RIVERSIDE COMMUNITY COLLEGE DISTRICT

Final Draft February 2012

Riverside Community College District
4800 Magnolia Avenue
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District Standards + Campus Guidelines Handbook Team

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Signage + Wayfinding Consultant

Impact Design Associates (ida)

Roofing + Waterproofing Consultant

Independent Roofing Consultants

VOLUME 2

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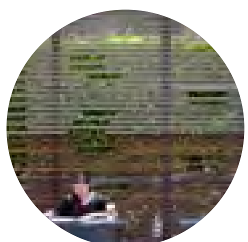

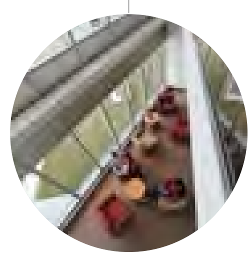

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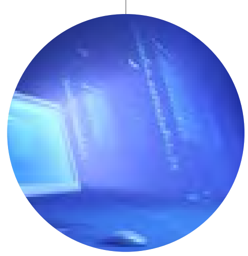

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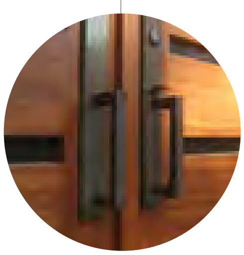

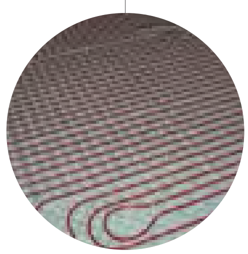

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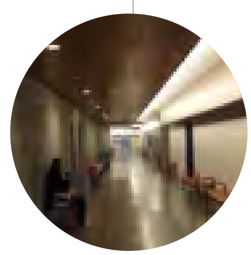

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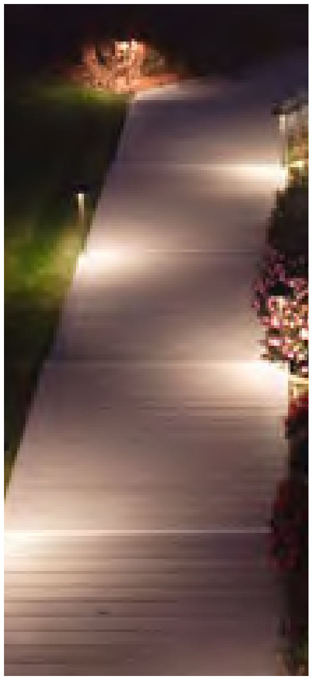
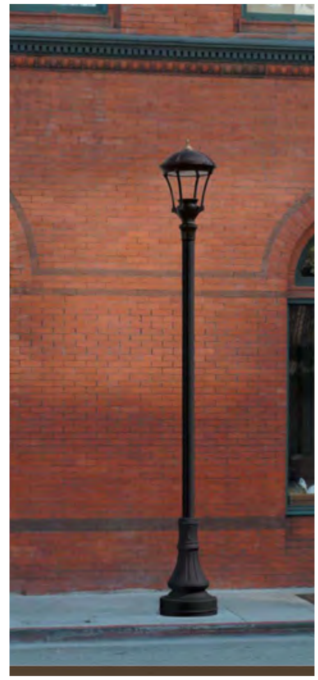
LIGHTING GUIDELINES



INTRODUCTION

The primary goal of establishing lighting guidelines for the District and each college is to create a more unifying experience as a person travels through each campus, as well as utilizing organized zones of lighting language and treatments to assist with campus identity and wayfinding.

District Benefits Include:

- Support student activity and safety at all times
- Common implementation of campus planning principles
- Gain cost savings with common maintenance requirements
- Gain cost savings with energy efficient lighting

PART A
ANALYSIS + RECOMMENDATIONS

I. OVERVIEW

By implementing lighting guidelines and a site lighting master plan, each campus will become more unified through a consistent lighting design that utilizes light to create areas of visual hierarchy and interest. In doing so, people will thus be more effectively drawn through the heart of the campus letting their eye guide them on their journey to their final destination.

I. OVERVIEW (CONT'D)

OBJECTIVES

- Improve campus safety by utilizing high rendering lamp sources, providing appropriate and uniform light levels on the ground, and lighting key elements surrounding the site.
- Support safety and nighttime activities with light fixtures that minimize glare.
- Utilize energy efficient lamp sources.
- Support the maintenance staff by incorporating long-life lamp sources which require less frequent re-lamping and minimize number of lamp types utilized throughout the site and District.
- Support environmental concerns by utilizing cut-off lighting fixtures to assist in possible future Leadership Energy and Environmental Design (LEED) aspirations.
- Support visual acuity with minimum illumination level recommendations outlined in PART   section II.
- Create visual interest while accentuating key landscape and architectural features.
- Support campus identity with consistency of lighting fixture approach, including creation of a campus fixture family.
- Improve consistency of fixture lamping, including color temperature and wattage.
- Assist wayfinding with unified zones of hierarchy throughout the campuses within the District.

II. EXECUTIVE SUMMARY

Lighting is an essential component of the design plan framework to achieve the long range objectives of the RCCD District Standards + Campus Guidelines.

Lighting systems implemented in conformance with the Lighting Guidelines will improve the performance and perception of light on each campus to create more inviting and comfortable spaces, limit environmental impact, and improve energy efficiency.

The Analysis and Recommendations presented in Part A form the basis of the criteria within the Lighting Guidelines in Part B. A detailed summary of issues and objectives are discussed in this analysis to summarize the basis of the proposed design solutions and the form and type of standards. Within the broad goal of developing new standards, this handbook also evaluates methods to preserve the existing lighting infrastructure to as great as an extent as possible. Part C presents a detailed review of existing lighting and electrical systems on each campus to define strengths, weaknesses, and opportunities moving forward.

IV. LIGHTING OBJECTIVES

The primary Lighting Objectives were developed in concert with District Standards Development Committee and are summarized below.

A. IMPROVE VISIBILITY, SAFETY, AND COMFORT

Lighting systems should provide adequate illumination for safe and comfortable access and use of each campus from dusk to dawn. All site and building illumination should provide a well organized and legible illuminated pedestrian pathway system that guides circulation to defined improved pathways, and aligns with each specific campus master plan to facilitate the appropriate use of the campus at night. Lighting is a form of communication and should therefore align with wayfinding and building egress systems.

1. Lighting Equipment
   - Lighting systems are technological advancements derived from research and development of new applied electrical, optical, and material science technology. Lighting Guidelines should foster the implementation of best practices in both new lighting building standards and application of more efficient and sustainable technology.

2. Performance Criteria for a Quality Luminous Environment
   - Lighting should serve the human needs of the users occupying the space balanced with the architectural context and factors of economics and the environment. Human needs encompass human emotions, actions, perceptions, and health as well as aesthetic judgment and social communication.

Lighting will serve a role in social communication and a aesthetic judgment of an interior or exterior space by responding to its natural or architectural environment. Lighting elements will relate to and support architectural context by way of its formal presence, its integration into the architectural or natural landscape, and the expression of aesthetic style.

B. SENSE OF PLACE

Lighting will improve the sense of place within each campus through alignment with the broad principles of each campus master plan, including the following wayfinding and hierarchal principles:

3. Accentuate Gateways:
    - Light will inform about arrival to each campus through pronounced and unique color, brightness, and pattern of light to accentuate and mark the landscape and buildings which form the major campus entry gateways.

4. Hierarchy of Corridor and Circulation:
    - Light intensity and the type and scale of light fixtures will define and communicate the order and significance of various circulation systems on each campus. Brightness and scale will be aligned with a ranked order of significance for types of spaces on campus. This method will clearly distinguish ceremonial and major cross campus and intercampus circulation pathways from subordinate building access and service paths.

5. Hierarchy of Public Spaces
    - The plaza space within the major public spaces will be illuminated to create a sense of destination within each campus. Intensity of light, scale, and style of light fixtures are differentiated from adjacent circulation spaces to create a unique, but coordinated, identity.

6. Adequately Illuminate Building Entries and Circulation:
    - Building site illumination standards must provide an ordered and ranked system of defining building site circulation including more prominent definition of major and after hours building entrances, plazas and major public spaces, emergency egress exits, and loading and service paths.

IV. LIGHTING OBJECTIVES (CONT'D)

C. IMPLEMENTATION PROCESS

The means and methods of implementation are essential to the long-term success of these lighting guidelines. These guidelines define both desired outcomes and the design review process to achieve these results. The standard also provides for periodic updates and revisions to these guidelines to incorporate best practices and new technologies as these become available.

1. Define Desired Outcomes:
    - The Lighting Guidelines establish minimum performance standards for site and building improvement projects. Each component of each campus lighting master plan is defined to achieve incremental improvement over the long range phased development of new projects on each campus.

2. Design Review Process:
    - The key ingredient to achieve the desired outcomes of the lighting is a methodology of review for new project submittals. The Lighting Guidelines define the precise methods, documents and procedures required for this review process.

D. SUSTAINABLE LIGHTING PROGRAM

Establishing New Precedents:

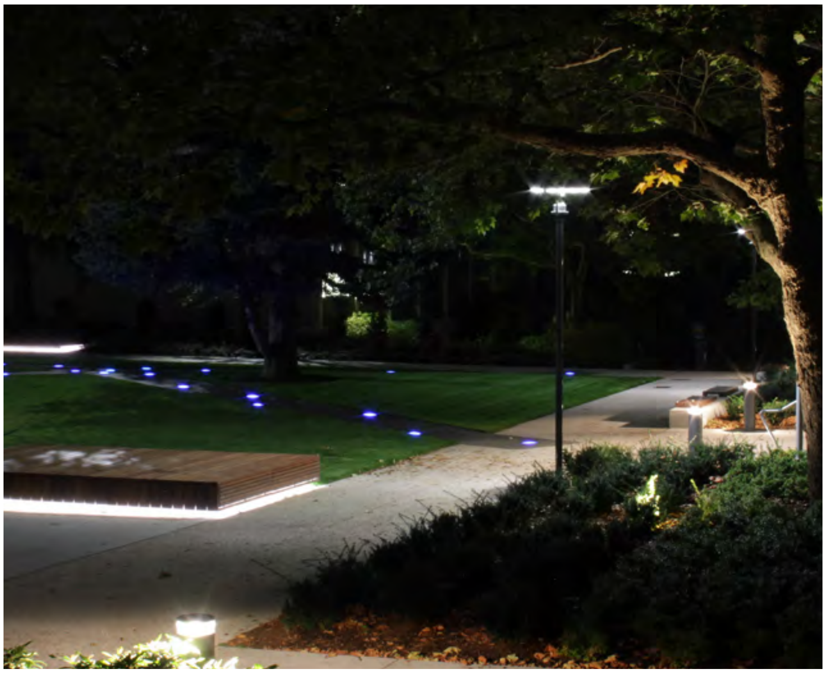
These guidelines include a procedure to incorporate first phase segments of the implementation plan at each campus as the new standard for future developments of that same campus plan component.

1. Guidelines Updates:
    - Periodic updates to the lighting master plan at each campus should be scheduled to incorporate new technology standards, new building code requirements, and evolutions to the campus urban plan.

2. Long Term Management:
    - Management of the Lighting System should include the implementation of a systematic and manageable maintenance program to anticipate capital expenses and document system performance.

V. CONTROL SYSTEMS

PART B
LIGHTING GUIDELINES



I. OVERVIEW

These Lighting Guidelines define the objectives and minimum design and operational standards for exterior lighting systems within the Riverside Community College District campuses. These Guidelines present a framework for lighting systems within each campus master plan to specify the intensity of light, the scale and style of lighting equipment by zone, and the relationship of the exterior lighting components to create comprehensive and cohesive lighting guidelines.

II. LIGHTING DESIGN PRINCIPLES

The lighting master plan at each campus expresses the campus master plan at night through the application of light intensity, pattern, color, and scale in a measured, precise program aligned with the hierarchy of the campus.

A. ILLUMINANCE HIERARCHY

The following table presents the required relative Illuminance for spaces within the campus.

