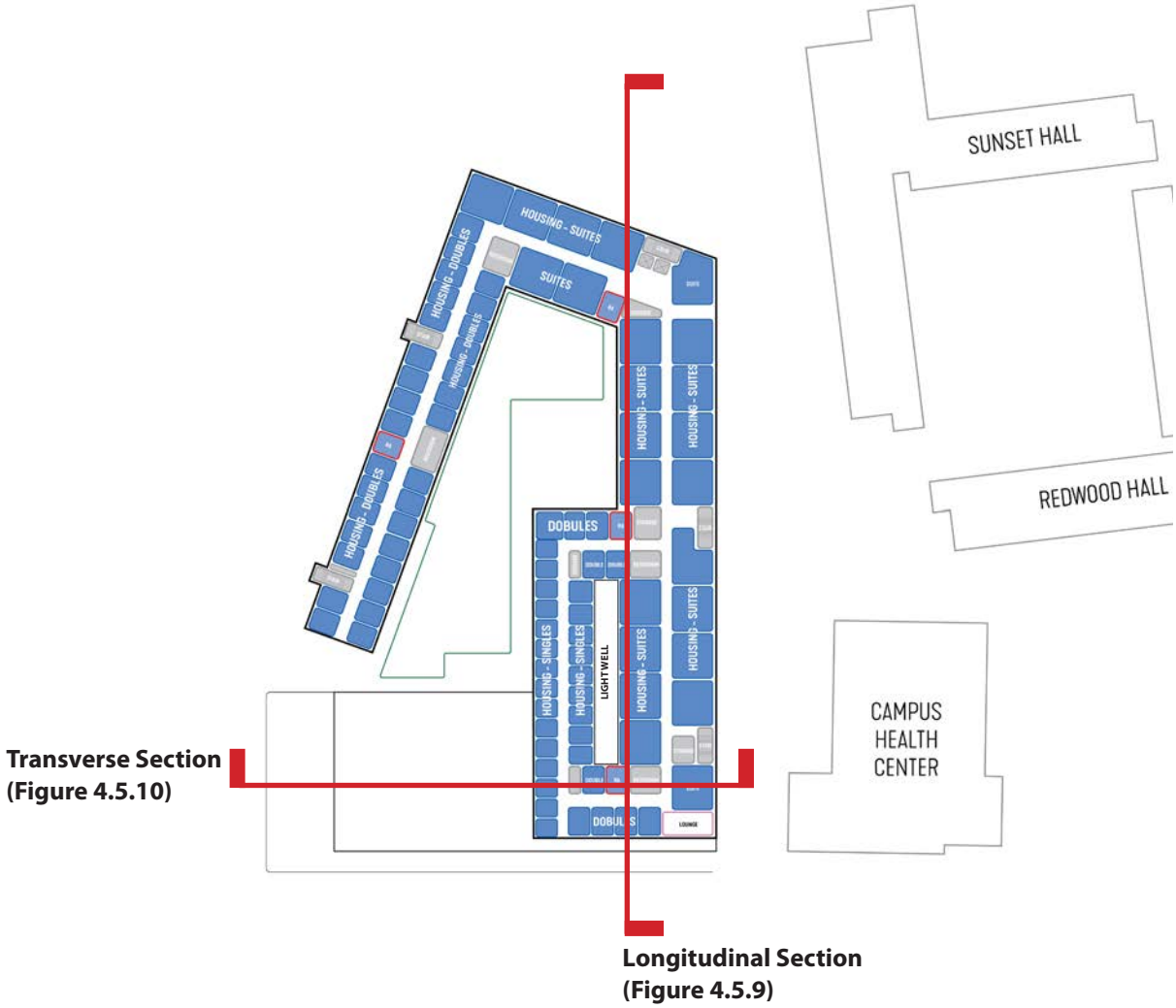


Figure 4.5.9 - Test Fit Diagram: Longitudinal Section

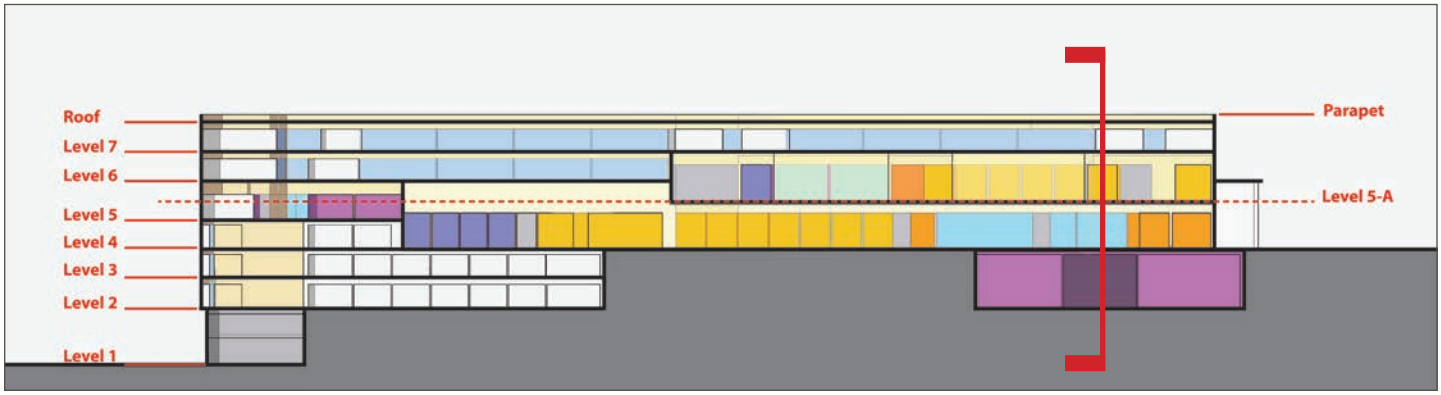


Figure 4.5.10 - Test Fit Diagram: Transverse Section

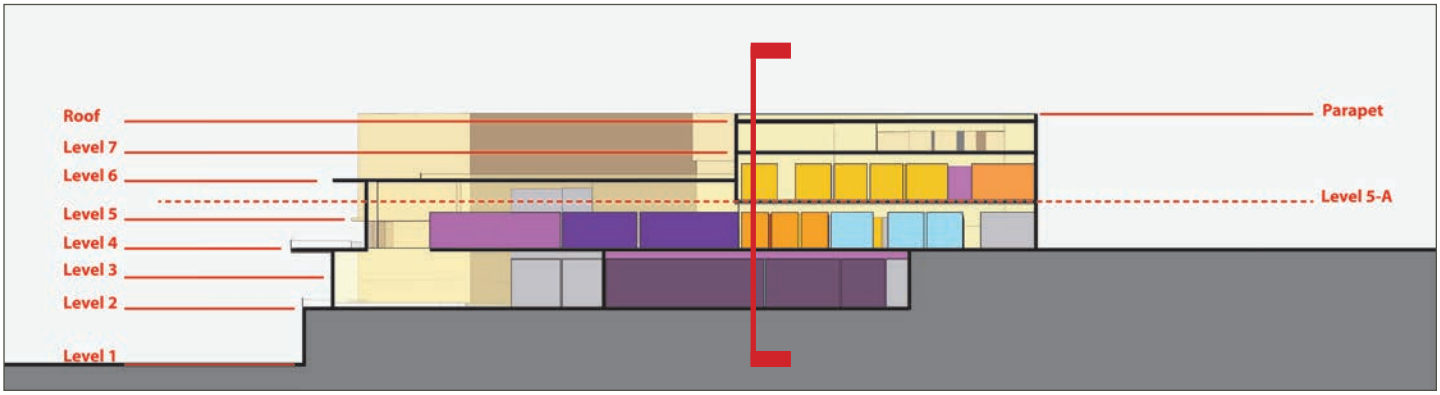


Figure 4.5.11 - Stacked Programs - Level 1

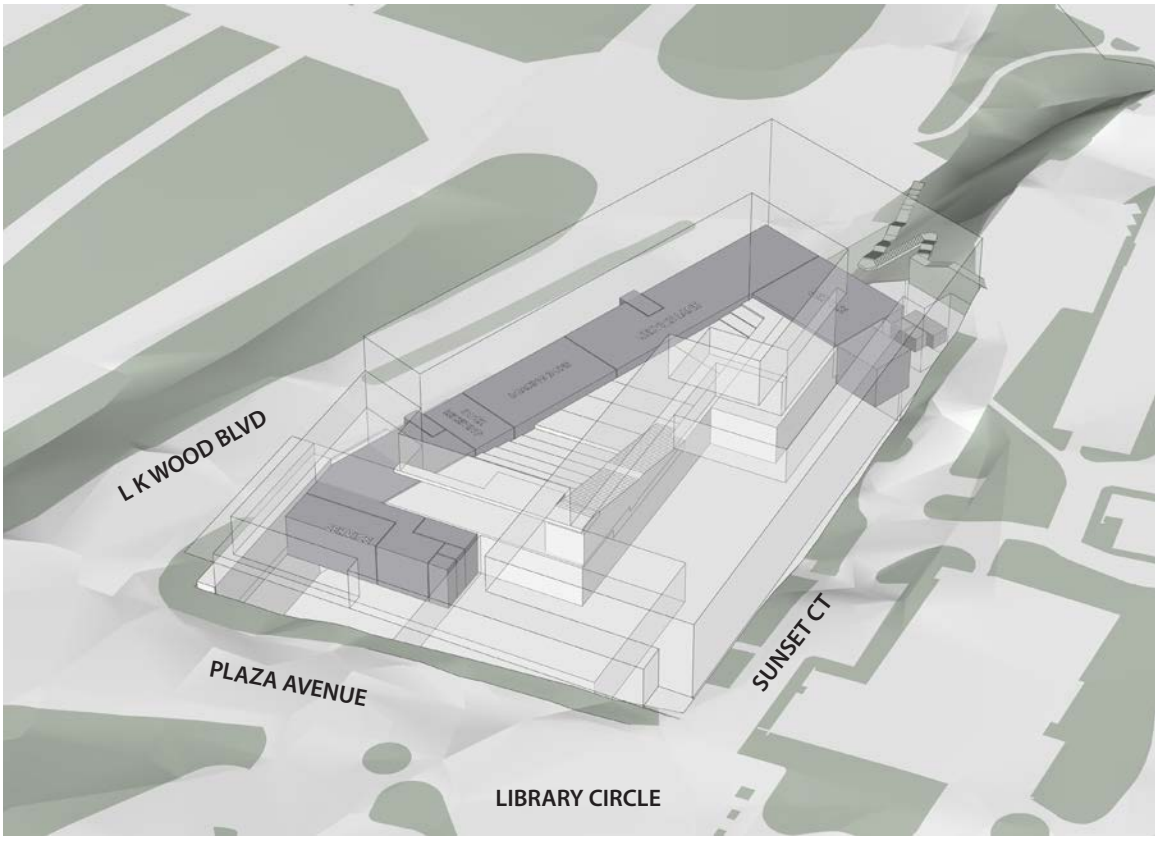


Figure 4.5.12 - Stacked Programs - Level 2

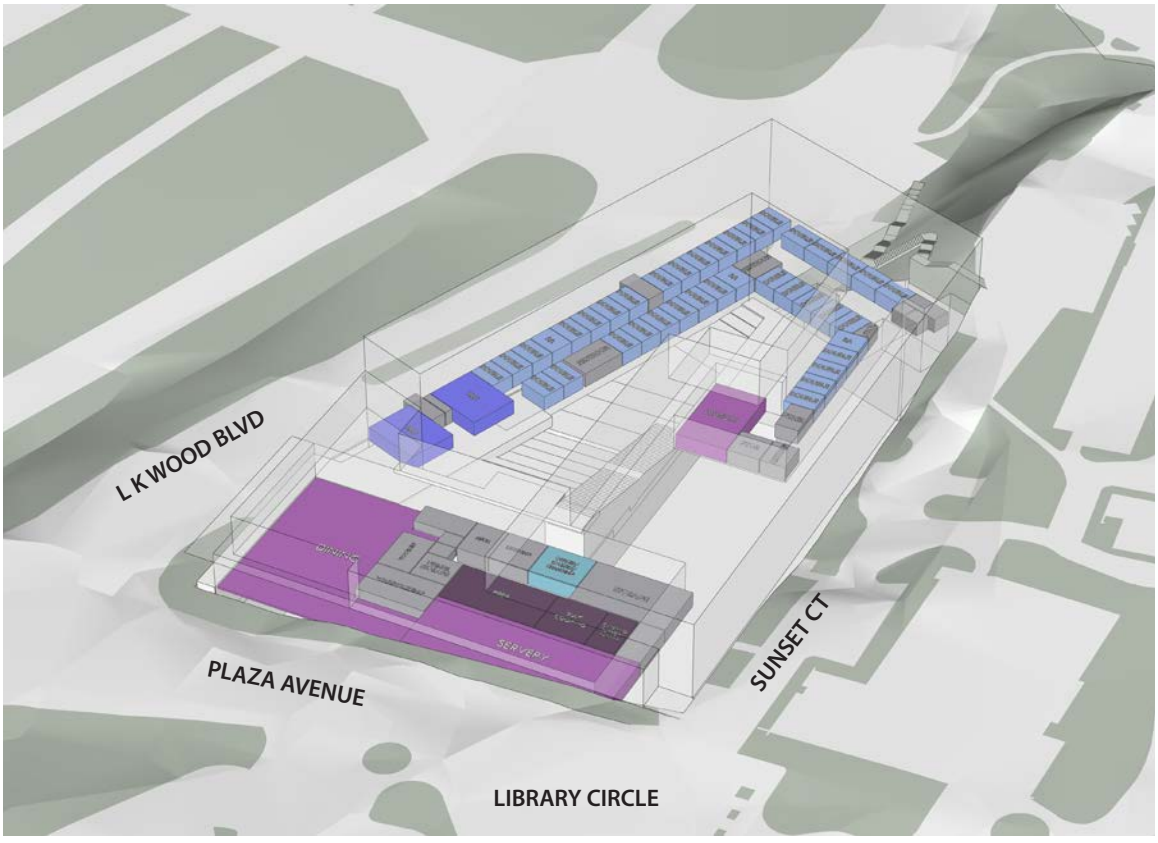


Figure 4.5.13- Stacked Programs - Level 3

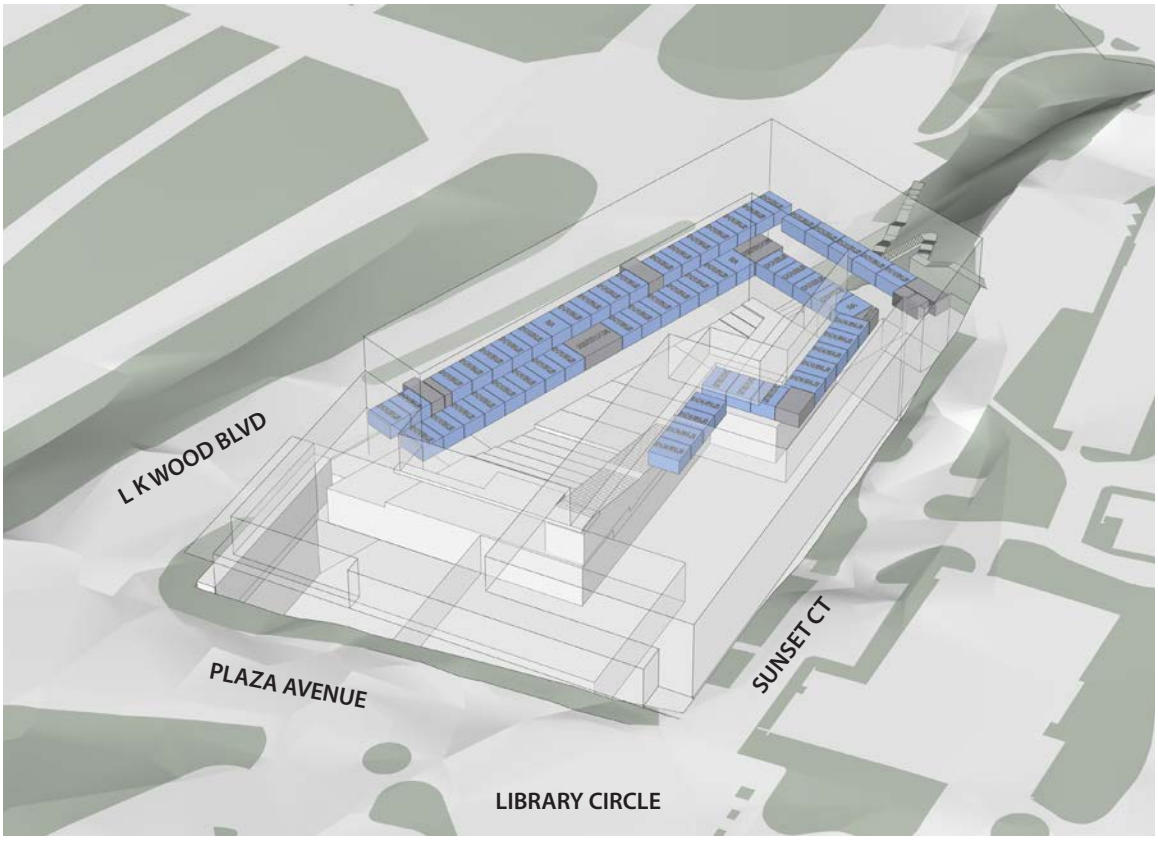


Figure 4.5.14 - Stacked Programs - Level 4

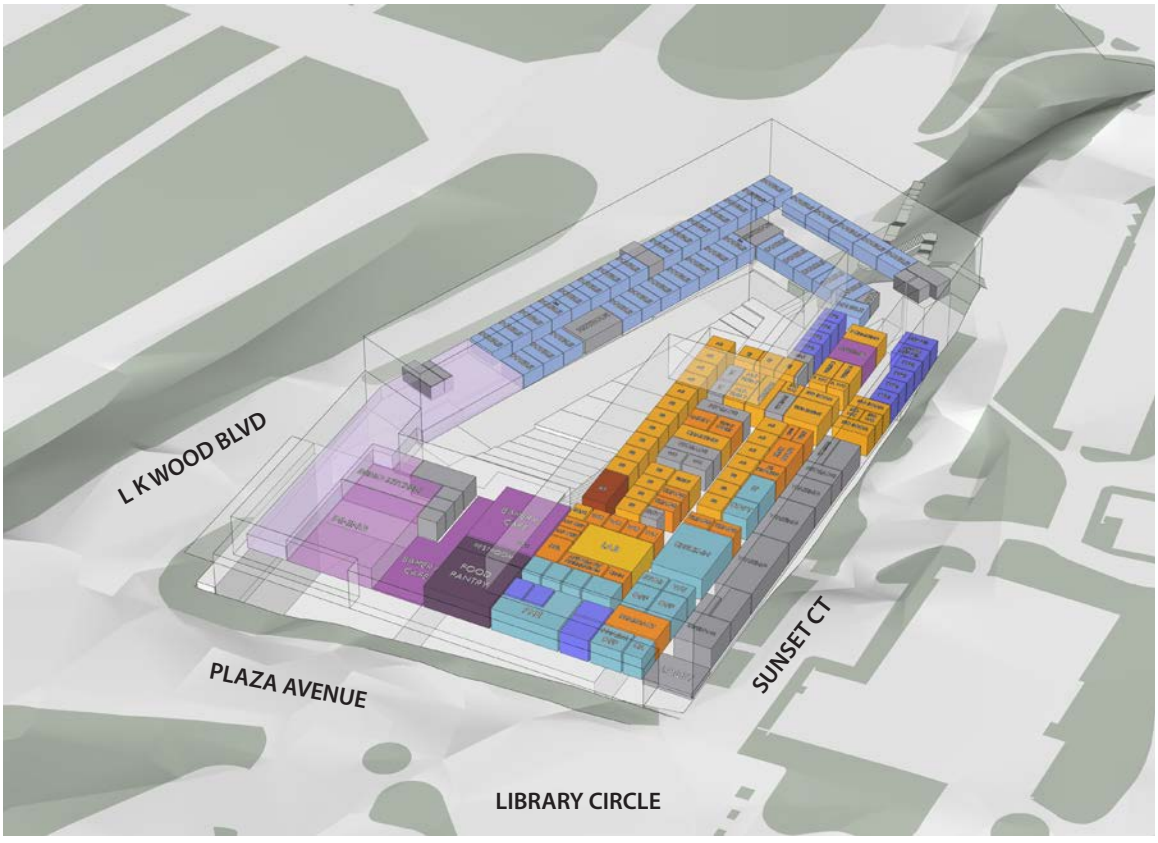


Figure 4.5.15 - Stacked Programs - Level 5

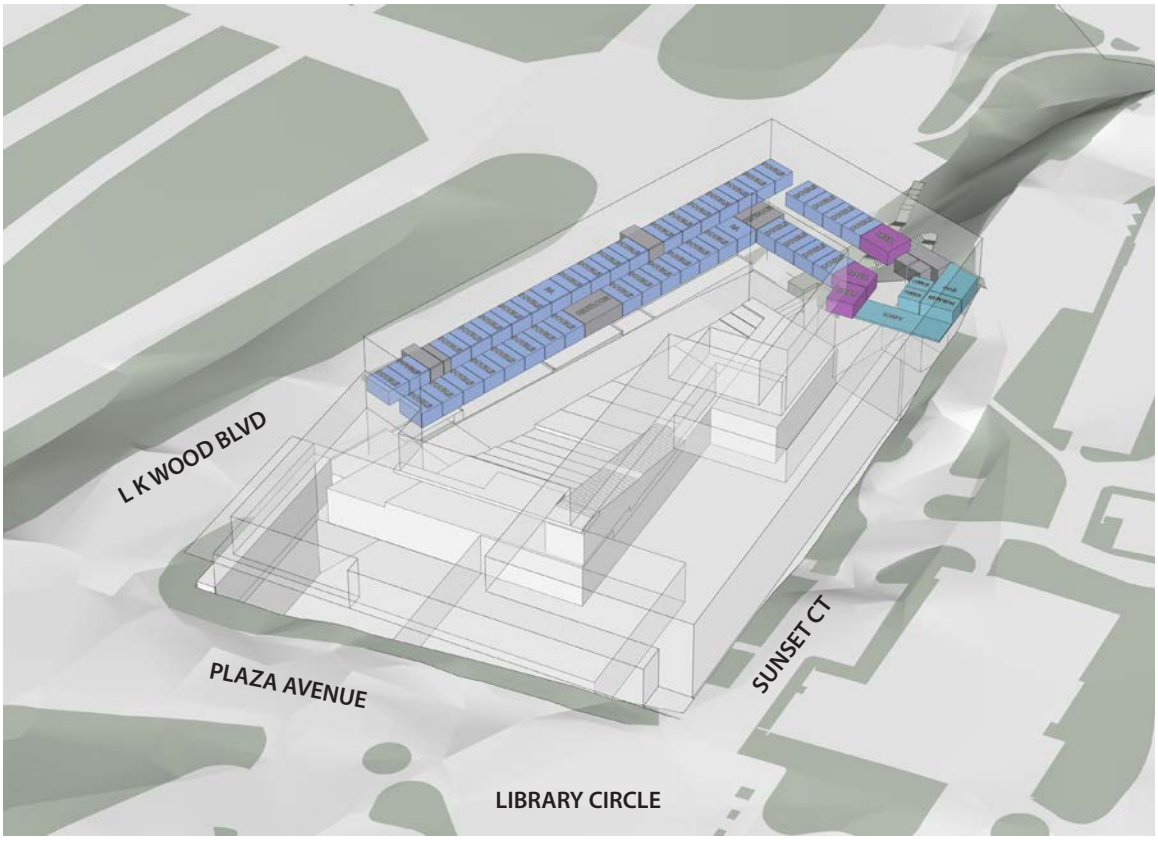


Figure 4.5.16 - Stacked Programs - Level 6

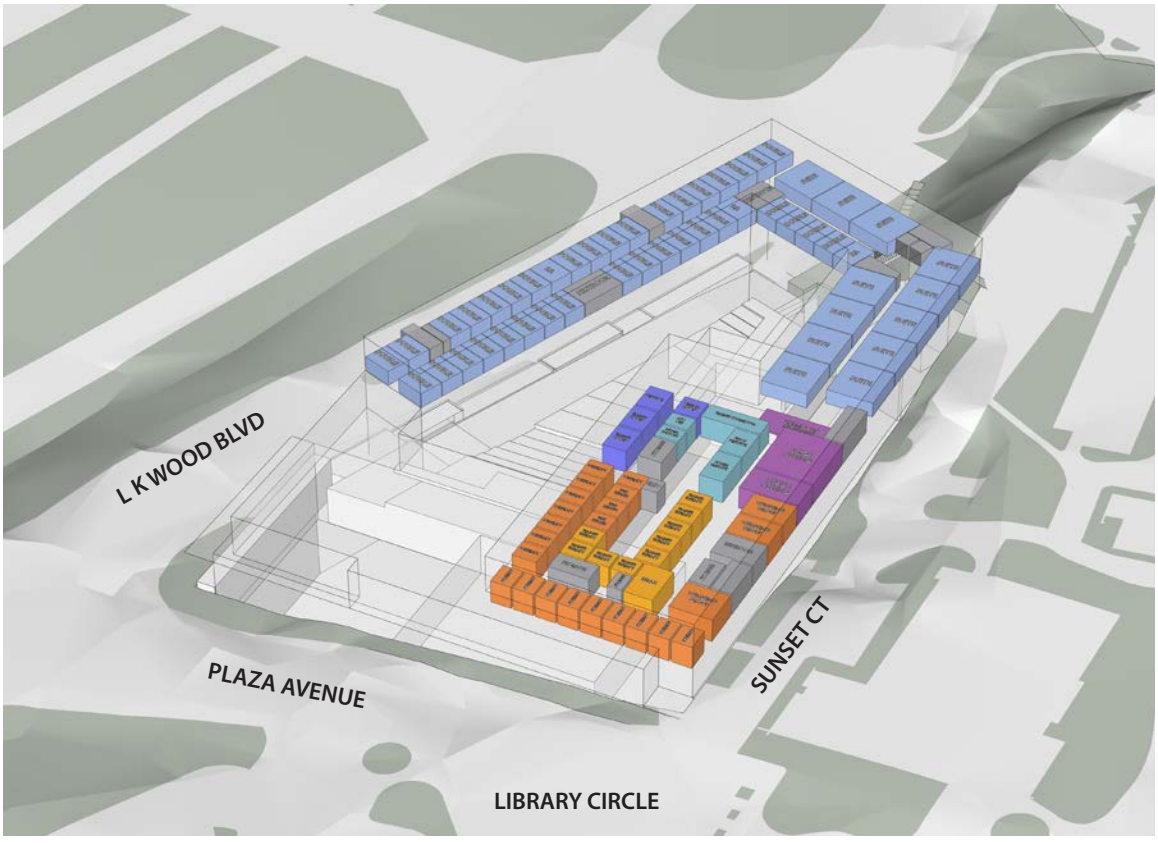
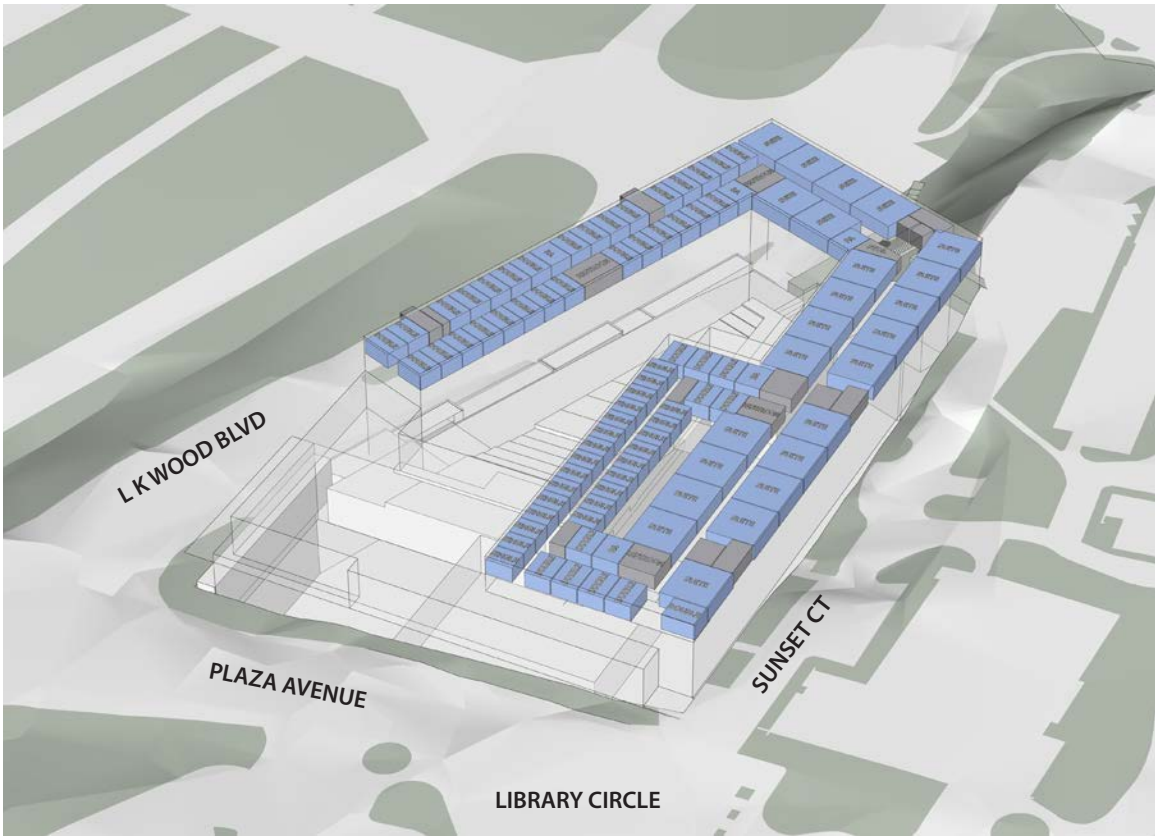
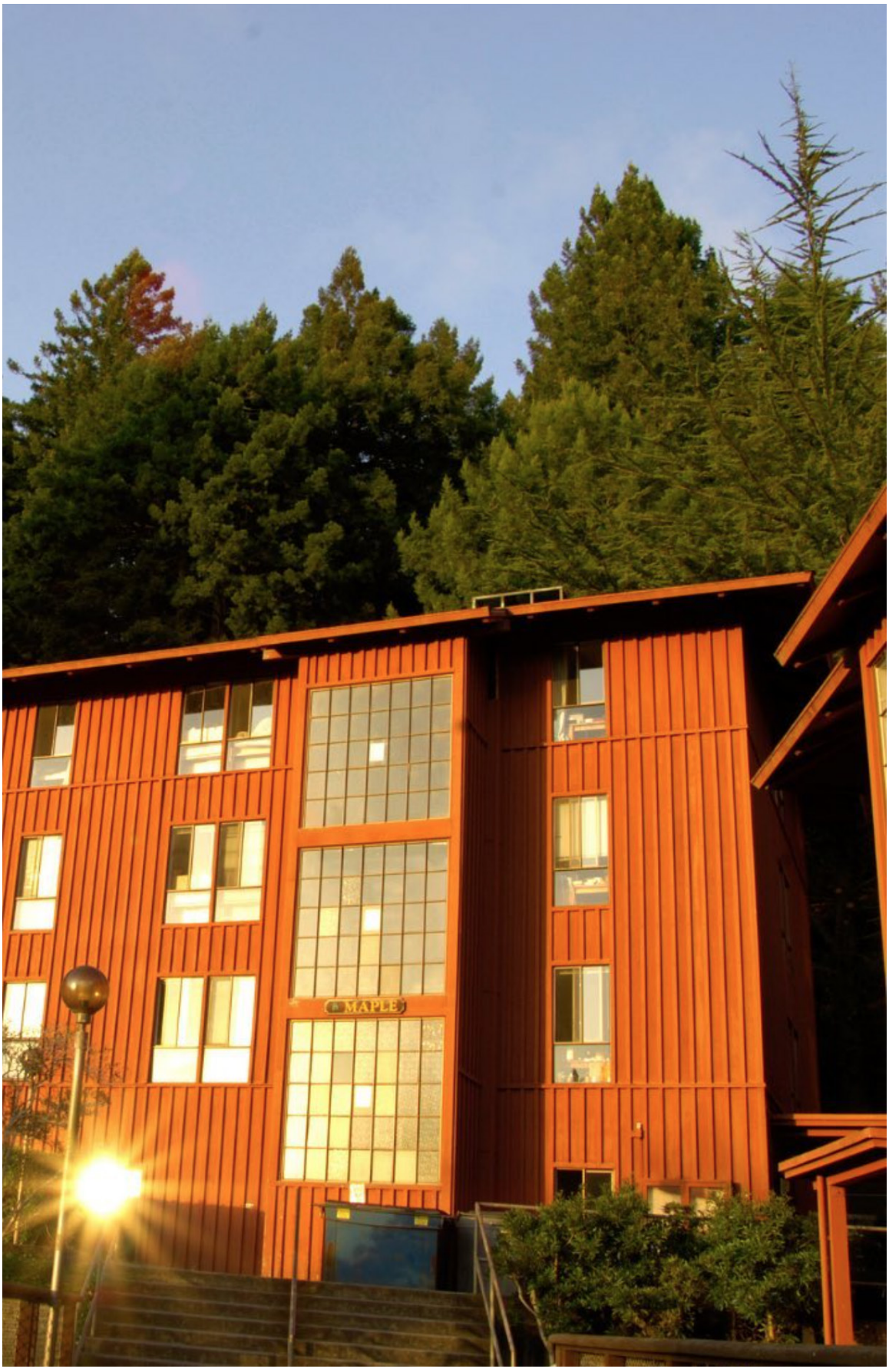


Figure 4.5.17 - Stacked Programs - Level 7




MAPLE

05

BASIS OF DESIGN AND SYSTEMS APPROACH

5.1 LANDSCAPE ARCHITECTURE

The landscape architecture design of the new Housing, Dining and Health building shall offer a beautiful, safe, accessible, and welcoming environment closely supporting the student residential life at this new building—along with wellness and comfort of students on campus. It should complement and reinforce the architectural character of the new buildings and will be cohesive with the 144-acre campus, downtown Arcata, and the Humboldt community. The term 'landscape' is inclusive of all non-building and non-vehicular paving portions of the site and includes planting areas. Planting will be provided throughout the site by means of tree lined streetscapes, along the new building faces, courtyards, and the on-structure exterior terraces. Refer to the civil engineering narrative for further discussion on infrastructure, grading, retaining walls, materials, water requirements, and other related aspects that are tied to the landscape.

Site circulation, views, and vistas for students, visitors, and staff, enhanced accessibility, access to green and respite open space, and a holistic approach around site life-cycle management shall be key elements to the site plan. The site plan should prioritize safety of all users and maximize the visual and physical connection to nature. Access to all public portions of the site and building shall be provided in compliance with applicable codes. The landscape shall guide and reinforce site circulation and provide clear and defined view corridors with minimal conflict between vehicles and pedestrians. The design should also include sustainable and environmentally responsible features to the greatest extent possible to meet CalGreen Code requirements and if pursued, LEED design credits. The landscape shall be compliant with ADA standards for accessible design, Water Efficient Landscape Ordinance (AB1881), as well as any other applicable governmental jurisdiction requirements that may be applicable to this site.

5.1.1 CONCEPTUAL DESIGN

The landscape design for the site should work in concert with the building and existing landscape to establish a unique presence on campus for housing and follow the overarching goals for the site:

- Equitable access, safety, and comfort throughout the site
- Designing spaces that teach = express sustainable features
- Interior / exterior / community engagement
- Opportunities for outdoor respite and healing
- Preservation of existing valued trees, views, and connections.

Site design concept should aim to respond to site specific goals of blending the building and the pedestrian experience into the existing landscape as seamlessly as possible--creating a weaving of sustainability and environmental understanding by design through compassion, collaboration, and connection to complement the tapestry of the Cal Poly Humboldt Campus. The landscape design should also support student activities that may take place outside at the new housing structure.

The following are key site components:

- **Courtyard:**
  - The courtyard is at the center of the of the Housing, Dining, and Health building and would be

considered a multifunctional open space. Consider design elements that help to enhance this visually important focal point and help to support various uses.

- The courtyard could have exterior furniture, seat walls and planting that supports social gathering, learning, and promotes health. The organization of this space should support both social connections and individual activity.
- Terracing a part of the courtyard for planting and or seating could be considered to add a dynamic quality to the space and allow for different vantage points.

- **Accessible pedestrian paths:**
  - Where possible, seamlessly integrate ADA accessible pathways from nearby parking and sidewalks to the plazas and entrances to the buildings.
  - There will be a walkway along the north of the building consisting of new accessible stairs to provide connection between LK Wood and Sunset court. Coordinate site lighting to integrate with stair design.
- **Existing trees**: Retain as many of the healthy tree specimens located on site as possible.

Safety of students, visitors, and staff is the top priority with the design of the landscape. The final design should consider the following goals:

1. 1. A simple and clean planting palette will use a limited number of native species to meet the function of the landscape.
2. 2. The landscape will be designed to be cohesive with the surrounding area and to reflect the unique culture and character of the campus.
3. 3. The landscape will complement the architectural character of the building.
4. 4. The design will provide various landscape areas that respond to the intended use of the site. Higher intensity landscape and hardscape should be considered near the exterior engineering work areas. Secondary landscape zones in key view areas such as street frontage and building perimeter will provide visual interest.
5. 5. Accessible pedestrian paving will be provided at all public entries with emphasis on a pedestrian connection between the existing campus, parking, and the new building.
6. 6. The design will provide enjoyable exterior spaces for students, visitors, and staff that is inclusive of seating areas with pleasant views.
7. 7. The design will provide aesthetically pleasing landscape views from the building windows (all floors) and use tree and shrub planting to screen unwanted views.
8. 8. Clear views will be maintained throughout the landscape areas for security and will provide defined access for pedestrians.
9. 9. The planting design will provide visual relief using shape and color, plant form, and leaf color and texture in key areas, utilizing biophilic design interventions.
10. 10. Unless specifically needed for screening, trees will be pruned up to provide a minimum of 7’ from the ground to the underside of the canopy.

11. 11. The design will utilize trees and other plantings to help mitigate the climate. Deciduous trees in the south and west facing building exposure will allow for solar gain and protection from wind in the winter and provide for cooler outdoor spaces in the summer.
12. 12. Where used, planting areas will use shrubs, perennials, and groundcovers that will remain low to maintain clear views throughout.

5.1.2 HARDSCAPE

Exterior hardscape shall be designed to be code-compliant and meet the functional needs of the site and the building. Materials and design shall be durable and long lasting, complementary to the building, lobby interior, greater campus, and provide clear and defined access. The hardscape will also conform to the forthcoming master plan and guidelines.

1. The design should provide code-compliant accessible concrete sidewalks and/or modular paving from public streets and accessible drop-off space to entries to the new building. Pedestrian walkways will be designed to minimize crossings between pedestrians and vehicles. At the drop off areas, vehicular paving may be modified to reinforce pedestrian use. Plantings shall be low in those areas to allow for visibility.
2. Some sidewalks and paving areas may be designed to slope toward the planting areas instead of the curb and gutter to direct storm and irrigation run-off into planting areas instead of the storm drain.
3. If used, color of pavers should meet necessary SRI requirements for LEED and sustainable practices.
4. Sidewalks shall be poured in place concrete with saw-cut joints. If used, Integral color selection will match the greater campus.
5. Due to site slopes, retaining walls adjacent to the pathways and buildings may be necessary in some areas.

5.1.3 FURNISHING

Site furnishings, where used should complement the historic campus context as well as the architectural style of the new building and conform to the forthcoming master plan and guidelines. Site furnishings such as benches, trash receptacles, and bike racks will be located at key areas to be used by employees and students. Sustainable materials, location of manufacturing facility in¬¬¬ proximity to the university, and site appropriateness of materials are some of the factors that should be considered when choosing site furnishing

1. End of life and responsible disposal should be considered in selecting all furnishings. Fair trade and ethically made products (sweat shop free) should be prioritized
2. All bench furnishings shall incorporate a back and arms to meet any accessibility code requirements or local guidelines.
3. Consider moveable furnishings in gathering spaces. The final quantity and types of flexible seating

should be coordinated with forthcoming campus standards

4. Outdoor lighting shall be International Dark Sky (IDA) compliant. Select lighting products certified to minimize glare, reduce light trespass, and help protect night sky.
5. Consider illuminated bollards at drop-off areas and other spaces where pedestrian-vehicular paths intersect
6. Small landscape path lights may be considered at areas of respite in lieu of full-size lighted bollard.
7. An art feature could be considered in one of the plaza or garden areas to create a focal point.
8. For flexible seating, moveable tables and chairs may be considered in at the south-facing outdoor roof terrace.
9. Manufacturer for fixed above-grade planters includes Tournesol as Basis of Design.
10. Bike parking shall be incorporated in highly visible, accessible locations near entries at the new facility in accordance with state or local codes. Bike parking shall be covered and protected from the elements using building overhangs or other sustainable means and shall conform to LEED guidelines for both long- and short-term bike parking. The final quantity and types of bike parking should be coordinated with forthcoming campus standards.

5.1.4 PLANTING

The planting plan shall provide for an effective and functional landscape that meets the needs of the buildings, promotes safety, and uses relatively low water. Planting may frame and help to differentiate various exterior user spaces. Planting should complement the existing landscape while enhancing the character of the new building and reflecting the character of the campus. Plants will be selected from the campus Landscape Committee planting palette. The plant palette should respond to site elements, such as wind, and plant material should be placed in such a way to help mitigate areas that are uncomfortable due to climate. Plants will be chosen to perform well and require the least amount of on-going maintenance and conform to the forthcoming master plan and guidelines.

1. Plant species that are appropriate for the climate, the site, and ease of maintenance will be utilized.
2. Plants will be selected and spaced at the time of planting to be appropriate for the intended use and their size at maturity. Selected plant species will provide for:
    - A safe site with clear views.
    - Reduction in maintenance hours associated with pruning.
    - Better health of the plants.
    - Reduction in generation of green waste.
3. Consider a palette of drought-tolerant / low-water using plants for reduction in irrigation demand.
4. Maximize use of California native plants that are resilient to climate related stressors and promote pollinator health. Using native plants minimizes or eliminates the need for synthetic fertilizers and pesticides.

5. Planting will be designed in hydrozones of similar water needs. The irrigation will be designed to comply with the planting hydrozones. Hydrozones will be based on plant water needs, sun exposure, slope, and soil conditions.
6. A combination of ornamental and deciduous trees in informal massing to provide perimeter screening.
7. Trees will be planted away from light poles. The optimal lighting location will be coordinated with tree locations.
8. All planted landscape areas are to be covered with minimum 3" of bark mulch and, if flow through planters are required, will have a 3" lift of la paz stones 3" in diameter.
9. Lawn areas may be considered for functional use in the exterior plaza spaces (picnic, sports, etc).
10. Plants shall be installed at sizes that are appropriate for the intended use and typical of planting techniques.
11. Trees will be planted at minimum 24" box size with staking such as the hidden platypus deadman guying system below surface, similar to: https://platipus.us/wp-content/uploads/2018/05/Platipus-Brochure-Tree-USA.pdf
12. If used, focal point trees will be planted at 48" box size with staking or guying.
13. If used, specimen trees will be planted at 60"-72" box size with staking or guying.
14. If used, shrubs will be planted from 5-gallon and 1-gallon size containers and spaced as needed based on their mature size – typically 4' – 6' on center.
15. If used, groundcover will be planted from 1-gallon size containers and spaced as needed based on their mature size – typically 24" – 48" on center.
16. After mass grading and prior to planting, soil fertility test shall be performed from two-to-three areas of the site. Soil amendments, fertilizers, and ratio of mixture with the native soil shall be installed per the recommendations of that report.
17. Landscape may include edible fruits and berries, and medicinal plants in strategic locations.
18. Landscape should reflect regenerative soil practices, beneficial plan and pest relationships, and should be maintained with no chemical herbicides
19. Landscape will facilitate healthy insect and pollinator relationships.

5.1.5 IRRIGATION

The permanent irrigation system shall be designed for long-term function with quality components and for ease of maintenance. Irrigation to apply the optimal amount of water based on the needs of the plants. Plants will be placed in hydrozones based on their water use requirements, and the irrigation will be designed specific to those hydrozones.

1. Planting will be designed to meet the requirements of the city and the state-mandated Water Efficient Landscape Ordinance (WELO - AB 1881). This ordinance limits the amount of irrigation water that can

be used based on site specific calculations to determine the maximum water allowance as well as minimum irrigation efficiencies.

2. Irrigation will be predominately drip emitters or bubblers at each plant for shrub and groundcover areas.
3. Irrigation will be designed for no overspray onto hardscape.
4. Irrigation controller will be a smart controller that will automatically self-adjust based on real-time weather updates (via cellular update from the manufacturer or on-site weather station) or soil moisture sensors. The model and manufacturer are to match existing controllers and allow for integration into the sitewide irrigation system.
5. Quick couplers and isolation gate valves will be placed throughout the landscape areas per the direction of hospital maintenance staff.
6. All piping, including drip tubing is to be buried and not placed on the surface of the soil. Only emission devices, such as emitters or the top of pop-up sprinklers shall be on the surface.

5.1.6 DRAINAGE

All landscape areas to effectively drain and/or serve as storm water run-off filtration and storage areas. Bioswales will be incorporated throughout site where possible. Drainage shall also conform to the forthcoming master plan report. Refer to the civil engineering narrative for further discussion on drainage and stormwater management.

1. All landscape areas that are not designed for storm water filtration or storage shall have swales and/or drainage catch basins to drain excess water.
2. Catch basins and swales shall be provided adjacent to the building to move water away from the foundation.
3. When possible, use swales to move run-off in lieu of drainage piping.
4. Storm water shall not be allowed to puddle in any vehicular or pedestrian paving areas.
5. Swales and basins shall be designed at the service area and parking lot to filter storm water run-off prior to entering the storm drain system where possible.
6. Site sidewalks may be designed to slope toward landscape and away from curbs and gutter to the greatest extent possible with swales in the landscape to move water away from the walks.
7. Landscape drainage facilities will be constructed of durable materials such as NDS, Rainbird, ACCO or similar high-quality products.
8. Slopes shall be planted and/or covered with slope stabilization fabric to eliminate/minimize drainage erosion. Erosion control fabrics shall not contain plastics or petroleum of any kind.
9. Bioswale areas will incorporate various sized boulders and river rock. Groundcovers, shrubs, and perennials shall be used on edges and interior of bioswale areas. Species will be chosen for adaptability of water to flow through as well as adapt to dry conditions.
10. Plantings that stabilize hillsides and prevent erosion will be promoted.

5.2 CIVIL ENGINEERING

Sherwood Design Engineers has evaluated the capacity of the utility infrastructure systems listed below to serve the planned Health+Dining+Housing building. In addition, some of the utility expansions or modifications that may be required to serve or accommodate the proposed building have been identified.

- Water supply.
- Wastewater collection, treatment and disposal.
- Stormwater management and control.

5.2.1 SITE CONDITIONS & CONSTRAINTS

5.2.1.1 EXISTING CONDITIONS

The planned Housing+Dining+Health building would occupy a partially vacant site located in the northwest corner of the campus. The site is bounded by LK Wood Blvd. on the west, Plaza Avenue/Library Circle on the south, Sunset Court and Parking Lot R4 on the east, and Parking Lot G1 on the north. The site is divided into east and west sections by Mill Street, which runs north from Plaza Avenue to an existing cul-de-sac. The Feuerwerker House is located on the smaller west section, and the Little Apartments, Brero House and Hagopian House are located on the east. All existing buildings are clustered at the south end of the site, near Plaza Avenue and Library Circle. The remainder is heavily wooded open space that extends north to Lot G1. The Housing+Dining+Health building, however, would only occupy the southern half of the site, leaving the remainder undeveloped.

Other than Mill Street and the cul-de-sac, the only pavement on the site consists of the Feuerwerker House parking spaces and driveway, handicap and service vehicle parking stalls adjacent to the Little Apartments and Brero House, and several pedestrian paths. One of these paths consists of mostly raised walkways and elevated staircases that provide a route through the woods from Sunset Court in front of the Hagopian House to the east side of the Mill Street cul-de-sac.

The following sections provide additional existing site information obtained primarily from the campus utility maps. Prior to finalizing any plans for the installation of utility improvements to serve the Housing+Dining+Health building, on-site surveys should be performed as required to confirm the extent and condition of all existing utilities that may serve the site in the future.

5.2.1.2 DEMOLITION

Construction of the Housing+Dining+Health building as currently planned would require removal of Mill Street plus all existing buildings, pedestrian pathways, the Sunset Court/Mill Street walkway, and overhead power and communication facilities. Trees surrounding the existing buildings, as well as within the undeveloped areas extending north to the limits of the proposed building footprint would have to be removed. At this time, the campus, wishes to maximize preservation of trees on the remainder of the site. Where either trees or building foundations are removed, standard geotechnical remediation would be required to prepare the ground for construction of new building foundations.

Campus infrastructure maps indicate the existing water infrastructure in the project vicinity has been abandoned, except for a 1" line that extends north in Mill Court from Plaza Drive to Feuerwerker House. No point of connection into an active water network is shown, so it is not clear how the existing buildings are currently being served. The largest abandoned line is a 24" diameter main that runs east from Library Circle into Plaza Avenue, then north in Mill Street through the north end of the project site to Granite Avenue. Sewer service is provided by a 6" sewer that also runs north in Mill Street and across the wooded north end of the property and then Lot G1 to a City of Arcata sewer in Granite Avenue. There are no existing storm drains on site, other than some small diameter underdrains with undetermined outlets on the east side of the Little Apartments and the Brero House, plus a single catch basin at the north end of the Mill Street cul-de-sac that discharges into the woods. All existing, underground utilities would have to be removed prior to building construction, although, in the area slated to remain undeveloped at the north end of the site, the 24" water main could be abandoned in place and the 6" sewer could be preserved to provide service for the new building.

5.2.1.3 SITE GRADING & DRAINAGE

The proposed site encompasses a significant amount of topographic variation. The south end drops approximately 25 feet from east to west along Plaza Avenue/Library Circle (8% average slope), while the north end drops about 55 feet (36% slope) between the parking spaces on the west side of Lot 4 and LK Wood Blvd. This significant change in conditions between the south and north ends of the site occurs because Sunset Court slopes up about 10 feet from south to north, while LK Wood Blvd. slopes down just over 30 feet in the same direction. The developed portions of the site are generally level with the adjacent roads, with no significant landscape banks or slopes that make abrupt transitions between adjacent ground and the interior of the site. This condition gradually changes north of Feuerwerker House and Hagopian House, though, where the wooded slope between Sunset Court and LK Wood Blvd. becomes progressively steeper.

As noted above, there is little existing storm drain infrastructure. It is expected that runoff from the Little Apartments, Brero House and Hagopian House drains to Mill Street, where it flows north to the catch basin in the cul-de-sac for discharge to the wooded slope below. West of Mill Street, runoff from Feuerwerker House and the undeveloped woods to the north most likely sheet flows to LK Wood Blvd. where it is collected by City-owned[1] catch basins on the east side of the street.

Preliminary sections through the planned development site indicate the building would be set into the hillside, with the north end of the lowest level opening on to LK Wood Blvd. Level 2 would have an entrance at a higher elevation on LK Wood, at the south end of the building, and Level 4 would have an entrance up the hill where Sunset Court meets Library Circle. The final at-grade entrance would be in the northeast corner on Level 5, near the beginning of the resident's parking lot at the north end of Sunset Court. The interior building courtyard would be relatively level at the south and north ends, with a gently sloping middle portion that transitions between the elevation of Level 3 at the south end and the elevation of Level 2 at the north.

---

1. For the purposes of this study, if "City" is used by itself, it is intended to mean the "City of Arcata" and or the "City of Arcata's" officials and departments.

The building footprint would extend to the back of sidewalk along Sunset Court, but would be slightly set back on Plaza Drive and LK Wood Blvd. to permit the possible incorporation of terraced landscape elements between the exterior building walls and the sloping walk. Significant grade transitions would be required along Plaza Drive/Library Circle and LK Wood Blvd. (both drop at least 20 feet along the proposed building frontage), but these changes would predominantly be made directly against the building walls, with minimal use of retaining walls or stepped foundations (please see the Structural narrative portion of this Feasibility Study). The building entrances described in the preceding paragraph would be located as required to provide nearly level, accessible routes from the adjacent street sidewalk into the different building levels.

Access for service vehicles and deliveries would be through a driveway entrance into Level 1 on LK Wood Blvd., near the middle of the building. As now planned, this driveway would be one-way, exiting to LK Wood at the north end of the building, opposite the Sunset Avenue bridge over Highway 101. The configuration of this service/delivery driveway, including its entry and exit points, would be contingent on final design of the building and also on the City of Arcata's plan to replace the existing Sunset Drive/LK Wood Blvd. 3-way stop intersection with a traffic circle.

5.2.2 WATER SUPPLY

Water is provided to the Cal Poly Humboldt campus by the City of Arcata, which currently obtains all of its supply from the Humboldt Bay Municipal Water District (HBMWD), but also has a currently off-line groundwater well with a capacity of 182 million gallons per year. In 2020, the City used approximately 50% of its 1,186 acre feet (386 million gallons) annual allotment from HBMWD, and projects this will rise to 63% by 2045. Because the City's demand projections include the anticipated growth of the entire community, including the Cal Poly Humboldt campus, it is not expected that supply constraints will affect the City's ability to serve the campus in either the short or long term. However, continued campus development could potentially affect the City's local storage facilities, which it maintains to meet peak domestic and fire flow demands. As a result, the City Engineer has indicated they would like the campus to provide advance notice of all planned increases in demand so the collective impact of ongoing development throughout the City's service area on both storage and distribution facilities can be continually evaluated.

Water is delivered to Cal Poly Humboldt through a City distribution system that abuts or intersects the campus on four adjacent roadways; LK Wood Boulevard, Granite Avenue, 14th Street and Union Street, as well as a section that runs northeast across the campus from the end of Union Street to intersect Granite Avenue. In addition, a large diameter water main cuts across the campus on Harpst Street, B Street and 17th Street, connecting main water lines on LK Wood Boulevard and Union Street. The B Street main also runs south to connect with the main on 14th Street, and continues north past Harpst Street to a dead end near the middle of the Student and Business Services building. This network of pipelines provides multiple points of connection between the City and the campus distribution system, which delivers water to all existing campus buildings and facilities. There is no separate fire system. Both potable and fire suppression supplies, including building sprinklers and fire hydrants, are supplied by the same distribution system.

Maps of the campus and City distribution systems show only a City-owned 8" water line in LK Wood Blvd. and a dead end 6" line that feeds a fire hydrant at the north end of Parking Lot R4. This 6" line begins at a connection to a 10" main in front of Redwood Hall, runs west past the Student Health Center, then angles northwest into Sunset Court and the parking lot. It was most likely installed to provide service connections for Redwood Hall, the Student Health Center and Sunset Hall, as well as to supply an additional hydrant at the east end of Redwood Hall. The 8" LK Wood main extends from an 8" line in Harpst Street to a 12" main that crosses Highway 101 on Sunset Drive and then continues north in LK Wood Blvd. The campus maps show only two service connections to this main between Harpst Street and Plaza Avenue, plus an "alternate supply" service notation adjacent to Feuerwerker House. This line was probably installed to supply fire hydrants situated along the east side of LK Wood Blvd. As previously noted, because the only water lines in the area of Plaza Avenue/Library Circle are designated "abandoned," it is not possible to determine the current source of supply for the existing buildings on the project site.

Combined domestic and fire water demand for the Housing+Dining+Health building is currently unknown, but it is not expected to exceed 2,000 gpm.[2] Although it must be confirmed by the City of Arcata, this level of demand should not exceed the available capacity of the 8" LK Wood Blvd. water main. As a result, it is expected an additional supply line (most likely an extension south from the existing Sunset Court 6" water main) would only be needed if the university determines the building should have a redundant source of supply. . It is noted the building's need for City water may be reduced through capture and reuse of on-site rainfall for toilet flushing. Current plans call for the installation of interior plumbing to support this option, although no plans have been developed for the treatment and storage infrastructure required for implementation (refer to the Plumbing narrative portion of this Feasibility Study for further discussion of this option).

There are four existing fire hydrants in the project vicinity, one located on LK Wood Blvd. south of Plaza Avenue, one in a landscape island east of Library Circle, and two on the east side of Sunset Court and Lot R4, near the north end of Sunset Hall and the east end of Redwood Hall. As currently proposed, it appears the south and east faces of the Housing+Dining+Health building would be within the State Fire Code's maximum 250 foot hose pull allowance from an existing fire hydrant. Only the south end of the west face would be close enough to the existing LK Wood hydrant, leaving the remainder of this face unprotected. The north face of the building would be close enough to the Sunset Court hydrants, but they would be located at the top of a heavily wooded slope below the parking stalls on the west side of the street, so it is expected a more accessible location would be required. A single new fire hydrant located a short distance south of the northwest corner of the building should adequately cover the north face as well as most if not all of the west face beyond the reach of the LK Wood hydrant, although any proposal to extend fire hydrant coverage would have to be evaluated by the State Fire Marshall. In addition, the Fire Marshal would have to determine the extent of fire hydrant coverage needed within the building's interior courtyard to access the inner facing exterior walls.

---

2. Fire flow demand is preliminarily estimated to be 250 gpm for building sprinklers and 750 gpm for interior standpipes. Because the building will include residential dorms, a dining facility and student health center, peak domestic demands could be quite high, but should not be greater than 1000 gpm.

5.2.3 WASTE WATER COLLECTION, TREATMENT AND DISPOSAL

The City of Arcata treats and disposes of all campus wastewater in the City's wastewater treatment facility, located adjacent to the north end of Humboldt Bay. The facility includes the Arcata Marsh Wildlife Sanctuary, which provides enhanced treatment for the secondary treated effluent from the treatment plant's oxidation ponds. Overflow from the ponds is discharged to Humboldt Bay in accordance with the City's National Pollutant Discharge Elimination System operating permit.

The City is currently upgrading the treatment facility, primarily to address numerous discharge violations. These violations mainly concerned the quality of effluent being discharged to the Bay, so the upgrades are focused on improving the facility's treatment processes, rather than increasing treatment capacity. Once complete, the facility will be able to treat a design average day flow of 2.3 million gallons per day (mgd) in accordance with the water quality requirements set forth in the operating permit. This flow rate, along with a 5.9 mgd peak wet weather flow capacity, was established in 2017, and both reflected a 20% increase over existing rates to accommodate build-out of the City's General Plan. No estimate of wastewater generation by the Housing+Dining+Health project is currently available, but because the City's wastewater improvement program is underway, it is not expected development of this project would adversely affect the City's ability to comply with all discharge requirements. The City Engineer, however, has asked to be informed of any campus development plans that entail increased wastewater production.

Wastewater is conveyed to the treatment facility through the City's collection system, which campus utility maps indicate abuts the campus on LK Wood Boulevard, 14th Street, a portion of Union Street, the west end of Granite Avenue, and on a pedestrian path south of College Creek Field that connects the south end of Rossow Street to 14th Street. The only Cal Poly Humboldt sewer in the immediate vicinity of the project site is the previously described Mill Street line that connects to Granite Avenue. From this point of connection, the Granite Avenue sewer crosses Highway 101 and winds around the north and east sides of Shay Park to then flow through the main part of town to the wastewater treatment plant. There is also a City-owned sewer on LK Wood that beings just south of Plaza Avenue and flows south to 14th Street. At 14th Street, it joins a major collection line that crosses Highway 101 between 11th and 12th Streets and then continues south to also end at the wastewater treatment plant. As a result, the existing Mill Street and LK Wood sewers should provide two potential points of connection for the proposed building, although the LK Wood option would require a short extension north across Plaza Avenue and its installed elevation may to too high to serve the lowest levels of the new building.

5.2.4 STORMWATER MANAGEMENT

5.2.4..1 STORM DRAIN INFRASTRUCTURE

Stormwater runoff on the Cal Poly Humboldt campus is routed through a network of on-site storm drains. This network drains most of the central campus into an extension of the City of Arcata stormwater collection system that extends into the campus on B Street to just past Harpst Street, and on 17th Street into the residential neighborhoods east of Union Street. This extension exits the campus at 14th Street, near the north end of D Street, then discharges into a Caltrans culvert that runs south in the median

of Highway 101 from a beginning point underneath the G Street overpass. The median culvert crosses to the west side of the highway in the vicinity of 7th Street and transitions into a series of mostly open channels that ultimately discharge into Butcher Slough at the north end of Humboldt Bay.

Runoff from the north end of the campus, which includes the project site, drains north into a large diameter culvert that carries Jolly Giant Creek under Jolly Giant Commons and Parking Lots R1 and G1. The stream culvert continues west across Highway 101 and becomes an open channel at Arcata Pond, which drains into Shay Park and then an alternating series of open channel and culverted sections that flow south through town to an eventual discharge at Bucher Slough. As noted in a previous subsection, stormwater runoff from the east half of the project site flows to an existing catch basin in the Mill Street cul-de-sac, which discharges north into the woods. This discharge, as well as runoff from the west half of the site, is collected in catch basins on the east side of LK Wood Blvd. This system begins at the southeast corner of Plaza Street and LK Wood Blvd. and runs north along LK Wood to the Sunset Drive intersection. At this point it leaves the road and runs northeast along the edge of the trees at the north end of the project site to a connection with the Jolly Giant Creek culvert in Parking Lot G1.

5.2.4..2 STORMWATER CONTROL

The City Engineer has indicated the storm drain system serving the campus has adequate capacity to convey existing peak rates of stormwater runoff to Humboldt Bay.[3] To ensure this capability is not compromised, the City would require any projects that might increase runoff (by increasing the area covered by impervious surfaces) to mitigate potential impacts on downstream piping systems by limiting the rate of post-development discharge to the existing rate under predevelopment conditions. This is typically accomplished by detaining a portion of a storm's runoff until the period of peak rainfall has passed and the capacity of downstream facilities is no longer at risk of being exceeded. For the proposed project, it is estimated this could require as much as 900 cubic feet (approximately 6,715 gallons) of storage to fully attenuate the peak flow increase associated with a 10-year recurrence interval storm.[4] Standard detention options include the installation of buried storage (such as empty culverts, stormwater chambers and/or gravel beds) or routing the runoff into a modified bioretention facility, as described in Section 5.1.3c below. If buried storage is utilized, the best location for such facilities may be underneath the paved service driveway exit proposed for construction at the north end of the building, although

---

3. A Caltrans representative was not able to comment on development-related drainage issues that may affect Highway 101 infrastructure until they can be evaluated as part of the CEQA review process. However, it is expected that implementation of the City discharge limitations described in this section will prevent project development from adversely affecting the capacity of the highway culverts that receive runoff from the campus through the City storm drain system.

---

4. Pre and post project runoff rates were calculated using the Soils and Conservation Service TR-55 methodology and a 24 hour rainfall total of 4.68 inches. Impervious areas were assigned a Runoff Curve number of 98, and pervious areas a number of 71 (the area's Empire fine sandy loam is classified as a Type B soil, and a "fair" (30% - 70%) cover of grass, weeds and brush was assumed for selection of a Runoff Curve number). This data, along with pre and post project estimates of impervious cover, was inserted into a hydrologic model that determined approximately 720 cubic feet of runoff would have to be detained to maintain discharge rates no higher than under existing conditions. This volume was then increased by 25% to allow for inefficiencies that typically occur when routing stormwater runoff through detention facilities.

as discussed below, it may also be possible to locate some or all stormwater storage within the interior courtyard.

5.2.4.3 WATER QUALITY PROTECTION

In addition to the City's requirement to control post-construction peak discharge rates, the building project would also have to comply with applicable provisions of the National Pollutant Discharge Elimination System (NPDES) Small Municipal Separate Storm Sewer Systems (MS4s) General Permit, as administered by the State Water Resources Control Board. The principal goal of this permit is to prohibit the discharge of contaminants by proposed development projects into downstream water bodies, both during construction and after a project is completed. For construction, the Housing+Dining+Health development team would have to prepare a Stormwater Pollution Prevention Plan (SWPPP) for implementation by the general contractor. These plans typically focus on preventing sediment from entering storm drain facilities that will carry it into streams or other downstream receiving waters. This is mainly accomplished by not disturbing natural areas until they are ready to be developed, stabilizing disturbed slopes immediately after grading is complete, and filtering or impounding sediment-laden runoff until it can be safely released.

Per the MS4 permit, post-construction pollution controls must be designed to trap the contaminants that accumulate on impervious surfaces and are washed into stormwater runoff. This is achieved by retaining on site the "first flush" of all impervious surface runoff (retained stormwater is never discharged, whereas detained stormwater, as discussed in the previous subsection, is only held temporarily). In the north coast region, the first flush includes all runoff generated by storms up to and including the 85th percentile rainfall event, which, around Humboldt Bay, equals 0.65 inches of rain. As currently planned, there would be approximately 84,200 square feet (sf) of impervious surfaces (57,610 sf building; 26,590 sf site paving) on the Housing+Dining+Health building site. These areas would generate just approximately 4,560 cubic feet (34,100 gal.) of runoff in the design rainfall event, which would typically be retained in some type of below ground storage facilities.

At least a portion of the first flush runoff could be retained by capturing it for reuse, if the system described in Section 5.1.2 is installed. If it is not, or if the reuse storage facility does not have the capacity to hold all of this runoff, it can only be retained by infiltration into the ground. Although Type B soils were assumed in a footnote in the previous subsection, infiltration rates within the underlying subsoil may not permit extensive infiltration.[5] If this is the case, the Regional Water Quality Control Board would permit runoff that cannot be reused to be slowly discharged to Humboldt Bay through the local storm drain system, which would eliminate or reduce the 4,560 cubic feet retention requirement. The project would still have to provide the detention storage discussed in Subsection 5.1.3b, but the biotreatment facility(ies) described below would only be required to include a 12" deep gravel storage reservoir below the upper layer of filtration soils.

---

5. According to the 1925 USDA Soil Survey of the Eureka Area, California, the subsoil beneath Empire fine sandy loam contains higher percentages of silt and sand, along with occasional cemented layers, both of which potentially restrict infiltration.

In order to protect the quality of both groundwater (in the case of infiltrated runoff) and surface waters (in the case of slowly released runoff), the first flush of runoff would first have to flow through a biotreatment facility[6] to remove contaminants. Per sizing criteria set forth in the Humboldt Low Impact Development Stormwater Manual, such facilities must have a surface area equal to no less than 4% of the impervious area being treated. For the estimated 84,200 sf of impervious surfaces on the Housing+Dining+Health site, this would require a biotreatment facility of approximately 3,360 sf. This does not represent an overly large area on a site this size, but there will be very little open space within the defined project footprint, except for within the building courtyard. It should be possible to site one or more biotreatment facilities in this area, although the overflow or discharge lines from any treatment facilities at the lower, north end of the courtyard, would have to be routed underneath the building to connect with the LK Wood in-street storm drain. In addition, structural and geotechnical constraints associated with long term stability of the surrounding building foundations may preclude any disposal of infiltrated runoff within the courtyard.

The use of biotreatment and/or bioretention facilities as described above to meet the project's water quality protection requirements would be in accordance with the site design provisions of the Humboldt Low Impact Development Manual, which encourage project proponents to integrate water quality protection facilities into the surrounding landscape wherever possible, mimic natural patterns of flow, and maximize the incorporation of green infrastructure into project open spaces.

---

6. Biotreatment refers to the contaminant removal achieved by filtering runoff through a layer of soil and organic material, whereas a bioretention facility combines biotreatment with a gravel reservoir that holds the runoff until it can infiltrate into the ground. If the runoff simply passes through the soil and gravel prior to discharge, so little or nothing is "retained," it is more accurately referred to as a biotreatment facility.

5.3 ARCHITECTURAL

5.3.1 EXTERIOR CLADDING

The following section provides a summary of the relevant Architectural criteria and recommendations for the "Health, Dining, and Housing Building (2A)" which will contain a full-student Dining facility with food preparation, integral Student Housing occupying large parts of the building at different locations on the floor plates, and a student health center providing both medical and psychiatric services.

The exterior skin system for the planned buildings will be durable, water-resistant, compatible with the surrounding context, cost-effective and appropriate for the intended use.

Several types of metal or composite window systems are available within varying cost allowances and different materials will be analyzed for their cost effectiveness to meet the budget. The final choice of systems will be made during the Schematic Design phase of work. Contrast and texture in the use of exterior materials will be studied carefully for visual interest and for the relationship to the interior function of each of the buildings. Careful attention will be given to avoid water and moisture intrusion at areas where different materials or building systems are joined, such as at exterior windows and door conditions. The minimum R-value for exterior walls will be R-19. If using rain-screen type cladding systems, preference will be given to systems that can work with non-metallic support systems.

Metal flashings at walls and openings shall be made from stainless steel to maximize the longevity of the exterior systems. Stainless steel flashing shall be provided at grade to conceal exposed slab edges and to cover transitions of subgrade waterproofing to vertical surface vapor barrier transitions.

Glazing will be utilized to provide natural light into the occupied building areas and to provide views out-wards into the surrounding campus. Sun shading, screening and glazing types will be studied to limit the effects of undesirable heat gain and visual glare. The window system may be painted aluminum, structural curtain wall, or another appropriate quality system and will be investigated during design. In parts of the façade, smaller punched openings may be developed where less light is required within the adjacent spaces. Careful consideration will be given to the location of exterior windows with respect to maximizing daylight, possible furniture locations, and final locations of specialty equipment.

At exterior door entries, canopies or recessed entries will provide the necessary protection for inclement weather. The features at the entries, canopy or other, should also be used to give the building presence and as a way-finding tool.

5.3.2 ROOFING & WATERPROOFING

The selection of roofing systems will be considered to reduce heat island effect and to limit glare if visible from occupied spaces. The roofing system will also be selected to withstand the long-term effects of sun, wind and rain, and to accommodate on-going roofing maintenance and eventual replacement. All fasteners and flashings shall be of stainless steel to maximize longevity of the system, unless the flashings and fasteners are specifically part of the warrantable roofing system itself. Roofing color and material may be considered so to complement the existing campus aesthetic.

The roofing system will provide thermal insulation having a minimum value of R-30. If making use of low-sloped roofing, among acceptable roofing membranes are PVC, EPDM and Multi-Ply SBS-Modified

Figure 5.3.2.1 Glass Simple Comparison

Bitumen Membrane systems and minimum slope shall be 2% minimum at the valley of any low sloped roof. Other roofing materials may be considered depending on the final design and will need to be reviewed with the University. Performance criteria is a minimum and shall be designed per Code and California State University requirements.

If a seismic joint is determined to be required per the Structural Engineer's final requirements, the joint shall be compatible and warrantable with adjacent exterior building weather barrier systems.

In schematic design, the locations of the air-handling units and exhaust fans will be studied - if located on the roof, they will be installed with vibration isolation. Exposed, roof-mounted equipment will be located behind a parapet wall or equipment screen made of durable materials to withstand the environment, screened from view and kept to a minimum. Roof screens structural systems shall be hot-dipped galvanized at all surfaces. Roof-mounted equipment will be grouped together and rest upon common curbs to the extent possible. The rooftop equipment shall be well organized visually and functionally. Roof penetrations for piping and ductwork will be minimized and appropriately detailed. The roof area will be evaluated for its potential to accommodate photovoltaic (PV) panel arrays.

- Where different waterproofing and weatherproofing systems meet, details shall be reviewed by manufacturers and ensured to be warrantable.
- Below grade waterproofing at the retaining walls and slab on grade shall be designed so to prevent a build-up of water at the earthen sides of structure.

5.3.3 STAIRS & ELEVATOR

Stairs and elevator will be located to maximize flexibility for future internal space changes and to comply with the building's exiting requirements. Stairs and elevators shall be designed to meet all applicable standards and codes, particularly the Americans with Disabilities Act.

5.3.3.1 STAIRS

There is a slope across the site from east to west. The Health, Dining, and Housing Building is sited to generally follow the existing topography as the site slopes down from Sunset Court on the east down towards LK Wood at the west. Given the shape of the building, there will be interior egress stairs that occur regularly at the perimeter of the building to permit egress to the public right of way. Where stairs occur, they are required to meet egress requirements as well as to provide direct exits.

The Health, Dining, and Housing Building is sited so that exits may occur at different levels around the building to provide direct exits onto grade. There are a few terraces at the building; the terrace at the courtyard serving the upper level of the health center program and the large terrace serving the main dining towards the southwest of the site. The terrace serving the health center may want to be minimized so to not require secondary stairs as a stairs will likely not be acceptable to the AHJ to egress into a courtyard as designed. The terrace at the dining may require a secondary stair to provide a direct exit to grade; it is expected that stair be concealed by the Architecture of the building to not be plainly visible from the street.

At the Health, Dining, and Housing Building, roof access may be through a penthouse space depending on final design and final mechanical system needs. The roof access may or may not be continuous from one of the egress stairs

5.3.3.2 ELEVATOR

The Health, Dining, and Housing Building is expected to have their own dedicated elevators that serve each of the programs separately. It is planned that the elevators servicing the student housing will be a pair of elevators near the north east main entry for the student housing program. It is intended that the elevators serving student housing will be able to serve both passengers as well as movement of delivery of materials within the building.

The dining program will also be serviced by a pair of elevators that will stop at all levels of dining from the loading dock / receiving areas up to the top-most dining level. It is intended that both elevators will serve passengers but only one to also be able to serve movement of materials within the building.

A single elevator is planned at the student health program that will occur within the controlled access areas for patients to gain access to the CAPS level. None of the elevators will not provide service to a roof. The elevators will be machine room less (MRL) type unit and shall conform to accessibility requirements.