Prominent:	High Illuminance, Medium Contrast
Legible:	Medium Illuminance, Medium Contrast
Active Ambient:	High Illuminance, Low Contrast

Note:

1. Recommendations for Pedestrian, Walkways, and Plazas refer to IESNA RP-33-99
2. Recommendations for Open-air and Roof-top parking facilities and Enclosed parking structure refer to IESNA RP-20-98

A. ILLUMINANCE HIERARCHY (CONT'D)

Pedestrian Circulation

Recommendations		**Horizontal Illuminance (footcandles)**		**Vertical Illuminance (footcandles)**		**RCCD Typologies**	**Recommended Fixture/ Lamps**
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Prominent:	High Luminance, Medium Contrast	2.0	4 :1	1.0		Ceremonial Pathway	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Legible:	Medium Luminance, Medium Contrast	1.0	4 :1	0.5		Secondary Pathway	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Active Ambient:	High Luminance, Low Contrast	0.5	4 :1	0.2		Tertiary Pathway	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1

II. LIGHTING DESIGN PRINCIPLES (CONT'D)

A. ILLUMINANCE HIERARCHY (CONT'D)

Commons, Hubs, and Courts (non-circulation areas)

Recommendations		**Horizontal Illuminance (footcandles)**		**Vertical Illuminance (footcandles)**		**RCCD Typologies**	**Performance Requirements**
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Prominent:	High Luminance, Medium Contrast	1.0	4 :1	1.0		Large Plaza	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Legible:	Medium Luminance, Medium Contrast	0.5	4 :1	0.5		Small Plaza	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Active Ambient:	High Luminance, Low Contrast	0.3	4 :1	0.2		Small Plaza	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1

A. ILLUMINANCE HIERARCHY (CONT'D)

Pedestrian/Auto Intersections

Recommendations		**Horizontal Illuminance (footcandles)**		**Vertical Illuminance (footcandles)**		**RCCD Typologies**	**Recommended Fixture/ Lamps**
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Prominent:	High Luminance, Medium Contrast	1.8	4 :1			Pedestrian Drop Off	CCT 4000K 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Legible:	Medium Luminance, Medium Contrast	1.4	6 :1			Secondary/ Shared Roadway	CCT 4000K 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G1
Active Ambient:	High Luminance, Low Contrast	0.8	6 :1			Parking Areas	CCT 4000K 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G2

II. LIGHTING DESIGN PRINCIPLES (CONT'D)

A. ILLUMINANCE HIERARCHY (CONT'D)

Streets

Recommendations		Horizontal Illuminance (footcandles)		Vertical Illuminance (footcandles)		RCCD Typologies	Recommended Fixture/ Lamps
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Prominent:	High Luminance, Medium Contrast	0.8	4 :1	2-4		Gateways	Monuments and Vertical markers to be lit per IES handbook 10th edition Table 15.2 ("Typically Moderate") See Part B Section IV
Legible:	Medium Luminance, Medium Contrast	0.6	6 :1			Primary Roadway	CCT 4000K 21'-30' HEIGHT, 90' CTC, IESNA BUG rating B1-U0-G1
Active Ambient:	High Luminance, Low Contrast	0.6	6 :1			Secondary/ Shared Roadway	CCT 4000K 21'-30' HEIGHT, 90' CTC, IESNA BUG rating B1-U0-G1

A. ILLUMINANCE HIERARCHY (CONT'D)

Building Entries

FKA Recommendations		**Horizontal Illuminance (footcandles)**		**Vertical Illuminance (footcandles)**		**RCCD Typologies**	**Recommended Fixture/ Lamps**
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Legible:	Medium Luminance, Medium Contrast	5.0	2 :1	3.0		Vestibule	
Legible:	Medium Luminance, Medium Contrast	1.5	2 :1	0.8	4	Canopies	

II. LIGHTING DESIGN PRINCIPLES (CONT'D)

B. ENERGY EFFICIENCY

RECOMMENDED LIGHT SOURCE

1. LED
   a. Positives:
      - Long Lamp Life Maintenance
      - High Energy Efficiency
   b. Negatives:
      - Glare

2. Induction lamp
   a. Positives:
      - Long Lamp Life Maintenance
      - Dimmable
      - Less Glaring Light Source
      - High Energy Efficiency
   b. Negatives:
      - Less Energy Efficient than LED

C. LIGHTING CONTROLS

Lighting Control to be integrated with audio visual—refer to *Section 11 and 18* (***RCCD District Technology Standards Revision 1.17???)***

Existing Exterior Lighting
- Minimum control per code, controlled by time clock

Recommended Lighting Control:
Monitoring + Sensor Control at Fixtures
- Whole Building Energy Monitoring + Control for Load Shredding
- Street + Site Lighting Monitoring + Control

II. LIGHTING DESIGN PRINCIPLES (CONT'D)

C. LIGHTING CONTROLS (CONT'D)

Recommend implementation of campus-wide monitoring.

Three Solutions for Outdoor LED Lighting

sensorswitch

1. TLPS (Locking-Type) Photocontrols for LED Lighting

TLPS Locking-Type Photocontrol

Bi-level Control Module

Applications

- Roadway lighting, area-lighting, relight* or new construction

Compatible Lighting Products

- ALX by Lithonia Lighting
- LED Roadway by American Electric Lighting (available late 2010)
- Select Tersen luminaires equipped with photocontrol receptacle and/or bi-level module

Part-Night	Zonal Controls	Prevent Day Burning	Lumen Management	Night Trimming	Surge Protection
Yes	Yes	Yes	Yes	No	Yes

Additional Features

- Upgrade existing facility to bi-level switching or dimming without re-wiring
- Optional "Part-Night" models require no programming
- Five-year warranty
- Surge supression at the fixture where it is most effective

* Existing location, wiring, with new lighting fixture

For product details, options and accessories, please refer to product catalogs.

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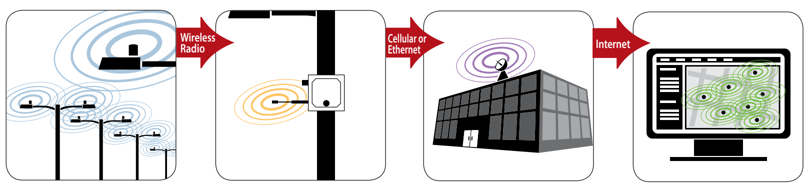
C. LIGHTING CONTROLS (CONT'D)

Recommend implementation of campus-wide monitoring.

ROAM wireless controls complete your LED investment



Smart Photocontrols

Diagnostic photocontrol with wireless radio (one per fixture)

ROAM starts with a Mesh Network of Smart Photocontrols. In addition to standard photocontrol, nodes can also receive control instructions such as "dim to 65% at midnight and return to 100% light output at 4:00 a.m. The nodes continuously monitor and collect fixture performance data and unusual operating conditions.

- Universal: works with any manufacturers' outdoor LED lighting fixture
- Powerful transmitters allow nodes to be spaced far (up to 1,000 ft.) apart
- Increased surge protection for durability and long life

Gateway

Smart photocontrol collection device (one gateway per 2,000 nodes)

Nodes transmit performance data to and receive commands from the Gateway.

- Industry leading Node-to-Gateway ratio lowers equipment and installation costs
- Flexible uplink options using Cellular, Ethernet or Wi-Fi
- Flexible outdoor mounting options (pole or building)

Network Operation Center

Centralized Data Collection and Management

Fixture performance data is transmitted from the Gateways and stored at the U.S.-based Network Operations Center.

- Our secure web servers analyze and store the fixture data
- Highest encryption available for civilian applications
- Requires no customer-hosted hardware, software or IT Support

Customer Portal

Secure, web-based user interface

The web-based Customer Portal displays all of the system operating conditions and performance data by map or dashboard-based views. Scheduling and reports are all available on the Customer Portal.

- Map or Dashboard-based Graphic User Interface
- Control and Schedule ON/OFF/TRIM/DIM for individual fixtures or groups of fixtures
- Exception-based reporting quickly highlights fixture malfunctions operating characteristics for each LED fixture

For product details, options and accessories, please refer to product catalogs.

III. CAMPUS LIGHTING TYPOLOGIES

The Lighting Guidelines define Lighting Typologies by the importance of spaces within the public realm, the sense of place, and the network of pathways within each campus.

A. CIRCULATION

The lighting guidelines enhance the pedestrian circulation network of pathways, plazas, sidewalks, lanes and building entrances to create a safe and welcome environment. These guidelines at each campus emphasize the pedestrian space as the primary component within the public realm and subordinates spaces as dedicated to vehicles and service activities.

PEDESTRIAN CIRCULATION

The Lighting guidelines define the public realm pedestrian circulation zones into three types:

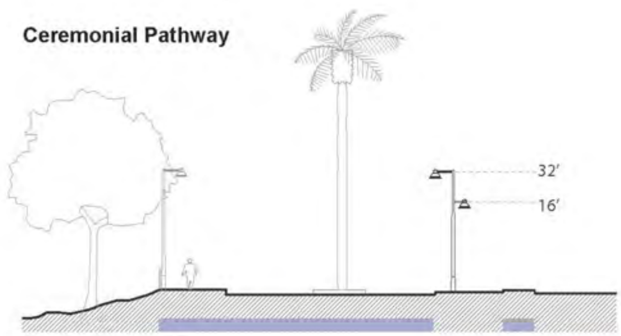
1. Ceremonial Pathway
2. Secondary Pathway
3. Tertiary Pathway

The guidelines require consistent application of light intensity and contrast to each of these typologies to affect a legible and cohesive primary system of inter campus circulation.

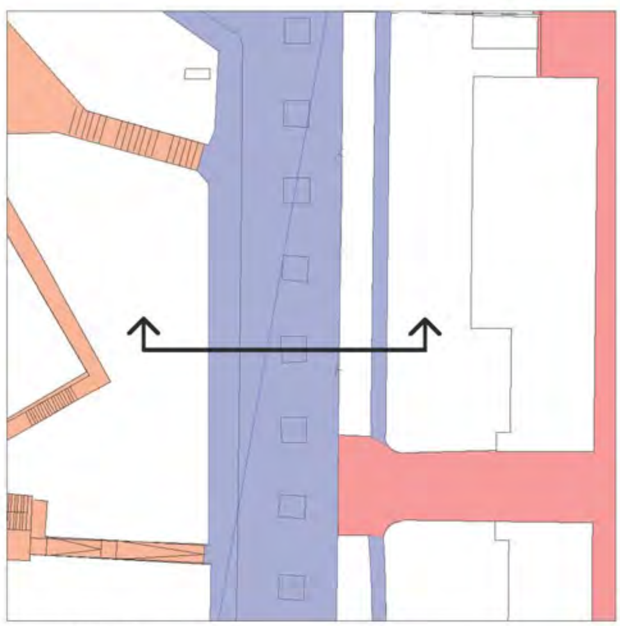
A. CIRCULATION (CONT'D)

PEDESTRIAN CIRCULATION: CEREMONIAL PATHWAY

Ceremonial Pathway



Typical Section View



Typical Plan View

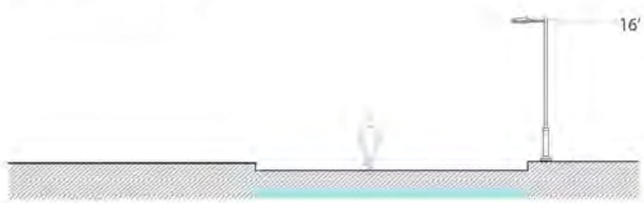
NODES	ILLUMINANCE
Large Plaza	2 fc
CIRCULATION	
Ceremonial Pathway	2.5 fc
Tertiary Pathway	0.5 fc

III. CAMPUS LIGHTING TYPOLOGIES (CONT'D)

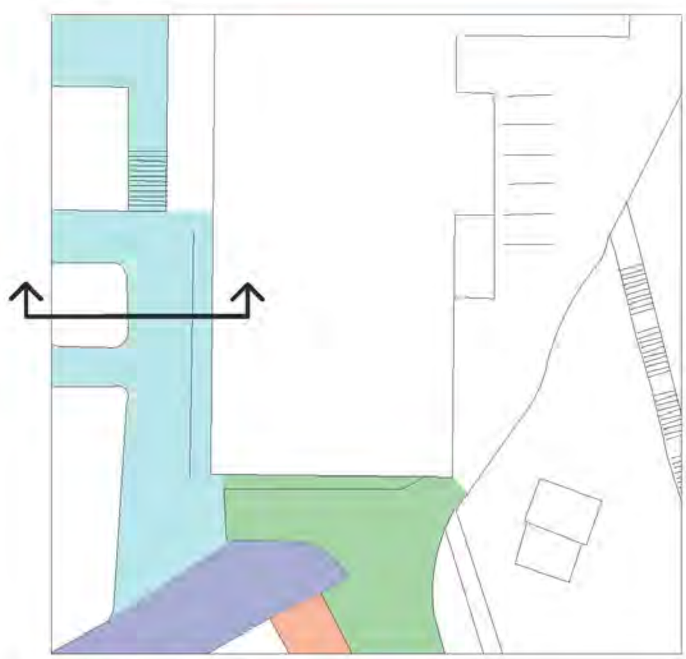
A. CIRCULATION (CONT'D)