5.3.3.3 GLAZING

A key indicator of excellent glass is the ratio of light transmission to the solar heat gained. The more Light to Solar Gain (LSG), the better. Solarban 72 on Starphire glass is an example of industry leading high performance glass, with a VLT of 0.71 and an SHGC of 0.30. This resultant LSG of 2.37 is unparalleled by other glass types, and is the most visually clear double pane low-e IGU currently available.

While the final glazing specification may be driven more by the SHGC requirement than the VLT, choosing a glass type that achieves a LSG of at least 2.1 is recommended.

All partitions shall be finished with gypsum board to a smooth finish (Level 4), ready for paint. Storage rooms and building support spaces shall be finished in a light texture (Level 3) and ready for paint. Above finished ceilings and at concealed spaces a fire-taped level of finish is acceptable. All gypsum board wall surfaces exposed to view shall be painted. Where ceramic tile, concrete, concrete unit masonry, or metal surfaces occur, those surfaces may be left unpainted and their natural finish exposed. Latex enamel interior paint with a satin finish will be the typical paint used at partitions.

5.3.3.4 CEILINGS

Finished ceilings may not be appropriate for all spaces and will be omitted where a ceiling system is neither necessary nor desirable. Finished ceilings may be omitted for aesthetic effect in public areas such

as the building lobby, office areas, or possibly some large open area. Consideration will be given to the nature of adjacent spaces when determining whether the finish ceiling may be omitted. Finished ceilings will be provided in utility spaces that adjoin and may be visible on a regular basis from high profile public areas.

Acoustics in the areas where open ceilings occur will be studied to achieve appropriate sound levels. Finished ceilings will be omitted in mechanical rooms, electrical rooms, telephone/data room, and other similar spaces.

Where the control of noise or vibration is necessary, the ceiling design may be required to include additional layers of gypsum board, 3-1/2" acoustical batt insulation laid above the ceiling, and/or vibration isolated hanger devices.

Gypsum board ceilings shall be installed primarily in toilets, locker rooms and showers, and other areas where there will be exposure to water vapor. Gypsum board ceilings shall also be installed as required to control noise and vibration in spaces with high levels of equipment or fixture-generated noise or where aesthetic effects are warranted. All gypsum board ceilings shall be constructed with ceiling framing independent of walls and columns and be attached with resilient channels or resilient hangers to the structure above. All joints between floors, walls, and ceilings shall have an acoustic seal.

Gypsum board ceilings in spaces with little to no exposure to water vapor, such as public areas, offices, or other similar spaces where gypsum board is used solely for noise control or aesthetic effect, shall be constructed with standard gypsum board. Standard gypsum board shall be 5/8" thick and comply with the requirements of ASTM C36.

Gypsum board used on ceilings shall be finished smooth (Level 4), ready for paint. Satin finish, latex enamel interior paint shall be applied to ceilings in general use spaces where there is little or no exposure to vapor. Semi-gloss finish, latex enamel interior paint shall be applied to ceilings in areas with low to moderate exposure to vapor. Semi-gloss finish, alkyd enamel paint shall be applied to ceiling above showers and other spaces with high exposure to water vapor.

Exposed structure with concrete elements, structural steel elements, and metal deck exposed to public view should be painted or may be left unfinished as if desired by Owner for appropriate for aesthetic effect. It should be considered when exposing mechanical, electrical and plumbing systems as well that all exposed items meet the same desired aesthetic where such materials may be exposed to public view.

5.3.3.5 INTERIOR FABRIC SHADES

Where shades are provided, shades shall be manually controlled. Where shades are used and placed at heights not accessible by all building occupants, motorized shades are to be considered.

If a fabric shade system is pursued, the following shade fabric specifications to maximize performance shall be met:

- PVC-free shade cloth material
- Medium to light grey or medium-light tone in color (avoid whites that become too bright when struck by direct sun, and avoid dark colors and black that do not diffuse sufficient ambient daylight into the space when struck by direct sun).
- 1% openness factor on east and west facades
- 3% openness factor on south facade
- 5% openness factor on north façade

5.4 STRUCTURAL

5.4.1 PROJECT DESCRIPTION

The following section provides a summary of the relevant Structural criteria and design recommendations for the "Housing, Dining and Health Services Building" which will combines the Housing with Dining and Health services into one inter-connected building. This complex of interconnected buildings "wrap around" a central court yard on a site that is steeply sloping along its principal north-south axis. The Housing portion has approximately 77,000 asf, the Dining 21,000 asf, and the Healthcare 28,000 asf. Housing is primarily located parallel to L K Wood Blvd. and occupies the full 7 stories. Healthcare occupies level 4-7 on the East side of the site, and Dining Levels 1 and 2 on the south end of the site.

Our code consultant has determined that these buildings will need to qualify as type II, non-combustible construction. Housing is the primary occupant of the site, and this function normally has low floor to floor heights. Concrete post-tensioned flat slabs 8" thick are recommended to meet this requirement and shear walls at building core functions which align floor to floor, such as stairs, restrooms and elevator cores will provide the frame lateral system for wind and seismic. The connected Dining and Health Care which stack and overlap with each other and the housing would have the same system, but with different floor to floor heights from the housing – see preliminary building sections shown in Section 4.5. At this time it is too early to determine if seismic joints along the edges of the building complex would be required, however it may be possible to avoid these.

We do not have site specific geotechnical information at this time but in most instances a combination of spread footings at the gravity columns and mats foundations are the shear wall cores are typical to this type of building. If the site has soft layers then a pile foundation with pile caps and grade beams would be required.

Code: California Building Code 2022 with amendments in conformance with CSU Seismic Requirements dated Mach 5, 2020.

Live Loads:

Stairs and Exit Corridors:…… 100 psf

Housing…….. 40 psf

Classrooms:……40 psf

Healthcare & Dining……40 psf

Roof (areas without equipment):……20 psf + 5 psf allowance for solar

Mechanical Areas:……100 psf or weight of equip. + 50 psf

Deflection Control:

Defections shall be in conformance with CBC 2022 criteria for roofs and floors

½" maximum at exterior walls or based on compatibility with glazing systems

Elevators supports in accordance with elevator manufacturer guidelines

Site Seismic Design Parameters will be in conformance with CSU standards once a soils investigation compliant with CBC 2022 requirements is complete. See Table 1 – CSU Campus Seismic Ground Motion Horizontal Response Spectral Acceleration Parameters for the seismic parameters which vary depending on the site class.

Risk Category:.....II or III will depend on occupancy count and types of chemicals stored on site

Seismic Importance Factor:.....Ie =1.25 due to occupancy count for Risk Category 3

Wind Speed:..... V_{3S} = 100 mph

Exposure:..... C

5.4.2 MATERIALS

Concrete Compressive Strength

Mix "A" Foundation Elements:.....4,000 psi

Mix "B": For slab-on-ground, normal-weight fill over steel deck

formed slabs and beams, curbs and equipment pads, stair pan fills : .....4,000 psi

Mix "C" & "D": For walls and columns.....5,000 psi

Reinforcing Bars..... ASTM A615, grade 60

Welded Reinforcing Bars.....ASTM A706, grade 60

Concrete Masonry

CMU Block.....f'_m 1,500 psi

Grout..... f'_c 2,000 psi

Steel

W-Shapes.....ASTM 992, Grade 50

Angles, Channels and Bent Plates..... ASTM A36

Square Round or Rectangular Tubes..... ASTM A500, Grade B

Pipe Columns..... ASTM A501 Fy=36 ksi

Plates..... ASTM A572 Fy=50 ksi, typical ASTM 36 where noted

High Strength Bolts..... ASTM 325 Slip Critical

Machine Bolts and Thru Bolts..... ASTM A307

Standard Anchor Bolts..... ASTM F1554, Grade 36

High Strength Anchor Bolts .....ASTM F1554, Grade 105

Shear Connector Studs.....AWS d1.1, Type B, Automatic End Weld

Expansion or Wedge Anchors .....Hilti KWIK BOLT TZ expansion anchor or equal

Steel Members at Exterior.....Hot Dipped Galvanized

Metal Deck

Roof Deck.....ASTM A653, Grade 33, Galvanized G50 at interior, G90 at exterior

Cross Laminated Timber

CLT.....APA PRR 410-2021

5.4.3 SUSTAINABILITY

Starting in 2022 projects funded by the State of California will need to comply with the "Buy Clean California Act", see website: https://www.dgs.ca.gov/PD/Resources/Page-Content/Procurement-Division-Resources-List-Folder/Buy-Clean-California-Act

This establishes the maximum acceptable GWP (Global Warming Potential) for new construction:

Figure 5.4.3.1 Maximum Acceptable GWP Limit Summary

Eligible material	Maximum acceptable GWP limit (unfabricated)
Hot-rolled structural steel sections	1.01 MT CO_2 eq./MT
Hollow structural sections	1.71 MT CO_2 eq./MT
Steel plate	1.49 MT CO_2 eq./MT
Concrete reinforcing steel	0.89 MT CO_2 eq./MT
Flat glass	1.43 MT CO_2 eq./MT
Light-density mineral wool board insulation	3.33 kg CO_2 eq./1 m^2
Heavy-density mineral wool board insulation	8.16 kg CO_2 eq./1 m^2

In addition, concrete has a large embodied footprint because of the carbon emitting process used to make the portland cement. By some estimates production of portland cement is responsible for 5% of the global CO2 emissions. Fly ash may be substituted for portland cement to reduce the embodied carbon of the concrete.

The following recommendations apply to concrete mix designs available in the area and consider the quality of locally available aggregate. 15% fly ash substitution may be made without impacting strength for concrete with up to f'c = 5 ksi. At this level of substitution, it improves the workability of the concrete and is less expensive than the Portland cement it replaces. Up to 25% substitution for f'c less than or equal to 5 ksi may be used although concrete quality begins to degrade because it is harder to work and strength is impacted. 35% may be used in foundations or retaining walls where there is little need to work the concrete but strength is limited to f'c = 4 ksi and is determined based on 56 days rather than the traditional 28 days.

Cast-in-place concrete should utilize cementitious and aggregate materials produced locally as much as possible.

5.5 MECHANICAL

The following narrative describes the mechanical (HVAC) systems to be provided for the new Health – Dining – Housing Building at Cal Poly Humboldt. The project will be provided with mechanical systems that are cost-effective, energy-efficient, environmentally friendly, easily maintainable, and appropriate for the coastal location's corrosive moist air. Strategies will be employed to conserve energy in conjunction with various sustainability and wellness strategies. Design of the mechanical system shall promote forward thinking in engineering and be flexible in design incorporating minimum requirements needed to ensure a safe and healthy building while applying guidelines to minimize the environmental impact.

All mechanical systems shall be designed to promote reliability, serviceability, flexibility, and capacity for future renovation. Mechanical systems and equipment shall be all-electric, with an emphasis on heat pumps for supplying comfort heating and cooling (if required), and be sized to accommodate worst-case operational conditions. The system shall be designed to accommodate and promote the four "S's" of grid-integration: Shape, Shift, Shed, Shimmy where feasible. In addition, wherever possible, natural refrigerants, or refrigerants with global warming potentials of 500 or less should be used.

5.5.1 DESIGN CONDITIONS

Cal Poly Humboldt campus is located in Arcata, CA, which has the following CA T24 Part 6 design conditions:

Climate Zone:	1
Latitude:	41.0°N
Longitude:	124.1°W
Elevation:	203 ft
Cooling 0.1% Drybulb:	75°F
Cooling 0.1% MCWB:	61°F
Heating 0.2% Drybulb:	31°F
Heating Degree Days:	5029 HDD

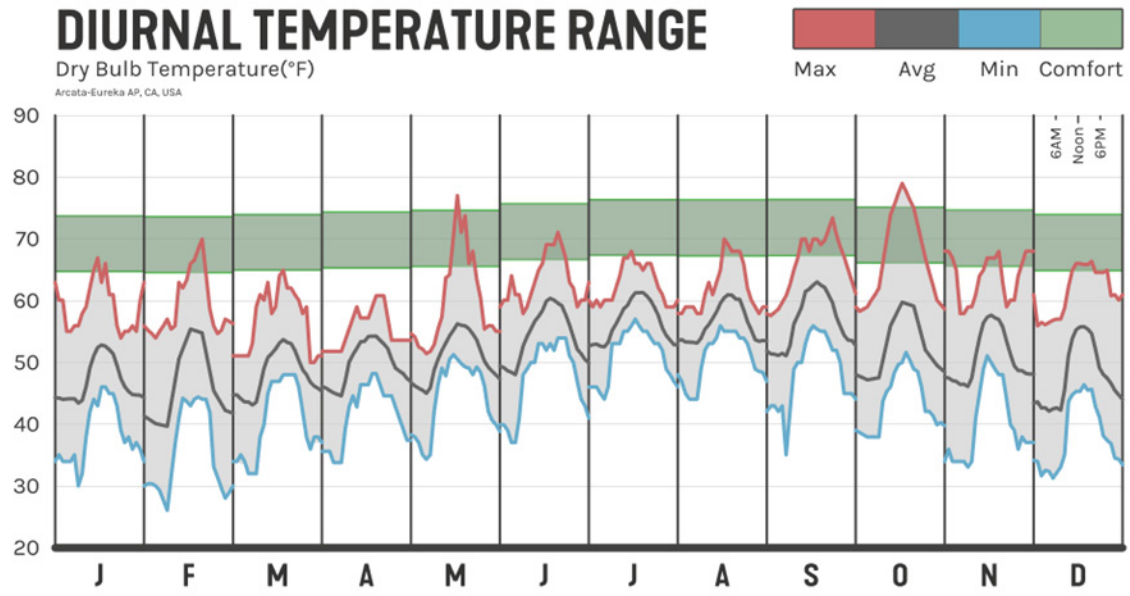


Figure 5.5.1.1 Historical Diurnal Temperature Range, Arcata, CA

With Climate Change, projected temperatures in Arcata are anticipated to increase. The HVAC design should reflect the anticipated increases in temperatures and the potential impact this will have on design loads for both heating and cooling. Where cooling may not have been historically needed in this climate zone, increasing peak day conditions may necessitate the inclusion of active cooling.

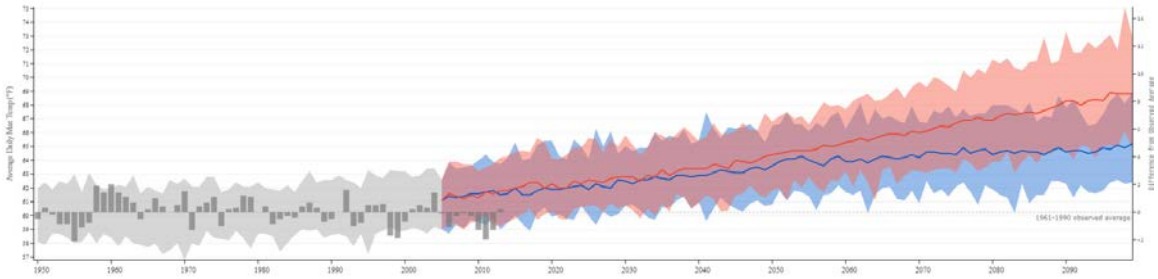


Figure 5.5.1.2 Anticipated Future Temperature Ranges
Under a high and low Global Emissions Model for Arcata, CA

5.5.2 GENERAL HEATING AND COOLING

The Health – Dining – Housing building includes a mix on internally load dominated program areas as well as enclosure load-dominated program areas. The health services program, given its dense programing, potential imaging equipment will have higher cooling loads than dining and housing. Dining services, with it's high outside air exchange rate will need extensive heating. Allowing waste heat from one program area to be used in another program area highlights the need for a central heat recovery plant serving the entire building.

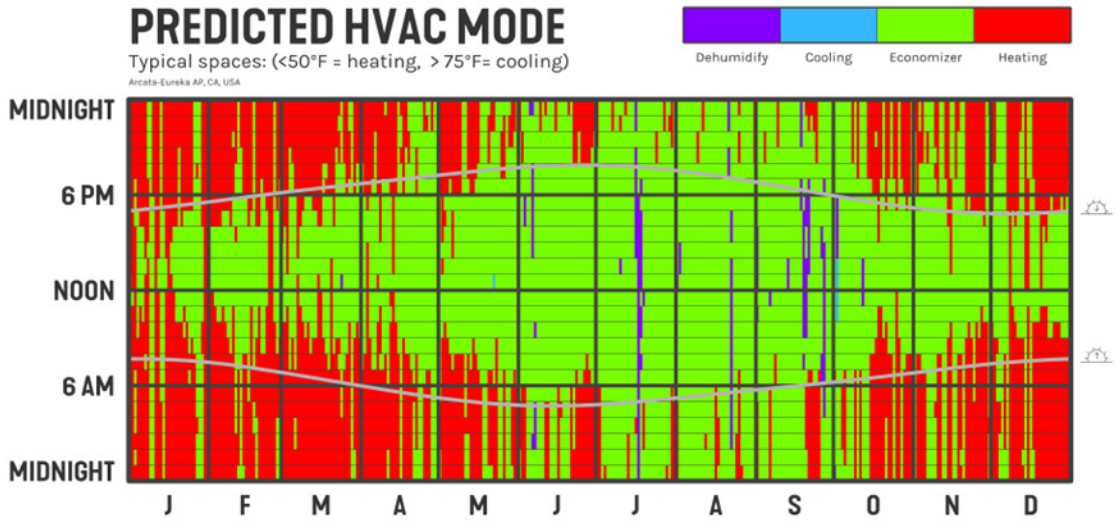


Figure 5.5.2.1 Anticipated HVAC Mode for an all-air System. Typical Economizer cooling will "waste" heat energy that could be recovered and used in the Dining Facility Makeup Air System

Temperature Regimes

To enable exceptional efficiency, and to assist with meeting a net zero energy goal, the supply water temperature for a heat pump-based heating system is critical. The following chart indicates the relationship between Coefficient of Performance, Outside Air Temperature, and the supply water temperature of an air-source heat pump. Given Arcata's cool climate and predominantly heating conditions, the selected supply water temperature is critical for energy performance. The graphic below is only an example of the impact of supply water temperatures on heat pump performance. The design team should investigate all options for low GWP-refrigerants.

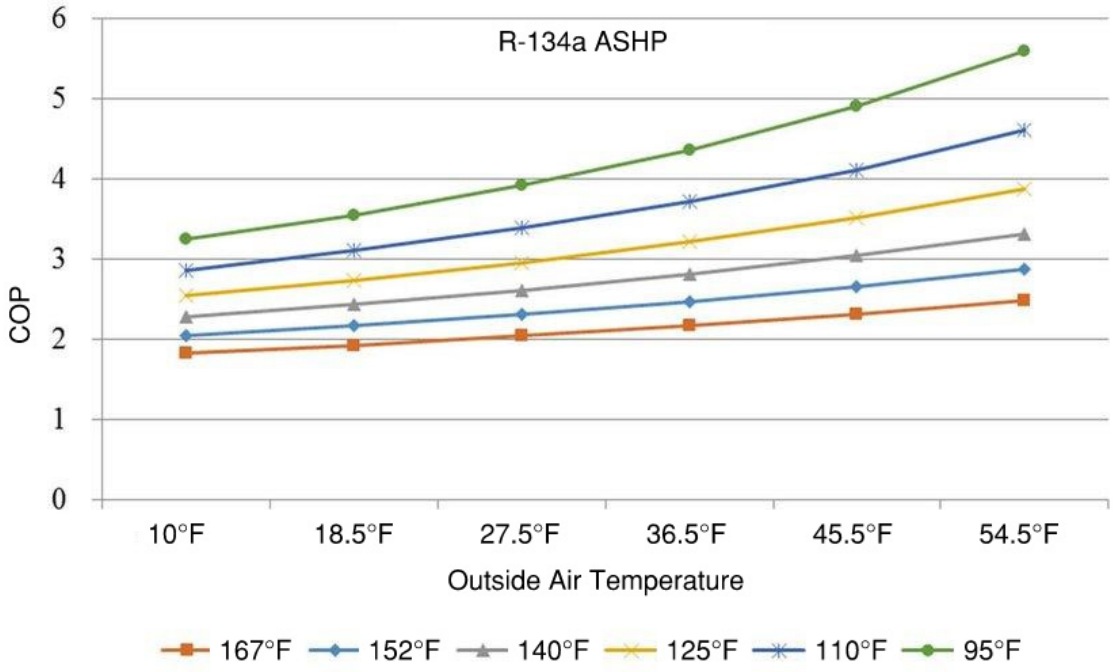


Figure 5.5.2.2 Supply Water Temperature

For efficient performance in Climate Zone 1, the design team should design any heating hydronic systems around the following criteria:

• Heating Hot Water Systems	95°F - 110°F
• Medium Chilled Water Systems	55°F - 60°F
• Dehumidification	Where required, consider the use of a dedicated low temp chilled water loop or DX system.

Special consideration should be given to Wetbulb temperatures during the heating season in this coastal climate zone. Air-source Heat Pumps (ASHP's) in heating dominated coastal zones can experience excessive frost build up on the evaporator coil. This buildup of frost will trigger significant hours of defrost cycle for the heat pump. The defrost cycle in most ASHP's significantly reduces the heating capacity if not eliminating it all together. Pairing the ASHP with thermal energy storage, including an acceptable system volume, and/or adding supplemental ASHP units is crucial to meeting the system heating demand. Optimizing heat recovery from internal waste heat sources will also help to minimize defrost impacts.

Heat Pump Selection and Refrigerants

Although an R-134 COP graph is shown above, the design teams shall evaluate an appropriate 4-pipe ASHP which utilizes low-GWP refrigerants, including the potential use of natural refrigerants. The design team shall include refrigerant leakage and end of life emissions into their analysis and present it to Cal Poly Humboldt for decision making.

Thermal Energy Storage

It is highly recommended that the project include thermal energy storage (TES). TES can provide significant load shifting capacity to the HVAC system. In addition, the strategic use of TES can provide demand charge savings as well as resilience. TES can play a critical role in a fully integrated Micro-grid, providing both load shaping and shifting capacity. TES can also provide additional resilience during a power outage event.

5.5.3 GENERAL VENTILATION

Ventilation is critical to the health and wellbeing of students, staff, and faculty. Ventilation rates will be the higher of CA Title 24 and 30% above ASHRAE 62.1 (and 62.2 for student housing) requirements for each space type, whichever is greater. In response to the COVID pandemic, and in alignment with ASHRAE Epidemic Taskforce, the project will limit the potential for exhaust air re-entrainment. The design team should review design solutions that include Dedicated Outdoor Air Systems (DOAS). Such systems do not recirculate ventilation air within the building.

Heat/Energy Recovery

It is advised to include air-to-air heat recovery devices if a DOAS system is used. Given the heating dominated climate zone, heat recovery ventilation will reduce peak heating loads on the central heating heat pumps as well as reduce energy use. Reducing peak loads will reduce the heat pump sizes and potentially reduce cost.

Exhaust Systems

Where the room program and/or equipment within the space requires dedicated exhaust, exhaust shall be provided in accordance with the California Mechanical Code.

5.5.4 MAINTENANCE AND SERVICEABILITY

The California coast is extremely corrosive to mechanical equipment. All equipment that is able to be installed indoors should be located within conditioned space. For equipment that must be located outdoors, such as ASHP's, exhaust fans, and exterior louvers, all equipment should be specified with the highest level of corrosion resistance the project can afford. In addition, the design team should consider putting equipment below protective roofs and/or screens where appropriate to reduce environmental exposure wherever possible.

5.5.5 HEALTH SERVICES SPECIFIC HVAC

The Health services program should be serviced by a dedicated Air-Handler serving a VAV w/reheat system. Ventilation rates and pressure relationships shall meet the requirements of CMC Table 4-A. Special attention shall be made for shaft locations from the roof mounted AHU and acoustical provisions, as the shafts will pass through student housing floors. The AHU serving the healthcare program spaces shall have it's Outside Air inlet and Exhaust located 30 feet or greater from any other openings into or exhaust points from the building.

The AHU serving the Healthcare spaces shall include heat recovery. The design team shall investigate the use of a hydronic coil in the exhaust air stream, as a means of capturing waste heat from the healthcare program areas for use in preheating or condition the make-up air in the dining services space. Flat plate, enthalpy wheels, or other direct connect heat recovery options are not recommended. Instead, the design team should consider run-around coils, heat pipe scenarios or the use of a cooling coil connected directly to the local heat recovery plant.

The following system options are recommended to provide the highest level of efficiency:

- VAV with Reheat AHUs:
    - 4-Pipe Heat Recovery Air-Source Heat Pump and hydronic distribution to Rooftop mounted Air Handlers

Figure 5.5.5.1 Health Program

5.5.6 DINING SPECIFIC HVAC

The Dining Services space will have a higher exchange rate due to the inclusion of commercial kitchen functions. In addition to right-sized Type 1 and Type 2 exhausts hoods to meet the needs of the commercial kitchen, it is recommended that the design team utilize a strategy of cascading ventilation makeup air from the dining rooms and ancillary spaces to the kitchens. Such a strategy reinforces improved contaminant capture by the exhaust hoods and keeps food odors from escaping the kitchens. Any additional make up air shall be provided by a dedicated make-up air unit with the air tempered as needed by a hydronic coil from the central building heat recovery heat pumps.

The following system options are recommended to provide the highest level of efficiency:

- VAV with Reheat AHUs Serving the Dining Rooms:
  - 4-Pipe Heat Recovery Air-Source Heat Pump (Central for the whole Building) and hydronic distribution to Rooftop mounted Air Handlers
  - Type 1 and Type 2 hoods connected to rooftop exhaust fans
  - Makeup Air Unit for any kitchen makeup air needs in excess of CFM available as cascading from the dining rooms
  - Auxiliary hydronic Fan Coils in Commercial cooking spaces to maintain kitchen temperatures within the ASHRAE thermal comfort standards.

For teaching cooking spaces, the design team shall work with campus and local departments of health to determine hood and fire/life safety requirements for the teaching kitchens, where food will be prepared, but not sold.

5.5.7 STUDENT HOUSING SPECIFIC HVAC

The Student Housing program space will shall have independent HVAC systems from the Dining Services and Healthcare services program. To support the campus goals around integrated pest management , energy efficiency, and maintenance, each housing unit will be equipped with a stand-alone Heat Pump A/C/Heating Unit (HPAC) with integrated ventilation heat recovery ventilation core. The heat pumps are capable of cooling as well, but requirements for cooling shall be determined in consultation with the University during the validation phase. The units shall include MERV-13 filtration for enhanced IAQ.

Figure 5.5.7.1 Epocha HPAC 2.0 Unit with Through Wall Connections

Restroom Exhaust is recommended to be continuous, and subducted to roof level exhaust fans. Corridor ventilation air shall be tempered to provide cooling and/or heating from floor-by-floor fan coil units. Trash/Recycling rooms shall be exhausted per CMC requirements.

The following system options are recommended to provide the highest level of efficiency:

- Option 1 – Room by Room HPAC Units
  - Epocha 2.0 or equivalent HPAC units with integrated heat recovery ventilation
  - Inverter Controlled compressor and ECM fans. Unit provides heating and cooling as a single unit.
  - Local BACnet integrated thermostat with adjustable lockout temperature range
  - Continuous Restroom Exhaust
  - Corridor Outside Air Fan Coil Units for tempered ventilation air to corridors.
  - Roof Mounted Exhaust fans for all trash/recycling rooms.
- Option 2 – Floor-by-Floor Ventilation
  - As an alternate to the room-by-room heat pump units, ventilation air will be tempered by floor-by-floor fan coil units ducted to each residential unit.
  - Room-by-room fan coil units for heating. Whether cooling is included shall be discussed with the design team.
  - Exhaust air from residential units through the façade.

5.6 PLUMBING

The following section provides a summary of relevant Plumbing criteria and recommendations for the Health-Dining-Housing building. The project will be provided with plumbing systems that are cost-effective, energy-efficient, environmentally friendly, and easily maintainable. Strategies will be employed to conserve energy in conjunction with various sustainability and wellness strategies. Design of the plumbing system shall promote forward thinking in engineering and be flexible in design incorporating minimum requirements needed to ensure a safe and healthy building while applying guidelines to minimize the environmental impact.

All plumbing systems shall be designed to promote reliability, serviceability, flexibility, and capacity for future renovation. Plumbing systems and equipment shall be all-electric, with heat pumps being the preferred recommendation, and be sized to accommodate worst-case operational conditions. The design of the systems and materials shall not compromise the systems' required cleanliness or purity levels.

5.6.1 DOMESTIC WATER

Metered domestic water service with backflow preventer will serve the building. Minimum of 35 psi shall be delivered at the most hydraulically remote fixture.

Based on hydrant flow test results dated January 21, 2021 from the Library Seismic project, it is likely a booster pump will be required to provide adequate pressure. Note, the closest hydrant provided was about 400 feet away from the project site. Flow tests for a hydrant closer to the building location shall be conducted to confirm available pressures.

Non-potable industrial water systems will be provided for laboratory fixtures and make-up water for equipment, as required. The non-potable water systems will be separated from the domestic water systems through reduced pressure backflow preventers.

Emergency showers and eyewashes, where required, will be supplied with tepid water per the ANSI Z358.1 definition of tepid water.

5.6.2 DOMESTIC HOT WATER

Option 1: CO2 Heat Pumps

Provide a central, recirculating hot water system served by electric heat pump units, complete with refrigerant-to-water heat exchangers, as needed, storage, and swing tanks. Heat pump units may be of the air-source type, or pending the mechanical HVAC system, water-source type with the ability to simultaneously generate chilled water.

Option 2: Wastewater Heat Recovery Heat Pumps

Provide a central, recirculating hot water system served by wastewater heat recovery heat pumps (e.g. Sharc Energy Piranha HC). The system is composed of a wastewater holding tank, circulating pump,

hot water storage and swing tanks, and uses warm wastewater discharged from showers, laundry, and dishwashers as the source to heat the domestic hot water. The heat pump has an additional recovery option, which can take waste heat from the mechanical condenser water loop and use it to supplement the production of hot water.

If there are lab fixtures requiring hot water, a separate heat pump system will be provided to produce domestic industrial hot water.

Any equipment located outdoors shall be provided with protective coatings for corrosive environments.

The domestic hot water system will also support mixing valves, if required, at emergency safety showers and eyewashes.

5.6.3 SANITARY WASTE & VENT

The building will be provided with a sanitary waste & vent system. At this time, it is assumed a sewage ejector is not needed and all sanitary waste will discharge from the building by gravity.

5.6.4 LAB WASTE & VENT

A laboratory waste and vent system will be provided to serve laboratory fixtures and equipment per program.

Lab waste & vent shall not interconnect with the sanitary waste & vent system.

Prior to connection to the sanitary waste system, a centralized, monitored neutralization tank and sample port to be provided outside with vault/manholes accessible from grade.

5.6.5 STORM DRAIN

A storm drainage system will be provided to convey rainwater from the roof of the building and any balconies / plazas to point of discharge outside the building. An overflow drain system will be daylit to the exterior of the building.

Roof area will be drained to bioretention areas/planters as well as to a rainwater harvesting cistern which is to be located on site outside of the building footprint .

Reclaimed rainwater (purple pipe) piping will be provided from 5' outside of the building into the building for connection to flush water closets and urinals.

5.6.6 PLUMBING FIXTURES

All applicable fixtures will meet the American Disabilities Act (ADA) for accessibility. The design team will use advanced innovative, water-efficient plumbing fixtures to help attain water conservation goals. Plumbing Fixtures shall be highly efficient, decreasing total water demands without negatively impacting

the quality of life.

Emergency Fixtures

Emergency fixtures will be provided in rooms where corrosive or hazardous materials are handled or as required by the building program.

5.6.7 HEALTH MEDICAL AIR, VACUUM, AND GASES

Medical Air

Provide minimum duplex oil-less scroll medical air compressor package; base mounted single point connection with desiccant dryers and 200-gallon receiver.

Medical Vacuum

Provide a minimum of duplex oil-less claw medical vacuum package; base mounted single-point connection, variable frequency drive, and 200-gallon receiver. ASME coded vacuum receiver with bypass, manual drain, control panel with automatic lead/lag controls, and components shall be pre-piped and pre-wire to single-point service connections.

Medical Gases

Provide the following medical gas systems per the latest edition of NFPA 99:

- Oxygen high-pressure cylinders with automatic switchover.
- Nitrogen, if required, high-pressure cylinders with automatic switchover.
- Carbon dioxide, if required, high-pressure cylinders with automatic switchover.
- Nitrous Oxide, if required, high-pressure cylinders with automatic switchover.
- Gas Manifolds and headers

5.6.8 DINING GREASE WASTE

A gravity grease interceptor with manholes accessible from grade will be provided to treat the dining kitchen grease waste prior to connecting into the sanitary waste system. Location and connections to be coordinated with Civil.

5.7 ELECTRICAL

The following section provides a summary of the relevant Electrical criteria and recommendations for the "Housing, Dining and Health Services Building" which will be a mixed-use 7-story building with housing, food service, dining, and medical office clinics. The building is not considered a high-rise. The Medical Office shall not be certified under HCAI.

The objectives of the Electrical Design are to establish uniformity of design, best overall cost-effective installation, and construct an Electrical system that is robust and consistent with other research and educational buildings. The design of the Electrical systems shall meet the program requirements with commitment to sustainability and energy-efficiency.

Power and Lighting systems are intended to have ample capacity to meet future demand. The systems shall include provisions for future loads as determined by the project. This building shall be All-Electric not relying on natural gas for water and space heating and cooking. The kitchen and laundry appliances shall be all electric.

The "Housing, Dining and Health Services Building" programming consists of the following facilities:

- Student Health Center Clinic spaces
- Health Education
- CAPS (Counseling and Psychological Services)
- General Offices and Medical Office Spaces
- Medical Services such as Labs, X-ray and Phlebotomy
- Pharmacy
- Medical Auxiliary Spaces
- Commercial Kitchen, Bakery, Refrigeration, Vending and Dining
- Dormitory – Single unit, Double unit, and Apartment
- Laundry
- Lounge and Multi-purpose rooms

5.7.1 CODE AND STANDARDS

The Electrical design shall comply with the latest edition of the applicable codes and standards as listed below. In addition, the system shall comply with other relevant safety guidelines as required by the program.

Applicable Codes:

- California Administrative Code Part 1, Title 24, California Code of Regulations (CCR)

- California State Fire Marshal Regulations
- City of Arcata Municipal Codes
- California Building Code (CBC) – Part 2, Title 24, CCR
- California Electrical Code (CEC) – Part 3, Title 24, CCR
- California Mechanical Code (CMC) – Part 4, Title 24, CCR
- California Plumbing Code (CPC) – Part 5, Title 24, CCR
- California Energy Code (CEC) – Part 6, Title 24, CCR
- California Fire Code (CFC) – Part 9, Title 24, CCR
- California Green Building Standards Code – Part 11, Title 24, CCR
- NFPA 101 – Life Safety Code
- NFPA 70E – Standard for Electrical Safety in the Workplace

Applicable Standards

- IEEE – Institute of Electrical and Electronic Engineers
- IESNA – Illuminating Engineering Society of North America Handbook
- ICEA – Insulated Cable Engineers Association
- NEMA – National Electrical Manufacturers Association
- NFPA – National Fire Protection Association
- UL – Underwriters Laboratories
- ADA – American with Disabilities Act
- ASTM – American Society of Testing and Materials
- OSHA – Occupational Safety and Health Administration
- ANSI – American National Standards Institute

Applicable Guidelines

- CSU Campus Design Guidelines

5.7.2 ELECTRICAL SERVICE

A load analysis was completed for each building. It was based on a volt- amperes (VA) per square foot calculation utilizing the gross square footage (GSF) of building areas, and estimated VA load of large equipment such as HVAC.

Space Description	Proposed Area (SF)	HVAC (VA/SF)	Plumbing (VA/SF)	Recept/Eqpt (VA/SF)	Lighting (VA/SF)	Total VA/SF per space
Common and Support Spaces	8,800	5	3	2.5	1	11.5
Meeting, Office and Workspace	13,875	10	.5	5	1.3	16.8
Medical Office Space	12,900	10	5	5	3	23
Dining	9,000	10	.5	.5	2	13
Kitchen	13,200	15	10	25	2	52
Dormitory	69,980	5	2	1	2	10

Table 5.7.2.1 Housing, Dining and Health Service Building Load

Large Equipment Load

Elevators – (4) 100HP

Domestic Water Pump – 30HP

5.7.2.1 BUILDING ELECTRICAL SERVICE CALCULATION

Overall Building Load (KVA) = 2,914KVA

+25% Spare Capacity (KVA) = 3,643KVA

Service Load (Amps at 480V) = 3,505A

+25% Spare Capacity (Amps) = 4,381A

Service Main Switchboard Rating = 5,000A

5.7.3 SITE ELECTRICAL UTILITIES

The normal power to the building will be served from an existing Central Utility Plant with 12.47kV service. Capacity of the Central Utility Plant should be evaluated in detail and confirm that the campus MV service has capacity. It was noted that it currently has sufficient capacity for the addition of these building. New underground conduit duct bank shall tie from MV Feeder #6, Grid Switch #6, as it is the closest to the site.