PEDESTRIAN CIRCULATION: SECONDARY PATHWAY

Secondary Pathway



Typical Section View



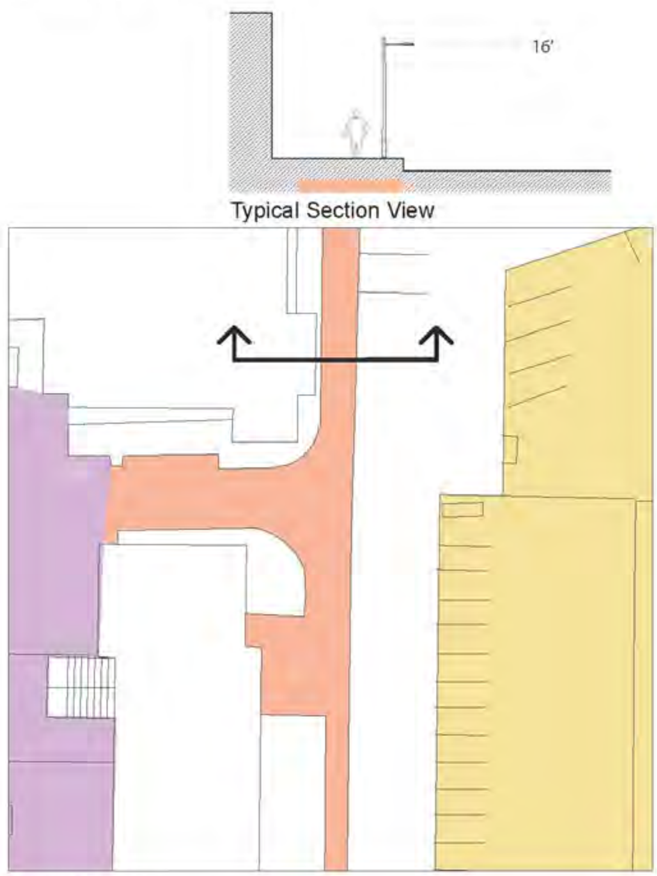
Typical Plan View

CIRCULATION	ILLUMINANCE
Tertiary Pathway	0.5 fc
Primary Roadway	1.0 fc
Secondary Pathway	1.0 fc

A. CIRCULATION (CONT'D)

PEDESTRIAN CIRCULATION: TERTIARY PATHWAY

Tertiary Pathway



Typical Plan View

NODES	ILLUMINANCE
Small Plaza	0.5 fc
CIRCULATION	
Tertiary Pathway	0.5 fc
Parking Area	1.0 fc

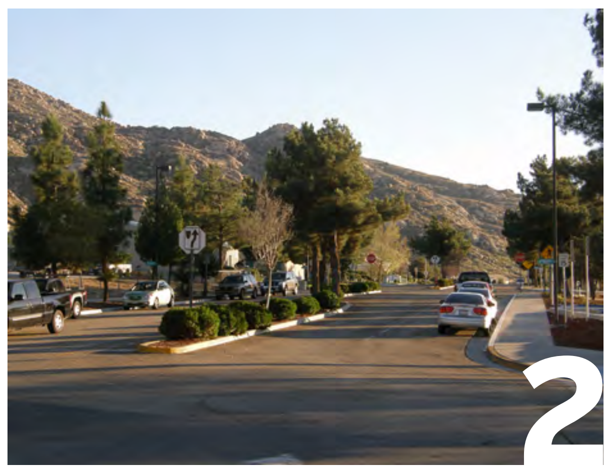
III. CAMPUS LIGHTING TYPOLOGIES (CONT'D)

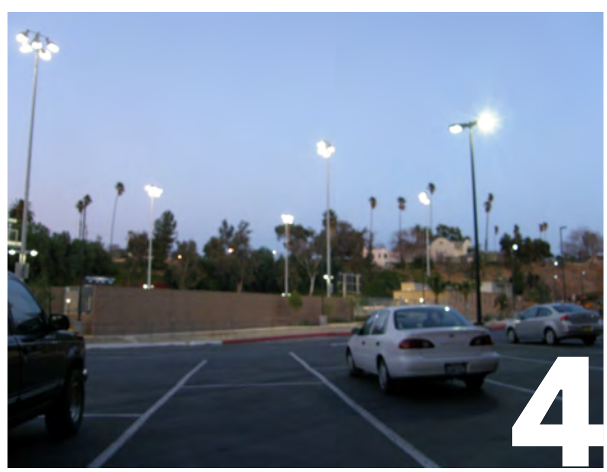
A. CIRCULATION (CONT'D)

VEHICULAR CIRCULATION

The Lighting Guidelines defines inter-campus streets which serve vehicular and pedestrian access in the public realm into four categories:

1. Pedestrian Drop Off
2. Primary Roadway
3. Secondary/Shared Roadway
4. Parking Area

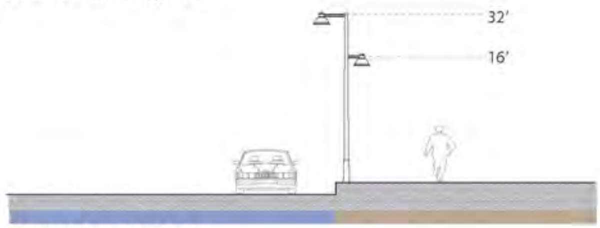




A. CIRCULATION (CONT'D)

VEHICULAR CIRCULATION: PEDESTRIAN DROP-OFF

Pedestrian Drop Off



Typical Section View

Typical Plan View

NODES	ILLUMINANCE
Small Plaza	0.5 fc
CIRCULATION	
Pedestrian Drop off	2.5 fc
Primary Roadway	1.0 fc
Parking Area	1.0 fc

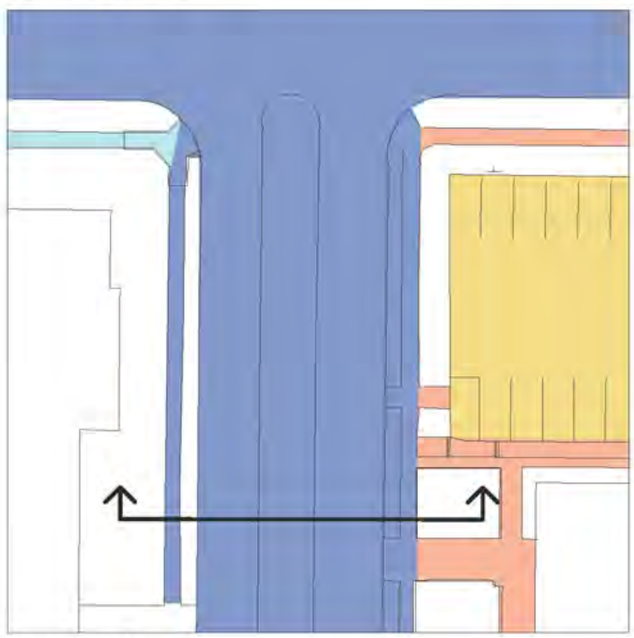
III. CAMPUS LIGHTING TYPOLOGIES (CONT'D)

A. CIRCULATION (CONT'D)

VEHICULAR CIRCULATION: PRIMARY ROADWAY

Primary Roadway

Typical Section View



Typical Plan View

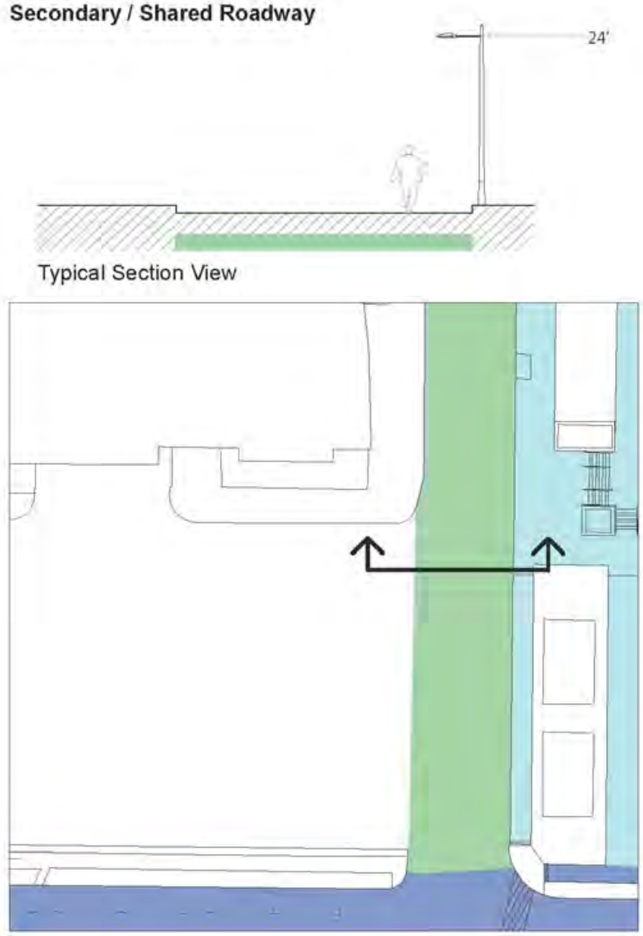
CIRCULATION	ILLUMINANCE
Tertiary Pathway	0.5 fc
Primary Roadway	1.0 fc
Parking Area	1.0 fc
Secondary Pathway	1.0 fc

III. CAMPUS LIGHTING TYPOLOGIES (CONT'D)

A. CIRCULATION (CONT'D)

VEHICULAR CIRCULATION: SECONDARY/SHARED ROADWAY

Secondary / Shared Roadway



Typical Section View

Typical Plan View

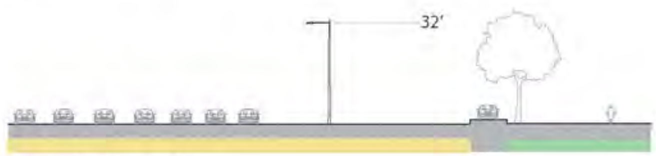
CIRCULATION	ILLUMINANCE
Tertiary Pathway	0.5 fc
Primary Roadway	1.0 fc
Secondary Pathway	1.0 fc

III. CAMPUS LIGHTING TYPOLOGIES (CONT'D)

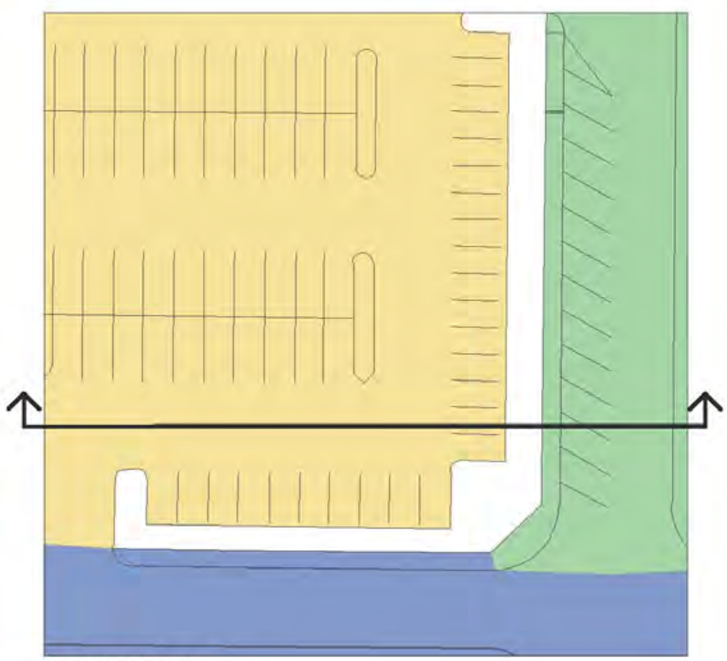
A. CIRCULATION (CONT'D)

VEHICULAR CIRCULATION: PARKING AREAS

Parking Areas



Typical Section View



Typical Plan View

CIRCULATION	ILLUMINANCE
Parking Area	1.0 fc
Secondary Pathway	1.0 fc
Ceremonial Pathway	2.5 fc

B. NODES

The Lighting Guidelines define nodes as a series of important spaces within the public realm which define the entrance threshold to each campus and or significant destinations within each campus. Nodes are crucial components that define the sense of place and character and therefore requirements for lighting are more rigorous within these spaces.

The Lighting Guidelines defines inter-campus streets which serve vehicular and pedestrian access in the public realm into three categories:

1. Campus Gateway
2. Large Plaza
3. Small Plaza


1


2


3

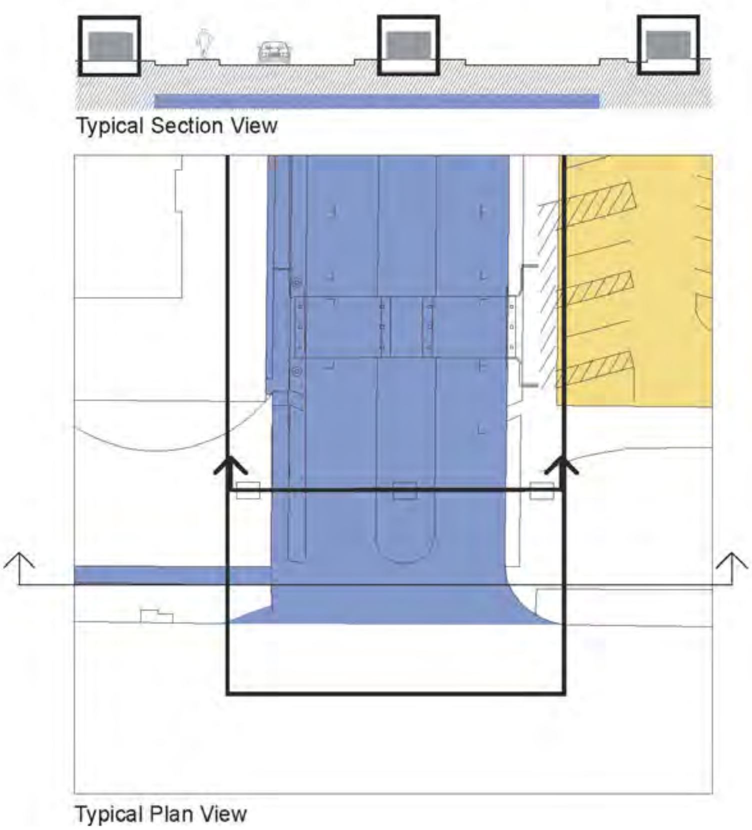
III. CAMPUS LIGHTING TYPOLOGIES (CONT'D)

B. NODES (CONT'D)

CAMPUS GATEWAY

- Gateways are highly legible and recognizable forms serving as wayfinding tools with differentiated forms of scale, massing, articulation, or texture
- These gateways denote prominent intersections or portals of entry, marking significant destinations or connections.
- Lighting supports the differentiated gateways with pattern, color, texture, higher intensity, and contrast to adjacent surroundings.

Campus Gateway



CIRCULATION	ILLUMINANCE
Campus Gateway	5.0 fc
Primary Roadway	1.0 fc
Parking Area	1.0 fc

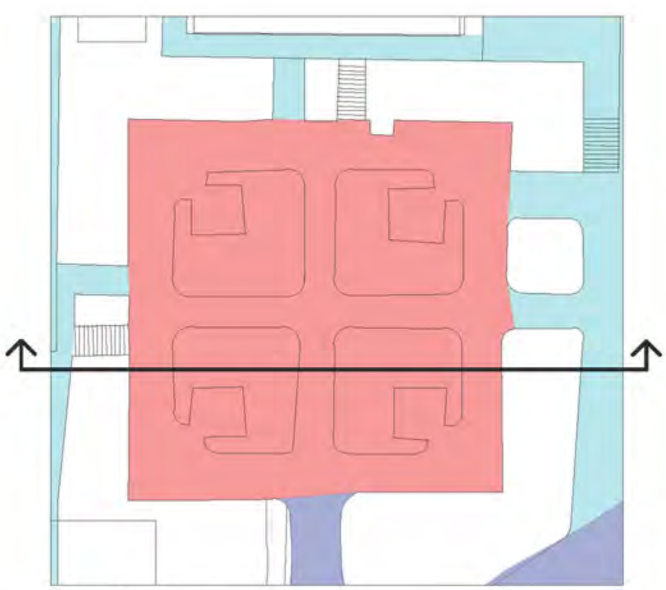
B. NODES (CONT'D)

LARGE PLAZA

Large plazas present the significant cultural and historical connections for the students and each campus. The plaza might include specimen tree, low wall seating, stairs, or a green area. Lighting accents such components and provide a moderate level of prominence to support the activities and safety.

Large Plaza

Typical Section View



Typical Plan View

NODES	ILLUMINANCE
Large Plaza	2 fc
CIRCULATION	**ILLUMINANCE**
Ceremonial Pathway	2.5 fc
Secondary Pathway	0.5 fc

III. CAMPUS LIGHTING TYPOLOGIES (CONT'D)

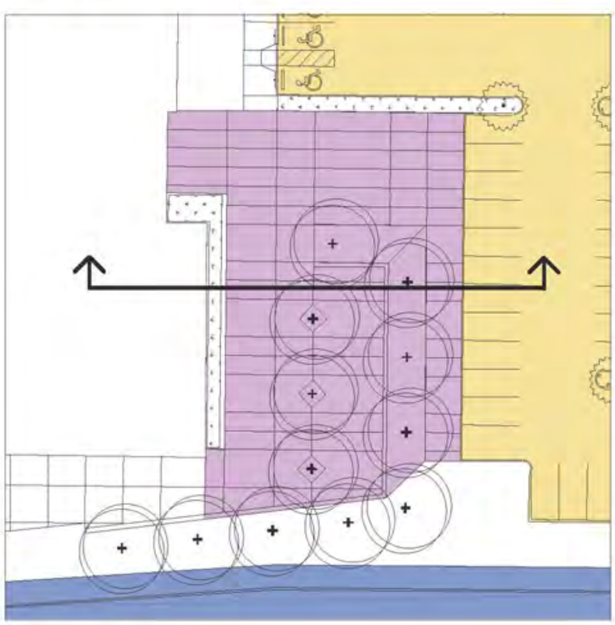
B. NODES (CONT'D)

SMALL PLAZA

Similar to large plazas, small plazas accommodate the cultural and activity connections for the students and each campus. The plaza might include specimen tree, low wall seating, stairs, or green area. Lighting accents such components and provides a low level of prominence to support the activities and safety.

Small Plaza

Typical Section View

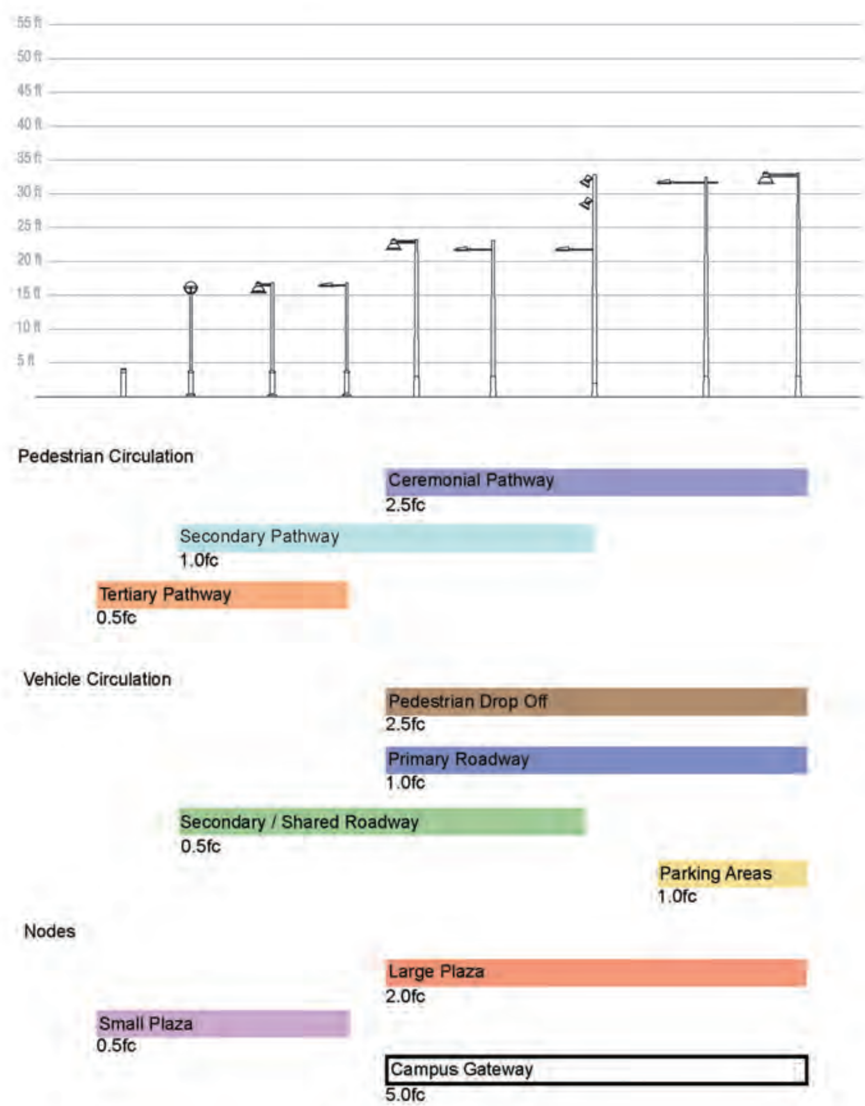


Typical Plan View

NODES	ILLUMINANCE
Small Plaza	0.5 fc
CIRCULATION	**ILLUMINANCE**
Primary Roadway	1.0 fc
Parking Area	1.0 fc

IV. SCALE

Lighting systems will be selected relative to the adjacent architectural height and the depth of the outdoor space to meet the functional requirements of providing sufficient illumination in relation to the size of the area provided for. The scale of the lighting equipment can also support the notion of hierarchy of use or level of importance as relative to the prominent, legible, active ambient or low level ambient scales of importance.



V. PERFORMANCE LIGHTING STANDARDS

A. LIGHTING CRITERIA - SITE AND BUILDINGS

1. Luminance Photometric
   - Project submissions are to demonstrate measure of reflected light energy from a surface in a specific direction over a standard area (candelas/square foot). This term is the measure of the intensity and direction of reflected light or light from a source. The guidelines utilize candelas/square foot to evaluate relative brightness of light fixtures versus the adjacent background and prominent objects versus their background to establish comfortable limits to maximum intensity.

2. Illuminance Photometric of Project Submission
   - Project submissions are to demonstrate measure of light energy (luminous flux) incident at a specific point on a surface over a standard area (lux, lumens per square meter). This term is commonly used to measure and describe light intensity on a surface. The guidelines establish lux values to support safety and hierarchal campus master plan objectives.

3. Context Description
   - Project submissions to demonstrate lighting design elements in the context of adjacent compositions of architecture and landscape to create and support varying scale, color, texture, pattern for design definition. These qualitative values are to be considered with quantitative values of illuminance and luminance for a comprehensive evaluation of the visual lighting environment. The guidelines require evaluation of any new improvements relative to the adjacent existing or future planned improvements to establish a cohesive campus master plan.

4. Luminance Contrast Ratios
   - Project submissions to demonstrate surrounding 50 feet of design luminance and/or illuminance ratio of subject versus background or subject versus adjacent surroundings used to differentiate to establish recognition to prominence. The guidelines establish acceptable ranges of contrast ratios for types of spaces within each campus master plan. Generally higher contrast ratios are assigned to those spaces and objects identified as desirable prominence. Lower contrast ratios are defined for subordinate or support components. Light intensity, scale of light elements, and color values create differentiation for legibility and hierarchy (see Appendix for recommended Contrast Ratio).

5. LED Graphic Display
   - Whereby LED technology and graphic displays are to be incorporated into project submissions, lighting is to demonstrate that vertical luminance on buildings and nodes throughout comply with the illuminance and luminance hierarchal program established in the RCCD zone typologies.

V. PERFORMANCE LIGHTING STANDARDS (CONT'D)

B. SUBMITTAL REQUIREMENTS

1. Lighting Layouts
   - Each submission will require a lighting plan with light fixtures specified and keyed to the plan. Plan will include an overlay to specify those portions of the site area that are to be illuminated in conformance with the campus Master Plan.

2. Exterior Lighting Fixture Specifications
   - Performance Criteria for Lighting Equipment - Minimum performance criteria for all lighting equipment utilized within the RCCD Campuses:
     a. Lamp life - rated average lamp life hour preferred.
     b. Color temperature 4000K for white light.
     c. Lamp color rendering index- 80 or higher.
     d. Durability - system and components to meet local and national electrical codes, I.P. 65 waterproof, rated for outdoor use, and higher thermal heat dissipation properties.
     e. Luminaire optical design - luminaire design shall incorporate appropriate shielding to limit view to direct lamp images, outdoor luminaire optical design shall meet the luminaire classification system (LCS) of three composite (BUG) ratings of Backlight, Uplight, and Glare (<10% to

frontlight very high FVH, <10% to backlight very high BVH, and 0% uplight high UH).