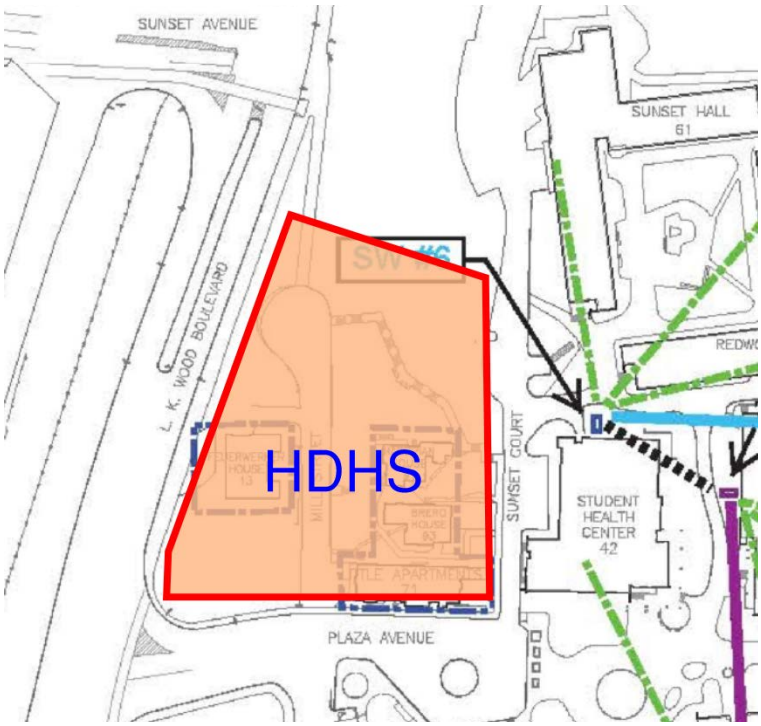


Figure 5.7.3.1 Campus MV Distribution Site Plan

Service feeders shall terminate to an outdoor medium voltage interrupting switch, The building MV transformer(s) shall be 12.47kV-480/277V 3-ph 4-w pad mounted medium voltage transformer, natural esther oil-filled type, Spill containment shall not be required. An outdoor electrical utility yard shall house this equipment.

5.7.4 EMERGENCY POWER

5.7.4.1 EMERGENCY POWER

The building is not a high-rise and will not utilize elevators for egress. The building life safety emergency power needs for the building are to serve the life safety loads which includes emergency egress lighting, exit signage and fire alarm system. A Central Lighting Inverter UL 924 to serve the emergency egress lighting and exit signage. Fire Alarm panels will be equipped with built-in batteries.

5.7.4.2 STANDBY POWER

The building has loads critical to the operation of the building and optionally can be provided with standby power. The following loads are:

General

- Domestic water pumps to keep the kitchen and student housing with water supply
- Technology System within MDF and IDF rooms to allow continuity of operation of certain programs

Health

- Pharmacy Refrigerator/Freezer combo
- Laboratory Refrigerator and Freezer
- Immunization Refrigerator and Freezer
- Medical Air Compressor and Medical Vacuum Pump
- Nurse Call System
- Public Address System

Dining

- Emergency Kitchen and its related appliances to allow food services to continue
- Electric Water Heaters to maintain hot water needs for the Emergency Kitchen
- Power and general lighting within the Emergency Kitchen and Dining

There are two options on providing standby power that can be considered in the design:

1. An Existing 2000kW Campus Generator can provide standby power and a separate Standby Switchboard with automatic transfer switches. The capacity of the Standby Switchboard shall be determined during design. The load on the campus generator should not exceed it's available capacity.
2. An on-site outdoor Battery Energy Storage System (BESS) can be designed to provide standby power. BESS shall be sized during design taking into consideration the loads to be supported and the number of hours of back up.

5.7.5 POWER DISTRIBUTION

The building transformer shall support the HVAC, Plumbing equipment, motors, receptacles, appliances, lighting and low voltage systems that enable the building space to function. The following are recommended distribution.

Building Distribution

- 5,000A, 480/277V, 3-phase, 4-wire main switchboard
- 1,600A capacity total with (2) HVAC Distribution Boards.
- 600A capacity total with (2) Plumbing Panels
- 400A capacity total with (4) Lighting Panels

- (9) 112.5KVA Transformers
- 3,000A capacity total with (18) Receptacle Panels

The grounding system for the building shall be provided complete with main service grounding utilizing ground rods, Ufer or concrete encased electrode, and cold-water pipe. Provide ground busbar in electrical rooms, MDF and IDF rooms.

5.7.6 METERING AND POWER QUALITY

On-board digital metering system shall be provided within all switchboard, distribution boards and data center panelboards. The metering system shall report power quality issues to the BMS or other power monitoring system.

To protect sensitive electronic and sensitive equipment, Surge Protective Device (SPD) level 1 and 2 shall be provided at all switchboards and distribution boards serving laboratory, maker space and sensitive equipment.

Variable Frequency Drive (VFD) Controllers for HVAC and plumbing equipment generates nuisance harmonics. Active harmonic filtering system shall be provided if built-in filters at each VFD cannot be provided.

5.7.7 GENERAL MATERIALS

Distribution panels and power panels will be circuit breaker-type. Molded-case and insulated-case breakers will be used. Lighting panels will be commercial-type with bolt-on circuit breakers. Bussing will be copper. Panelboards will be provided with a "door-in-door" construction to allow for entire front cover to swing open for easy maintenance.

Transformers will be provided to convert 480 volt power to 208Y/120 volt for receptacle and equipment needs. Transformers shall be NEMA 1 or 3R as required. Transformers shall be standard high efficiency, NEMA STP TP1 dry-type rated for 115o C rise. Windings will be copper. Transformers shall be floor mounted within electrical rooms, as much as possible. Transformers serving sensitive loads shall be equipped with Electrostatic Shielding, and shall be K-rated according to the application.

All floor mounted large distribution equipment shall be provided with concrete pad.

Disconnect switches will be heavy-duty fuse type.

All distribution equipment shall be consistent of the same manufacturer.

All outdoor electrical equipment shall be with enclosure rated for marine environment equal to NEMA 4X rated stainless steel for corrosion resistance.

Raceways

- Rigid steel conduit – feeders, branch circuits, exposed.
- PVC – feeders and branch circuit underground.
- EMT – feeder, branch circuits, and low voltage.
- Flexible Metallic Conduit (FMC): May be used in dry locations for connections from adjacent outlet boxes to motors, transformers, vibrating equipment and machinery and lighting fixtures installed in suspended ceilings, minimum sizes shall be 3/8" for lighting fixtures and control wiring and ½" for motor and transformer connections.
- Liquid tight Flexible Metallic Conduit (LFMC): May be used in damp and wet locations for the same applications as for Flexible Metallic conduit specified under this Section. Connections to all pump motors, solenoid valves, float switches, flow switches and similar devices shall be made using liquid tight flexible metallic conduit. Minimum sizes shall be 3/8" for lighting fixtures and control wiring and ½" for motor and transformer connections.

Conductors

- Provide insulated copper conductors for all wires and cables. Use stranded conductors for AWG #8 and larger sizes. Medium voltage wires and cables shall be aluminum.
- Provide minimum AWG #12 Cu for all power and lighting branch circuits. Provide minimum AWG #14 Cu for all signal and control circuits.
- Feeders and branch circuit wiring shall contain a separate green insulated grounding conductor
- Use NEC type THW, THWN or Type XHHW for feeders and branch circuits in wet or dry locations. Use NEC type THHN for branch circuits in dry locations.
- Use NEC type XHHW, rated 90 degrees C in dry locations and 75 degrees C in wet locations, for exterior branch circuit wiring and for circuits served by ground fault interrupting circuit breakers.

Boxes

- Four inch square by 1-1/2" minimum sheet metal boxes for interior use.
- Two inch wide by three-inch long steel switch boxes, ganged together for multiple switches.

Devices

- Receptacles – 20 amp, 125 volt, duplex, grounding type, specification grade, convenience outlets. Receptacles shall be white or as specified by electrical identification or architect. Provide 20 amp GFCI receptacles in locations where required by code. Controlled receptacles shall be green in color and labeled as controlled by an industry standard method.
- Switches – low-voltage momentary contact compatible with lighting control system. Switches shall be white.

- Cover plates shall be stainless steel in Lab and Maker spaces and thermoplastic white elsewhere.

5.7.8 LIGHTING CONTROLS

The lighting control system will be designed to comply with the requirements of Title 24.

Multilevel lighting controls shall be provided as required with the appropriate dimming scheme and local override controls. Areas with dimming control will include all spaces with a lighting power density greater than 0.5 W/ft^2 and larger than 100 ft^2.

The automatic shut-off controls for the building will be a combination of a lighting control system for common areas and localized occupancy sensors in restrooms, utility rooms, and other small spaces.

Dual-technology (passive infrared/ultrasonic) occupancy sensors will be used for control of storage spaces, bathrooms, janitorial rooms, private offices, conference rooms and other areas subject to intermittent occupancy. Occupancy sensors will be provided with auxiliary inputs and will integrate with the BMS system to control VAVs where specified by the mechanical engineer.

Daylight sensors will be used to lower lighting levels when natural lighting is sufficient. Areas requiring automatic daylight control include primary and secondary sidelit zones. Reduction in lighting output will be provided by continuous dimming.

5.8 AV / IT / TELECOM

5.8.1 TELECOM

Housing Dining Health

- The following provides a description of telecom systems for Cal Poly Humboldt - Housing Dining Health in a narrative form.
- Systems shall meet or exceed standards and guidelines found in CSU Telecommunications Infrastructure Design Standards v5.1 and shall supersede details in this Feasibility Document where applicable.

5.8.1.1 OVERVIEW

The scope of work for the telecommunications system consists of the following components:

- Telecommunications Spaces
- Pathways
- Backbone Cabling
- Horizontal Cabling
- Firestopping
- Grounding and Bonding
- Testing and Labeling

5.8.1.2 EQUIPMENT SPACES

5.8.1.2.1 Equipment Spaces – MDF/MPOE

The building will have a minimum point of entry (MPOE) for telecommunications utilities combined with the building's main distribution facility (MDF).

The MPOE will house demarcation equipment (copper and fiber optic facilities) originating from the campus OSP network.

Telephone and Internet services are already provided elsewhere on campus and will route to this building over Cal Poly Humboldt's network.

The MDF/MPOE will be located on a floor that resides in the center of the building (depending on the final quantity of building stories) and will house the following equipment:

- Base Building Network Equipment
- Backbone Cabling Terminations
- Horizontal Cabling Terminations

- Mechanical Cooling Equipment
- Electrical UPS

Architectural Requirements:

- The MDF is approximately 180 sq. ft. (12'x15')
- Floor: durable, anti-static floor covering
- Ceiling: open to the deck above
- Walls: Two-hour rated full height walls with 3/4" fire retardant plywood. Paint plywood with a low-gloss white paint masked around the fire-retardant labels on plywood.
- Door: 7' 0" high by 3' 0" wide, no sill

Electrical Requirements

- Support a load of 3kW per rack or cabinet
- Each cabinet will receive two dedicated NEMA L5-20R receptacles. Mount receptacles on cable tray above each cabinet.
- Provide one duplex convenience receptacle per wall, mounted at 18" AFF.
- For each network equipment rack, provide a vertical rack mount smart PDU.
- Include a dedicated 100A panelboard.

Mechanical Requirements:

- Support a connected load of 3 kW per rack or cabinet.
- Provide continuous 24/7/365 cooling with local control.
- Maintain a temperature range between 65F and 80F.

Lighting Requirements:

- Provide a minimum light level of 50 foot-candles at 3' 0" AFF.
- Install lights on either side of racks – lights should not be located directly above the racks
- Provide cages on light fixtures (recommended).
- Provide a light switch near the door.

Fire Protection Requirements:

- Equip sprinkler heads with protective cages.

Security Requirements:

- Electronic key access (card reader)

Bonding Requirements:

- A Telecommunications Primary Bonding Busbar (PBB) is provided within the main electrical room.
- A Secondary Bonding Busbar (SBB) will be installed within the MDF. Provide a 1/0 AWG conductor from the TMGB to the TGB in the MDF. Use an irreversible connection method to connect the

conductor, preferably an exothermic weld.

- Provide bonding conductors from the TGB to the following components within the MDF:
  - Equipment Racks
  - Equipment Cabinets
  - Termination Equipment
  - Cable Runway
  - Cable Tray
  - Building Steel (if available)
  - Electrical Panel
  - Security Panel
  - Conduits and sleeves entering the room
  - Armored Fiber Optic Cables

Telecommunications Equipment Requirements:

- Minimum of four-post racks will be required for the MDF/MPOE.

5.8.1.2.2 Equipment Spaces – Telecommunication Rooms (TRs)(IDFs)

IDFs connect back to the MDF in star-topology with home runs of fiber and copper.

The IDFs will house the following equipment:

- Base Building Network Equipment
- Backbone Cabling Terminations
- Horizontal Cabling Terminations
- Security System Equipment
- Mechanical Cooling Equipment
- Electrical UPS

Architectural Requirements:

- Each IDF is approximately 120 sq. ft (10'x12') and will be centrally located (to minimize cabling distances) and stacked.
- Vertically stacked through the building.
- Floor: durable anti-static floor covering
- Ceiling: open to deck above
- Walls: Two-hour rated full height walls with ¾" fire retardant plywood. Paint plywood with a low-gloss white paint masked around the fire-retardant labels on plywood.
- Door: 7' 0" by 3' 0" wide, no sill

Electrical Requirements:

- Support a connected load of 2.5 kW per rack
- Each rack will receive two dedicated NEMA L5-20R receptacles. Mount receptacles on cable tray above each cabinet.
- Install a rack-mounted UPS unit. Size the UPS systems to support the full connected equipment load for a minimum of 15 minutes.
- Provide one duplex convenience receptacle per wall, mounted at 18" AFF.
- Provide a vertical rack mount smart PDU.

Mechanical Requirements:

- Support a connected load of 2.5 kW per rack or cabinet.
- Provide continuous 24/7/365 cooling with local control.
- Maintain a temperature range between 65F and 80F.

Lighting Requirements:

- Provide a minimum light level of 50 foot-candles at 3' 0" AFF.
- Install lights on either side of rack – lights should not be located directly above the rack
- Provide cages on light fixtures (recommended).
- Provide a light switch near the door.

Security requirements:

- Electronic key access (card reader)

Fire Protection Requirements:

- Provide sprinklers with high temperature heads and protective cages

Bonding Requirements:

- Provide a 1/0 AWG conductor from TMGB to the TGB in each IDF room.
- Provide bonding conductor from the TGB to the following components within the IDF:
    - Equipment Racks
    - Cable Runway
    - Cable Tray
    - Building Steel (if available)
    - Electrical Panel
    - Security Systems Panel
    - Conduits and Sleeves Entering the Room
    - Armored Fiber Optic Cables

Telecommunications Equipment Requirements

- Minimum of two, 2-post racks will be required for each IDF.

5.8.1.3 BASE BUILDING PATHWAYS

5.8.1.3.1 Cable Tray (Primary Pathways)

Size cable tray based on quantity of telecom cabling per initial installation with 30% spare capacity for future growth. Standard tray is a 4" high (4" loading depth) wire mesh style cable tray. Width varies based on cable quantities. Cable tray will run in areas with accessible ceilings. Powder-coat (factory-painted) visible cable tray to match ceiling space color or as directed by the Architect.

Provide seismic bracing to conduit systems as approved by the structural engineer.

Provide fire rated assemblies where cable tray passes through fire rated walls. Determine quantities of sleeves based on quantity of telecom cabling per initial installation with 30% spare capacity for future growth.

Provide supports at each connection point (junction of 2 or more straight sections), direct transitions, at the end of each run and at other locations necessary to attain a fully supported and seismically braces cable tray system using structurally approved anchoring system.

Cable tray system shall maintain a 12" minimum bend radius throughout (no hard 90 degree turns).

Bond cable tray to telecommunications grounding and bonding system.

Provide blind ends where tray termination is exposed.

5.8.1.3.2 Conduits and Boxes (Primary Pathways)

Each conduit needed for the project is not shown on the plans. Apply the following guidelines in conjunction with conduits shown on the drawings for complete conduit installation.

- Provide (4) 4" conduits from the MDF stubbed out 10ft from the building perimeter for connection to OSP facilities.
- Provide (4) 4" conduits from the MDF to each IDF. Stacked IDFs will have (4) 4" sleeves interconnecting them vertically.
- Provide conduits where ceiling is inaccessible.
- Provide pull boxes as necessary to facilitate proper cable placement, including the following:
  - No more than 180 degrees bend between placement points
  - No more than 100 feet conduit length
- To meet AHJ requirements
  - Provide seismic bracing to conduit systems as approved by the structural engineer.
  - Provide expansion joints and/or fittings to conduit where necessary. Expansion joints/ fittings shall be approved by a structural engineer licensed in the state of California.

- Label each conduit with permanent labels at both ends and on pull box lids indicating use for telecommunications purposes and the far-end destination.
- Provide fire rated assemblies when penetrating fire rated partitions.
- Paint exposed conduits in the ceiling space to match ceiling color or as directed by the Architect.
- Bond conduits to telecommunications grounding and bonding system.
- Install protective non-metallic bushings on all conduit ends.

5.8.1.3.3 User Space Pathways – Cable Hangers (Secondary Pathways)

Provide conduits between primary pathways and work area pathways and/or outlet locations.

Secondary pathways conduits are to run from the outlet/box directly to the nearest primary pathway (typically cable trays).

Maximum conduit length, bends, and pull-box requirements shall match primary pathway rules.

Cable hangers (J-hooks) may not be used.

5.8.1.4 CABLING

5.8.1.4.1 Backbone Cabling

Backbone cabling is provided to interconnect the main telecom room with other telecom rooms in a standard star-topology configuration.

Backbone fiber optic cabling will be a will originate from the MDF and terminate to each IDF:

- OS2 single-mode, CMR rated, and with a minimum strand quantity of 24.

All backbone copper cabling will originate from the MDF and terminate on 25 port rack mount patch panels in the IDF:

- 24 AWG, CMR rated, 16 pairs.

5.8.1.4.2 Horizontal Cabling

Outlets on floors are served by IDF/MDF on the same floor. A telecommunications room will only serve one floor, and a maximum of 20,000sqft.

Each standard telecom outlet receives two cables and a two-port faceplate. The cable configuration for each standard outlet is as follows:

- All cables will be CAT6, CMP (plenum).
- All cables will be U/UTP.
- Terminate cables to TIA-568A standard.
- All cables will have a maximum outside diameter of 0.24in (6.3mm)

- Each cable run shall be a continuous single cable; splices are not permitted.
- Overall jacket color will be yellow.

All CAT6 cabling will be terminated on rack mounted CAT6 rated patch panel.

Terminate cables in patch panels in MDF/IDF.

Maintain a maximum tested cable length of 90 meters (295 feet) from the termination in the telecom room to the termination at the user's outlet faceplate.

Specific conditions per building type

Housing (dwelling units):

- Each student dwelling unit bed will receive a 2-port faceplate with one port dedicated for campus LAN, the other for telephone.
    - Note: Coaxial cabling is excluded and only category cabling will be used.
- While most students will connect via Wi-Fi for the majority of their devices, it is anticipated that RAs or offices will require some minimum quantity of wired services.

5.8.1.5 LABELING

Label all cables with permanent labels at both ends with the serving telecom room designation and outlet destination.

5.8.2 AUDIOVISUAL

Housing Dining Health

- The following provides a description of audiovisual systems for Cal Poly Humboldt – Housing Dining Health Building in a narrative form
- Audiovisual system descriptions are presented as an assessment for the Owner to determine the design direction in order establish a basis of design.

5.8.2.1 DESIGN CRITERIA AND GOALS

5.8.2.1.1 Standards:

- General Requirements
    - Audiovisual enabled rooms will be designed to meet the current Cal Poly Humboldt and design standards including AV equipment selection.
    - Refer to California State University TIP Standards Fifth Edition 03-2022
- Reliability:
    - The systems should operate with minimum start-up time, minimum maintenance, and

maximum availability based on the features that the selected technology can provide.

- Quality:
  - The video systems will provide high-quality image reproduction.
  - Provide display sizes and placement for student viewing at all seats for each room.
  - Program and speech audio must be clear, intelligible, and of appropriate volume in all spaces.
  - Assisted listening devices (where they are required) must be interconnected with all display systems and must be configured to allow for interconnection to changing technology
- Operation
  - System operation will be simple, intuitive, and provide a consistent control experience in rooms of similar layout and functionality throughout the building. Auto-switching and other methods of automation should be used where possible.
- Expandability
  - Infrastructure and pathway capacity should be designed with expandability in mind to support present and foreseeable user requirements.
  - Each classroom must have the basic infrastructure to support instructor- controlled display and computing equipment, even if the systems will not initially be installed.
- Flexibility
  - AV systems should support various collaboration and instructional methods and have sufficient flexibility to meet emerging instructional trends.

5.8.2.2 AV SYSTEMS DESCRIPTIONS

5.8.2.2.1 Digital Signage:

- General: Displays for messaging, advertising, and/or wayfinding. Locations include:
  - Lobby for branding, event announcements, etc.
  - Dining for digital menus and digital ordering
  - Medical waiting areas (e.g. Pharmacy for order-ready)
  - Also consider locating and installing power and data for digital signage to meet future needs.
- Display: 4k Commercial Grade LED displays for digital signage applications
- Sources: Remotely managed digital signage player either built into the display or as an external device.

5.8.2.2.2 Dining:

- General: A public address system for general messaging (related to dining functionality) with the ability to playback background music.
- Audio: Audio playback via ceiling loudspeakers and/or wall mounted speakers.

- Control: Paging microphones and if background music is desired, a commercially available, on-line music subscription.

5.8.2.2.3 Conference Room:

- General: A meeting room with standard conference- table for up to 16 people
  - Display: wall-mounted flat panel display, appropriately sized based on room size and sight lines.
  - Video: Videoconferencing via software-based codec, USB connectivity to a computer; videoconferencing camera/soundbar unit mounted at the display wall
  - Sources: Laptop input at table, wireless presentation option
  - Audio: Content playback via built-in display/soundbar
  - Control: Touch or button panel for system on/off, volume, source selection located at the table

5.8.3 SECURITY

Housing Dining Health

- The following provides a description of security systems for Cal Poly Humboldt - Housing Dining Health in a narrative form
- Security system descriptions are high level and presented for review and feedback of the Owner to note any additional requirements beyond industry best practices or campus specific requirements.
- Systems shall meet or exceed standards and guidelines found in CSU Telecommunications Infrastructure Design Standards v5.1 and shall supersede details in this Feasibility Document where applicable.

5.8.3.1 OVERVIEW

This basis of design criteria will cover security systems, including the following:

- Access Control and Alarm Monitoring System (ACAMS)
- Video Surveillance System (VSS)
- The security subsystems will also require interfaces to other systems which may include but are not limited to the following building systems:
  - Voice Fire Alarm System
  - Electrical System
  - Door Hardware (electrified)

5.8.3.2 GOALS AND POLICES

5.8.3.2.1 Goals

- Protection
  - Increase the safety and security of Cal Poly Humboldt students, educators, staff, parents/ visitors, and assets
- Flexibility
  - Capable of interfacing with other base building systems, and access through web-based interfaces and mobile applications.
- Scalability
  - Expandable to accommodate additional building security devices.
- Efficient
  - Improve efficient use of other areas of the building for after-hours community events.

5.8.3.2.2 Policies

- Normal Operating Hours
  - Defined as 7:00 AM to 10:00 PM. The building will be controlled during normal operating hours. After-hours access available to Cal Poly Humboldt staff via the ACAMS located at designated entry points. Final policy will be outlined in future versions of this program narrative.
- Staffing
  - Will be defined in future versions of this narrative. It is assumed campus police and security personnel will be available.

5.8.3.2.3 Coordination

The ACAMS will be integrated with the Division 8 (door hardware). As well as Division 14 (Elevators) with card readers in the elevators.

5.8.3.2.4 Security Systems Criteria

The ACAMS will allow Cal Poly Humboldt to manage access to the building perimeter, lobbies, garage, individual levels, and administrative suites, elevators, and base building utility spaces (MDF/MPOE, IDF, Utility Rooms, etc.). The system will generate reports and monitor status of designated points in the facility. The overall ACAM system will be RS2 which is compatible with the campus wide system.

The ACAMS will consist of multi-format (13.56 MHz & 125 KHz) credential readers (mag-stripe, optional, depending on student card system utilized), door monitoring alarm contacts, request-to-exit motion detectors, and interfaces to electrified door hardware at designated locations.

The ACAMS utilizes a client/server topology and communicates across the building LAN/WAN. This configuration allows future flexibility in monitoring locations, integration with other building systems, and capable of being scaled to support any future security system requirements.

The ACAMS will integrate through software with the VSS system to provide automatic display of an associated VSS cameras based upon a selected ACAMS

The ACAMS will monitor emergency exit only doors utilizing door position contacts and local audible alarms.

Security devices will wire back to security control panels and power supplies located in the nearest IDF Room.

Emergency lock-down functionality will be provided to lock doors in the event of an emergency (utilizing RS2 based system and buttons).

5.8.3.3 VIDEO SURVEILLANCE SYSTEMS (VSS)

Cal Poly Humboldt has a minimal approach to video surveillance systems so care must be used in placing cameras only where deemed absolutely necessary.

The building video surveillance system will consist of High Definition (HD) IP fixed and 360-degree cameras selectively located to minimize appearance and quantities of cameras.

VSS fixed camera views will be recorded for a minimum of 30 days at 15 frames-per-second and at a minimum resolution of 2 Megapixels (1920x1080P).

VSS 360-degree camera views will be recorded for a minimum of 7 days at least 15 frames-per-second per imager and at a minimum resolution of 8 Megapixels. The cameras will have four imaging sensors.

Video Surveillance Cameras will be managed and recorded by a video management system that can be deployed using a commercial off the shelf server located in the MDF/MPOE room or through a Cal Poly Humboldt server located elsewhere.

Archival storage retrieval and live viewing of camera views can be done on security client workstations located at the lobby, private offices, or remotely via the internet (with authorized credentials).

Security cameras will utilize telecommunications category cable to the nearest IDF room and connect to commercial grade PoE switches.

The following table shows the proposed video surveillance locations:

Area	Coverage	Field of View
Building Exterior	Yes	General overview of the perimeter of the building.
Building Entry/Exits	Yes	-
Lobby	Yes	-
Corridors	Yes	-
Elevator Cabs	Yes	-
Stairwells	Yes	-
Classrooms	Yes	-
Dining	Yes	-
Dwelling Units	No	-

5.8.3.5 LIGHTING RECOMMENDATIONS

The success of any security program critically depends on the presence and amount of exterior lighting. During nighttime operation, exterior lighting provides:

Illumination to allow the proper operation of the exterior Video Surveillance System (VSS) camera system.

A sense of security to Cal Poly Humboldt staff and students using the building.

Site lighting design shall meet all City and local building codes.

Minimum lighting levels as recommended by the IES and by VSS camera manufacturers consist of:

- Building perimeter – 1 foot-candle (10 lux)
- Entrances – 5 foot-candles (50 lux)
- The average to minimum uniformity ratio shall not exceed four to one

Exterior lighting shall operate continuously during hours of darkness in these areas:

- Building perimeter
- Building entrances

5.8.4 WI-FI / NETWORK

Housing Dining Health – Feasibility Study

- The following provides a description of audiovisual systems for Cal Poly Humboldt - Housing Dining Health in a narrative form
- Systems shall meet or exceed standards and guidelines found in CSU Telecommunications Infrastructure Design Standards v5.1 and shall supersede details in this Feasibility Document where applicable.

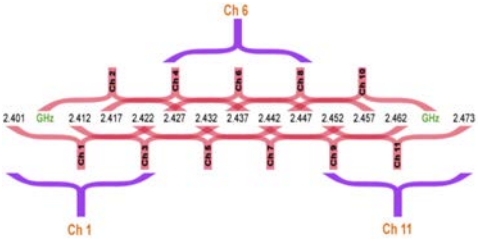
5.8.4.1 OVERVIEW

An enterprise wireless network shall be provided for the new buildings. These access points (APs) in conjunction with wi-fi controllers will provide 802.11ax (Wi-Fi 6) coverage for both Cal Poly Humboldt staff, student, vendor, and guest wireless connectivity. Wireless coverage will include all interior spaces, and outdoor coverage (including courtyards) utilizing exterior wall mounted APs as well as potentially bollard mounted APs.

A comprehensive predictive model will be used to determine optimal placements and configuration of APs within the interior space.

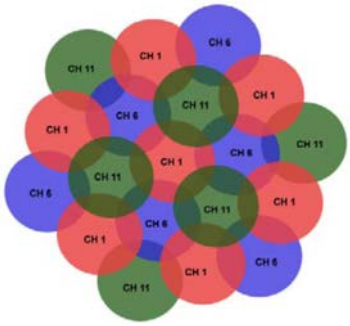
5.8.4.2 REQUIREMENTS

802.11abg and n support 14 channels, each one 22MHz wide. In the USA and Canada, channels 1 through 11 are allowed. Each of these channels overlaps significantly with their neighboring channels and somewhat with their neighbor's channels. The only four non-overlapping channels are 1, 6 and 11 as shown below.



Industry best practice recommends that the channels for each AP be set such that their signals do not overlap with other APs on the same channel if possible. This will minimize interference (channel overlap) between APs. If all APs are set to the same channel, the system will in most cases still work. However, because each AP will interfere with each other, throughput is likely to be degraded and will be unacceptable for Cal Poly Humboldt's deployment of wireless.

The recommended channel strategy will be implemented similar to the following diagram:



Support for 802.11ax (Wi-Fi 6) will be required, with Wi-Fi 6E (utilizing the 6GHz spectrum) to also become used in the future. This technology has significant performance features such as multiple-user + multiple-input / multiple-output (MU-MIMO), channel bonding, and Orthogonal frequency-division multiple access (OFDMA). Because the 2.4 GHz spectrum is limited in frequency bands. It is recommended that Wi-Fi 6 be implemented within the 5 GHz spectrum to allow for channel bonding without interfering with non-bonding channels. 6GHz has the added advantage of being new spectrum

Cal Poly Humboldt will retain the wireless survey model and data internally for future modifications and adjustments. Hence the predictive, passive, and active survey data will be included within the as-built documentation.

An example predictive model signal strength heat-map.

A few considerations and criteria for the future wireless deployment:

- Mobile computers will be deployed
- Expanded use of VoIP over wireless
- Support 802.11ax (Wi-Fi 6) features such as MIMO, channel bonding and OFDMA.
- 1 AP per 1,500 sq. ft

Manufacturers:

- Aruba 500 (or 600) series

5.8.5 DAS-ERRCS

Housing Dining Health – Feasibility Study

- The following provides a description of audiovisual systems for Cal Poly Humboldt - Housing Dining Health in a narrative form
- Systems shall meet or exceed standards and guidelines found in CSU Telecommunications Infrastructure Design Standards v5.1 and shall supersede details in this Feasibility Document where applicable.

5.8.5.1 DISTRIBUTED ANTENNA SYSTEMS (DAS)

An optional Distributed Antenna System (DAS) will consist of a head end that houses a wide band

transceiver located in the MDF (or dedicated DAS room). This head end system will be a common interface node; collocated with signal source equipment for wireless service providers. Integration with these providers will be turnkey and include antenna, cabling, mounts, equipment installation and integration with all wireless systems. This system is not code-required, and it is to be determined if it will be included as part of this project.

The transport medium for DAS can take many forms, from traditional off-air repeater, small cell, or Base Transceiver Station (BTS) connected to architecture consisting of coaxial, fiber optic, or hybrid fiber/coaxial solution.

For a building of this size, and campus considerations, there are two recommended approaches to the DAS.

- Small cell (sometimes referred to as "cloud-based") source injected into a hybrid passive/active DAS.
- Base-station transceivers co-located with owner DAS equipment.

Small cell source consists of an Internet connected device which communicates with wireless service providers servers to receive a wireless signal which is then output either by the small cell device itself, or, by connecting its antenna outputs to a passive/active DAS. This is suitable for projects where the off-air source is too weak and distributing the signal within the building would not provide any noticeable increases in the quality of service.

Base-station transceivers consist of carrier provided cabinets that house all of the signal origination equipment that would commonly be found either at a cell tower "hut" or at the carriers central office. This equipment receives a fiber connection from the carrier, and then the signal is outputted via coaxial jumpers into the Point of Interface (POI) cards of the owner's DAS.

Since the buildings are approximately 125,000 sq. ft. in aggregate, it is recommended that a campus DAS head-end is created (or an existing one connected back-to, as discussed in the Sustainability Research Center narrative).

If a base-station head-end is created, then this would then become the head-end for the entire campus feeding all buildings carrier signals.

5.8.5.1.1 Passive DAS Components

The passive DAS architecture is comprised of three main elements, the wireless portal, the vertical riser cable or feeder, and the horizontal cable that connects to antennas.

The wireless portal is the DAS head-end that receives signal sources. This portal consists of a combination of band pass filters and combiners. These signals are summed and provide a single common output. The function of these lumped devices is to precondition the input signals, balance input signal levels, combine them with minimum loss, and feed them into one common wide frequency band spectrum output.

The combined output port is connected to the riser feeder cable that runs vertically transporting the combined signal throughout the building.

High precision broadband "taps" and splitters are used to extract the combined signals at each floor.

The combined signal is power divided, or coupled with the Horizontal cable distribution system for that particular floor area.

Based on the physical obstruction of signals and building design of each floor, the floor area is divided into coverage segments (typically 5,000 to 7000 square feet). The horizontal cable distribution system is deployed with multiple broadband antennas in a predetermined fashion (based on predictive modeling in software) providing a custom design unique to the floor. This design will provide the required area coverage segments, capacity and signal levels throughout the floor.

The passive DAS network does not require any monitoring or control equipment to maintain coverage and service. The system is grounded at the portal and on each floor at the Riser cable with building ground.

5.8.5.1.2 Active DAS Components

The Active DAS architecture is comprised of three main elements, the Master Unit, the Fiber Optic Transport (Radio over Fiber), and the Remote units.

The system's basic function is to extend the coverage beyond what could typically be carried by a passive DAS only. Or, where long runs of bulky and inflexible "hard-line" coaxial riser cables are impractical.

The Master unit is DAS head-end that receives signal sources. This system consists of a series of band pass filters specially tuned to a specific carrier frequency, bidirectional amplifiers for the uplink and downlink signals, where they feed to a media converter subsystem module (Radio over Fiber).

The uplink and downlink signals are transported over Fiber to the Remote Units that could be located anywhere in the building, and the signal loss is insignificant.

At the Remote Unit the signal is distributed over traditional passive DAS infrastructure (splitters, taps, coaxial cable, antennas, etc.).

5.8.5.1.3 Supported Signals

The DAS shall be designed to support the following systems and frequencies:

Wireless Operators: Verizon, AT&T, T-Mobile/Sprint

- LTE (700 MHz) - Verizon (4G/5G)
- Cellular (850 MHz) - AT&T, Verizon (2.5G & 3G)
- PCS (1900MHz) - Verizon, T-Mobile/Sprint (2.5G & 3G)
- AWS (1700/2100 MHz) - AT&T, T-Mobile/Sprint (3G/4G/5G LTE)

5.8.5.1.4 Distribution Areas

The System shall distribute radio-frequency (RF) coverage at levels outlined below in the following areas of the building(s) – herein specified coverage areas:

All floors and areas including:

- Stairwells
- Elevators
- General Use spaces (break rooms, staff rooms)
- Restrooms
- Large gathering spaces
- Circulation
- Dining

5.8.5.1.5 Additional Requirements

The system shall have the capability for separate control over each service (or wireless operator) to allow the ability to adjust and control power levels without disturbing other services/operators.

The system shall support multiple services in a modular architecture so services can be added or removed without requiring new infrastructure, without readjustment of signal power levels, or disturbing existing services.

The system shall enable services to be added without requiring additional cable plant or antenna systems.

The system shall not impede any management features or functionality of any attached network and/or device management system. The System shall allow for proactive management and end-to-end alarming of active electronics. The System shall be able to engage with 3rd party SNMP-based element management systems and provide fault management information.

The DAS network shall support the use of legacy cellular enhancement and technologies such as GSM, EDGE, and UMTS-HSPA technologies.

The DAS must be FCC certified and in compliance with FCC's and regional regulatory authority's emission rules for wireless devices.

5.8.5.2 EMERGENCY RESPONDER AUDIO COVERAGE SYSTEMS (ERRCS)

A code-required (Chapter 510 of the CFC) ERRCS shall be provided.

This is a wholly separate DAS from cellular carriers and is provided to extend the coverage of emergency responder radio signals throughout the building.

The infrastructure of the ERRCS is nearly identical to cellular DAS as described previously in this narrative with the exception that the ERRCS is almost always an off-air source system.

5.8.5.2.1 Requirements

All channels shall be -95 dBm or stronger as specified by any local ordinance.