3. Sustainable Lighting Program
    - Lighting should support the overall local and global environmental concerns or issues, by utilizing environmentally friendly solutions which limit light pollution, or the disposal of harmful waste and utilize solutions that integrate ease of maintenance and use of durable, reliable systems that anticipate future technologies.
    - Lighting is targeted toward the intended surface of illumination for the most efficiency of design. The lighting system will consider minimized lighting impacts of: light trespass, light pollution, and glare. Lighting systems shall be in compliance with Lighting Zone Definitions LZ3 within each campus boundary.

V. PERFORMANCE LIGHTING STANDARDS (CONT'D)

C. SYSTEMATIC AND MANAGEABLE MAINTENANCE PROGRAM

- New lighting systems will incorporate digital control systems, electronic ballasts, and digital control sensors.
- Photocell, time-clock, and centralized lighting control to monitor and manage light energy consumption are required.
- Local use of photocell and time-clock may limit lighting use to occupancy frequency in limited approved areas.
- A campus-wide lighting management system is recommended for monitoring lamp life and lighting system efficiency for improved maintenance and energy management.
- Step down dimming technology is recommended to dim lighting for reduce power consumption over the life of the lamp and at time of lower occupancy use, after midnight.

D. LIGHTING STRATEGY

1. Lighting Layouts – Campus Lighting Plan, Circulation and Nodes Lighting Diagrams shall indicate that:
    a. The primary ceremonial pathway is within the prominent level of hierarchy, to be at an enhanced illumination value of 25 lux.
    b. The spacing of the light pole to provide the appropriate light level and improve the sense of place and safety.

2. Lighting Equipment Specifications shall include:
    a. Lighting system efficiency
    b. Lamp efficacy
    c. Finishing
    d. Lamp life
    e. Color temperature
    f. Lamp color rendering index
    g. Durability
    h. Ease of maintenance – system to be easily accessible with low maintenance
    i. Luminaire optical design – optics to be full cutoff, with appropriate shielding to limit views to direct lamp images

VI. REFERENCES

A. IESNA STANDARDS

The Illumination Engineering Society of North America (IESNA) establishes the professional best practices for the implementation of lighting. Many national, provincial, and local lighting codes are based on the IESNA recommendations. These guidelines based the illuminance hierarchy for circulation and nodes upon the applicable recommendations IESNA Recommendations. A brief summary of relevant IESNA recommendations are shown below.

IESNA Recommendations		**Horizontal Illuminance**				**Vertical Illuminance**				**Luminance**	
DESCRIPTION	**IES Site Program**	**Max**	**Average**	**Min**	**Uniformity Ratio**	**Max**	**Average**	**Min**	**Uniformity Ratio**	**Uniformity Ratio**	**Source**
PEDESTRIAN ZONES AND PATHWAYS	EM Egress		1	0							
	Mixed Vehicle Pedestrian		2		4 :1			1			IESNA RP-08-00 Table 5
	Pedestrian Only (High Conflict)		1		4 :1			1			IESNA RP-08-00 Table 5
	Ped Areas		0.5		4 :1			0			IESNA RP-08-00 Table 6
	Medium Density Residential		0.4		4 :1			0			IESNA RP-08-00 Table 7

A. IESNA STANDARDS (CONT'D)

IESNA Recommendations		Horizontal Illuminance				Vertical Illuminance				Luminance	
DESCRIPTION	**IES Site Program**	**Max**	**Average**	**Min**	**Uniformity Ratio**	**Max**	**Average**	**Min**	**Uniformity Ratio**	**Uniformity Ratio**	**Source**
ROADWAY INTERSECTIONS	Roadway - Major (High Ped Conflict)		3.4		3 :1						IESNA RP-08-00 Table 9
	Roadway - Major (Med Ped Conflict)		2.6		3 :1						IESNA RP-08-00 Table 9
	Roadway - Collector (High Ped Conflict)		2.4		4 :1						IESNA RP-08-00 Table 9
	Roadway - Collector (Med Ped Conflict)		1.2		4 :1						IESNA RP-08-00 Table 9
	Roadway - Local (High Ped Conflict)		1.8		6 :1						IESNA RP-08-00 Table 9
	Roadway - Local (Med Ped Conflict)		1.4		6 :1						IESNA RP-08-00 Table 9
	Roadway - Local (Low Ped Conflict)		0.8		6 :1						IESNA RP-08-00 Table 9

VI. REFERENCES (CONT'D)

A. IESNA STANDARDS (CONT'D)

IESNA Recommendations		Horizontal Illuminance				Vertical Illuminance				Luminance	
DESCRIPTION	IES Site Program	Max	Average	Min	Uniformity Ratio	Max	Average	Min	Uniformity Ratio	Uniformity Ratio	Source
ROADWAYS	Roadway - Major (High Ped Conflict)		1.5		3 :1						IESNA RP-08-00 Table 2
	Roadway - Major (Med Ped Conflict)		1.1		3 :1						IESNA RP-08-00 Table 2
	Roadway - Collector (High Ped Conflict)		1.0		4 :1						IESNA RP-08-00 Table 2
	Roadway - Collector (Med Ped Conflict)		0.8		4 :1						IESNA RP-08-00 Table 2
	Roadway - Local (High Ped Conflict)		0.8		6 :1						IESNA RP-08-00 Table 2
	Roadway - Local (Med Ped Conflict)		0.6		6 :1						IESNA RP-08-00 Table 2
	Roadway - Local (Low Ped Conflict)		0.4		6 :1						IESNA RP-08-00 Table 2

A. IESNA STANDARDS (CONT'D)

IESNA Recommendations		Horizontal Illuminance					Vertical Illuminance					Luminance		
DESCRIPTION	IES Site Program	Max	Average	Min	Uniformity Ratio		Max	Average	Min	Uniformity Ratio		Uniformity Ratio		Source
FAÇADE & MONUMENT	Bright Surroundings Light Surface							5						IESNA_RP-33-99 Table 2
	Bright Surroundings Medium Light Surface							7						IESNA_RP-33-99 Table 2
	Bright Surroundings Dark Surface							10						IESNA_RP-33-99 Table 2
	Dark Surroundings Light Surface							2						IESNA_RP-33-99 Table 2
	Dark Surroundings Medium Light Surface							3						IESNA_RP-33-99 Table 2
	Dark Surroundings Medium Dark Surface							4						IESNA_RP-33-99 Table 2
	Dark Surroundings Dark Surface							5						IESNA_RP-33-99 Table 2
	Site Contrast Blend in w/ surroundings											1	:2	IESNA_Lighting Handbook_22-Fig.22-1

VI. REFERENCES (CONT'D)

A. IESNA STANDARDS (CONT'D)

IESNA Recommendations		Horizontal Illuminance				Vertical Illuminance				Luminance	
DESCRIPTION	IES Site Program	Max	Average	Min	Uniformity Ratio	Max	Average	Min	Uniformity Ratio	Uniformity Ratio	Source
FAÇADE & MONUMENT	Site Contrast Soft Accent									1 :3	IESNA_Lighting Handbook_22-Fig.22-2
	Site Contrast Accented									1 :5	IESNA_Lighting Handbook_22-Fig.22-3
	Site Contrast Strong Accent									1 :10	IESNA_Lighting Handbook_22-Fig.22-4

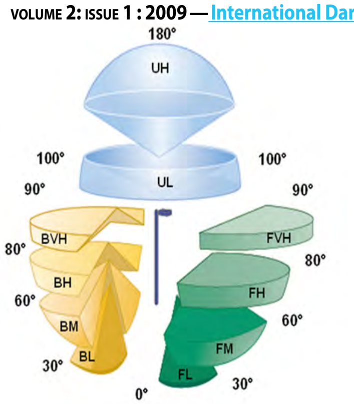
VI. REFERENCES (CONT'D)

A. IESNA STANDARDS (CONT'D)

IESNA BUG RATING

Specifier Bulletin for Dark Sky Applications

VOLUME 2: ISSUE 1 : 2009—International Dark-Sky Association



A Classification System for Lighting Zones

The BUG System—A New Way To Control Stray Light from Outdoor Luminaires

For more information on FSA approved luminaires please visit the IDA Web site www.darksky.org.

BUG STANDS FOR "**Backlight**", "**Uplight**" and "**Glare**." The acronym describes the types of stray light escaping from an outdoor lighting luminaire. "B" stands for backlight, or the light directed in back of the mounting pole. "U" stands for uplight, or the light directed above the horizontal plane of the luminaire, and "G" stands for glare, or the amount of light emitted from the luminaire at angles known to cause glare.

It is expected that BUG values will be published by luminaire manufacturers so lighting specifiers, designers or purchasers can tell at a glance how well a certain luminaire controls stray light or compares with other luminaires under consideration for an installation.

The BUG system was developed by the Illuminating Engineering Society (IES) to make comparing and evaluating outdoor luminaires fast, easy and more complete than older systems.

Work on the BUG system started in 2005 when the IES upgraded the roadway shielding classification system. The original system, which included the ratings full cutoff, cutoff, semi-cutoff and non cutoff, had been designed as a rating system solely for street lighting. However, increasing demand for control of glare and light trespass extended these terms to all types of outdoor lighting, and the IES realized that a more comprehensive system was needed.

The Lighting Research Center, acting as an IES contractor, developed a new classification concept that addresses light emitted from the luminaire in all directions, not just up into the sky. This system, released to the public as IES Technical Memorandum TM-15, technically replaced the old system. It divides the sphere around a luminaire into zones assigning values according to expected environmental impact. This rating system offers the most complete evaluation of the total light emitted from luminaires to date. A point to

The BUG System

VI. REFERENCES (CONT'D)

A. IESNA STANDARDS (CONT'D)

IESNA BUG RATING (CONT'D)

2 / IDA Specifier Bulletin

remember, however, is that while the values assigned by the new system are good indicators, they may not in all cases directly correlate to light pollution. ***It still depends upon the site, the application and how the luminaire is installed***.

A fundamental component of the Model Lighting Ordinance (MLO), currently under public review, divides lighting requirements into lighting zones according to environmental impact. ***See Appendix A***. The joint IDA/IES task force in charge of drafting the MLO reviewed TM-15 and realized that it could be modified to serve as a key measure of all forms of light pollution related to shielding and the direction of light, becoming an important tool to determine which luminaires are appropriate for each zone. Modifications were made, including subdividing the TM-15 uplight zone to better address artificial sky glow, and subdividing the upper downlight zone to better address glare. The IES accepted these adjustments and released TM-15-07 (revised). ***See Figure 1***.

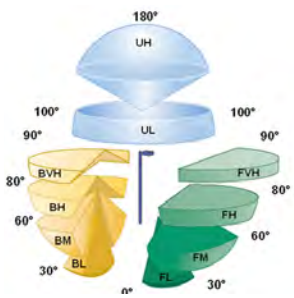


Figure 1: the revised outdoor luminaire distribution measuring system from TM-15-07 (revised)

After reviewing hundreds of candidate luminaires, the MLO task force established the three composite (BUG) ratings based on TM-15-07 (revised):

Backlight, which creates light trespass onto adjacent sites. The B rating takes into account the amount of ligwht in the BL, BM, BH and BVH zones, which are direction of the luminaire OPPOSITE from the area intended to be lighted.

Uplight, which causes artificial sky glow. Lower uplight (zone UL) causes the most sky glow and negatively affects professional and academic astronomy. Upper uplight (UH) is mostly energy waste. The U rating accounts the amount of light into the upper hemisphere with greater concern for the lower uplight angles in UL.

Glare, which can be annoying or visually disabling. The G rating takes into account the amount of frontlight in the FH and FVH zones as well as BH and BVH zones.

Appendix A:

Lighting Zone Definitions: The Lighting Zone shall define the limitations for outdoor lighting as specified in this ordinance. The policymaking body is able to designate areas according to the following descriptions, thereby creating a custom lighting plan according to local needs, functions, and geography.

LZ0: No ambient lighting Areas where the natural environment will be seriously and adversely affected by lighting. Impacts include disturbing the biological cycles of flora and fauna and/or detracting from human enjoyment and appreciation of the natural environment. Little or no lighting is expected. When not needed, lighting should be extinguished.

LZ1: Low ambient lighting Areas where lighting might adversely affect flora and fauna or disturb the character of the area. The vision of human residents and users is adapted to low light levels. Lighting may be used for safety, security and/or convenience but it is not necessarily uniform or continuous. After curfew, most lighting should be extinguished or reduced as activity levels decline.

LZ2: Moderate ambient lighting Areas of human activity where the vision of human residents and users is adapted to moderate light levels. Lighting may typically be used for safety, security and/or convenience but it is not necessarily uniform or continuous. After curfew, lighting may be extinguished or reduced as activity levels decline.

LZ3: Moderately high ambient lighting Areas of human activity where the vision of human residents and users is adapted to moderately high light levels. Lighting is generally desired for safety, security and/or convenience and it is often uniform and/or continuous. After curfew, lighting may be extinguished or reduced in most areas as activity levels decline.

LZ4: High ambient lighting Areas of human activity where the vision of human residents and users is adapted to high light levels. Lighting is generally considered necessary for safety, security and/or convenience and it is mostly uniform and/or continuous. After curfew, lighting may be extinguished or reduced in some areas as activity levels decline.

***Figure 1:* the revised (or BUG) outdoor luminaire distribution measuring system from TM-15-07 (revised)**

The resulting rating system, called BUG for obvious reasons, is a comprehensive system that takes into account uplight shielding, glare shielding and backlight shielding as well as limiting lamp lumens to values appropriate for the lighting zone. BUG is a simple system consisting of a a table of consensus acceptable values against which any luminaire having photometric data can be judged. A luminaire's numerical rating is the LOWEST light zone number in which it can be used. BUG will be part of the latest IES outdoor lighting system update.

The BUG rating system is a principal component of the Model Lighting Ordinance (MLO). The MLO is also a simple system that considers BUG ratings in the context of total lumens allowed per site. which the total site lumens are restricted. Use of the BUG system as the measuring tool for the MLO creates a straightforward system of controlling light pollution that can be implemented by persons having minimal experience or education in outdoor lighting design.

BUG FAQs

Are BUG luminaire ratings better than using the old full cut off, semi cut off, non cut off, etc. designations for shielding?

Yes, because BUG ratings provide backlight and glare information as well as how well the luminaire controls uplight. These additional measurements provide a much more accurate picture of lumen distribution and the overall efficiency of a luminaire.

Does BUG allow any uplight?

BUG requires downlight only with low glare (better than full cut off) in lighting zones 0, 1 and 2, but allows a minor amount of uplight in lighting zones 3 and 4. In lighting zones 3 and 4, the amount of allowed uplight is enough to permit the use of very well shielded luminaires that have a decorative drop lens or chimney so that dark sky friendly lighting can be installed where in places that traditional-appearing fixtures are required.

Will all outdoor lighting manufacturers rate their luminaires according to BUG?

Not at first. Since BUG is designed to prevent bad lighting practices, a lot of current outdoor products won't pass BUG, so there will be no point in rating them. But it is expected that manufacturers will rate their "good" luminaires and make changes to current products to improve BUG ratings.

Will BUG apply to residential lighting?

No. BUG can't be used for residential luminaires because they generally are not photometrically tested. The IDA Fixture Seal of Approval Program can be used to rate residential outdoor luminaires.

Is BUG as strict as the toughest anti-light pollution ordinances in effect today?

BUG, by itself, is a luminaire rating tool. It can easily be applied more stringently by using the zonal factors in response to community choices of lighting zones. While lighting zone determinents are clearly outlined in the MLO, the community decides upon zone placement. If a community adopts the MLO and chooses all lighting zones LZ0 and LZ1, the MLO with BUG is actually more restrictive than any of the toughest ordinances. However, zone assignment will always remain at the discretion of the community.

VI. REFERENCES (CONT'D)

A. IESNA STANDARDS (CONT'D)

IESNA BUG RATING (CONT'D)

Addendum A for IES TM-15-07: Backlight, Uplight, and Glare (BUG) Ratings

Text, charts, and photograph from IES TM-15-07:
http://www.iesna.org/PDF/Erratas/TM-15-07BUGRatingsAddendum.pdf

The following **Backlight**, **Uplight**, and **Glare** ratings may be used to evaluate luminaire optical performance related to light trespass, sky glow, and high angle brightness control. These ratings are based on a zonal lumen calculations for secondary solid angles defined in TM-15-07. The zonal lumen thresholds listed in the following three tables are based on data from photometric testing procedures approved by the Illuminating Engineering Society for outdoor luminaries (LM-31 or LM-35).

Notes to Tables ***A-1***, ***A-2***, and ***A-3***:

1. Any one rating is determined by the maximum rating obtained for that table. For example, if the BH zone is rated B1, the BM zone is rated B2, and the BL zone is rated B1, then the backlight rating for the luminaire is B2.
2. To determine BUG ratings, the photometric test data must include data in the upper hemisphere unless no light is emitted above 90 degrees vertical (for example, if the luminaire has a flat lens and opaque sides), per the IES Testing Procedures Committee recommendations.
3. It is recommended that the photometric test density include values at least every 2.5 degrees vertically. If a photometric test does not include data points every 2.5 degrees vertically, the BUG ratings shall be determined based on appropriate interpolation.
4. A "quadrilateral symmetric" luminaire shall meet one of the following definitions:
    a. Type V luminaire is one with a distribution that has circular symmetry, defined by the IES as being essentially the same at all lateral angles around the luminaire.
    b. Type VS luminaire is one where the zonal lumens for each of the eight horizontal octants (0-45, 45-90, 90-135, 135-180, 180-225, 225-270, 270-315, 315-315-360) are within ±10 percent of the average zonal lumens of all octants.

Table A-1: Backlight Ratings (maximum zonal lumens)

	Backlight Rating						
	Secondary Solid Angle	B0	B1	B2	B3	B4	B5
Backlight / Trespass	BH	110	500	1000	2500	5000	>5000
	BM	220	1000	2500	5000	8500	>8500
	BL	110	500	1000	2500	5000	>5000

Table A-2: Uplight Ratings (maximum zonal lumens)

	Uplight Rating						
	Secondary Solid Angle	U0	U1	U2	U3	U4	U5
Uplight/ Skyglow	UH	0	10	100	500	1000	>1000
	UL	0	10	100	500	1000	>1000
	FVH	10	75	150	>150		
	BVH	10	75	150	>150		

Table A-3: Glare Ratings (maximum zonal lumens)

	Glare Rating for Asymmetrical Luminaire Types (Type I, Type II, Type III, Type IV)						
	Secondary Solid Angle	G0	G1	G2	G3	G4	G5
Glare / Offensive Light	FVH	10	250	375	500	750	>750
	BVH	10	250	375	500	750	>750
	FH	660	1800	5000	7500	12000	>12000
	BH	110	500	1000	2500	5000	>5000

	Glare Rating for Quadrilateral Symmetrical Luminaire Types (Type V, Type V Square)						
	Secondary Solid Angle	G0	G1	G2	G3	G4	G5
Glare / Offensive Light	FVH	10	250	375	500	750	>750
	BVH	10	250	375	500	750	>750
	FH	660	1800	5000	7500	12000	>12000
	BH	660	1800	5000	7500	12000	>12000

VI. REFERENCES (CONT'D)

A. IESNA STANDARDS (CONT'D)

IESNA BUG RATING (CONT'D)

"BUG" RATING EXAMPLE:

A 250-watt MH area luminaire, Type IV forward throw optical distribution. Based on the photometric test data, the luminaire has the following zonal lumen distribution:

	Lumens	% Lamp Lumens
Forward Light		
FL (0–30 degrees)	1618	5.9%
FM (30–60 degrees)	6093	22.2%
FH (60–80 degrees)	3748	13.6%
FVH (80–90 degrees)	27	0.1%
Backlight		
BL (0–30 degrees)	985	3.6%
BM (30–60 degrees)	930	3.4%
BH (60–80 degrees)	136	0.5%
BVH (80–90 degrees)	16	0.1%
Uplight		
UL (90–100 degrees)	0	0.0%
UH (100–180 degrees)	0	0.0%

Backlight Rating:
Determine the lowest rating where the lumens for all of the secondary solid angles do not exceed the threshold lumens from ***Table A-1***. In this example the backlight rating would be B2 based on the BL lumen limit.

Uplight Rating:
Determine the lowest rating where the lumens for all of the secondary solid angles do not exceed the threshold lumens from ***Table A-2***. In this example the uplight rating would be U1 based on the FVH and BVH lumen limits.

Glare Rating:
Determine the lowest rating where the lumens for all of the secondary solid angles do not exceed the threshold lumens from ***Table A-3*** for a Type IV distribution. In this example, the glare rating would be G2 based on the FH lumen limit.

Therefore, the BUG rating for this luminaire would be: **B2 U1 G2**

Addendum A for IES TM-15-11: Backlight, Uplight, and Glare (BUG) Ratings

This Addendum replaces Addendum A in IESNA TM-15-07.
The following Backlight, Uplight, and Glare ratings may be used to evaluate luminaire optical performance related to light trespass, sky glow, and high angle brightness control. These ratings are based on a zonal lumen calculations for secondary solid angles defined in TM-15-11. The zonal lumen thresholds listed in the following three tables are based on data from photometric testing procedures approved by the Illuminating Engineering Society for outdoor luminaries (LM-31 or LM-35).

Table A-1: Backlight Ratings (maximum zonal lumens)

		Backlight Rating					
	Secondary Solid Angle	B0	B1	B2	B3	B4	B5
Backlight / Trespass	BH	110	500	1000	2500	5000	>5000
	BM	220	1000	2500	5000	8500	>8500
	BL	110	500	1000	2500	5000	>5000

Table A-2: Uplight Ratings (maximum zonal lumens)

		Uplight Rating					
	Secondary Solid Angle	U0	U1	U2	U3	U4	U5
Uplight / Skyglow	UH	0	10	50	500	1000	>1000
	UL	0	10	50	500	1000	>1000

VI. REFERENCES (CONT'D)

A. IESNA STANDARDS (CONT'D)

IESNA BUG RATING (CONT'D)

Notes to Tables A-1, A-2, and A-3:

(1) Any one rating is determined by the maximum rating obtained for that table. For example, if the BH zone is rated B1, the BM zone is rated B2, and the BL zone is rated B1, then the *backlight rating for the luminaire* is B2.

(2) To determine BUG ratings, the photometric test data must include data in the upper hemisphere unless no light is emitted above 90 degrees vertical (for example, if the luminaire has a flat lens and opaque sides), per the IES Testing Procedures Committee recommendations.

(3) It is recommended that the photometric test density include values at least every 2.5 degrees vertically. If a photometric test does not include data points every 2.5 degrees vertically, the BUG ratings shall be determined based on appropriate interpolation.

(4) A "quadrilateral symmetric" luminaire shall meet one of the following definitions:
  a. A Type V luminaire is one with a distribution that has circular symmetry, defined by the IESNA as being essentially the same at all lateral angles around the luminaire.
  b. A Type VS luminaire is one where the zonal lumens for each of the eight horizontal octants (0-45, 45-90, 90-135, 135-180, 180-225, 225-270, 270-315, 315-360) are within ±10 percent of the average zonal lumens of all octants.

Table A-3: Glare Ratings (maximum zonal lumens)

Glare Rating for Asymmetrical Luminaire Types (Type I, Type II, Type III, Type IV)

	Secondary Solid Angle	G0	G1	G2	G3	G4	G5
Glare / Offensive Light	FVH	10	100	225	500	750	>750
	BVH	10	100	225	500	750	>750
	FH	660	1800	5000	7500	12000	>12000
	BH	110	500	1000	2500	5000	>5000

Glare Rating for Quadrilateral Symmetrical Luminaire Types (Type V, Type V Square)

	Secondary Solid Angle	G0	G1	G2	G3	G4	G5
Glare / Offensive Light	FVH	10	100	225	500	750	>750
	BVH	10	100	225	500	750	>750
	FH	660	1800	5000	7500	12000	>12000
	BH	660	1800	5000	7500	12000	>12000

VI. REFERENCES (CONT'D)

A. IESNA STANDARDS (CONT'D)

IESNA BUG RATING (CONT'D)

"BUG" RATING EXAMPLE:

A 250-watt MH area luminaire, Type IV forward throw optical distribution.

Based on the photometric test data, the luminaire has the following zonal lumen distribution:

Forward Light	**Lumens**	**% Lamp Lumens**
FL (0 - 30 degrees)	1618	5.9%
FM (30 - 60 degrees)	6093	22.2%
FH (60 – 80 degrees)	3748	13.6%
FVH (80 – 90 degrees)	27	0.1%
Back Light		
BL (0 – 30 degrees)	985	3.6%
BM (30 – 60 degrees)	930	3.4%
BH (60 – 80 degrees)	136	0.5%
BVH (80 – 90 degrees)	16	0.1%
Uplight		
UL (90 – 100 degrees)	0	0.0%
UH (100 – 180 degrees)	0	0.0%

Backlight Rating:
Determine the lowest rating where the lumens for all of the secondary solid angles do not exceed the threshold lumens from **Table A-1**. In this example the backlight rating would be **B2** based on the BL lumen limit.

Uplight Rating:
Determine the lowest rating where the lumens for all of the secondary solid angles do not exceed the threshold lumens from **Table A-2**. In this example the uplight rating would be ~~**U1**~~ **U0** based on the ~~FVH~~ **UL** and ~~BVH~~ **UH** lumen limits.