The ERRCS will support the following local systems:

- CAL FIRE 450MHz
- Humboldt County Sheriff (150MHz / 450MHz)
- Cal Poly Humboldt (150MHz)

Currently, the existing systems are legacy LMR systems. The ERRCS shall not only accommodate these legacy systems, but also the latest advancement in 2-way communication radio systems, such as the P25 project, which is an IP based simulcast network that supports both digital, and analog 2-way communication systems.

The ERRCS riser pathways and head-end equipment must be protected by 2-hour rated assemblies. In addition, the head-end equipment must be contained in a NEMA 4 enclosure to protect it from sprinkler or fire hose water sources so that in the event of a fire emergency responders and still use the in-building ERRCS.

Due to the more complicated construction assemblies involved in a 2-hour rated pathway, it is recommended that the ERRCS riser stack vertically in order to reduce any horizontal runs of backbone cabling. Such horizontal runs may require either custom 2hr rated soffits, or fire-wrapped conduits in order to protect the cabling.

It is also recommended that the ERRCS head-end receive its own room at the top floor of the building to reduce the length of passive coaxial cabling that connects from antennas on the roof of the building to the ERRCS head-end unit. Typically, a small 6' by 6' closet is all that is required to house this equipment. This closet's construction assemblies shall be 2-hour rated.

The ERRCS shall also have its system status connected to the building's fire alarm system so that it can be monitored in the event any fault in the ERRCS occurs. If a fault occurs the fire alarm systems annunciator panel will be triggered to show the fault.

The ERRCS must be FCC certified and in compliance with FCC's and regional regulatory authority's emission rules for wireless devices, as well as approved by the local authority having jurisdiction (AHJ).

5.9 LIGHTING

Lighting for the Health, Dining, and Housing building seeks to reinforce a high level of efficiency and simplicity. To this end, lighting will focus primarily on illumination for the functional requirements of the spaces while offer flexibility for various scenarios. Lighting systems will also aid in the user experience with added focus on common areas such as the lobby and clarifying wayfinding throughout. Lighting for the housing spaces seeks to provide a functional and supportive environment for student residence and study. To this end, lighting will focus primarily on illumination for the multiuse requirements and offer flexibility for various scenarios. Light fixture selection will also consider visual comfort, maintenance, economic value, and sustainability.

5.9.1 INTERIOR LIGHTING SYSTEMS

5.9.1.1 GENERAL CRITERIA

The lighting system and controls for the interior spaces throughout the Health-Dining-Housing building will target the following attributes:

- Luminaires throughout the building will be LED type, 3500K CCT, 90 CRI, with lumen packages selected to provide light level in accordance with the recommendations of the Illuminating engineering Society of North America (IESNA) handbook and recommend practice guides and local ordinances.
- Luminaires within student residences will be LED type, 2700K CCT, 80 CRI, with lumen packages selected to provide light level in accordance with the recommendations of the Illuminating engineering Society of North America (IESNA) handbook and recommend practice guides and local ordinances.
- All lighting shall be LED with dimmable drivers.
- Storage and unfinished areas will be provided with 2' x 4' standard lensed troffers or industrial type strip fixture.
- Emergency egress lighting: selected light fixtures shall be connected to the emergency power system, per the electrical narrative in this feasibility study, to provide egress lighting along the egress paths in accordance with California building code. 1.0 FC average, 0.1 FC minimum, 40:1 uniformity ratio.
- Illuminated exit signs will also be used along the path of egress, allowing a sign to be seen at any one time. Exit signs will be LED and UL listed with red lettering and an operating voltage of 277-volts.

5.9.1.2 HEALTH

Area	Illumination Levels
Lobby	5fc at floor, 15fc at desk
Private office	30fc at task
Open office	30fc at task
Kitchen/Breakroom	20fc at task
Large Multipurpose	30fc at task
Medium Multipurpose	30fc at 2.5ft
Group Room	30fc at 2.5ft
Food Pantry	30fc at 2.5ft
Demo Kitchen	30fc at 2.5ft
Reception	30fc at 3.5ft
Relaxation/Safe Space	10fc at floor
Waiting Room	20fc at floor
Charting	30fc at 3.5ft
Exam Room	50fc at 3ft
Ward/Isolation	75fc at 3ft (exam), 20fc at floor (general)
Ward/Isolation Bathroom	10fc at floor, 30fc at fixtures, 30fc at sink
PT/Exercise	40fc at 3ft
Lab	50fc at 2.5ft
Imaging	50fc at 3ft
Pharmacy	100fc at 3ft
Conference/Meeting	30fc at 2.5ft
Telehealth/Huddle	30fc at 2.5ft
Restrooms	5fc at floor, 10fc at Task, 20fc at vanity
Single Restroom	5fc at floor, 10fc at Task, 20fc at vanity
Corridors	10fc at floor
Storage	20fc at floor

Table 5.9.1.1 Illumination Design Criteria

Lobby:

The lobby employs a multi-level lighting system to provide required functional lighting levels, articulate specific ceiling and wall surfaces, reinforce intuitive wayfinding, and provide accent for special programmatic elements such as donor wall, information wall, and art pieces. Recessed small aperture louvered downlights provide functional light levels. Continuous linear with mitered corners accent architectural ceilings. Recessed continuous perimeter coves and recessed asymmetric wall wash fixtures highlight strategic wall surfaces.

Private Office:

A task-ambient lighting approach will be utilized to reduce energy and provide individual control. The ambient system will be comprised of pendant mounted direct/indirect LED fixtures. Furniture mounted LED under-cabinet task light fixtures will provide elevated lighting levels at the work plane.

Open Office:

A task-ambient lighting approach will be utilized to reduce energy and provide individual control. The ambient system will be comprised of pendant mounted direct/indirect LED fixtures. Furniture mounted LED under-cabinet task light fixtures will provide elevated lighting levels at the work plane.

Kitchen/Breakroom:

Linear recessed light fixtures provide general lighting to the space. Continuous linear diffuse lensed under cabinet lighting will be provided to increase functional light levels at counter/task plane. Additionally recessed wall wash fixtures will accent strategic walls.

Multipurpose:

Recessed linear lensed fixtures will provide functional illumination of the multipurpose space. Perimeter walls will be washed with recessed continuous linear fixtures. Recessed downlights will be provided as needed for additional functional lighting.

Group Room:

Recessed linear lensed fixtures will provide functional lighting in the group room.

Food Pantry:

Recessed linear lensed fixtures will provide functional lighting in the food pantry.

Demo Kitchen:

Demo kitchen will employ downlights for functional task lighting. Additional pendants and linear millwork integrated lighting will define the serving areas.

Reception:

Linear recessed light fixtures provide general lighting to the space. Additionally recessed wall wash fixtures will accent strategic walls.

Relaxation/Safe Space:

Recessed perimeter slot fixtures will provide ambient lighting in the relaxation space. Recessed downlights will be utilized for functional lighting as needed.

Waiting Room:

The waiting rooms will be illuminated with recessed discrete downlights for functional illumination, wall wash lighting for wall accent or strategic architectural pendants to delineate specific seating areas, as well as reception desk with integrated toe kick lighting.

Charting:

Recessed discrete downlights will be provided at charting areas. Additional recessed perimeter slots lots will be utilized for ambient fill and wayfinding as needed.

Exam Room:

Exam rooms will utilize recessed 2x4 troffer exam lights and undercabinet task lighting for functional illumination.

Ward/Isolation:

Recessed multifunction exam light will provide exam lighting, ambient lighting, and reading light at patient bed location. Recessed downlights will be provided for additional functional lighting in surrounding areas. Undercabinet task lighting will be provided as needed.

Ward/Isolation Bathroom:

The bathrooms will utilize recessed downlights for functional illumination. Wall mounted vanity light fixture will provide illumination at mirror and sink. Additional step light will be employed if needed for night light.

PT/Exercise:

Suspended linear direct/indirect pendants will provide task and ambient lighting for the space.

Lab:

A task-ambient lighting approach will be utilized for lab spaces. The lighting system for this space will primarily utilize direct/indirect pendants centered between benches to provide the ambient lighting layer. The task system will vary depending on the lab bench type. For typical lab benches, under-cabinet LED task lights will be used to enhance lighting levels at the work plane. For open benches recessed adjustable spot fixtures located in the ceiling directly above the bench will provide enhanced lighting levels.

Imaging:

Architectural perimeter cove lighting will be provided for ambient lighting. Additional recessed downlights and undercabinet task lighting will be provided for functional illumination.

Pharmacy:

Recessed lensed 2x4 troffers will be employed for illumination of pharmacy.

Conference/Meeting:

Recessed louvered linear fixtures will provide functional task illumination at table. Perimeter walls will be uniformly washed with recessed baffled wall wash fixtures.

Telehealth/Huddle:

Wall mounted direct and indirect light fixtures will provide task illumination on work surface as well as ambient fill light on ceiling. Baffled downlights will provide additional light as needed.

Restrooms:

The restroom will employ continuous perimeter recessed wall slot lighting for general illumination. Downlights will provide additional lighting where needed.

Single Occupant Restrooms:

Single occupant restroom will utilize wall mounted vertical vanity luminaires for face lighting and ambient fill. Additional recessed downlights will be utilized for functional lighting.

Corridors:

The hallways employ recessed downlights for general illumination. Entry alcoves will be accented with

asymmetric linear wall wash fixtures for wayfinding and vertical brightness.

Storage:

Standard strip light fixtures will be provided where no ceiling occurs. Recessed lensed linear fixtures will be provided where ceilings are placed.

5.9.1.3 DINING

Area	Illumination Levels
Café	20fc at task
Private Office	30fc at task
Lockers/Changing	10fc at task
Food Prep	50fc at task
Cooking Kitchen	50fc at task
Catering Pantry	30fc at 2.5
Warewashing	20fc at 2.5ft
Dining Area	15fc at task
Vending	10fc at 2.5ft
Corridors	5fc at floor
Storage	20fc at floor

Table 5.9.1.2 Illumination Design Criteria

Cafe:

Recessed small aperture downlights will provide functional lighting. Suspended architectural pendants and millwork integrated linear accent lighting will highlight architectural features and transaction/pickup counters. Additional wall wash or adjustable accent lighting will highlight menus and graphic walls.

Private Office:

A task-ambient lighting approach will be utilized to reduce energy and provide individual control. The ambient system will be comprised of pendant mounted direct/indirect LED fixtures. Furniture mounted LED under-cabinet task light fixtures will provide elevated lighting levels at the work plane.

Lockers/Changing:

Recessed linear lighting will be employed in locker rooms and changing areas.

Food Prep:

Recessed lensed 2x4 troffers will provide functional illumination of food prep spaces.

Cooking Kitchen:

Recessed lensed 2x4 troffers will provide functional illumination of cooking spaces.

Catering Pantry:

Recessed lensed 2x4 troffers will provide functional illumination of catering pantry spaces.

Warewashing:

Recessed lensed 2x4 troffers will provide functional illumination of wash spaces.

Dining Area:

Functional lighting will be provided with baffled small aperture downlights. Strategic bench back uplighting, architectural coves, and wall wash lighting will provide accent and wayfinding. Larger areas may have larger fixtures appropriate to the scale of the spaces.

Vending:

Vending areas will utilize recessed downlights for functional illumination.

Corridors:

The hallways employ recessed downlights for general illumination. Entry alcoves will be accented with asymmetric linear wall wash fixtures for wayfinding and vertical brightness.

Storage:

Standard strip light fixtures will be provided where no ceiling occurs. Recessed lensed linear fixtures will be provided where ceilings are placed.

5.9.1.4 HOUSING

Area	Illumination Levels
Bedroom	4fc at floor, 40fc at desk
Living area	30fc at floor
Kitchen (in-suite)	50fc at 3ft
Private bathroom	5fc at floor, 10fc at Task, 20fc at vanity
Community Restroom	5fc at floor, 10fc at Task, 20fc at vanity
Study room	30fc at 2.5ft
Multipurpose/“Living Room”	15 - 30fc at 2.5ft
Lounge	15 - 30fc at 2.5ft
Kitchenette	50fc at 3ft
Mailroom	5fc at floor, 10fc at box faces
Laundry	30fc at 3ft
Office	30fc at 2.5ft
Reception	15fc at 2.5ft
Corridors	5fc at floor
Storage	20fc at floor

Table 5.9.1.3 Illumination Design Criteria

Bedroom:

Lighting for the bedrooms will employ a combination of wall mounted direct indirect lighting for ambient and functional light. Separate control for direct and indirect components will provide flexibility for higher light levels.

Living Area (in-suite):

Lighting for the living area will employ a combination of wall mounted direct indirect lighting for ambient and functional light. Separate control for direct and indirect components will provide flexibility. Additional downlights will be utilized as needed.

Kitchen (in-suite):

Recessed continuous lensed light fixture will provide functional lighting for the kitchen tasks.

Private Bathroom (in-suite):

Bathrooms will utilize a wall mounted vanity light for illumination of general tasks. Additional wet rated recessed downlight will be used for shower illumination.

Community Restroom:

Bathrooms will utilize a wall mounted vanity light for illumination of sinks. Recessed downlights will provide general illumination. Additional wet rated recessed downlights will be used for shower illumination.

Study Room:

Wall mounted direct and indirect light fixtures will provide task illumination on work surface as well as ambient fill light on ceiling. Baffled downlights will provide additional light as needed.

Multipurpose/"Living room":

The Multipurpose living room will look to provide a comfortable and relaxing multiuse space for students. A combination of recessed downlights for functional light requirements and suspended round direct indirect lights will be utilized. Strategic graphic walls will employ asymmetric wall wash lighting for accent.

Lounge:

Combination of recessed downlights for functional light requirements and suspended round direct indirect lights will be utilized.

Kitchenette:

Linear recessed light fixtures provide general lighting to the space. Under cabinet lighting will be provided to increase function light levels at counter/task plane. Additionally recessed wall wash fixtures will accent strategic walls.

Mailroom:

Linear recessed light fixtures provide general lighting to the space. Linear light location to provide proper illumination of mailbox faces. Under cabinet lighting will be provided to increase function light levels at counter/task plane if needed.

Laundry:

Linear recessed light fixtures provide general lighting to the space.

Office:

The office will employ linear suspended direct indirect light fixtures provide general lighting to the space.

Reception:

Linear recessed light fixtures provide general lighting to the space. Additionally recessed wall wash fixtures will accent strategic walls.

Corridors:

Corridor lighting will utilize recessed downlights for general illumination. Strategic graphics walls will be illuminated with recessed wall wash fixtures to aid in wayfinding.

Storage:

Standard strip light fixtures will be provided where no ceiling occurs. Recessed lensed linear fixtures will be provided where ceilings are placed.

5.9.2 EXTERIOR LIGHTING SYSTEMS

The lighting systems and controls for the exterior will target the following attributes:

- Fixtures throughout the site and building exterior will be LED type, 3000K CCT, with lumen packages selected to provide light level in accordance with the recommendations of the Illuminating Engineering Society of North America (IESNA) handbook and recommended practice guides and Local Ordinances.
- All exterior light fixtures must utilize marine grade materials, copper free alloys, fully gasketed IP65 enclosures, marine rated powder coating, and stainless-steel hardware with stainless-steel inserts where applicable. Ground mounted flood lights shall be brass construction and naturally finished.
- MLO LZ3 will be used for outdoor lighting ordinances and for determining light pollution reduction targets.
- All exterior lighting will be selected to meet the LEED light pollution reduction credit for MLO LZ3 and align with International Dark-sky Association (IDA) recommendations.
- Light pollution reduction will also be addressed via controls and a curfew based on programmatic requires. Occupancy based site lighting controls will be used where possible.
- LED wall packs will be used above exterior doors connected to emergency power circuit.
- LED pole mounted fixtures on 12'-15' poles will be used for pedestrian walkway lighting.
- Pole mounted LED lighting fixtures will be used for roadways. Poles will be round tapered aluminum, 20'-25' high with single or double arm mounted fixtures.

Area	Illumination Levels
Roadway	2.0fc avg. 0.9fc min., 4:1 avg./min.
Pedestrian Path	0.5fc min. and 1.0fc avg.
Entry	1.0fc min.
Courtyard	0.5fc min. and 1.0fc avg.

Table 5.9.2.1 Illumination Design Criteria

Building Exterior/Facade:

Main building entries will be accented to provide an increased sense of wayfinding to denote main entry points to facility. Building exterior overhangs will be accented with soft up light to highlight building massing and stacking. Up lighting will be contained within overhang to eliminate light pollution. Building façade lighting will be curfew controlled.

Exterior Stair:

Exterior stairs will be illuminated with a combination of stair integrated linear under tread lighting and handrail integrated LED lighting.

Courtyard:

The courtyard will utilize a combination of typical pedestrian area pole lights, linear bench integrated continuous under glow, and strategic landscape accent with ground mounted floodlights.

5.10 ACOUSTICS

The following section provides a summary of the relevant acoustical criteria and acoustical recommendations for the "Health + Dining + Housing (2A)" building. The focus of this section is:

- Sound Isolation: Coordination of interior partitions to reduce airborne noise transfer between spaces as well as structure borne (e.g., footfall, machinery) noise.
- Room Acoustics: Coordination of acoustically absorptive finishes to meet the reverberation time requirements and support clear speech and hearing within spaces as well as reducing noise build-up.
- MEP and Elevator Noise and Vibration: Coordination of engineered building systems such as mechanical, electrical, plumbing, and elevator.
- Exterior noise intrusion (such as traffic noise).

5.10.1 CRITERIA

5.10.1.1 HEALTH + DINING

The California State University (CSU) Guidelines and Standards does not contain acoustical criteria. The following criteria is based on similar California State University projects, industry standards, ANSI Standard S12.60, LEED, and ASHRAE guidelines.

- CalGreen Section 5.507 "Environmental Comfort," stipulating a maximum Leq of 50 dBA inside of occupied hours due to exterior (environmental noise).
- All indoor spaces shall meet the requirements as described in LEED for New Construction – Indoor Environmental Quality Credit: Acoustic Performance, including both HVAC Background Noise and Sound Transmission Standards.
- Exterior Noise Control: Project-generated noise shall comply with State and local City noise ordinances.

LEED v4.1 and ASHRAE's guidelines contain quantitative acoustical criteria for health and office space.

Table 5.10.1.1 summarizes the relevant criteria from the sources noted above.

Space	Room Acoustics	Sound Isolation	Background Noise [a]
Corridors	No requirement, recommend reverberation time of 1.2 seconds or less	**Impact Noise** IIC 45 **Maximum Hourly L_{eq} due to Exterior Noise Sources** 50 dBA	NC: 40 45 dBA
Ward/Isolation Rooms	--	**Airborne Noise** STC 50: At corridors (without door) STC 50: Between adjacent ward/isolation room/conference rooms/huddle/private offices/shared offices/exam/treatment/break room/stairwell/open plan/occupied spaces/corridor STC 55: At restrooms STC 60: Adjacent to MEP equipment room/IT room [b] **Impact Noise** IIC 50 **Maximum Hourly L_{dn} due to Exterior Noise Sources** 45 dBA	NC: 35 40 dBA
Large & Medium Conference Rooms/Large & Medium Multipurpose Room/Wellbeing Group Room	Incorporate acoustically absorptive ceiling (NRC 0.80 minimum) or maximum reverberation time of 0.6 seconds	**Airborne Noise** STC 40: At corridors (with door) STC 50: Between adjacent conference rooms/huddle/private offices/shared offices/break room/stairwell/open plan/occupied spaces/corridor STC 55: At restrooms STC 60: Adjacent to MEP equipment room/IT room [b] **Impact Noise** IIC 45 **Maximum Hourly L_{eq} due to Exterior Noise Sources** 40 dBA	NC: 30 35 dBA
Huddle/Private Office/Wellness/Lactation/Relaxation/ Small Meeting Rooms/PT/Exercise Room	Incorporate acoustically absorptive ceiling (NRC 0.75 minimum) or maximum reverberation time of 0.6 seconds	**Airborne Noise** STC 35: At corridors (with door) STC 45: Between adjacent huddle/private offices/shared offices/break room/stairwell/open plan/occupied spaces/corridor STC 55: At restrooms STC 60: Adjacent to MEP equipment room/IT room [b] **Impact Noise** IIC 40 **Maximum Hourly L_{eq} due to Exterior Noise Sources** 40 dBA	NC: 30 35 dBA
Therapy/Telehealth Room/Triage/Exam Rooms/Treatment Rooms	Incorporate acoustically absorptive ceiling (NRC 0.75 minimum) or maximum reverberation time of 0.6 seconds	**Airborne Noise** STC 35: At corridors (with door) STC 50: Between adjacent ward/isolation room/conference rooms/huddle/private offices/shared offices/exam/treatment/break	NC: 35 40 dBA

Table 5.10.1.1 Acoustical Criteria

Space	Room Acoustics	Sound Isolation	Background Noise [a]
		room/stairwell/open plan/occupied spaces/corridor STC 55: At restrooms STC 60: Adjacent to MEP equipment room/IT room [b] **Impact Noise** IIC 50 **Maximum Hourly L_{dn} due to Exterior Noise Sources** 45 dBA	
Shared Workspace/Shared Offices	Incorporate acoustically absorptive ceiling (NRC 0.75 minimum) or maximum reverberation time of 0.6 seconds	**Airborne Noise** STC 35: At corridors (with door) STC 45: Between adjacent huddle/private offices/shared offices/break room/stairwell/open plan/occupied spaces/corridor STC 53: At restrooms STC 60: Adjacent to MEP equipment room/IT room [b] **Impact Noise** IIC 40 **Maximum Hourly L_{eq} due to Exterior Noise Sources** 50 dBA	NC: 35 40 dBA
Open Plan/Waiting Areas/Nurse Stations/Workstation/Immunization Station	Incorporate acoustically absorptive ceiling (NRC 0.80 minimum) or maximum reverberation time of 0.8 seconds	**Maximum Hourly L_{eq} due to Exterior Noise Sources** 50 dBA	NC: 40 45 dBA
Work Rooms/Copy/Breakroom/Pantry	Incorporate acoustically absorptive ceiling (NRC 0.75 minimum) or maximum reverberation time of 0.6 seconds	STC 35: At corridors (with door) STC 45: Adjacent to huddle/private offices/shared offices/break room/stairwell/open plan/occupied spaces/corridor. STC 50: Adjacent to conference, classrooms/labs or similar spaces requiring a high degree of acoustical privacy **Maximum Hourly L_{eq} due to Exterior Noise Sources** 50 dBA	NC: 40 45 dBA
Labs/X-Ray/Changing Room	Incorporate acoustically absorptive ceiling (NRC 0.75 minimum) or maximum reverberation time of 0.6 seconds	STC 40: At corridors STC 50: Adjacent to acoustically sensitive space [b] **Maximum Hourly L_{eq} due to Exterior Noise Sources** 50 dBA	NC: 35 40 dBA
Lobby/Entry/Reception/Lounge	Incorporate acoustically absorptive ceiling (NRC 0.80 minimum) or maximum reverberation time of 1.0 second	**Maximum Hourly L_{eq} due to Exterior Noise Sources** 50 dBA	NC: 40 45 dBA
MEP Rooms/Data Center/IT Room	Incorporate acoustically absorptive ceiling (NRC 0.75 minimum)	STC 40: At corridors STC 60: Adjacent to acoustically sensitive space [b]	--
Servery/Dining Areas/Bakery/Café	Incorporate acoustically absorptive ceiling (NRC 0.80 minimum) or maximum	**Maximum Hourly L_{eq} due to Exterior Noise Sources** 50 dBA	NC: 40 45 dBA

Space	Room Acoustics	Sound Isolation	Background Noise [a]
	reverberation time of 1.0 second		
Bathrooms/Kitchen/Showers/Laundry	--	STC 40: At corridors STC 55: Adjacent to acoustically sensitive space	NC: 40 45 dBA

[a] Background noise level from continuous interior sources (e.g., fan coil units, VAV boxes, etc.). Equipment such as fume hoods and other intermittent devices may be louder if they are user-controllable (i.e., they can be turned off). Both A-weighted (dBA) and NC criteria are presented, as dBA is easier to measure/utilize during commissioning/post-construction measurements.

[b] If it can be demonstrated that equipment in the MEP and IT/Data Center room meets the background noise limits specified in the adjacent space, STC rating of wall can be reduced to no lower than STC 45.

Table 5.10.1.1 Acoustical Criteria

5.10.1.2 HOUSING

1. COMMERCIAL SPACES - CALIFORNIA GREEN BUILDING CODE

Section 5.507 of the 2019 California Green Building Standards Code (CALGreen) stipulates noise criteria for commercial spaces. If exterior hourly noise levels at the project site are above LEQ 65 dBA, then interior noise levels in commercial/office spaces must not exceed LEQ 50 dBA during the noisiest hour of operation (Performance Method). This CALGreen standard applies to the Multipurpose Activity Room, Meeting / Study Room, Student Lounge, Laundry. Reception, Offices, and kitchen.

CALGreen stipulates that partitions separating tenant spaces, and partitions separating tenant spaces from public spaces, should achieve a minimum STC 40 rating.

2. RESIDENTIAL SPACES - CALIFORNIA BUILDING CODE

The 2019 California Building Code (CBC), California Code of Regulations, Title 24, Part 2, Section 1207.4, stipulates that an interior noise level attributed to exterior sources shall not exceed DNL 45 dBA for any habitable room in a residential building.

The California Building Code (CBC) stipulates the following criteria applicable to common interior walls, partitions and floor-ceiling assemblies between adjacent dwelling units and sleeping units, or between dwelling units and sleeping units and adjacent public areas such as halls, corridors, stairways or service areas. This applies to the housing units.

- Airborne Sound: Minimum STC rating of 50 (45 when field tested)
- Structure-borne (Impact) Sound: Minimum Impact Insulation Class (IIC) rating of 50 (45 when field tested); criterion does not need to be met at spaces located over non-habitable spaces such as garages/mechanical rooms/storage areas

For this project, we recommend the STC and IIC criteria be increased by five points between adjacent dwelling units (i.e., STC/IIC 55), as the Code criteria is a minimum standard. FYI, the STC 55 recommendation is similar to that recommended by the U.S. Department of Housing and Urban Development (HUD) in their multi-family guidelines document.

For housing units adjacent to noise emitting rooms such MEP, Kitchens, etc., we recommend a rating of minimum STC 60 for the demising partition.

3. INTERIOR ROOM ACOUSTICS AND ROOM FINISH TREATMENTS

Table 5.10.1.2 summarizes the amount of sound build-up recommended (measured as Reverberation Time, in seconds).

Space	Max. Reverberation Time (RT_{60}) in sec.
Reception	1.2
Multi-Purpose Spaces / Lounge	0.8
Study Room / Meeting Rooms / Offices	0.6
Residences	N/A
Support Spaces	N/A

Table 5.10.1.2 Recommended Reverberation Time

4. MEP/HVAC NOISE LEVELS

Table 5.10.1.3 summarizes the MEP/HVAC noise criteria, based on ASHRAE guidelines.

Space	Noise Criteria (NC)
Bedroom	Max. 35
Kitchen/Dining	Max. 35 (when kitchen exhaust fans are off) (rate kitchen exhaust fans up to 4.5 sones)
Living Room	Max. 35
Bathroom Exhaust Fans	0.6 to 1.5 sones
Public Spaces, Corridors	40
Reception	40
Multi-Purpose Spaces / Demo Kitchen	40
Study Room / Meeting Rooms / Offices / Lounge	35

Table 5.10.1.3 Background Noise (HVAC) Criteria

5.10.2 RECOMMENDATIONS

5.10.2.1 PARTITION SOUND ISOLATION

Airborne sound isolation is the amount of noise reduction afforded by constructions (doors, windows, partitions, floor-ceiling, etc.). Constructions with high levels of noise reduction, such as concrete walls, are described as providing greater amounts of airborne sound isolation. Sound isolation recommendations are expressed in terms of laboratory STC rating.

To achieve the STC ratings listed in the criteria section above, sound-rated partitions will be necessary. The field-measured Noise Isolation Class (NIC) value of the installed wall assembly shall not be more than 5 decibels below the STC rating of the demising assembly.

We have found that partitions with fewer layers of gypsum board incorporating “acoustical” studs, staggered studs, or double-stud assemblies may cost less than single-stud partitions with multiple layers of gypsum board. We recommend the Cost Estimator provide input on the most efficient partition design.

Sound-Rated partitions shall follow these guidelines:

- Offset gypsum board layer seams by 24”. Mud and tape all joints between gypsum board layers.
- Provide full depth insulation in all stud cavities; do not compress insulation.
- Hold back the face layer of gypsum board ¼” from intersecting surfaces and caulk airtight with non-hardening resilient acoustical sealant.

- Minimize the number of penetrations in sound-rated partitions.
- Oversize full perimeter of penetrations (maximum ¼" gap) to avoid direct contact between the penetrating element and partition framing elements and layers. Seal all penetrations with closed cell foam backer rod, if necessary, and non-hardening, resilient acoustical sealant.
- Rough-in boxes should be fully backed with putty pads (minimum ¼"-thick intumescent clay pads).
- Rough-in boxes should not be placed back-to-back; offset boxes by a minimum of 16" horizontally.
- Seal gaps airtight where full height walls meet structural decks above (see following section).
- Double-stud walls should not be laterally bridged; at metal stud walls, we recommend following the UL U493 design which does not require lateral bridging across stud rows.

Schematic detail options for each STC rating are provided as follows:

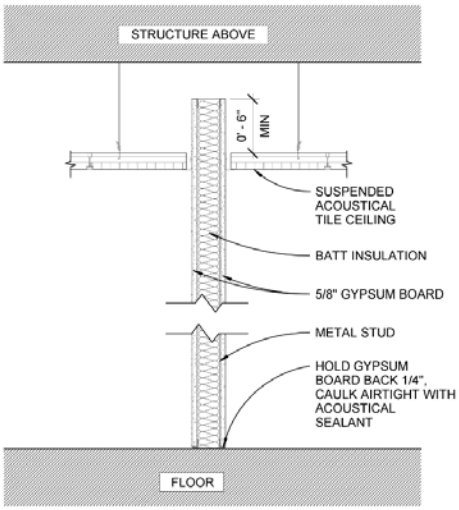


Figure 5.10.2.1 STC 35 Partition

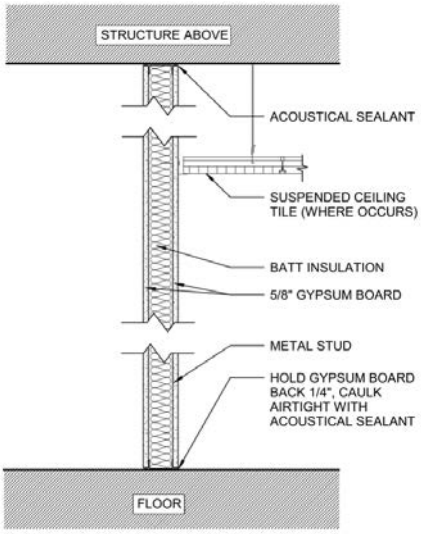


Figure 5.10.2.2 STC 40 Partition

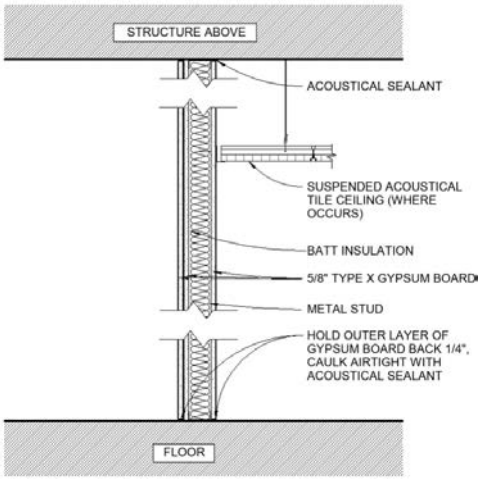


Figure 5.10.2.3 STC 42 Partition

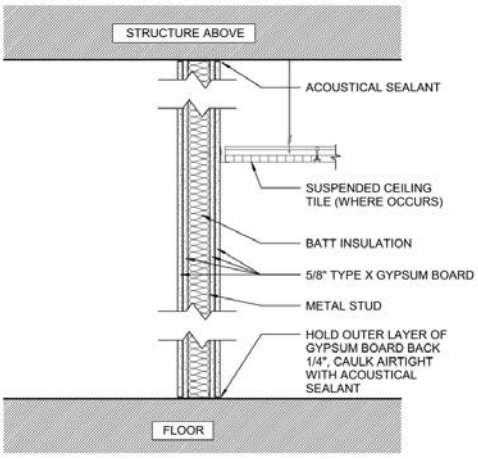


Figure 5.10.2.4 STC 45 Partition

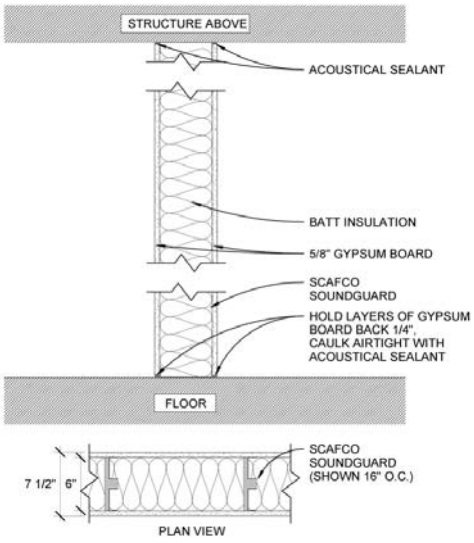


Figure 5.10.2.5 STC 50 Acoustic Stud Partition
(SCAFCO SoundGuard)

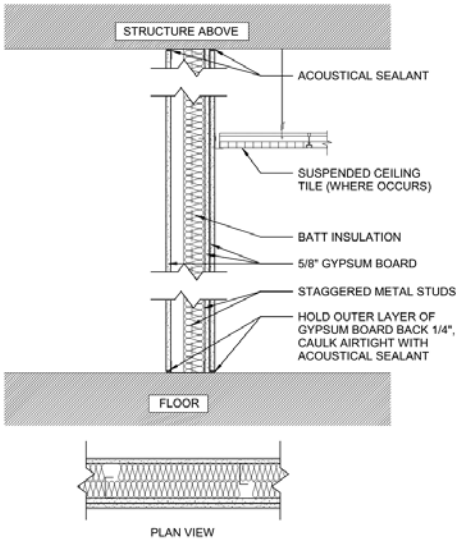


Figure 5.10.2.6 STC 50/53 Staggered Stud Partition

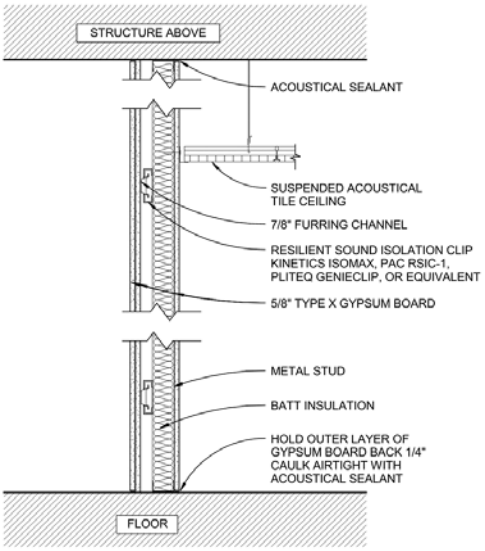


Figure 5.10.2.7 STC 50/53 Acoustic Clip Partition

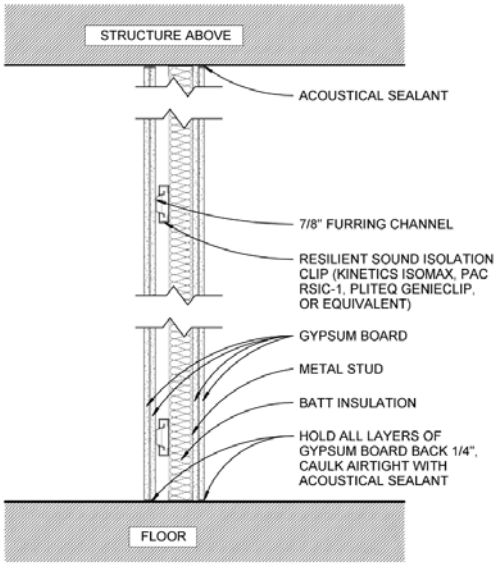


Figure 5.10.2.8 STC 55 Acoustic Clip Partition

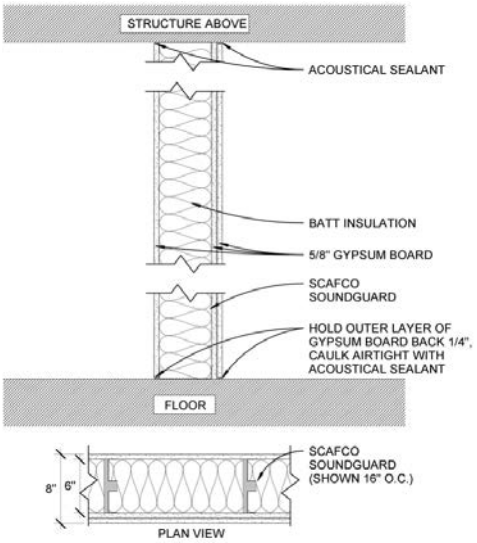


Figure 5.10.2.9 STC 55 Acoustic Stud Partition (SCAFCO SoundGuard)

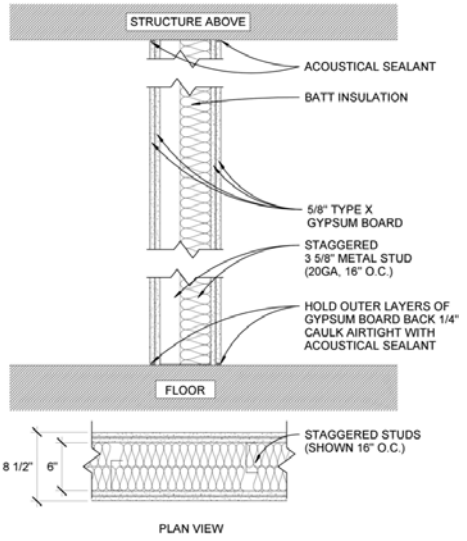


Figure 5.10.2.10 STC 55 Staggered Stud Partition

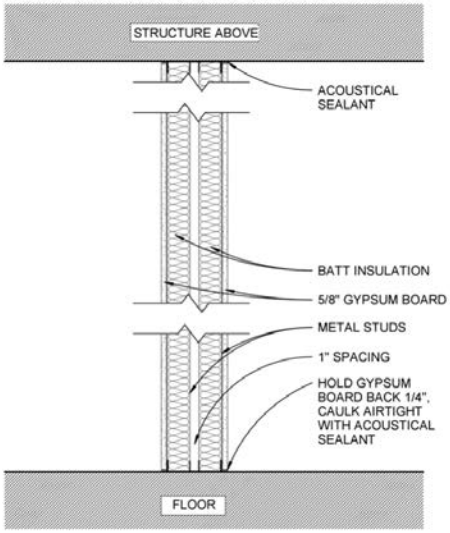


Figure 5.10.2.11 STC 55 Double-Stud Partition

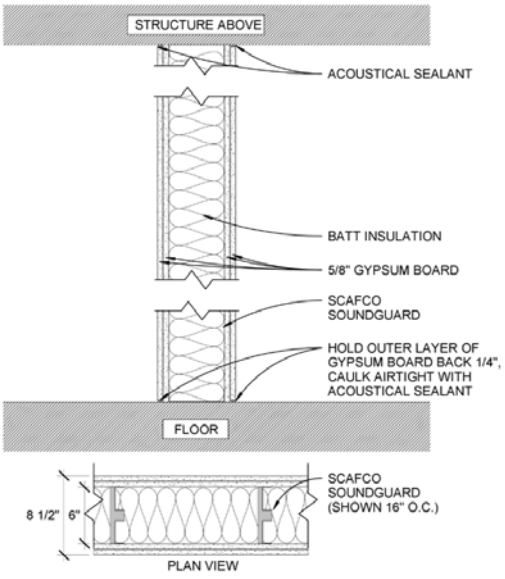


Figure 5.10.2.12 STC 60 Acoustic Stud Partition (SCAFCO SoundGuard)

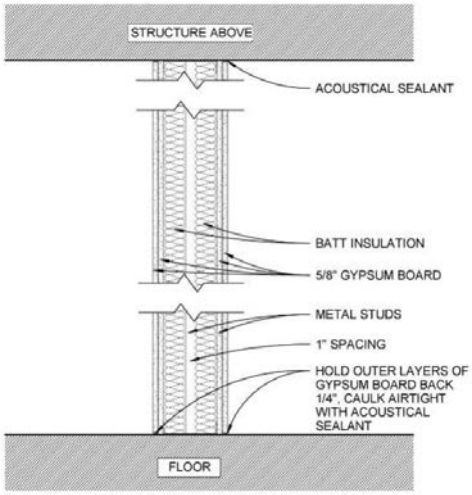


Figure 5.10.2.13 STC 60 Double-Stud Partition

Residents should not be allowed to install recessed loudspeakers or other recessed items in party walls, as the sound isolation performance of the wall would be compromised.

5.10.2.2 PARTITION SOUND ISOLATION SPECIALTIES

Partitions at shafts, MEP rooms, Telecom Rooms, Data Center / IT Rooms, IDF rooms, and other noise emitting rooms should be evaluated and recommended STC ratings should be refined as the equipment is scheduled and noise calculations are completed; prescriptive STC recommendations are provided in Table 1.

Some sound-rated partitions that terminate at the exterior windows can be an acoustical "weak link" in the wall assembly and will compromise the performance of the demising partition. The intersection should be treated with an acoustical mullion product such as the Mull-it-Over, Emseal QuietJoint, or Piedmont Plug products.

The acoustical treatment of penetrations, partition intersections, and outlet boxes is critical to achieve the STC ratings presented in the Criteria section. The following details should be incorporated into the architectural drawings and noted on the floor plans, sections, etc. as appropriate.

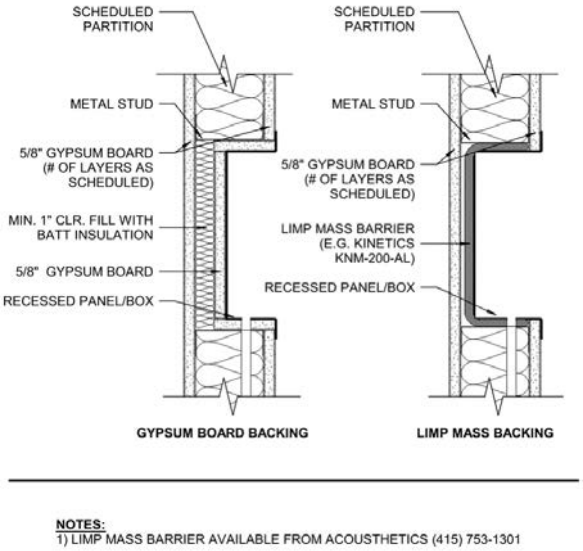


Figure 5.10.2.14 Recessed Panels and Fixtures

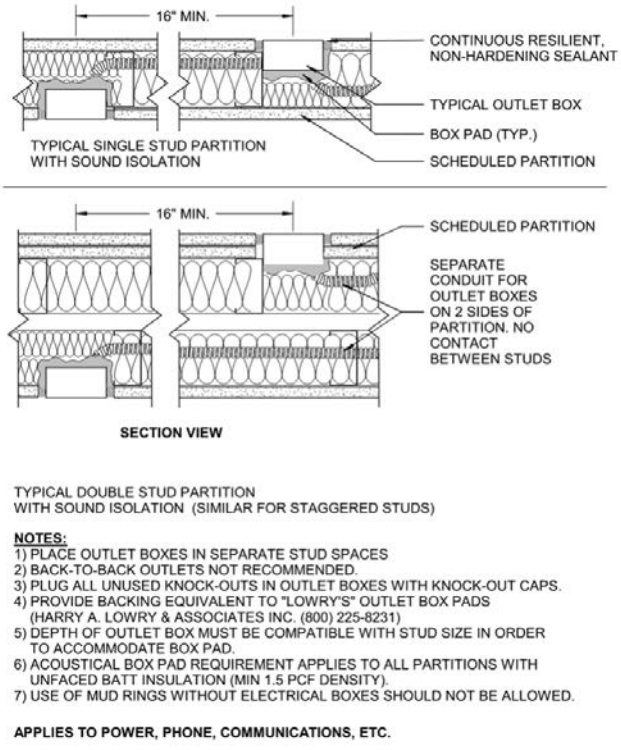


Figure 5.10.2.15 Junction Box Isolation

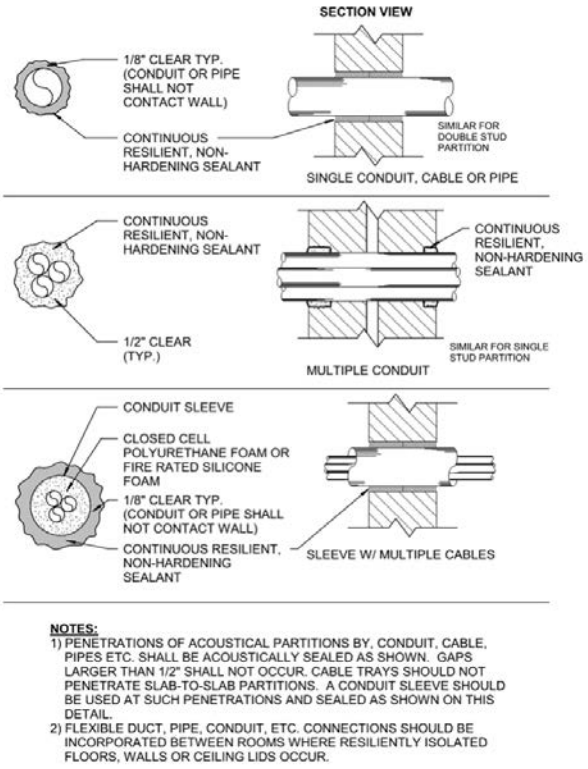


Figure 5.10.2.16 Partition Penetration Details

5.10.2.3 DOORS AND VISION WINDOWS

Doors and vision windows between adjacent sound sensitive spaces (such as conference room to conference room) should be avoided, otherwise STC rated sound control door and window assemblies equal to the STC demising wall rating listed in the criteria section will be required to maintain sound isolation.

Entry doors to occupied spaces should be solid core wood or insulated hollow metal with a minimum surface density of 5 psf. Entry doors to core learning spaces as well as conference rooms (and other rooms where speech privacy is a concern) and MEP / IT / Elevator Machine Rooms (or any other noise emitting rooms) should incorporate rubber bulb gasketing and automatic door bottoms. These doors should provide STC 30 (NIC 28) minimum sound isolation performance. Door undercuts shall be no more than 1/4". A typical entry door with automatic door bottom is shown below.

				AUTOMATIC DOOR BOTTOM	
MANUFACTURER	PERIMETER	ASTRAGAL	SHOE	MORTISE	SURFACE MOUNT
PEMKO	S-88	355CS	234	434A/420A	
NATIONAL GUARD	5050	109N		423N	420N
REESE	797		DB591F	371	521
ULTRA				DB 043	
ZERO		1840	253A	369	367

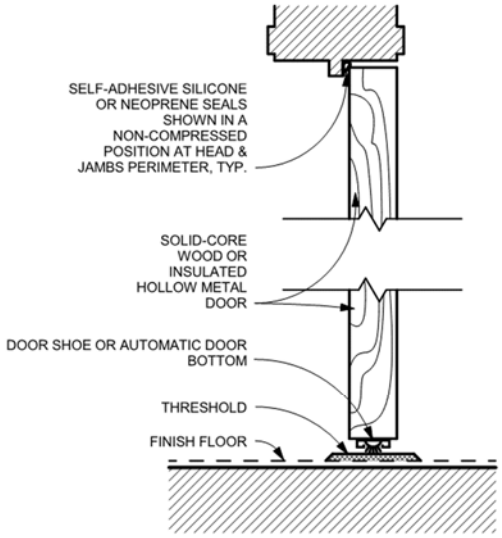


Figure 5.10.2.17 Doors to Core Learning Spaces and Other Noise-Sensitive Spaces

Doors to rooms with noise generating equipment such as MEP / IT / Elevator Machine Room should not open into acoustically sensitive spaces, otherwise STC rated sound control doors will be required.

Entry doors at housing residences should be solid-core wood doors or insulated hollow metal doors with full-perimeter gaskets (such as Pemko S-88 self-adhesive bulb seals) with an automatic door bottom (such as Pemko 434) or a door shoe (such as Pemko 234). Door panel weight should be a minimum of 5 lbs./sq. ft. The multipurpose room, MEP rooms, offices, study, laundry, and meeting rooms should also include similar door treatment.

5.10.2.4 INTERIOR GLAZING

Glazing located at office/conference room fronts can be an acoustical "weak link." When glazing is located adjacent to a door (e.g., a sidelite), 1/2" thick glazing is sufficient. However, if glazing is located in a partition without a door or a wall is fully glazed, then a more robust glazing system (e.g., dual pane with 2" airspace) will be necessary.

5.10.2.5 OPERABLE PARTITIONS

If operable partitions are added, close coordination with the operable partition design is important to verify that the perimeter conditions (e.g., head, base, sides) of the operable partition do not compromise the sound isolation performance of the operable partition. Generally, an operable partition should have an STC rating equal to or higher than that of a standard framed wall. For most adjacencies, an operable partition should have a minimum STC rating of 50 and NIC rating of 42. The STC rating listed by operable partition manufacturers should be for the assembly, and not only the panel.

Depending on its location, it may be recommended that the facing of the operable partition incorporate acoustically absorptive materials to reduce reverberation in the space.

5.10.2.6 FLOOR-CEILING ASSEMBLY SOUND ISOLATION

1. HEALTH + DINING

The Health + Dining structural system will be concrete slab. We recommend at least a 6" inch thick slab. Where hard-surface floors are planned, an acoustical underlayment will be necessary. The thickness and type of underlayment is as follows:

- Carpet tile with pad: no underlayment required. Pad underneath carpet must be minimum 1/4-inch thick.
- Vinyl: 2mm thick Pliteq RST, Ecore, or Acousticork or cushioned vinyl should be used. If a third-party underlayment is used, the flooring manufacturer needs to review the assembly. See figure below:

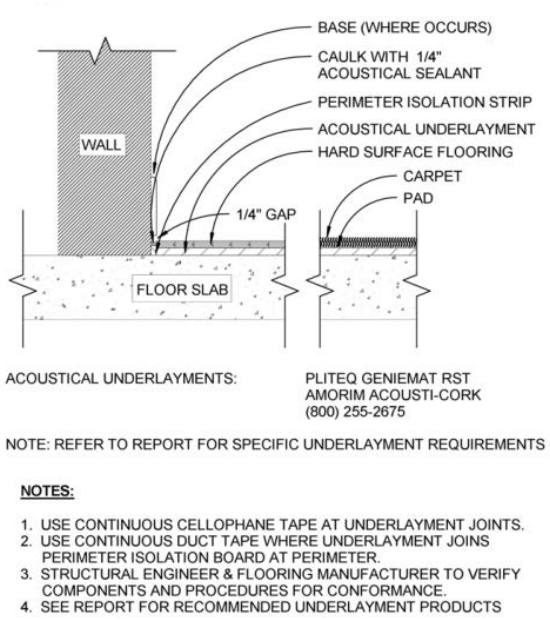


Figure 5.10.2.18 Floor Assembly with Underlayment

- Hardwood or Tile: 5mm thick Pliteq RST, Ecore, or Acousticork

2. HOUSING

The Housing structural system will be concrete slab. We recommend at least 6" inches thick slab.

a) **Structure between commercial and residential spaces**: To achieve acceptable impact sound isolation levels between the commercial and residential spaces, where hard-surfaced flooring is planned above Meeting / Study Room, Offices, Multi-Purpose, Lounge, Kitchen, and Lobby, we recommend incorporating a minimum 2 mm thick acoustical underlayment. For spaces without a suspended gypsum board ceiling, see figure below.

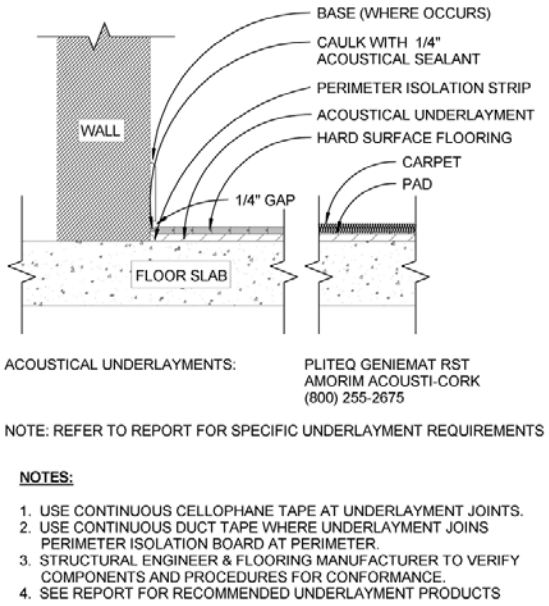


Figure 5.10.2.18 Floor Assembly with Underlayment (no ceiling below)

Where housing units are above health building areas (for ex., CAPS), in addition to the underlayment, a gypsum hard lid ceiling on resilient hangers such as Kinetics Isogrid or Mason WHR is recommended in the areas below. An acoustical ceiling tile (with minimum NRC as shown in Table 1 above) recommended below the gypsum lid. Alternate is to use surface mounted acoustical treatment on the underside of the gypsum lid. See figure below.

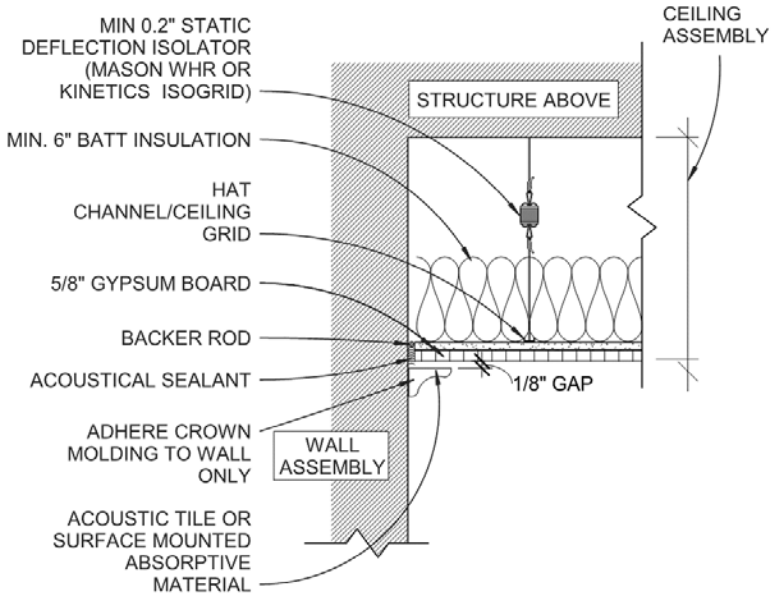


Figure 5.10.2.19 Resilient ceiling below

For spaces with a wire suspended gypsum board ceiling, see figure below.

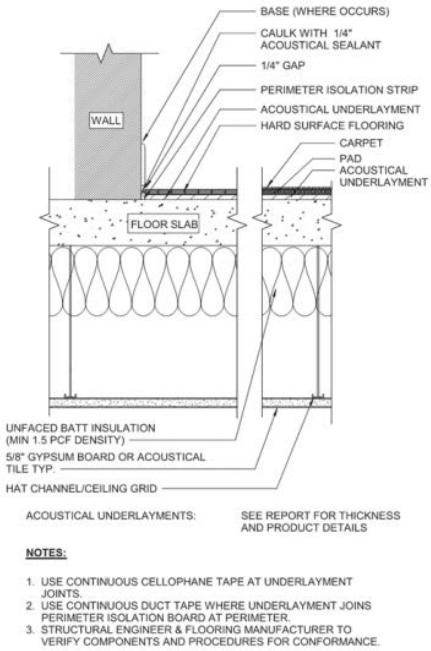


Figure 5.10.2.19 Floor Assembly with Underlayment (with ceiling below)

Acceptable underlayment options include Pliteq GenieMat RST02, Ecore EcoSilence, AcoustiCork, or similar.

a) **Structure at housing units**: To achieve the recommended IIC 55 design goal, acoustical underlayments are necessary in occupied spaces with hard surfaced flooring that are located above residential units. Table 3 includes our recommendations associated with a variety of floor finish types that may be selected as the design progresses. For spaces without a suspended gypsum board ceiling and for spaces with a suspended gypsum board ceiling, see figures above. If the floor finish being considered will be luxury vinyl tile (LVT) with integral acoustically rated backing, acoustical lab test reports should be submitted for our review for the planned LVT (with acoustical backing) floor finish option.

Floor Finish	Underlayment[1, 2]	
	With Suspended GWB Ceiling	Without Suspended GWB Ceiling
Hardwood/Engineered Wood	Pliteq RST05	Pliteq RST10
Tile/Stone	Pliteq RST10	Pliteq RST12
Vinyl/LVT/ULVT (w/o acoustical backer)	Pliteq RST02 [3]	Pliteq RST05
Carpet	Standard Pad	Standard Pad

Table 5.10.2.1 Floor-Ceiling Underlayment Recommendations

Where resilient underlayments are installed, perimeter isolation should be installed. The perimeter isolation should be no less than 1/4-inch thick and be approved by the manufacturer of the resilient underlayment. Perimeter isolation should be used at all penetrations in the floor and at the entire perimeter including the junction at the corridor. The resilient underlayment should be required below bathrooms tubs and showers.

5.10.2.7 STAIRS

Stairs should be supported at the landings and stringers should not be connected to the wall shared with a housing unit, learning space, conference room, or other noise-sensitive space. Stair treads and landings should be concrete-filled.

5.10.2.8 LABORATORY TOOLS - VIBRATION

We understand that there will be no equipment and instruments that are extremely sensitive to vibration.

5.10.2.9 LAUNDRY ROOM

We recommend selecting “quiet” units in the Laundry room in the housing building. We recommend installing the washer/dryers on rubber mounts such as Mason BM mounts.

5.10.2.10 MULTIPURPOSE ROOM

We recommend a STC 65 double stud wall between the multipurpose room and adjacent rooms in the housing building. A gypsum board ceiling on resilient clips such as Kinetics Isomax or Pac-International RSIC-1 is recommended for this room to reduce noise to units above. An acoustical ceiling tile (with minimum NRC as shown in Table 1 above) recommended below the gypsum lid. Alternate is to use surface mounted acoustical treatment on the underside of the gypsum board ceiling.

5.10.2.11 TRASH CHUTES (HOUSING)

If used, isolating trash chutes are important for reducing noise to adjacent acoustically sensitive spaces. We suggest including the following information in the project documents:

- Avoid offsets in trash chute.
- The chutes should be supported with resilient mounts equal to Mason Industries ND, Kinetics AC-222E or equal.
- The chute stanchions at the basement should be isolated with resilient mounts equal to Mason Industries ND, Kinetics AC-222E or equal.
- The chutes should not come into contact with the trash compactor.
- The chutes shall be provided with a damping compound equal to Soundcoat GP-1, Kinetics Noise Control KDD or KDC, or approved equal.

- Trash chutes should be vibration-isolated as shown in image below.

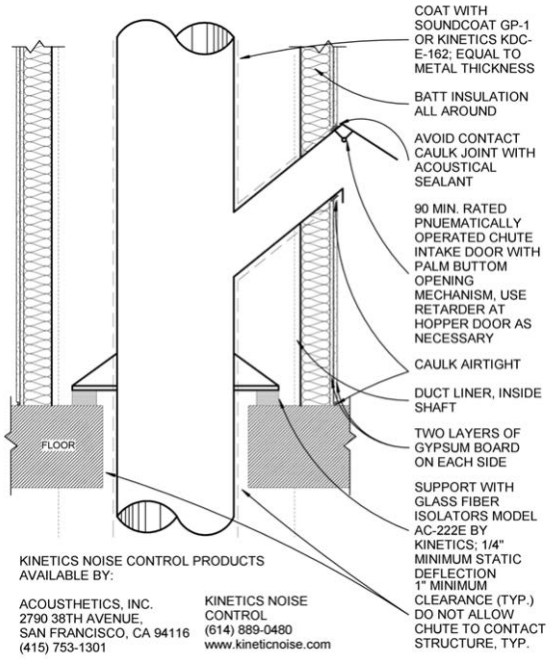


Figure 5.10.2.20 Trash Chute Acoustical Treatment

5.10.2.12 MISCELLANEOUS HOUSING RECOMMENDATIONS

The following recommendations are included as additional options for the design teams' consideration. These recommendations provide further sound isolation by acoustically treating noisy items within residences.

- Casework: Casework located on or adjacent to party (residential) walls or other sound-rated walls (e.g., at offices, conference rooms, classrooms) should incorporate slow-closing hinges, drawer slides, and felt pads at closure points to reduce impact noise.
- Garbage Disposals: "Quiet" garbage disposals, or units with internal vibration isolation, should be specified to reduce disposal noise transfer into sensitive spaces (e.g., residences, classrooms, conference rooms).

5.10.2.13 EXTERIOR SOUND ISOLATION

The project shall comply with the acoustical requirements of the criteria section above for environmental noise. The acoustical impact of environmental and all new and existing outdoor equipment (mechanical and electrical) noise on interior noise levels within rooms that may be impacted by the exterior noise should be quantified. Acoustical recommendations in the form of the equipment selections, building facade recommendations, noise control recommendations for the new and existing equipment should be provided so that exterior noise intrusion from all sources is limited to the values in the criteria table. Exterior windows must have an STC rating of at least 35, unless outdoor and indoor noise levels can be verified to justify a lower rating. An environmental noise study should be conducted to determine building facade recommendations for the Health + Dining + Housing building.

5.10.2.14 ROOM ACOUSTICS

To achieve the reverberation time criteria, acoustically absorptive finish materials are required. Typically, this is accomplished by specifying a sound absorbing ceiling (e.g., a suspended acoustical tile ceiling). Where a suspended acoustical tile ceiling is not planned, surface applied wall panels or ceiling panels can be specified (e.g., Autex, Kirei, Euromat). The minimum NRC rating of the selected acoustically absorptive material should be NRC 0.75 and most spaces require approximately 70 to 80% of the room's ceiling area (in terms of square feet) in absorptive materials to achieve the criteria. The acoustic ceiling tile products (e.g., Armstrong Ultima High NRC, Certainteed Performa, Armstrong Optima, USG Mars) can meet NRC 0.75.

If hard-surfaced flooring is planned (e.g., concrete, vinyl), then acoustically absorptive wall panels at 20% to 30% of the wall area will likely be needed (depending on total room volume and the space criteria). Reverberation time calculations should be performed when floor finish selections are made.

You may consider the addition of acoustically absorptive materials in corridors and circulation spaces to reduce noise build-up and disruption to adjacent spaces. The necessity for this is dependent on whether there will be large numbers of people utilizing the corridors. This can also be considered as a "Day 2" (post-construction) option. For budgeting purposes, assume that the required number of square feet is equal to the floor area (absorptive materials can be placed on the ceiling or upper wall areas).

Where it is important to utilize acoustically absorptive materials that can be easily cleaned, product options include Conwed Metro Rebound, Decoustics High Impact Resistant, Kinetics High Impact Hardside (PVC face).

5.10.2.15 MECHANICAL / HVAC NOISE AND VIBRATION

Note: These guidelines should be considered general in nature and it may be necessary to modify these guidelines to meet fire, structural, and/or other project requirements.

- Where possible, ducts should be sized to limit maximum air velocities as indicated in Table 5.10.1.5 below, to ensure that regenerated noise due to air movement does not cause the relevant design noise criteria to be exceeded.

Location	Noise Criterion - NC				
	45	40	35	30	25
Riser - rectangular duct	2500	2250	2000	1750	-
Main branch above suspended ceiling - rectangular duct	2500	1800	1550	1300	-
Exposed duct in occupied areas - rectangular duct	2000	1700	1450	1150	-
Duct within 10 to 20 feet of supply diffuser (S) / return grille (R)	900(S)/ 1000(R)	850(S)/ 950(R)	800(S) /900(R)	700(S) /800(R)	550(S) / 650(R)
Duct within 0 to 10 feet of supply diffuser (S)/return grille (R)	700(S)/ 800(R)	650(S)/ 750(R)	600(S) / 700(R)	500(S) / 600(R)	450(S) / 500(R)
Supply Diffuser - 'free' velocity	550	500	450	400	300
Return Grille - 'free' velocity	650	600	550	500	400
Open return duct above ceiling	850	750	650	-	-

Note: These velocity guidelines assume good airflow conditions. Presence of elbows, fittings, or abrupt duct transitions may require air to run at lower velocities.

Table 5.10.2.2 Design Guidelines for Maximum Air Velocities in Ducts in Feet Per Minute (FPM)

- Supply air diffusers and return air grilles should be selected with manufacturer's noise rating 5 NC points below the HVAC design noise criterion of the area served. Where possible, connections to diffusers should utilize lined flex-duct to reduce any noise generated by flow through individual takeoffs.
- Where possible, flex-duct should consist of a flexible vapor barrier jacket with a wire reinforced inner core containing 1 1/2-inch thick resilient glass fiber insulation faced with reinforced coasted glass fabric; conforming to NFPA Standard 90A. Regenerative noise due to air turbulence within the duct shall not exceed the following sound power levels for a 12-inch diameter duct with an air speed of 1,000 FPM.

	Sound Power Levels, dB re: 10-12 Watts, at each octave band center frequency, Hz				
	125	250	500	1k	2k
Max. Regenerative Noise, dB	30	31	30	22	20

- Acoustically acceptable flex-duct products include:
  - Genflex IL
  - Casco Silentflex
  - Cody West type NILS
  - Flexmaster Acoustical Flex
  - Casco Acoustical Flex Duct (SF-181M)
  - Thermaflex Acoustical Flexible Air Duct
- The need for duct silencers (sound traps) and internal duct lining should be evaluated as the design progresses. A sufficient length of ductwork should occur between the AC unit and the silencer. Typically, there should be at least one and preferably two duct "diagonal(s)" of straight duct at either end of the attenuator prior to connections to equipment or fittings such as elbows. Silencers should be sized for a maximum pressure drop of 0.25 inches w.g.

- Fan coil units should not be located above any space with noise criteria of NC 30 or lower. Otherwise, a solid gypsum board ceiling or enclosure will be needed.
- Supply and return ductwork for the fan coil units should be internally lined with 1" duct lining. There should be 5 feet of acoustical flex duct at diffusers and grilles.
- Ducted indoor VRF or mini-split system should be designed to 0.5" or less static pressure.
- Where possible, volume control boxes should not be located within the acoustically sensitive rooms, and in general should be selected with a manufacturer's noise rating 10 NC points below that of the room served and the room over which the box is located for both discharge and radiated noise.
- A combination of acoustically lined ductwork and standard flexible duct will typically be required downstream of the VAV box to control discharge noise. If this cannot be accommodated, boxes may need to be oversized to reduce the overall noise levels generated.
- As far as is practical, HVAC systems serving acoustically sensitive occupied areas should be "self-balancing." Balancing dampers should not be located immediately upstream of diffusers. There should be a minimum of 5 feet of acoustical flexible duct or internally lined sheet metal duct between the damper and the connection to the diffuser. Dampers should not be incorporated into grilles, and diffuser blades should not be used for balancing of the air system.
- Recommendations for crosstalk control between occupied spaces should be provided as the design develops. It is acoustically preferred that return air systems be fully ducted where crosstalk is a concern. If this is not the case, crosstalk control may be required at air transfer openings.
- At open returns (i.e., where the return grille opens to the ceiling plenum) in enclosed, noise-sensitive rooms, duct boots should be used to reduce cross-talk. The duct boot opening should be pointed in the opposite direction from the entry door and not connected to the transfer grille; see image below.

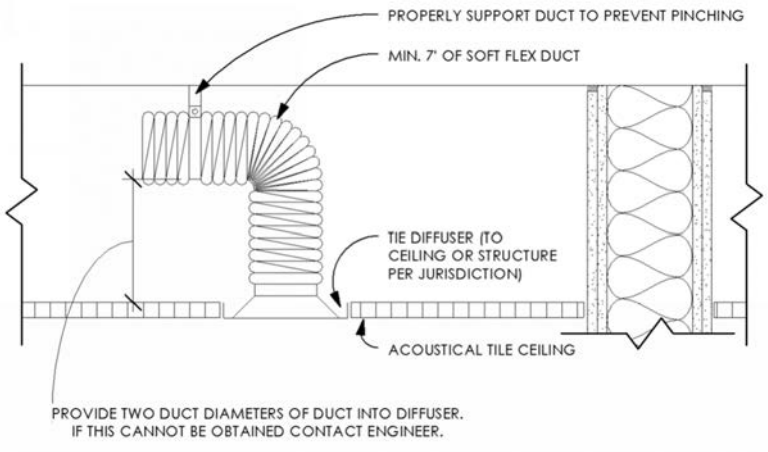


Figure 5.10.2.21 Duct Boot at Plenum Returns

- Return air transfer grilles at enclosed, noise-sensitive spaces (i.e., conference rooms, meeting rooms, and spaces with automatic door bottoms) should incorporate a transfer grille silencer, such as the Commercial Acoustics TS-4 or Ruskin GSV4 or use a lined transfer elbow (see image below). Transfer grilles should be located above doors and not located in sound-rated partitions (e.g., partitions separating adjacent classrooms, conference rooms, etc.) without doors.

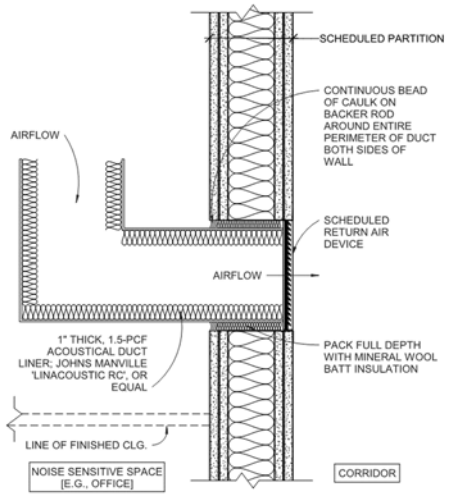


Figure 5.10.2.22 Return Air Transfer Duct Grille

- The following vibration isolation recommendations are based on ASHRAE guidelines.
  - All spring mounts should be unhoused and incorporate a neoprene pad or cup. We recommend that floor-mounted springs be Mason Type SLFH or equal; where necessary, Mason Z-1225 seismic snubbers or restrained springs equal to Mason Type SLR should be used.
  - Spring hangers should have a spring in series with neoprene and must allow for up to 30 degrees of misalignment; spring hangers should be Mason 30N or equal. Where equipment requires springs and is mounted on a roof curb, the roof curb should include integral springs (e.g., Mason RSC).
  - Double deflection neoprene should have a molded unit type neoprene element with a projecting bushing lining rode clearance hole. The neoprene element should be a minimum 1 3/4 inch (45 mm) thick with a steel retaining box encasing the neoprene mounting; neoprene should be Mason HD or equal.
  - Neoprene waffle pad should have a ribbed or waffled design, with a minimum thickness of 0.75-inch (19 mm). Pads should be selected for adequate durometer to handle loads and reduce over compression. We recommend that pads be Mason Super W or equal.
  - All connections to vibration isolated equipment should be flexible; this includes electrical service, plumbing/piping, and duct. Where possible, service loops should be provided. Duct connections should be canvas style, high pressure fluid lines should be twin sphere (e.g., Mason SFDEJ) or steel braided with a minimum length of 12 inches. Generator flue exhaust should utilize an open pitch style steel braided hose with a length equal to four (4) times the diameter, with a minimum length of 12 inches and a maximum length of 24 inches.
  - Suspended piping and pipe risers will be resiliently isolated from the building structure.
  - Table 5.10.1.6 provides vibration isolation guidelines for various types of mechanical equipment; the structural engineer should confirm that the deflection of the support structure due to the weight of the mechanical equipment is no more than 8-10% of the specified vibration isolator deflection.

(On grade and above-grade installations with spans < 20ft and speeds > 500 RPM)		
Equipment Type	**Isolator Type**	**Static Deflection (inches)**
Fans (including AHU, ERU, RTU)	Spring & Neoprene	2
Horizontal Fan Coil Units / Heat Pumps	Spring & Neoprene	1
Vertical Fan Coil Units	Neoprene	0.3
Cooling Towers (above NC 40 spaces)	Spring & Neoprene	2
Cooling Towers (above residential or < NC 35 spaces)	Spring & Neoprene	3
Dry coolers, Air-Cooled Condenser, Air-Cooled Chillers, Air-Cooled Equipment	Spring & Neoprene	2
Mechanical & Domestic Pumps ≥ 5hp (Concrete Inertia Base)	Spring & Neoprene	2
Mechanical & Domestic Pumps less than 5hp	Double-deflection Neoprene	0.3
Condensate Pumps	Neoprene Waffle Pad	0.1
Heat Exchangers	Spring & Neoprene	1
Boilers	Neoprene	0.3
Hot Water Generators, Boilers (Skid Mounted)	Spring & Neoprene	1
Air Compressors	Spring & Neoprene	1
Generators	Spring & Neoprene	2
Transformers < 150 kVA	Double-deflection Neoprene	0.3
Transformers ≥ 150 kVA	Spring & Neoprene	1

Table 5.10.2.3 Vibration Isolation Guidelines

- Do not penetrate sound-rated partitions with flex duct.
- Where possible, rooftop units should not be located above acoustically sensitive spaces. Locate equipment to avoid increased noise levels within building.
- Ducts should be properly sealed to avoid leaks which generate duct whistling/airflow noise.
- Exhaust fans should be isolated with springs.
- Screen all rooftop and ground mounted equipment from street views.