Glare Rating:
Determine the lowest rating where the lumens for all of the secondary solid angles do not exceed the threshold lumens from **Table A-3** for a Type IV distribution. In this example, the glare rating would be **G2** based on the FH lumen limit.

Therefore, the BUG rating for this luminaire would be: **B2 U0 G2**

B. LIGHTING GLOSSARY

Discussions of lighting issues should include precise descriptions or terminology of the specific lighting technical parameters. The following glossary summarizes explanations of the technical lighting terms utilized within these guidelines and the related practice standards to facilitate discussion of these issues.

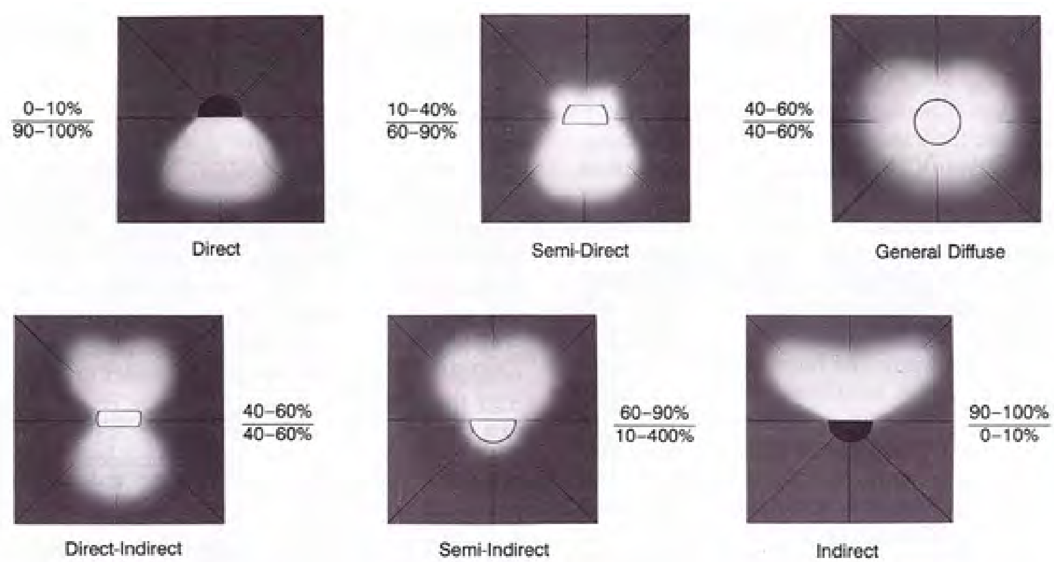
- Brightness: The magnitude of sensation which results from viewing surfaces from which light comes to the eye. This sensation is determined partly by the measurable luminance of the source and partly by the conditions of observation, such as the state of adaptation of the eye. For example, very bright lamps at night appear dim during the day, because our eyes have adapted to the higher brightness of daylight.
- Candela: Measure of light energy from a source at a specific standard angle and distance. Candela is a convenient measure to evaluate output of light from a lamp or light fixture in terms of both the intensity of light and the direction of travel of the light energy away from the source. The output of a 60-watt household incandescent lamp is approximately 150 candelas.
- Context: Unobstructed portion of the site location view towards the project site, including ambient illuminance and visual obstructions.
- Contrast: Calculated evaluation of high, medium and low contrast of visible light sources or surfaces within the site by a ratio of luminance values. Ratio of one surface luminance to a second surface luminance. Contrast values exceeding 30 to 1 are usually deemed uncomfortable; 10 to 1 clearly visible; less than 3 to 1 appear to be of equal value.
- Coverage: Extent portion of the field of view covered by the project site area.
- Cutoff: Type of light distribution which includes a shield to restrict light to a direct (down) configuration. Cutoff is a luminaire light distribution classification where the candela per 1000 lamp lumens does not numerically exceed 25 (2.5%) at or above a vertical angle of 90° above nadir, and 100 (10%) at or above a vertical angle of eighty degrees above nadir. This applies to all lateral angles around the luminaire.
- Extent: Visual description of prominence of the site and lighting elements within the field of view. Describes visible illuminated features, describe the extent of the field of view (180 degrees) covered by the project site and illuminated objects.

VI. REFERENCES (CONT'D)

B. LIGHTING GLOSSARY (CONT'D)

- Full Cutoff: A luminaire light distribution where zero candela intensity occurs at an angle of 90° above nadir, and at all greater angles from nadir. Additionally, the candela per 1000 lamp lumens does not numerically exceed 100 (10%) at a vertical angle of 80° above nadir. This applies to all lateral angles around the luminaire.
- Fully Shielded: Outdoor light fixtures shielded or constructed so that light rays emitted by the fixture are projected below the horizontal plane passing through the lowest point on the fixture from which light is emitted.
- Glare: Visual discomfort experienced from high contrast. Describes visual evaluation of each visible source or surface relative to the surrounding background (sky, hills, and foreground). There are two types of glare: 1) Disability Glare, that which reduces the ability to see or identify objects; 2) Discomfort Glare, that which produces ocular discomfort, but does not reduce the ability to see. Glare is categorized into three levels based on the contrast ratio as follows:
- High glare sources: View of light fixture emitting surface, such as lens, reflector or lamp where contrast ratio exceeds 30 to 1.
- Medium glare sources: Brightly lighted surfaces where contrast ratio exceeds 10 to 1, but is less than 30 to 1.
- Low glare sources: Illuminated surfaces where contrast ratio exceeds 3 to 1, but is less than 10 to 1.
- Illuminance: Measure of light energy (luminous flux) incident at a specific point on a surface over a standard area (or lumens per square foot). This term is commonly used to measure and describe light intensity on a surface.
- Light Pollution: Any adverse effect of man-made light including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste.
- Light Trespass: Electric light from subject property incident onto adjacent properties, measured Illuminance (lux or foot-candles), usually analyzed by measurement at or near the property line.
- Line of Sight: An imaginary straight line from the eye to a perceived object.
- Lumen: Mean value of total candelas produced by a light source. Lumen does not define direction.
- Luminaire: A device to produce, control, and distribute light.
- Luminance: Measure of reflected light energy from a specific surface in a specific direction over a standard area (candela per square meter). This term is the measure of the strength or intensity of the source.

- Light Output Direction: Luminaires for general lighting are classified in accordance with the percentages of total luminaire output emitted above and below horizontal. The light distribution curves may take many forms within the limits of upward and downward distribution, depending upon the type of light and the design of the luminaire. The following diagrams show examples of light output direction.



DEFINED DIRECTIONAL LIGHT OUTPUT CONFIGURATIONS

- Nadir: The direction of straight down, as would be indicated by a plumb line. Ninety degrees above nadir is horizontal. Eighty degrees above nadir is 10 degrees below horizontal.
- View: Description of the components visible from a specific location toward a project site including the distance from the site; the distance to visible light sources; the extent of view in radian degrees; extent of the project site in radian degrees; description of major physical features visible.

VI. REFERENCES (CONT'D)

C. LIGHTING FACTORS IN VISUAL SYSTEM

1. Light Pollution
   a. Light Trespass

      - Light trespass is considered an undesirable condition in which spill light (light that falls outside of the area intended to be lighted) is cast. By limiting the exterior lighting originating on a property to a maximum of 0.5 horizontal foot candles (HFC) at a distance of 25 feet beyond the property lines will greatly alleviate many complaints and will certainly improve the quality and effectiveness of most all outdoor area lighting applications.

      - This specification will allow the controlled placement of luminaires adjacent to the property lines. With many outdoor luminaires, it is difficult to comply with low-level foot-candle requirements at the property line. Height and placement of luminaires are strategic in preventing this contentious aspect of outdoor lighting.

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PART C

CAMPUS LIGHTING PLAN

Refer to Campus Specific Lighting Plans

ILLUMINANCE RECOMMENDATIONS

Pedestrian Circulation

Recommendations		**Horizontal Illuminance (footcandles)**		**Vertical Illuminance (footcandles)**		**RCCD Typologies**	**Recommended Fixture/ Lamps**
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Prominent:	High Luminance, Medium Contrast	2.0	4 :1	1.0		Ceremonial Pathway	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Legible:	Medium Luminance, Medium Contrast	1.0	4 :1	0.5		Secondary Pathway	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Active Ambient:	High Luminance, Low Contrast	0.5	4 :1	0.2		Tertiary Pathway	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1

ILLUMINANCE RECOMMENDATIONS (CONT'D)

Commons, Hubs, and Courts (non-circulation areas)

Recommendations		**Horizontal Illuminance (footcandles)**		**Vertical Illuminance (footcandles)**		**RCCD Typologies**	**Performance Requirements**
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Prominent:	High Luminance, Medium Contrast	1.0	4 :1	1.0		Large Plaza	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Legible:	Medium Luminance, Medium Contrast	0.5	4 :1	0.5		Small Plaza	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Active Ambient:	High Luminance, Low Contrast	0.3	4 :1	0.2		Small Plaza	CCT 4000K 6,000 Fixture Lumens Maximum. Maximum Candela 4,000 cd 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1

Pedestrian/Auto Intersections

Recommendations		Horizontal Illuminance (footcandles)		Vertical Illuminance (footcandles)		RCCD Typologies	Recommended Fixture/ Lamps
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Prominent:	High Luminance, Medium Contrast	1.8	4 :1			Pedestrian Drop Off	CCT 4000K 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G0 or B1-U0-G1
Legible:	Medium Luminance, Medium Contrast	1.4	6 :1			Secondary/ Shared Roadway	CCT 4000K 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G1
Active Ambient:	High Luminance, Low Contrast	0.8	6 :1			Parking Areas	CCT 4000K 15'-24' HEIGHT, 40' CTC, IESNA BUG rating B1-U0-G2

ILLUMINANCE RECOMMENDATIONS (CONT'D)

Streets

Recommendations		Horizontal Illuminance (footcandles)		Vertical Illuminance (footcandles)		RCCD Typologies	Recommended Fixture/ Lamps
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Prominent:	High Luminance, Medium Contrast	0.8	4 :1	2-4		Gateways	Monuments and Vertical markers to be lit per IES handbook 10th edition Table 15.2 ("Typically Moderate") See Part B Section IV
Legible:	Medium Luminance, Medium Contrast	0.6	6 :1			Primary Roadway	CCT 4000K 21'-30' HEIGHT, 90' CTC, IESNA BUG rating B1-U0-G1
Active Ambient:	High Luminance, Low Contrast	0.6	6 :1			Secondary/ Shared Roadway	CCT 4000K 21'-30' HEIGHT, 90' CTC, IESNA BUG rating B1-U0-G1

Building Entries

FKA Recommendations		Horizontal Illuminance (footcandles)		Vertical Illuminance (footcandles)		RCCD Typologies	Recommended Fixture/ Lamps
Illuminance Hierarchy		Minimum Average	Uniformity Ratio	Minimum Average	Uniformity Ratio		
Legible:	Medium Luminance, Medium Contrast	5.0	2 :1	3.0		Vestibule	
Legible:	Medium Luminance, Medium Contrast	1.5	2 :1	0.8	4	Canopies	

LIGHTING PERFORMANCE SPECIFICATION

The Lighting Guidelines provides Lighting Performance Specification for each luminaire categories as follows.

EXTERIOR LIGHTING

1. Pole and post mounted lighting within the direct view of any residential property shall be located and/or shielded so that the source is not directly visible, and the view of the fixture lens and reflector is minimized.
2. Bollard luminaires shall be specified to prevent direct view of the light source. Where louvered bollards are specified, they shall utilize coated lamps.
3. All up lighting fixtures shall be aimed and/or shielded to constrain the light to the object being illuminated and minimize the amount of illumination escaping into the night sky.
4. All up lighting fixtures shall be focused on highlighting or emphasizing architectural features and significant landscaping elements.
5. Ground mounted up lighting fixtures shall be located and/or shielded in order to minimize direct view of the light source
6. Ground mounted up lighting fixtures shall not exceed 3300 initial lumens.

SITE LIGHTING

1. For pedestrian walkways and plazas, all lighting configurations shall comply with IESNA RP-33-99 14.0 Walkway and Bikeway Lighting, best practice recommendations.

PARKING LOT AND PARKING STRUCTURE LIGHTING

1. All interior lighting for parking structures that is visible from areas exterior of the parking structure shall utilize shielding that blocks direct view of the light source and minimize the view of reflector or diffuser.
2. At interior perimeter of parking structures, all lighting shall provide indirect illumination of the interior parking area.
3. All interior lighting for parking structures that is visible from areas exterior of the parking structure shall utilize shielding that blocks direct view of the light source and minimize the view of reflector or diffuser.
4. All interior parking structure lighting shall utilized lamps of intensity that are equal to or less than a 32 watt T-8 fluorescent lamp or 2950 lumens.
5. For open-air and roof-top parking facilities, all lighting configurations shall comply with IESNA RP-20-98, 4.0 Illuminance Recommendations – Parking Lots, best practice recommendations for typical conditions.
6. For enclosed parking structures, all lighting configurations shall comply with IESNA RP-20-98, 10.0 Illuminance Recommendations – Garages, best practice recommendations for typical conditions.