5.10.2.16 PLUMBING NOISE AND VIBRATION

- Plumbing should not be routed through partitions at rooms designated as NC 30 or below. For NC 30 to 45 rooms, if piping is located above an acoustical (mineral tile) ceiling, piping should be wrapped within mass-loaded vinyl or acoustical equivalent with a minimum surface weight of 2.0 psf over 1" thick fiberglass insulation.
- To reduce water-flow noise at sensitive spaces, all supply, hot-water heating, waste, HVAC, and drain piping must be vibration isolated when located adjacent to sensitive spaces.
    - For pipes one inch diameter or less, Acousto-Plumb or Hubbard Holdrite Silencer clamps should be used.

- For waste pipes and supply pipes greater than one-inch diameter, isolate riser clamps with neoprene waffle pads and/or utilize the Armaflex or Trisolator isolators.

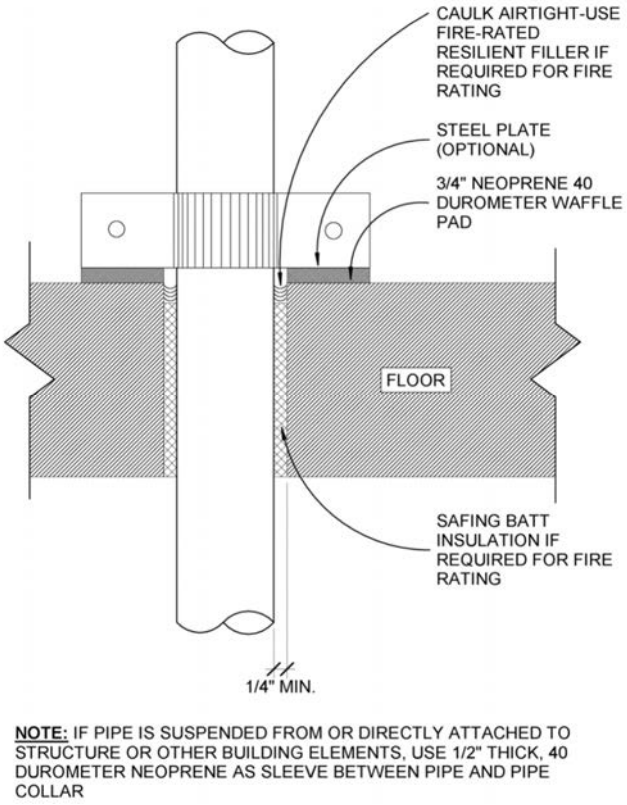


Figure 5.10.2.23 Plumbing Riser Isolation

- For trapeze piping supports, utilize combination neoprene/spring isolators at trapeze or other pipe hangers for the first three points of support or 50 feet (whichever is greater) after a pump or other vibration isolated equipment if the connection to the equipment is not flexible. See image below. For pipes greater than five-inches in diameter, flexible connections should be used at the outlet of the pump or other vibration-generating equipment.

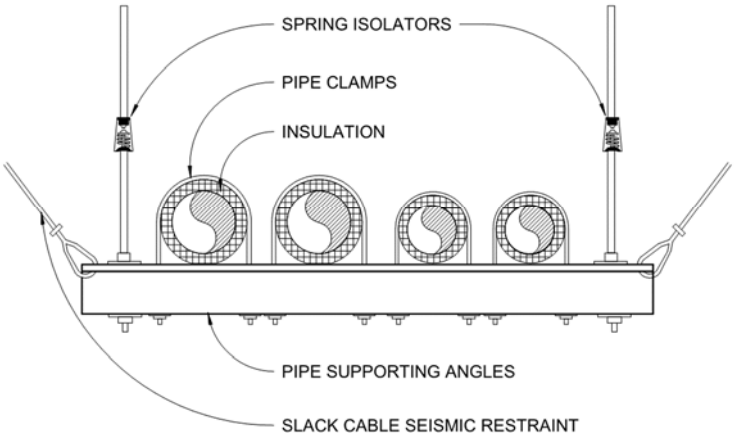


Figure 5.10.2.24 Trapeze Piping Acoustic Isolation

- Do not allow piping, pipe connectors, pipe hangers, or valves to directly touch the structure, studs, gypsum board, or other pipes.
- Support pipe as required by Uniform Plumbing Code.
- Plumbing penetrations should be sealed airtight with acoustical sealant.

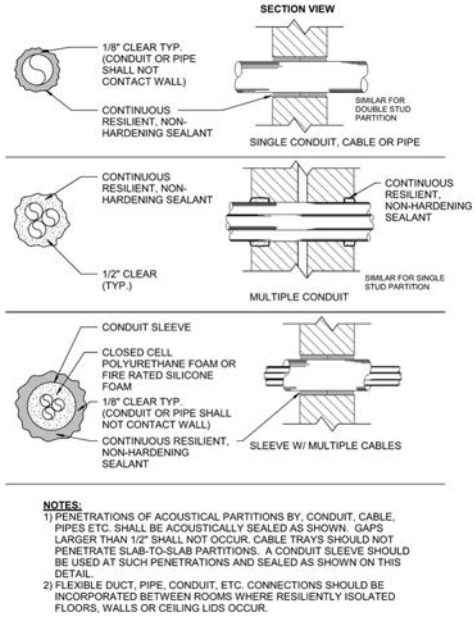


Figure 5.10.2.25 Partition Penetration Details

- Cast iron waste pipe is recommended; if ABS or other lightweight/thin wall material is planned, then pipe must be wrapped with Lowry's pipe wrap.
- Horizontal, cast-iron sanitary waste pipes above noise-sensitive spaces (e.g., bedrooms, living rooms) should be wrapped with pipe wrap such as Lowry's pipe wrap.

- Size supply piping for a maximum water-flow rate as shown in Table 6.

Pipe Diameter (in.)	Maximum Water Flow Velocity (fps)	Maximum flow rate (gpm)
1/2	4	3
3/4	4	6
1	4	10
1-1/4	4	15
1-1/2	4	25
2	4	42
2-1/2	5	74
3	6	138
4	7	277
6	8	720

Table 5.10.2.4 Maximum Plumbing Flow Rates

- Plumbing walls should be sized to permit installation of piping, clamps and brackets without contact with studs or wallboard. Do not locate supply or wastewater pipes closer than one inch from gypsum board in walls or ceilings of sensitive spaces (e.g., conference rooms, etc.). All stud bays containing plumbing piping adjacent to sensitive spaces should contain batt insulation.

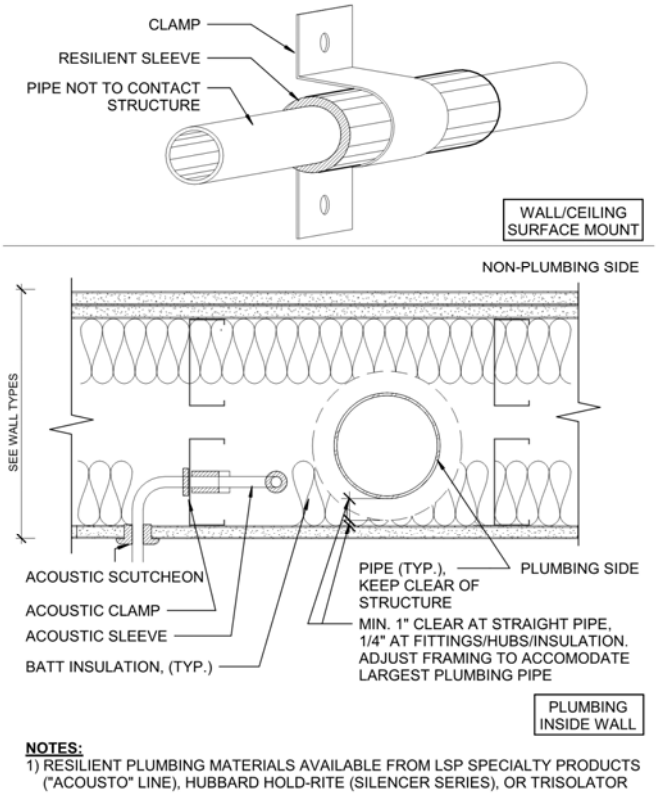


Figure 5.10.2.26 Plumbing Isolation at Noise-Sensitive Spaces

- Walls at sensitive spaces containing plumbing should have batt insulation in the stud or joist cavity containing the piping.
- Piping, clamps, or brackets must not bridge stud rows in double-stud walls.
- Holes cut in plates should be big enough to allow 1/2-inch clearance around pipe. It may be necessary to use a 6-inch, rather than 4-inch, plate to achieve this.
- Avoid placing rainwater leaders in sound-rated partitions at sensitive spaces.
- Stormwater and waste pipes should not be routed over or through noise-sensitive spaces and should be cast iron.
- Base-mounted pumps should be isolated with springs having a two-inch static deflection; inline pumps should be isolated with springs having one-inch static deflection.

5.10.2.17 ELECTRICAL NOISE AND VIBRATION

- Isolate all transformers as shown in Table 5. Transformers should be floor mounted.
- Transformers should not be mounted on framed walls that are adjacent to sensitive spaces.

- Place inverters at least 2 feet from any gypsum board framed wall (if associated with public/sensitive space) and vibration isolate similar as the transformers.
- Electrical connections to HVAC units, motors or other rotating equipment should be made with flexible conduit.
- In double-stud partitions, conduit should not bridge stud rows. Conduit should be routed only in the studs on the side of the unit served and should not be placed in the gap between stud rows.
- Outlet boxes on opposite sides of sound-rated partitions should be separated by at least 16 inches and provide backing equivalent to Lowry's outlet box pads. See image below. Ring-and-string for low voltage cabling is not allowed in sound-rated partitions. A traditional junction box should be used.

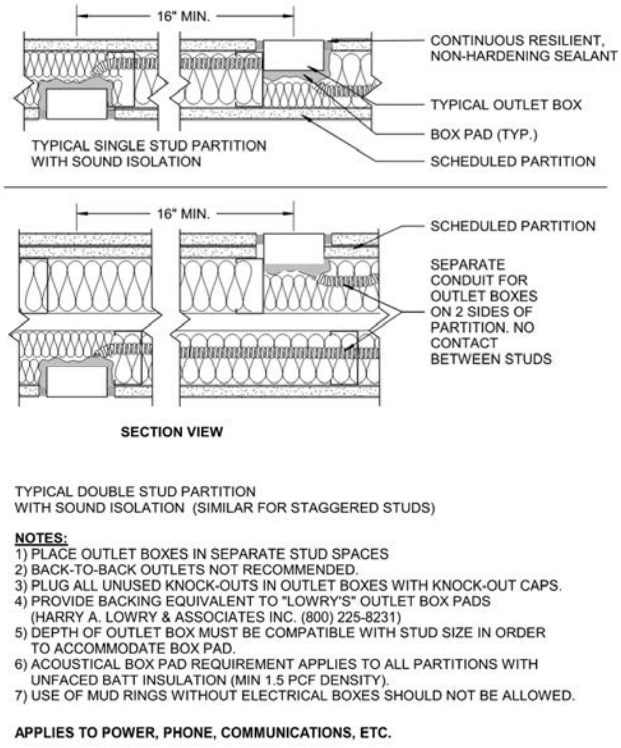


Figure 5.10.2.27 Junction Box Treatment

- Recessed panels, etc. should be treated as shown in image below.

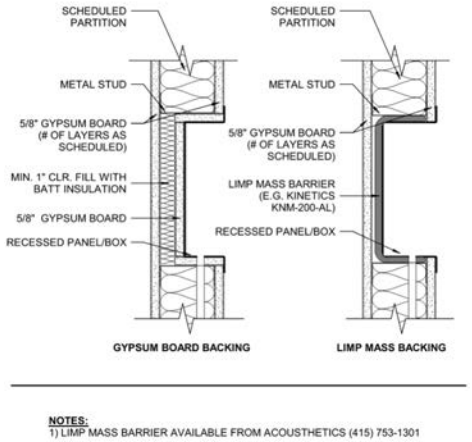


Figure 5.10.2.28 Recessed Panels and Fixtures

- Do not allow electrical conduit or boxes to come into contact with plumbing.
- Cable tray and conduit penetrations in partitions should be packed tightly with heavy density putty once the cables are pulled.

5.10.2.18 ELEVATOR NOISE AND VIBRATION

Elevator machine rooms shall not be located adjacent to rooms with an NC criterion of 40 or lower. If this cannot be avoided, elevator machine rooms should be located on grade level and STC 60 minimum walls and floor/ceiling assemblies shall be constructed around the rooms so that elevator machine room noise is not audible in adjacent rooms with an NC 35 or lower background noise level criterion. If the elevator machine room cannot be located on grade and is located above a room with an NC 40 or lower background noise criterion, the elevator machine room should be equipped with a 4-inch thick concrete floating floor to provide airborne sound isolation to the noise sensitive room below. The concrete floating floor should consist of 4-inch normal weight concrete supported by neoprene mounts with a 2-inch minimum airspace between the structural slab and floated concrete slab.

The power unit (motor/pump/tank) shall be vibration isolated from the building structure via seismically restrained neoprene mounts (e.g., Mason BR) that provide 0.35-inch minimum static deflection under the operational load of the power unit.

Isolate hydraulic pipes from the building structure via neoprene lined clamps from the tank to the piston base. Hydraulic pipes shall be isolated from walls and floors at penetrations via foam neoprene pipe insulation. Pipe should not come in rigid contact with the building structure. Provide an oil line muffler in the oil line near the pump. Provide Isolation Couplings in the oil line near the pump unit and near the jack unit. Electrical conduit and raceway connections made to the power unit shall be resiliently mounted to building structure via neoprene pads or mounts so as to not transmit airborne or structure-borne noise to adjacent spaces.

5.10.3 APPENDIX A: DEFINITION OF TERMS

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; Chapter 49. Noise and Vibration Control.

Ceiling Attenuation Class (CAC): CAC rates a ceiling panel's noise reduction performance; higher values correspond to increased noise reduction.

Impact Insulation Class (IIC): A single-number laboratory rating which quantifies the property of a floor/ceiling construction to reduce footfall-generated noise. Increasing IIC values correspond to improved impact insulation.

Noise Criteria (NC): Noise Criteria ratings approximate the human perception of "noisiness" within buildings. The NC rating is based on 8 octave band sound pressure level measurements in which building machinery normally produce sound which can be annoying to the occupants. These eight measurements are compared with a family of curves. The highest curve under which all the data fall is the rating. This rating is not applicable to pure tones where a penalty must be added since they are perceived to be more "noisy." High NC ratings are louder and an increase by 10 points approximates a doubling of perceived loudness.

Noise Reduction Coefficient (NRC): A measure of the acoustical absorption performance of a material, calculated by averaging its sound absorption coefficients at 250, 500, 1000 and 2000 Hz, expressed to the nearest integral multiple of 0.05.

Reverberation Time (RT60): The time it takes for sound to decay 60 dB in a room. Large rooms with hard surfaces, such as concert halls, have reverberation times around 2 seconds. Smaller rooms with sound absorbing surfaces have shorter reverberation times. Music sounds richer in rooms with long reverberation times, but speech may be difficult to understand. Speech is more intelligible in rooms with shorter reverberation times, but music may sound dry.

Mid-frequency Reverberation Time (Tmf): The average reverberation times in the 500 Hz, 1 kHz and 2 kHz octave bands; it is an appropriate metric for speech communication.

Sound Transmission Class (STC): A single-figure laboratory rating used to compare walls, floor-ceiling assemblies and doors for their sound insulating properties with respect to reducing airborne noise.

A-Weighted Sound Level: A term for the A-Weighted sound pressure level. The sound level is obtained by use of a standard sound level meter and is expressed in decibels. Sometimes the unit of sound level is written as dB(A).

L_{eq}: The time-weighted average noise level during the stated measurement period.

5.10.4 APPENDIX B: REFERENCE STANDARDS

2019 California Green Building Code - The CalGreen building code places limits on interior noise levels of non-residential buildings due to exterior noise that exceeds an hourly A-weighted level of 65 dBA during any hour of operation. If a noise sensitive space requires a lower background noise level than 50 dBA, then additional facade noise control measures shall be taken to achieve the required interior noise levels.

California State University (CSU) Guidelines and Standards. There are no binding acoustical criteria in these standards.

ASTM C 423 "Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"

ASTM E 90 "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements"

ASTM E 336 "Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings"

ASTM E 413 "Classification for Rating Sound Insulation"

ASTM E1007 "Test Method for Field Measurement of Tapping Machine Impact"

ANSI Standard S12.60-2010 – Performance Criteria, Design Requirements and Guidelines for Schools, Part 1: Permanent Schools.

LEED v4.1 for New Construction – Indoor Environmental Quality Credit: Acoustic Performance

ASHRAE (2019) – Chapter 49 Noise and Vibration Control

5.11 FOOD SERVICE

The following is a description of the functional areas of the Main Servery. This is following input from the preliminary design discussions thru 07/01/2022.

5.11.1 SECTION 1: DESCRIPTIVE NARRATIVES

5.11.1.1 GENERAL ASSUMPTIONS AND ASPIRATIONS FOR THE SERVERY

1. The Servery will serve Cal Poly Students and their guests.
2. This is a student meal program that is fully inclusive with no costs to students on the program.
3. The kitchen and servery may be designed to be secured during non-service hours with a retractable gate.
4. 3 meals a day will be served 5 days per week.
5. Juice and soda can be available from this location in addition to the standard water and vending options.
6. Participation and initial space allocation assumptions:
    - Participation for peak meal assumption will be 1,600.
7. Servery offerings will include varied menu of fresh seasonal offerings prepared from scratch and will include flexible stations such as the following concept:
    - Grill/Breakfast
    - Hearth
    - Global
    - Salad/Sandwiches
    - Vegan/Vegetarian
    - Allergen Free
8. Frontal preparation and open kitchen areas will be integrated into the design.
9. Flexibility to address changing menus and trends will be a key design element. Kitchen, preparation, and storage areas.
10. Sustainability in operational aspects as well as equipment will be key in design, equipment, and systems selection. Major systems will include energy efficient equipment, demand control ventilation, and low flow faucets where applicable. Consideration for an all-electric kitchen vs gas/electric kitchen to be discussed--the design intent is to move towards an all electric kitchen.
11. The food service facility, flow, and station design will be designed to maximize labor efficiency and reduce operational costs where possible.
12. Bulk walk-in cold storage will be equipped with compatible alarm systems for connection to Client's BMS system as required.

5.11.1.2 OVERVIEW OF FRONT OF HOUSE (SERVERY) EQUIPMENT / MENU AND OFFERINGS

1. GENERAL COMMENTS

- Each station will offer selections of main and side dishes from flexible equipment configurations. Each station will be capable of offering prepared-to-order items and / or and prepared-just-in time items.
- Mechanically cooled cold pans will be used in lieu of ice cooled units.
- Stations will be designed to be flexible and to accommodate full-service options.
- Countertops will meet accessible heights, without dedicated discernible tray rails, though space to rest a tray will be provided close to Guests. Self-serve counters will take into account ADA reach requirements and should be designed to be fully accessible.
- Breath protectors will be planned to be adjustable to allow change from self-serve to full-serve by Operator adjustment of glass.
- BOH equipment and standard items, where applicable, will be specified as modular on legs or casters for greater flexibility, cleaning, and replacement.
- Product flow from receiving to production and service will be a key and integral element in the design approach. Individual workstations will be designed and equipped for storage, processing and holding, and include readily accessible hand sinks and waste/recycling bins where needed.

5.11.1.3 DESCRIPTIONS OF SERVERY STATIONS

1. **Salad and Sandwich Station**
   - The salad bar will be designed to be adjustable for full-service or self service.
   - Equipment will allow for extensive options.
   - Key Equipment is outlined in the Preliminary equipment list.

2. **Global Station cooking – Global Flex -** Including the following elements:
   - This station will be able to produce all types of assembled-to-order or just-in-time dishes, street food, and ethnic specialties such as satay, skewers, stir fry dishes, tacos and many others.
   - Key Equipment is outlined in the preliminary equipment list.
   - An adjacent hot / cold switchable unit will provide holding for warm or chilled additions.
   - Adjacent cold and hot holding station will have hot / cold switchable unit for maximum flexibility to support cooking as well as additions.
   - Adjacent refrigerator and hot holding unit.
   - Adjacent prep tables with sinks, landing tables, and storage areas.
   - Key Equipment is outlined in the Preliminary equipment list.

3. **Comfort / Grill Station -** Including the following elements:
    - A la carte cooking line in rear will support this station as well as other adjacent needs. This will include a high efficiency fryer battery.
    - Key Equipment is outlined in the preliminary equipment list.
    - South of the Border / taco, burrito, or wrap station would all work here.
    - Hot and cold frontal service units – ideal for presentation of items from the grill, smoked items, casserole dishes, and other composed items with sides for quick dish up.
    - One Combination Ovens will be specified with a smoker option to allow for smoked meats, cheeses, and vegetables to be produced
    - This station will be planned to serve breakfast.
    - The open view to key baking and prep areas in the rear kitchen will add interest to this station.
    - Key Equipment is outlined in the Preliminary equipment list.

4. **Hearth Station -**
    - Aesthetically designed deck oven will be central to the program. This oven will be able to produce a wide variety of products including baked pastas and other Italian offerings beyond the typical pizza offerings.
    - Key Equipment is outlined in the preliminary equipment list.
    - This station will also be able to showcase the baked items coming forth from back of house mixer and baking preparation areas, then to final make up station and into the classic deck oven.
    - Mini casseroles can be cooked and then presented on the central heated shelf along with other baked or roasted products.
    - The adjacent switchable hot / cold holding and service units will support a varied and complete menu.
    - Key Equipment is outlined in the Preliminary equipment list.

5. **Vegetarian/Vegan**
    - Vegetarian and Vegan forward station that will highlight the plant-based alternatives as well as dishes catering to the Vegan mindset.
    - Key Equipment is outlined in the preliminary equipment list.
    - This station will showcase the plant based alternative options as well as options that include no animal products.
    - The adjacent switchable hot / cold holding and service units will support a varied and complete menu.
    - Key Equipment is outlined in the Preliminary equipment list.

6. **Beverage Stations -** will include the following:
    - Custom house prepared boutique beverage offerings
    - Fountain soda
    - Chilled sparkling and still water dispensers
    - Self-service ice dispenser
    - Hot beverage brewer and airpots
    - Countertop condiment and cup arrangements
    - Integral waste bins with small chutes
7. **Condiments and Utensil Stations –** will be strategically located between ordering and dining areas
    - Ambient millwork counters for guests to pick up silverware, napkins, and handle recycling.
    - Possibly integrated with a free beverage or water program.

5.11.1.4 BACK OF HOUSE AREAS

1. GENERAL COMMENTS
    - Hand sinks will be conveniently placed throughout facility as required.
2. UTENSILS AND WARE WASHING OPERATIONS - OVERVIEW
    - Permanent ware with option for take-away containers will be used for service in café.
    - The desire will be to have as close to a zero-waste-to-landfill operation as possible and this will affect acceptable packaging for incoming product as well as take away items. Compostable disposables will be recommended for use for take away.
    - The Guest will pick up plates (trays are optional) at point of service or will be handed to them by Server. Additional silverware will be available from condiment stations.
    - Following the meal, the Guest will return plates and utensils to collection area with accumulator or conveyor.
    - NGA recommends that sorting and scrapping take place in the dishroom and not be done by Guest to allow for speed of service and allow Operator to assure consistency of sorting and recycling.
    - Ware washing area will consist of engineered sorting table with scrapper and conveyor.
    - Conveyor dish machine with heat reclamation system and dryer
    - 3-compartment pot and utensil sink with power soak compartment
    - Utensil storage and transport equipment

- Utensils, once cleaned, will be distributed directly back to areas of use and service. Dishroom will accommodate soiled and clean utensil traffic and holding.
- Scrapping waste at sorting station will be directed to a scrapper or pulper to reduce waste volume and handling.
- Dish return and holding on the upper level for transport back to main dishroom.
- Kitchen waste will be collected and bagged (identified as trash, recycling, or compost – to be confirmed with local waste management practices) and then taken out to waste enclosure outside of the kitchen – presumably adjacent to the dock area, pending pickup and transfer to collection site by others.
- Used cooking oil will be transported safely with oil caddy from fryers to used oil collection tank in Janitor's Closet for regular pickup by recyclers.

3. RECEIVING, STORAGE, PREPARATION AREAS

- Receiving and staging area close to entrance will allow for short term set down and staging of goods coming and going.
- Employee time clock, lockers, linen storage, restroom, and changing room will be located adjacent to receiving entrance.
- Janitor closet or cabinet will accommodate janitor sink, adequate chemical, and mop bucket storage.
- A management office will accommodate 2 -3 workstations, safe, and filing systems.
- Raw produce receiving and washing. This operation will be to some degree dependent on local produce from small growers, a workstation with a 2-compartment sink near delivery entrance will serve as deboxing and washing station where produce can be washed, sanitized, and transferred to clean containers for use. This area may be equipped with cutting boards, salad dryer, etc.
- A dry and equipment storage area will be located in the back-of-house, adjacent to receiving.
- Cold holding – Separate refrigerated compartments for bulk and prepared foods and one walk-in freezer will be required. Ample point of service refrigerators and freezers as dictated by program will be dispersed throughout the various workstations.
- A catering preparation area will be equipped to allow convenient and safe preparation of bulk coffee and tea, salads, sandwiches, and platters for grab and go as well as office and catering functions. This area will include bulk ice production equipment.
- Baking prep area – limited but adequate to key baked goods. Bake off equipment will be integrated with main bulk cooking. A large mixer, storage bins, preparation tables, and other pastry and baking equipment will be included.
- Separate worktables with sinks and shelving will be set out in back-of-house for convenient and safe separation of various processes such as meat, fish, veggie prep, etc.
- Bulk cooking - this will be comprised of a dual stack combi oven, range, tilting skillet, tilting

kettle, and similar bulk cooking equipment for preparation of bulk items.

- Blast Chiller - to assist with fast safe chilling and freezing of advanced prepared menu items.

4. FOODSERVICE RELATED WASTE AND OUTDOOR FUNCTIONS WILL INCLUDE:
   - Mat wash and bin wash station will be located with the Janitor's Closet.
   - Waste frying oil tank / connection point will be serviced by an oil reclamation company.
   - Outdoor air-cooled remote refrigeration rack system will be located on the roof or mechanical space.

5.11.2 SECTION 2: GENERAL TECHNICAL REQUIREMENTS

5.11.2.1 CODES AND STANDARDS

All items shall comply with current applicable laws, codes, specifications, local ordinances, industry standards, and utility regulations of authorities having jurisdiction over project location. Kitchen Equipment Contractor (KEC) shall notify the Architect and Owner, in writing, of any design conflicts with above requirements. Additionally, all items shall comply with the latest standards from the following:

- Americans with Disabilities Act (ADA)
- American Gas Association (AGA)
- American Institute of Electrical and Electronics Engineer (AIEE)
- American National Standard Institute (ANSI)
- American Society of Mechanical Engineers (ASME)
- American Society for Testing and Materials (ASTM)
- American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
- Building Officials Code Administrators (BOCA)
- California AB1953
- California Department of Public Health (CDPH), in particular:
  a. Title 22, Chapter 5 – 70001 Acute care Hospitals; Dietary Services 70271 – 20279
  b. California Retail Food Code
- Factory Mutual Research (FM)
- International Conference of Building Officials (ICBO)
- National Board of Fire Underwriters (NBFU)
- National Electric Code (NEC)
- National Electrical Manufacturer's Association (NEMA)
- National Fire Protection Associates (NFPA)
- National Sanitation Foundation (NSF)

- Occupational Safety and Health Administration (OSHA)
- OSHPD, California Building Code; in particular, Title 24:1224.20 Dietetic Service Space
- San Francisco County Health Department
- Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
- Underwriters Laboratories (UL)

5.11.2.2 SEISMIC RESTRAINTS

Foodservice equipment shall be seismically anchored as required by local jurisdictional code and or University.

5.11.2.3 PRODUCTS

1. General
    - Equipment, and all associated accessories and parts, shall be new and unused unless otherwise specified. Installation must allow serviceable parts to be accessible for repair or replacement.
    - Plastic engraved nameplates shall be furnished on fabricated items with controls to identify functionality. Nameplates shall have a beveled edge to prevent injury. Nameplates shall be attached using a manufacturer approved adhesive.
    - Material Gauge for sheet iron and steel to be US standard gauges of the following thickness:

Gauge	Thickness (in)	Thickness (metric)
#10	0.141"	3.5814
#12	0.109"	2.7686
#14	0.078"	1.9812
#16	0.063"	1.6002
#18	0.050"	1.2700
#20	0.038"	0.9652

2. Electrical Requirements
    - Electrical systems, components, and accessories shall be certified to be in accordance with local code requirements and installed as specified.
    - Include provisions for back-up and emergency power as required for critical items and systems see electrical narrative included as part of this feasibility study.
    - Convenience receptacles in fabricated equipment shall be flush mounted with stainless steel cover plates. Convenience receptacles mounted "free standing" on equipment shall have stainless steel bodies and stainless steel cover plates.
    - Wall mount and floor mount convenience receptacles shall be Hubbell three wire or four

wire grounding type connectors with matching material and finish.

- Equipment switches and controls shall be UL recognized and installed recessed to prevent injury or damage. Controls shall be conspicuously labeled as to use with engraved plastic nameplates.
- Electric thermostatically-controlled equipment shall include an "on-off" red light indicator to be mounted adjacent to controls.
- Fabricated equipment with internal wiring shall be wired in conduit to a junction box within the item, ready for final connection. Equipment shall be listed and display UL label.
- Wiring and connection diagrams shall be furnished with electrically operated machines or fabricated equipment
- "Plug and cord" equipment shall include electric cords with grounding conductor, be UL type SO or SJO, and not to exceed six feet in length. Equipment to be furnished with UL caps or plugs.
- Motors shall be drip-proof or totally enclosed type, having a continuous duty cycle and ball bearings, except for small timing motors, which may have sleeve bearings. Motors shall have windings impregnated to resist moisture. Motors located in areas subject to deposits of dust, lint, or other similar matter from the machine on which installed shall be totally enclosed-type. Motors shall have ample power to operate the machines for which designated under full load operating conditions without exceeding their nameplate ratings. Horsepower requirements on driven equipment shall be determined by the manufacturer based on normal operation at maximum capacity. The nominal rated motor horsepower shall be not less than the horsepower required for normal operation of the equipment at maximum capacity.
- All conduits to be concealed and protected in walls or within fabricated equipment.
- All electrical fixtures, including junction boxes, receptacles, shut offs, electrical panels are to be recessed in walls or hidden in fabricated equipment.

3. Plumbing Requirements
   - Chrome plated vacuum breakers and check valves (except where prohibited) shall be furnished on all faucets, hose stations, and fixtures where water inlets are below water level to prevent siphoning.
   - Anti-siphon pressure type vacuum breakers shall be furnished for all hose reels.
   - Backflow preventers shall be furnished as required by code.
   - Special valves, strainers, thermometers, pressure gauges, water flow restrictors, regulators, control valves, pressure reducing valves and accessories shall be furnished as required by code or necessary for proper operation of equipment.
4. Refrigeration Requirements
   - Furnish and completely install refrigeration systems according to manufacturer's

instructions and recommendations, using high quality fittings, controls, valves, thermostats, etc. Refrigeration condensing units to be properly ventilated and accessible for inspection, maintenance, and repair. Charge, startup, test, and adjust refrigeration system as needed for proper operation.

- Furnish and install necessary refrigerant leak notifications/protection system.
- Provide within system redundancy for critical refrigeration systems and food holding, as applicable.
- Run all remote refrigeration lines, using Type "A.C.R." refrigeration grade copper lines. Insulate lines outside walk-in box using ¾" closed cell foam insulation or in accordance with manufacturer's instructions or recommendations.
    - Use only long radius bends to reduce flow resistance and line breaking. Silver solder and/or Sil-Fos shall be used on all refrigerant piping. Soft solder is not acceptable. Use minimum 35% silver solder for dissimilar metals.
    - All piping shall be supported with hangers that can withstand the combined weight of tubing, insulation, valves, and fluid in the tubing.
    - Use dry nitrogen in the copper tubing during brazing to prevent formation of copper oxides. Liquid and suction lines must be free to expand independently of each other. Do not exceed 100 feet without a change in direction or an offset.
    - Installer shall plan proper pitching, expansion allowance, and P-Traps at the base of all suction risers and at every vertical rise. Install service valve at several locations for ease of maintenance. These valves shall be UL approved for 450 PSI working pressure.
- Condensate drain piping shall be Type "M" seamless copper tubing with silver soldered joints pitched at ½" per foot of run. Heated drain lines from freezers must be insulated with minimum ½" armaflex insulation to prevent freezing.
- All refrigerant piping to be pressure tested with nitrogen at 300 PSI with all valves open and held for 12 hours. Electronic leak detectors shall be used to locate all leaks.
    - Complete system shall be evacuated to 500 microns with vacuum pump before charging the system.
    - Once system is charged and running, adjust all controls including pressure controls, expansion valves, thermostats, and time clocks. Return after 24 hours to verify proper operation of systems.
- Furnish an electric defrost evaporator coil where refrigeration systems are designed to operate at a room temperature of less than 35°F.
- Refrigeration systems are designed and shall be installed to maintain the following temperatures:
    - Walk-in refrigerators, reach-in refrigerators, undercounter refrigerators shall operate at 35°F or 1.7°C.

- Walk-in freezers, reach-in freezers, undercounter freezers shall operate at -10°F or -23.3°C.
- Integrated cold pans shall operate at 0°F or -17.8°C.
- Cold Work Rooms shall operate at 50°F or 10°C with adjustability to 70°F or 21°C.

5. Fabricated Equipment
   - Materials
     - Stainless Steel shall be 18-8, Type 304, polished to a #4 finish. Rolled shapes shall be cold rolled conforming to ASTM A36 standards.
     - Galvanized iron sheets shall have a zinc G-90 coasting. Sheets shall be cold rolled, stretcher leveled, bonderized, and re-rolled to ensure a smooth surface.
     - Aluminum shall be type 1110 with a #204-C1 finish for sheets exposed to viewing and type 6663-T5 with a #204 finish for rods and bars.
     - Tubing shall be seamless stainless steel, 1-5/8" diameter, 16 gauge, 18-8, type 304, polished to a #4 finish
     - Plastic Laminate (P-Lam) shall comply with NEMA LD 3 and NSF 35 requirements. P-Lam must also be NSF certified for end-use application and have a smooth texture that is easily cleanable.
     - Sealant shall be ASTM C 920; Type S, Grand NS, Class 25, Use, NT. Provide elastomeric sealant that is NSF approved for end use application. Sealant shall meet Food and Drug Administration's 21 CFR, Section 177.2600 for use in food contact areas.
     - Tempered Glass shall be ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), Class 1 (clear), Quality q3 (glazing select). Provide products complying with ANSI Z97.1, manufactured by horizontal (roller-hearth) process, and 6mm thick, unless otherwise indicated. Provide exposed safety edges, if any, seamed before tempering.
     - Plastic shall comply with NSF standard 51.
     - Sound Deadening shall be NSF certified, hard drying, and non-absorbent. Coating shall adhere to metal at minimum 1/8" (3mm) thickness. Sound deadening to be applied on all tables, drainboards, sinks, undershelves, and other stainless surfaces.
     - Gaskets shall be rubber, neoprene, or PVC that is NSF certified for end-use application, nonabsorbent and nontoxic.
     - Cabinet Hardware shall be NSF certified and stainless steel as indicated. Same equipment locks shall be keyed alike and be strong enough to prevent unauthorized access.
     - Casters shall be NSF certified, 5" diameter, rubber, neoprene, or polyurethane tires with 1-1/4" tread width, sealed, self-lubricating, non-marking swivel type with minimum load capacity of 200lbs. Two casters to have toe brakes. Brakes to be located on operator's side when item is placed against a wall, and diagonally when item is in an island application.

6. Finishes
    - Stainless Steel shall be polished to a uniform grain, #4 finish.
    - Paint and Coatings shall be NSF approved for foodservice use and have a durable, non-flaking, nontoxic, mildew resistant quality.
    - Fabricated equipment shall be sprayed with an easily removable protective coating for transport. Coating shall be removed after installation.
7. Workmanship
    - Materials shall be free of warpage and surface imperfections.
    - Equipment shall conform to NSF 2 standards for foodservice. There shall be no exposed fasteners in the food area.
    - Equipment edges shall be chamfered to be free of burrs, fins, or other projections.
    - Seams shall be continuously TIG or MIG welded and polished. Visible seams shall be free of pits or flaws, and shall be ground smooth to a #4 finish. Seal with clear RTV silicone as needed.
    - All fasteners shall be corrosion resistant steel. Fasteners joining like metals shall be of the same metal. Fasteners joining dissimilar metals shall be of the higher grade metal.
    - Concealed fasteners shall be used wherever possible. Exposed fastener threads shall be sheared and capped with a stainless steel washer and an acorn nut.
8. Construction
    a. Sinks and Drainboards
        - Sinks shall be 14-gauge, 18-8, Type 304 stainless steel and produced as an integral part of the top. All corners to be radius coved and conform to NSF standards. Sink bowl back, bottom, and front shall be one continuous sheet with ends welded into place. Bowl shall be die pressed star for positive drainage to 3-1/2" center drain. Drains shall be T&S Brass B-3972 for 3 compartment sink, and T&S Brass B-3972-01 with overflow for 1- and 2- compartment food preparation sinks. Sinks with two or more compartments shall come with full length, full height, flush stainless steel front panel to conceal joint between sinks. Where partitions occur, there shall be no beads nor straps on the outside of sink. Backsplash to be 8" high with 2" return on 45 degree angle break and ¾" flange turned down, with all exposed ends closed, welded, ground, and polished. Legs to be tubular 16-gauge stainless steel with NSF adjustable bullet feet fitted into stainless steel leg sockets. Sockets to be welded to a re-enforced plate which is welded to the sinks.
        - Sinks with integral drainboards shall be 14-gauge, 18-8, Type 304 stainless steel, sized per drawings, and welded to the sink frame to become an integral unit. Drainboards shall be pitched toward sink bowls.
        - Tops shall be reinforced with 12-gauge, 18-8, Type 304 stainless steel channel. One channel shall be provided on tops up to 36" wide and two channels shall be provided

on tops over 36" wide. Top to be attached to channel reinforcements with studs welded to the underside of the top.

- Where placed against wall or stationary fixed equipment, splash shall be turned up on sides 6" high and sloped back 2" on 45 degree angle break and ¾" flange turned down, with all exposed ends closed, welded, ground, and polished.
- All sinks shall be furnished with faucets and drains as specified. Faucets shall be T&S Brass model B-0231 for splash mount and B-0221 for deck mount, or equivalent, unless otherwise specified.
- Each sink compartment shall be furnished with 3-1/2" basket type waste drain and lever waste valve with overflow on sinks 12" or more.
- Furnish provisions for installing faucets, pre-rinse faucets with backflow preventers, vacuum breakers, and drains.

b. Dishtables

- Tops shall be 14-gauge, 18-8, Type 304 stainless steel, sized per drawings. Tops shall be reinforced with 12-gauge, 18-8, Type 304 stainless steel channel. One channel provided on tops up to 36" wide and two channels on tops over 36" wide. Attach top to channel reinforcements with studs welded to the underside of top. Slope top with an integral pitch so water drains toward dishmachine. All corners to be radius coved and conform to NSF standards.
- Tops shall be furnished with a coved 10" backsplash sloped back 2" on 45 degree angle and down at least 1" to receive 14-gauge, 18-8, Type 304 stainless steel 'Z' clip for anchoring to wall. All exposed ends to be closed, welded, ground, and polished.
- Sound deaden underside of tops with NSF approved sound deadening mastic.
- Furnish provisions for installing pre-rinse faucets with backflow preventers, vacuum breakers, and lever wastes.

c. Faucets

- Faucets shall be T&S Brass model B-0231 for splash mount, B-0221 for deck mount, and B-0133-A12-08C for Pre-Rinse units, or equivalent unless otherwise specified.
- Furnish water saving devices where required by local codes. Spray valves shall be 0.65 GPM for water conservation, be fitted with backflow prevention device (where required), and furnished complete with nipples, lock nuts, and washers for secure and proper installation.
- All faucets intended to dispense water for human consumption shall be manufacturer of materials that contain no lead intentionally added to the product.
- Finish shall be polished stainless steel.
- All faucets specified to have standard lever type handle with internationally coded handle identification buttons for hot and cold and ADA easy turn stems. All faucets

shall have internal stainless steel seats and two part swivel stems.

- All plumbing fixtures shall be ANSI/NSF 61 section 9 certified, CSA certified, California AB1953 Compliant, Vermont S152 Compliant, and EPAct 2005 Compliant.

d. Tables

- Island style tables shall be 14-gauge, 18-8, Type 304 stainless steel, #4 finish. All corners to be radius coved conforming to NSF standards. Legs to be 1-5/8" tubular, 16-gauge stainless steel tubing with NSF adjustable bullet feet fitted into stainless steel leg sockets. Sockets to be welded to a re-enforced plate which is welded to the sinks. Tables longer than 72" to have 6 legs.
- Wall mounted tables shall include a back/side splash to be 6" high sloped back 2" on 45 degree angle break and ¾" flange turned down at all instances where placed against a wall or other fixed equipment. All exposed ends to be closed, welded, ground, and polished.
- Tables with undershelves to have 16-gauge, 18-8, Type 304 stainless steel undershelf, #4 finish. All corners to be welded, ground and polished. Undershelves shall be reinforced with 12-gauge, 18-8, Type 304 stainless steel channel. Top to attach to channel reinforcements with studs welded to the underside of shelf. Front edge of undershelf shall be turned down 1-1/2" and returned ½". Rear (and sides as specified) to be turned up 2". Corners shall be notched at legs and welded, ground, and polished to same finish. Where required, undershelves shall be provided with pipe slots and grommets of suitable size to accommodate necessary service lines.
- All corners shall be reinforced on the underside with 1" x 4" x 1" stainless steel channels of not less than 14 gauge stainless steel. These channels shall be spaced not more than 30" apart in any direction and shall give full perimeter as well as interior support.
- Open base tables with cross bracing shall have leg gussets welded to secured channel on the underside of the tabletop. Table to have 1-5/8" round stainless steel bracing. Cross bracing to be installed on the back and two sides welded to the legs 10" AFF. Tables longer than 72" to have 5 legs.
- Over shelves shall be 16-gauge, 18-8, Type 304 stainless steel, #4 finish. All corners to be welded, ground and polished. Shelf to be support by four 1-5/8" round stainless steel polished tubing. Shelf to be 18" above table top. For double overshelves, top shelf to be 15" above bottom shelf. Shelves longer than 72" to have 6 legs.
- Drawers shall be flush mounted, double pan construction with semi-rigid fiberglass insulation, recessed stainless steel pull handle, and heavy duty ball bearing slides. Each drawer consists of 18-gauge, 18-8, Type 304 stainless steel 20"x20"x5" die stamped drawer insert with horizontal and vertical corners 1-3/4" minimum coved. Insert shall be removable and rest in a stainless steel cradle. Cradle shall be welded to a 16-gauge, 18-8, Type 304 stainless steel double pan drawer face. Drawer face to have full-length flush type stainless steel channel pull with heavy duty ball bearing drawer slides and

adjustable stops at the fully opened position. Enclose drawers on open base table with 18-gauge, 18-8, Type 304 stainless steel enclosure.

e. Cabinet Base

- Enclosed cabinet with open shelf shall be 14-gauge, 18-8, Type 304 stainless steel, #4 finish top with 16-gauge shelves. Frame construction shall provide a box-like welded frame. Sides and back to be 18-gauges stainless steel. Legs to be 1-5/8" round stainless steel with NSF adjustable feet. Cabinets longer than 72" to have 6 legs.
- Enclosed cabinet hinged doors shall be double wall construction with ½" thick semi-rigid fiberglass board between the two panels. Door exterior shall be 18-gauge, 18-8, Type 304 stainless steel. Doors shall have stainless steel lift off hinge and full length stainless steel channel pull.
- Wall Cabinets shall be 18-gauge, 18-8, Type 304 stainless steel all welded construction, sized per drawings, with edges turn down 1-1/2" on all sides. Cabinet back to be fitted with channels to attach to the wall. Top shall slope 6" from rear to front. Cabinet shall have a fixed bottom shelf with two adjustable intermediate shelves or as specified. Ends terminate at front with a 2" NSF-compliant mullion. Doors shall have stainless steel lift off hinge and full length stainless steel channel pull.
- Wall Mounted Shelves shall be 16-gauge stainless steel, Type 304, #4 finish with a 2" turnup at the rear (and ends as indicated on drawings). Fronts (and sides unless otherwise indicated) to be turned down 1-1/2" and returned ½". Wall mount shelf corners to be welded, ground, and polished. Supports and brackets shall be 14-gauge, 18-8, Type 304 stainless steel and supplied no more than 36" on center. First shelf to be 18" above table top. For double overshelves, top shelf to be 15" above bottom shelf.
- Pot/Utensil Rack, if specified, shall be stainless steel ¼" x 2" flat stock with pot hangers supplied one every 8".

f. Field Joints

- Field joints should be kept to a minimum and only used when equipment size must be limited for access into building or shipping.
- Field joints to be hairline butt joints, mechanically fastened, offset draw design and located on shop drawings.
- All field joints, including edges and splash must be fully welded, ground, and polished to match adjacent surface to achieve a seamless appearance.
- Acetylene welding or silver solder is not acceptable.
- All concealed or exposed welds on unpolished surfaces to be back-ground to surface of original metal to remove all impurities from welds. Make all welds smooth, without dips or bulges.
- All hidden weld joints shall be painted "gray".

5.11.2.4 WARRANTY

1. Kitchen Equipment Contractor (KEC) shall furnish a warranty covering all materials and labor for a period of one year from date of project completion or commissioning. KEC agrees to repair and make good, at its own expense, any and all defects in their work during that time, which arise from defective workmanship or imperfect or inferior material.
2. After one year, Manufacturer's full warranty shall remain valid and fully intact when applicable.

5.11.3 SECTION 3: GENERAL INFORMATION FOR ARCHITECTS AND ENGINEERS

5.11.3.1 INTERIORS

- The following are general plan check guidelines and best practices. Always check with the local authorities for local for up-to-date code interpretations and requirements.
- Floors - Floors shall be non-slip, smooth, and of durable construction, nonabsorbent, and easily cleanable. Floor surfaces shall be coved at the juncture of the floor and wall with a 3/8" minimum radius coving and shall extend up the wall at least 4". Floors under cooking equipment shall be non-combustible, as needed. Floors in kitchens, serveries, and other foodservice areas should be waterproofed if space below is occupied.
- Walls – All foodservice walls shall be non-combustible and wipe-able. Walls separating front of house and back of house areas must be sound attenuated. Walls that are susceptible to high traffic, carts, etc., should have wall protection, FRP at a minimum, that extends up at least five (5) feet. Type of material and color to be determined by the architect. Stainless, tile or other fully impervious and water tight solutions to be installed behind cart wash areas, dish machine and pot washing including all areas subject to wash down by spray hose.
- Ceilings – Finished ceilings should be minimum 108" above finished floor. Equipment such as walk-in refrigerators, walk-in freezers, and exhaust hoods must be closed to the ceiling with enclosure panels (by KEC).
- Doors and Openings – Door openings should be a minimum of 36" wide x 84" tall along all foodservice paths of travel. Door openings to be coordinated with delivery systems and robotics planned for use within the building to ensure accessibility. Doors should be equipped with 48" kick plates or made from non-denting, non-chipping material. Exterior doors leading directly to foodservice spaces shall be protected with automatic air curtains unless separated by another set of self-closing doors. All door entry ways should have corner guards as well as marked flooring if the swinging door radius can cause injury. Doors on means of transport should be reviewed for inclusion with building wide manual door opening systems.
- Lighting – All light fixtures in food service areas must be equipped with protective bulb covering or shatter-proof bulbs. Provide light intensity per Health Department requirements. Provide appropriate food lighting to enhance presentation.
- Windows – We recommend taking advantage of natural light in front and back of house spaces wherever possible. Avoid direct or intense sunlight / heat on food preparations or display.

Shades to be available for all windows if possible.

- Waste – For internal waste: If space allows, inclusion of integral pulper/extractor system is recommended. For external waste: We recommend installing an outside grease interceptor in a location that is easily accessible for servicing. If a local grease interceptor must be used, additional coordination must be done to ensure grease interceptor does not interfere with other equipment. Ramp access to dumpster or trash area is required.

5.11.3.2 ENGINEERING

- Plumbing – Pot washing sinks and dish machines require water temperature of 140°F unless otherwise specified. Water temperature at hand washing sinks shall not exceed Code Maximums or 110°F. If water hardness is above 5 GPG, notify foodservice consultant and provide water softener and soft water lines to all equipment with a water connection. Water pressure in foodservice areas not to exceed 50 psi. Water pressure at ware wash machines not to exceed 20 psi. If chilled or cooling tower water is available for refrigeration system use, please notify foodservice consultant as early as possible. Advise foodservice consultant if there are any local codes, ordinances, or conditions that could affect foodservice areas. GC to outsource water testing to two independent parties. This will determine the ph and hardness of the water which will help determine what filters or reverse osmosis systems may be needed for install, if applicable. Provide backflow prevention units, as needed.
- Gas – Current project directives are for use of electric equipment in place of gas equipment.
- Electrical – Advise on characteristics of available electrical supply. Receptacles in back of house shall include GFCI breaker protection per NEC Section 201. Provide GFCI circuit panels in place of GFCI outlets where recommended by manufacturers. Where required, coordinate with foodservice consultant and owner for emergency power strategies. All wiring shall be concealed in wall wherever possible.
- Refrigeration Rack System – For air cooled refrigeration rack systems, coordinate exterior location with architect. System redundancy and back up power to be coordinated and provided for critical systems.
- Ventilation – Exhaust hood control panels require dedicated 24-hour uninterrupted power. Separate fans and duct systems are required for cooking exhaust, solid fuel cooking equipment exhaust (if approved), and dishwashing exhaust. Demand control ventilation systems shall be added to all exhaust hood systems for energy efficiency and as required by code. Negative air pressure must be maintained in the kitchen to prevent vapors from escaping. Advise if make up air will be supplied from the hood or by other methods. Supply air returns need to be coordinated with exhaust hood locations and should not be within ten feet, or hood manufacturer's recommendation, of exhaust hood. Supply air shall be tempered per Code, preferably within ten degrees of room air temperature. Additional ventilation must be included for all dish rooms or other areas with high equipment density and latent heat. If a pollution control unit is required, provide space requirements and coordinate location with architect and foodservice consultant.

- Fire Control – Integral Fire Suppression Systems to be engineered for and provided with all Foodservice Exhaust Systems per Code. Activation and notification to be interlocked to Hood Systems and Building Systems as required by Code. Manual activation pulls to be provided within foodservices spaces at prescribed distances. Advise if walk-in refrigerators and freezers require sprinkler heads.
- Structural – All foodservice floor slabs should be designed for 125 psf. Advise of any site specific seismic requirements or limitations on floor slab depressions, penetrations, loads, etc. Anchorage details shall comply with applicable codes. Floors to be sloped to floor troughs or drains for wash down areas with hose bids, as required by Code.

5.11.3.3 ENVIRONMENTAL HEALTH PERMITTING REQUIREMENTS

- Information provided below is based on current regulations. Project to be installed based on current code requirements. Refer to each Authority Having Jurisdiction for applicable and up-to-date local requirements.
- The following are general plan check guidelines and best practices. Always check with the local authorities for local for up-to-date code interpretations and requirements.
- Floors and Floor Drains – Floors shall be smooth, nonslip, and of durable construction, nonabsorbent, and easily cleanable. Floor surfaces shall be coved at the juncture of the floor and wall with a 3/8" minimum radius coving and shall extend up the wall at least 4". Floor drains shall be installed in floors that are water-flushed for cleaning and in areas where pressure spray methods for cleaning are used.
- Walls & Ceilings – Shall be smooth and of durable construction, nonabsorbent, and easily cleanable and impervious to vermin. Walls adjacent to food or beverage areas shall be smooth and have a nonabsorbent washable surface. Wall surfaces to all sinks, cooking equipment, and hose areas must have an approved splash guard material. Walls adjacent cooking equipment to be non-combustible per code.
- Ventilation – Mechanical exhaust ventilation is required over all cooking and dishwashing equipment. An interlocked makeup air system is required. All hoods, ducts, and exhaust outlets shall be installed and maintained in accordance with the current edition of the Uniform Mechanical Code as adopted by the local jurisdiction.
- Lighting – All food preparation areas, dishwashing areas, bar, and fountain glass washing sinks shall be provided with at least 20 foot-candles of light as measured 30 inches above the floor. Food and utensil storage rooms, refrigerated storage areas, toilet rooms and dressing rooms shall be provided with at least 10 foot-candles of light. In areas where food is prepared, at least 50 foot-candles shall be required at a surface where a food employee is working with food or utensils, and equipment such as knives, slicers, grinders, or saws. In areas where food is exposed, shatterproof covers shall be installed over all lights.
- Equipment Standards – All food-related and utensil-related equipment shall be certified or classified for sanitation by the region's governing body, for example, US equipment must be

stamped for approval by the American National Standards Institute (ANSI) accredited certification program. Equipment in a utensil or food preparation area shall be on approved metal legs, casters, or sanitary raised curb. If not on casters, cooking equipment should be spaced at least 4" to allow for cleaning or spill guards should be installed between equipment.

- Hand-Wash Sink – shall be provided in all food preparation areas; shall be sufficient in number and conveniently located, maintained clean, unobstructed and accessible at all times for use by food employees; shall have water provided from a combination or premixing faucet which supplies warm water (min 100°F) for a minimum of 15 seconds while both hands are free for washing. Stocked soap and paper towel dispensers must be located at all hand sinks. In addition, where hand sinks are close to production areas and clean storage, splash guards are required. Splash guards need to be a smooth surface, easy to clean and at least as high as the tallest point on the faucet. Handicapped accessible handsinks should be provided per code within employee work areas.
- Food Preparation Sink – Food facilities are required to have a separate sink for when they are engaged in activities such as washing, rinsing, soaking, thawing, or similar preparation of foods, and shall be located within the food preparation area. In the US, the minimum sink bowl dimension is 18" x 18" x 12" deep with integral drain board. All food preparation sinks, display cases, walk-in refrigeration units, and other similar equipment that discharge liquid waste shall be drained by means of indirect waste pipes or per local code.
- Manual Ware-Wash and Bar Sinks – shall be large enough to accommodate immersion of the largest piece of equipment or utensil and with two integral drain boards. A faucet with sprayer is required to reach each of the three sink compartments.
- Janitorial Facilities – At least one curbed cleaning facility or janitorial sink equipped with hot and cold water and a drain shall be provided and conveniently located for the cleaning of mops or similar wet floor cleaning tools and for the disposal of mop water and similar liquid wastes. A room, area, or cabinet separated from any food preparation area, storage area, ware washing area, or storage area shall be provided for the storage of cleaning equipment and supplies.
- Noise – Mechanical, ventilation, and or refrigeration equipment or systems shall comply with all local noise regulations.
- Water Supply – An adequate, protected, pressurized, potable supply of hot water at least 120°F and cold water shall be provided at all times. The potable water supply shall be protected with a backflow or back siphonage protection device, as required by applicable plumbing codes.
- Storage – Adequate and suitable space shall be provided for the storage of food. All food, clean equipment and utensils, laundered linens, and single use articles shall be stored in clean, dry location where they are not exposed to splash, dust, vermin, or other forms of contamination on approved shelving at least 12" above finished floor.
- Restrooms – ADA-compliant toilet facility with approved hand washing facility shall be provided within proximity to the food facility - convenient for all employees. Finishes in restrooms will be reviewed and must be in compliance with local Health Dept. rules.

- Employee Locker/Storage Area – Lockers or other suitable facilities where employees may change and store their clothing and personal items shall be provided in a designated room or an enclosed area separated from toilets, food storage area, food preparation area, utensil washing and utensil/equipment/linens storage area where contamination of food, equipment, utensils, linens, and single-use articles cannot occur. Lockers must be at least 6" above finished floor and secured to the wall. Changing rooms may not be required when employees do not change clothes at work. Lockers to be ADA as required per Code.
- Garbage – Garbage is to be stored in a room separated from food handling and storage until transported to receptacle for collection by garbage service. All food facilities are required to obtain approved garbage service. Provide an area where garbage receptacles are cleaned and stored. Area shall be separated from food, equipment, utensils, linens, and single service and single-use articles to ensure a public health hazard or nuisance is not created. Public right of way and fire exits shall not be used for garbage storage.
- Food Protection Equipment – Food on display shall be protected from contamination by the use of packaging, counter, service line, or sneeze guards that intercept a direct line between the customer's mouth and the food being displayed, containers with tight fitting securely attached lids, display cases, mechanical dispensers, or other effective means.

5.11.3.4 ENERGY EFFICIENCY GUIDELINES

- The design approach will encourage sustainability and energy efficient operations, equipment and systems.
- Foodservice equipment specification, whenever possible, shall be equivalent or better than the California Energy Wise Rebate Qualified items listed at www.caenergywise.com or EnergyStar at www.energystar.gov taking into account local rebate programs where applicable. Listed equipment categories include:
  - Coffee Brewers
  - Dishwashers
  - Fryers
  - Griddles
  - Hot Food Holding Cabinets
  - Ice Machines
  - Convection and Rack Ovens
  - Combi-Ovens
  - Refrigerators and Freezers (not walk-in's)
  - Steamers
  - Demand Control Ventilation
  - Low Flow Faucets

- Additional systems and solutions:
  - Side containment panels for Exhaust Hoods
  - High Efficiency Exhaust Hoods with Demand Control Ventilation Systems
  - Walk-in Refrigerator Door Containment Systems
  - Remote Water Cooled Condensers when closed loop water system is available
  - Lighting Systems and Controls
  - Hot water systems
  - Recovery systems for water and heat

(This page intentionally left blank)


JUNIPER HALL

06

CODE ANALYSIS

6.1 PRELIMINARY BUILDING CODE ANALYSIS

The following section provides a code analysis for the "Health, Dining, and Housing Building (2A)" which will contain student housing.

The following preliminary code analysis is based on the California Code of Regulations, Title 24, Part 2 - the 2022 California Building Code (CBC) Volumes 1 and 2. During Schematic Design, a comprehensive code analysis will be developed. The following analysis may vary with subsequent editions of the building code. Code edition is determined at the time of submittal of construction plans, this review is based on the 2022 code.

6.1.1 HEALTH, DINING, AND HOUSING BUILDING (2A)

Type of Construction is a choice by the designer/owner. Type I-B construction has been selected as the best feasible choice for meeting program requirements.

Building Description:	The building is 7 stories tall and approximately 195,121 GSF. The occupied floors are composed predominately of housing, medical office spaces and dining spaces. The building contains a mixed occupancy types, but primarily A-3 (Dining and Associated Kitchen), B (Health Clinic), an	
Building Code:	2022 California Building Code	
Building Area:	195,121 GSF	
Occupancy:	Mixed A-3, B, R-2, and minor S-2	
Construction Type:	Type I-B	
Allowable Area: (Table 506.2)	Unlimited per floor for NS A-3	
Maximum Number of Stories: (Table 504.4)	Allowed – Proposed –	12 stories at A2 12 stories at B 12 stories at R-2 12 stories at S-2 7 stories
Maximum Building Height: (Table 504.3)	Allowable B = 180 feet, Allowable A - 180 feet, Allowable R-2 - 180 feet Proposed – 88'-0" (Level 1 = 0', Level, Level 2 = 20'-6", Level 3 = 30'-6", Level 4 = 40'-6", Level 5 = 50'-6", Level 5-A = 56'-6", Level 6 = 62'-6", Level 7 = 72'-6", Roof = 82'-6", Parapet = 88'-0")	

High-Rise Classification:	Non high-rise
Highest Occupied Floor: (Section 403)	Allowed - 75' Proposed - 72'-6" (Level 7) The building has 7 primary levels, however, it is built against a significant upslope which allows levels 2, 4 and 5 to have parts of the means of egress at grade. The measurement to qualify as a high-rise building is 75 feet from the lowest level of fire department access (level 1) to the floor of the highest occupied floor (level 7). Consideration must be taken with regard to the height of each floor and the service level (level 1) to assure that the measurements remains less than 75 feet to avoid high-rise requirements.
Chemical Quantities and Control Areas: (Section 307.1(1))	The Maximum Allowable Quantities (MAQ's) of hazardous materials will be in accordance with the CBC and CFC for indoor control areas. The number of control areas per floor will be determined in Schematic Design following an analysis of the chemicals used.
Fire Sprinkler System:	The building is required to be provided with automatic fire sprinklers (AFSS) throughout the building with NFPA-13 as the typical and 13R for Residential.
Occupancy Separation:	The analysis is assuming that the building qualifies for mixed use and nonseparated occupancies per CBC 508.3 thus the occupancies need not be separated with fire-resistive construction except that all portions of the R-2 occupancies shall be separated from other occupancies.
Elevator Lobby:	Not required per CBC Section 3006.3-5. The elevators are not being used as a means of egress.
Opening at Dining Level:	There is currently an opening at the Dining level connecting the upper floor with the larger lower level Dining area and Servery. This is permitted as long as the opening between no greater than 2 stories.
Outdoor Terrace	The Terrace at the courtyard should be kept to 49 or less occupants so to not require a second exit into the courtyard. If larger area is desired, this will need to be reviewed with the AHJ and may require a stair. The larger Terrace at the Dining will most likely be used for public assembly (gathering of people) for different types of assembly. These activities may involve serving alcohol thus the occupancy would be an A-2 instead of an A-3, this is not a significant change for egress except for possible occupant load calculation. It is recommended that

	the design consider the most restrictive occupancy use and occupant load calculation. Where the occupant load of the A spaces exceeds 100 and below 300 a direct exit may be required (see CBC 1029.3)
Mass Notification	CFC 917 notes that as mass notification risk analysis be conducted prior to construction of buildings with an occupant load of 1,000 or more. The anticipated occupant load of this building may likely exceed 1,000 occupants, triggering the need for a risk analysis to be performed.
High Fire Severity Zones	CalFire online maps for location of High Fire Severity Zones were reviewed as part of this analysis. It appears that the campus is within a Local Responsibility Area High or Moderate severity zone, thus CBC Wildland Urban Interface (WUI) requirements may apply. This should be verified with the Arcata Fire Department.
ERRCS	Emergency Responder Radio Coverage (ERRCS) is required, however depending on the construction, a system may or not be needed. We recommend that the infrastructure for a system be planned for and testing conducted upon completion of the major elements of construction.
Construction Type	Type IB has been selected as the most feasible and appropriate construction type. As the building contains both Assembly (A) and Residential (R-2) occupancies, these occupancies are limited to 5 stories for an R-2 and 4 stories for an A occupancy in Type II construction. Thus Type II or lesser construction are not feasible and Type IB is the minimum type of construction.
Fire Separation Distance	The minimum fire separation distance for this building to an imaginary property line is 30 feet without having to provide any rating to the exterior walls, unless required to be rated based on the type of construction. Thus this building must be at least 40 feet away from the existing Sunset Hall Student Housing building and the current existing Student Health Center; both assumed to be Type II-B construction to not be rated per CBC 705.5. The minimum fire separation distance from a Type II-B building is 10 feet.

Fire-Resistance Rating	Primary Structural Frame	2-hrs
for Building Elements:	Bearing Walls Exterior	2-hrs
(per Table 601)	Bearing Walls Interior	2-hrs
	Non-bearing walls/partitions Interior	**
	Non-bearing walls/partitions Interior	0-hr
	Floor construction	2-hrs
	Roof Construction	1-hr

** This will need to be reviewed against the final design

6.2 APPLICABLE CODES AND STANDARDS

Applicable State Codes (latest edition)

- Title 24, Part 1 - California Building Standards Administrative Code
- Title 24, Part 2 - California Building Code (CBC)
- Title 24, Part 3 - California Electrical Code (CEC)
- Title 24, Part 4 - California Mechanical Code (CMC)
- Title 24, Part 5 - California Plumbing Code (CPC)
- Title 24, Part 6 - California Energy Code (Title 24)
- Title 24, Part 9 - California Fire Code (CFC)
- Title 24, Part 11 - California Green Building Standards Code (CALGreen)
- Title 24, Part 12 - California Referenced Standards Code
- California Code of Regulations; Title 8, Title 19

Applicable National Codes (latest adopted edition)

- ADA - Americans with Disabilities Act Accessibility Guidelines
- IESI - Illuminating Engineering Society of North America
- NEMA - National Electrical Manufacturers Association
- National Fire Protection Association (NFPA) Guidelines and Standards

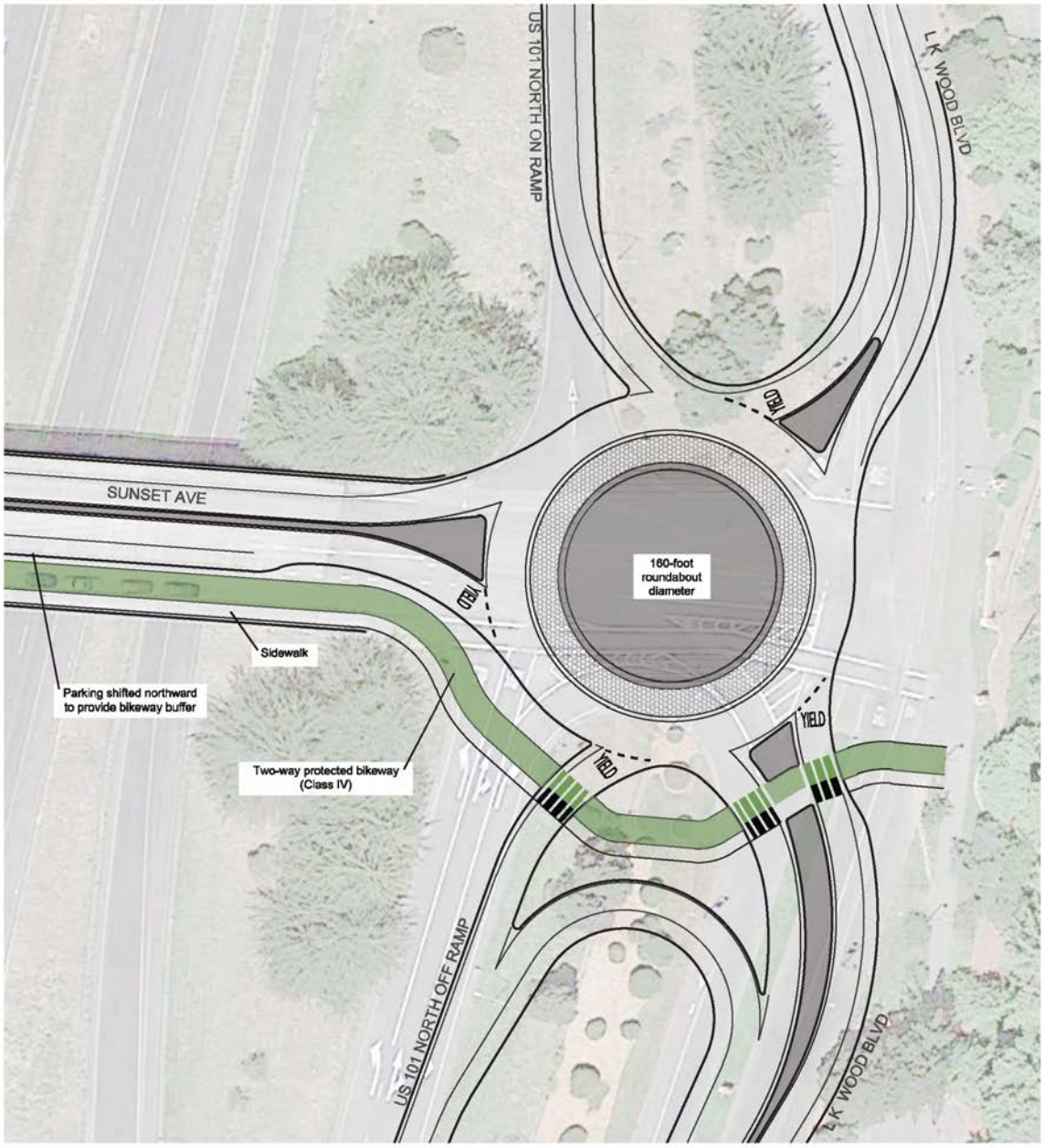
Guidelines and Standards (latest adopted edition)

- ACGIH Industrial Ventilation - A Manual of Recommended Practice
- ANSI Z358.1 Emergency Eyewash and Shower Equipment
- ANSI/AIHA Z9.5 - Laboratory Ventilation Standard
- ASHRAE Standard 62.1 Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 110 - Method of Testing Performance of Laboratory Fume Hoods
- LEED (Leadership in Energy and Environmental Design)
- OSHA (Occupational Safety and Health Administration Standard) 29 CFR 1926 and 29 CFR 1910

07
APPENDIX

7.1 CENTRAL ARCATA AREAWIDE TRAFFIC IMPACT STUDY

Figure 7.1.1 - Conceptual Roundabout at Sunset Avenue/US 101N Ramps/LK Wood Boulevard



(This page intentionally left blank)

7.2 SHARC ENERGY SYSTEMS - PIRANHA HEATING & COOLING

Figure 7.2.1.1 - SHARC Energy Systems Introduction

Figure 7.2.1.2 - SHARC Energy Systems Piranha Heating and Cooling Units

Figure 7.2.2.1 - SHARC Energy Systems Case Study - DC Water Administrative Building - SmithGroup

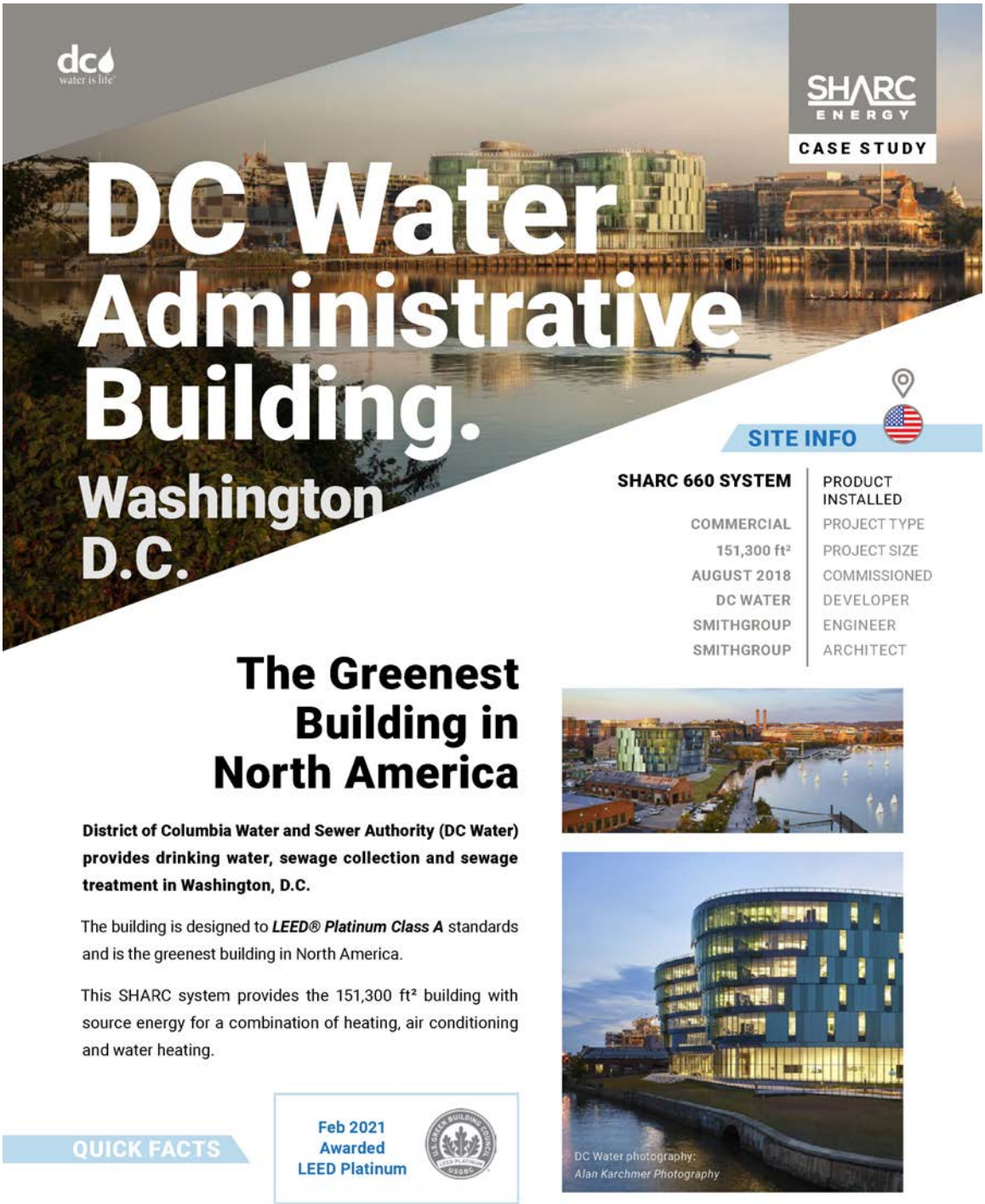


Figure 7.2.2.2 - SHARC Energy Systems Case Study - DC Water Administrative Building - SmithGroup

Figure 7.2.3.1 - SHARC Energy Systems Case Study - Wall Centre, Phase 1 - CBL Architects

Figure 7.2.3.2 - SHARC Energy Systems Case Study - Wall Centre, Phase 1 - CBL Architects