LIGHTING PERFORMANCE SPECIFICATION (CONT'D)

BUILDING MOUNTED LIGHTING

1. Building mounted fixtures shall be shielded so that source is not directly visible and the view of the fixture lens and reflector is minimized.
2. Building mounted fixtures that are not full-cutoff mounted at or below the fourth floor, shall note exceed the equivalent intensity of a 39 watt metal halide lamp or 3300 initial lumens.
3. Building mounted fixtures that are not full-cutoff mounted above the fourth floor shall not exceed the equivalent intensity of a 50 watt halogen lamp or 700 initial lumens.
4. Building mounted fixtures that are not full-cutoff shall be primarily decorative in nature. The predominance of illumination for such areas shall be provided by other luminaires.
5. Building mounted luminaires that are not full-cutoff and possess sources of greater intensity than a 50 watt halogen lamp or 700 initial lumens, shall possess shielding and/or translucent lenses that obscure any direct view of the light source.
6. Full-cutoff building mounted fixtures shall possess manufacturer provided internal house-side shielding to minimize the illuminance "hot spot" on the wall underneath the fixture.
7. Outdoor emergency lighting shall be architectural or decorative in appearance and shall be, whenever possible incorporated into normal lighting fixtures.

LANDSCAPE, WATER FEATURE, AND SIGN LIGHTING

1. All landscape lighting directed upwards shall utilize the external visors and/or internal louvers to minimize direct view of the light sources.
2. Landscape lighting shall only be utilized to accent plant material.
3. All landscape lighting shall be directed upward and away from the property lines.
4. Landscape up lighting shall not exceed the equivalent intensity of a 39 watt metal halide lamp or 3300 initial lumens.
5. Water feature lighting shall not exceed the equivalent intensity of a 70 watt metal halide lamp or 6200 initial lumens.

PART D
LIGHTING EQUIPMENT PALETTE

I. PARKING LOT LIGHTING

- Full-Cutoff Fixture
- High-Efficiency Lamp
- Finish options to be selected to support individual campus identity
  - Moreno Valley College = dark anodized bronze
  - Norco College = aluminum or silver
  - Riverside City College = black or silver


1


1


2


1

LEGEND
1. Recommended fixtures for prominent locations : Gardco-Pureform Series
2. Recommended fixtures for parking lots : Leotek - Green Street Series

To provide outlet at pole/base

II. BUILDING MOUNTED LIGHTING

Refer to Campus Specific Equipment Palette

III. PEDESTRIAN LIGHTING

Refer to Campus Specific Equipment Palette

PART E

INTERIOR LIGHTING GUIDELINES

Interior Lighting Guidelines

A. Lighting power densities and controls shall exceed the current Title 24 requirements by a minimum of 15%.

B. The use of standard T-8 linear lamps and compact fluorescent lamps are encouraged over the use of T5 lamps. LED type light fixtures are encouraged over the use of compact fluorescent type light fixtures. The standard color temperature is 4100 degree K.

C. Interior lighting in work spaces will be primarily fluorescent and controlled by switches and occupancy sensors. Incorporate the use of photosensors to take advantage of available daylighting and to reduce the amount of artificial lighting required during the daytime.

D. Interior lighting in public spaces will utilize controls to take advantage of daylighting and to reduce the amount of artificial lighting required.

E. Bi-level switching shall be provided in all spaces exceeding 100 sq. ft. or 8w/sq. ft.. Single level switches shall be provided in service areas and utility rooms.

F. AB switching for florescent is standard now, but should transition to dimming with LED.

G. Automatic shut off for all areas shall be accomplished through low voltage lighting control panel Automatic Logic Corporation (ALC) and override switches in compliance with current California Energy Code. Likewise corridor lighting shall be controlled with lighting control panel and override switches in compliance with CEC Code.

H. Refer to Section 7 for lighting control panelboards.

I. Toilet Rooms shall be provide with single level switch and ceiling mounted occupancy sensors.

J. Emergency power will be provided for all egress lights and exit signs.

Refer to Section 9: Space Standards

	LOCATION	FIXTURE TYPE	LAMP SOURCE	RECOMMENDED LIGHT LEVELS	SWITCHING
PART C	Lobbies	Downlights, decorative pendants	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 10-20 fc average Task lighting: 40-50 fc average @ workplane	General lighting to be switched separately from accent and task lighting.
PART C	Corridors	Direct/ indirect, pendant, or wall-mount	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 10-20 fc average Task lighting: 40-50 fc average @ workplane	General lighting to be switched separately from accent and task lighting.
PART D/E/F	Classrooms/ Learn Labs/ Lecture Halls	Direct/ indirect, pendant, or wall-mount	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 40-50 fc average Vertical task lighting: 20-30 fc average	General lighting to be switched separately from accent/display lighting as well as fixtures located adj. to projection screen.
PART G	Offices	Direct/ indirect, pendant, or wall-mount	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 20-30 fc average Task lighting: 40-50 fc average @ work plane	General lighting to be switched separately from accent/display lighting as well as task lighting.
PART J	Conference (Meeting) Rooms	Direct/ indirect, pendant, or wall-mount	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 20-30 fc average Task lighting: 40-50 fc average @ work plane Vertical task lighting: 20-30 fc average @ display locations	General lighting to be switched separately from accent/display lighting as well as task lighting for areas requiring low light level for projection, task lighting systems should be dimmable to at least 1%.
PART K	Toilet Rooms	Downlights, cove lighting at back of stalls and sink	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 10-20 fc average Vertical lighting @ mirrors: 20-30 fc average	Lighting to be switched on one zone with ceiling mounted occupancy sensors.

Incorporate the use of photosensors to take advantage of available daylighting and to reduce the amount of artificial lighting required during the daytime.

PART L

PART M

PART N

LOCATION	FIXTURE TYPE	LAMP SOURCE	RECOMMENDED LIGHT LEVELS	SWITCHING
Elevator Cabs	Downlights or cove light on four sides	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 5-10 fc average	Lighting to be switched on one zone
Custodial Rooms	Surface or pendant mounted fluorescent utility lights	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 10-20 fc average	Lighting to be switched on one zone.
Mechanical/ Electrical Rooms	Surface or pendant mounted fluorescent utility lights	All fluorescent and CFL: 4100K	General lighting: 30-40 fc average	Lighting to be switched on one zone.
Support Rooms	Direct/ indirect, pendant, or wall-mount	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 10-20 fc average Task lighting: 30-40 fc average	General lighting to be switched separately from accent/display lighting as well as task lighting.
Technology Rooms	Surface or pendant mounted fluorescent utility lights	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 10-20 fc average Equipment task lighting: 20-30 fc average	Lighting to be switched on one zone. Locate lighting at a minimum of 8’-6” AFF.
Workroom	Direct/ indirect, pendant, or wall-mount	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 20-30 fc average Task lighting: 40-50 fc average @ work plane Vertical task lighting: 20-30 fc average @ display locations	General lighting to be switched separately from accent/display lighting as well as task lighting.
Faculty Lounge	Direct/ indirect, pendant, or wall-mount	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 10-20 fc average Food prep counters: 20-30 fc average @ work plane	General lighting to be switched separately from accent/display lighting and task lighting at counters.
Mail Room	Direct/ indirect, pendant, or wall-mount	All fluorescent and CFL: 3500K All LED sources: 3500K	General lighting: 20-30 fc average Task lighting: 40-50 fc average @ work plane	General lighting to be switched separately from task lighting.

Div 26

ELECTRICAL

26 51 00 INTERIOR LIGHTING

- Interior lighting fixtures (including fixtures mounted on exterior of building), lamps, and ballasts.
- Emergency lighting units.
- Exit signs.
- Lighting fixture supports.
- Retrofit kits for fluorescent lighting fixtures.
- Quality Standard for Fixtures in Hazardous Locations: FMG.
- Quality Standard for Exit Signs: UL 924.
- Warranty:
    - A. Electronic Ballasts: Five years.
    - B. Electromagnetic Ballasts: Three years.
    - C. Fluorescent Lamps: Two year(s).
- Ballasts for Linear Fluorescent Lamps:
    - A. Electronic Ballasts: The campus standard is “Advanced”.
    - B. Type: Instant start.
    - C. Sound Rating: A.
    - D. Total harmonic distortion rating of less than 10 percent.
    - E. Transient Voltage Protection: Category A or better.
    - F. Lamp Current Crest Factor: 1.7 or less.
    - G. Ballast Factor: 0.85 or higher.
    - H. Power Factor: 0.95 or higher.
    - I. Parallel Lamp Circuits: Multiple lamp ballasts connected to maintain full light output on surviving lamps if one or more lamps fail.

26 51 00 INTERIOR LIGHTING (CONT'D)

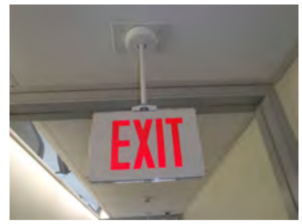
- Electronic Programmed-Start Ballasts for T5 Lamps:
  - A. Automatic lamp starting after lamp replacement.
  - B. Sound Rating: A.
  - C. Total Harmonic Distortion Rating: Less than 10 percent.
  - D. Transient Voltage Protection: IEEE C62.41, Category A or better.
  - E. Operating Frequency: 20 kHz or higher.
  - F. Lamp Current Crest Factor: 1.7 or less.
  - G. Ballast Factor: 0.95 or higher.
  - H. Low Ballast Factor: Provide a high performance T8 system with low ballast factor ballast and high output lumen lamps. Example: (BF).78, Rated Lumens 3100. See Sylvania Quicktronic ballast.
- Electromagnetic Ballasts: Energy saving, high-power factor, Class P, automatic reset thermal protection.
- Single ballasts for multiple lighting fixtures.
- Ballasts for Low-Temperature Environments:
  - A. Temperatures 0 Deg F and Higher: Electronic or electromagnetic.
  - B. Temperatures Minus 20 Deg F and Higher: Electromagnetic.
- Ballasts for low electromagnetic-interference environments.
- Ballasts for Dimmer-Controlled Lighting Fixtures: Electronic type.
  - A. Dimming Range: 100 to 1 percent of rated lamp lumens.
  - B. Ballast Input Watts: Can be reduced to 20 percent of normal.
- Ballasts for Bi-Level Controlled Lighting Fixtures: Electronic type.
  - A. High-Level Operation: 100 percent of rated lamp lumens.
  - B. Low-Level Operation: 30 percent of rated lamp lumens.
- Ballasts for Compact Fluorescent Lamps: Electronic.

26 51 00 INTERIOR LIGHTING (CONT'D)

- Ballasts for Dimmer-Controlled Lighting Fixtures:
  - A. Dimming Range: 100 to 5 percent of rated lamp lumens.
  - B. Ballast Input Watts: Can be reduced to 20 percent of normal.
- Ballasts for High-Intensity-Discharge Lamps:
  - A. Electromagnetic Type for Metal-Halide Lamps: Constant-wattage autotransformer or regulating high-power-factor, low-noise type.
  - B. Electronic type for metal-halide lamps.
  - C. Auxiliary instant-on quartz system.
  - D. Electromagnetic type for high-pressure sodium lamps with solid-state igniter/ starter.

DESCRIPTION		
Fluorescent Lamps	• Low-mercury lamps. • T8 rapid-start, low-mercury lamps, rated 32W maximum. • Compact Fluorescent Lamps: T4 double tube, low mercury, rated 13W.	 
High-Intensity-Discharge Lamps	• High-pressure sodium lamps. • Metal-halide lamps. • Pulse-start, metal-halide lamps. • Ceramic, pulse-start, metal-halide lamps.	 

26 53 00 EXIT SIGNS



- Manufacturer: Lithonia
- Model: Precise LRP Series, LED Recessed
- Mount: Ceiling, wall or pendant mount as applies
- Finish: Red letters
- Notes: Directional arrows or double sided as required
  Internally lighted:
  - LED, 100,000 hours

END OF SECTION 7

SECTION 7
MORENO VALLEY COLLEGE

PART A

EXISTING LIGHTING CONDITIONS

EXISTING LIGHTING CONDITIONS PART A

INTRODUCTION

Lighting systems implemented in conformance with the District Lighting Guidelines will improve the performance and perception of light on campus to support Moreno Valley College (MVC) campus identity, create more inviting and comfortable spaces, limit environmental impact, and improve energy efficiency.

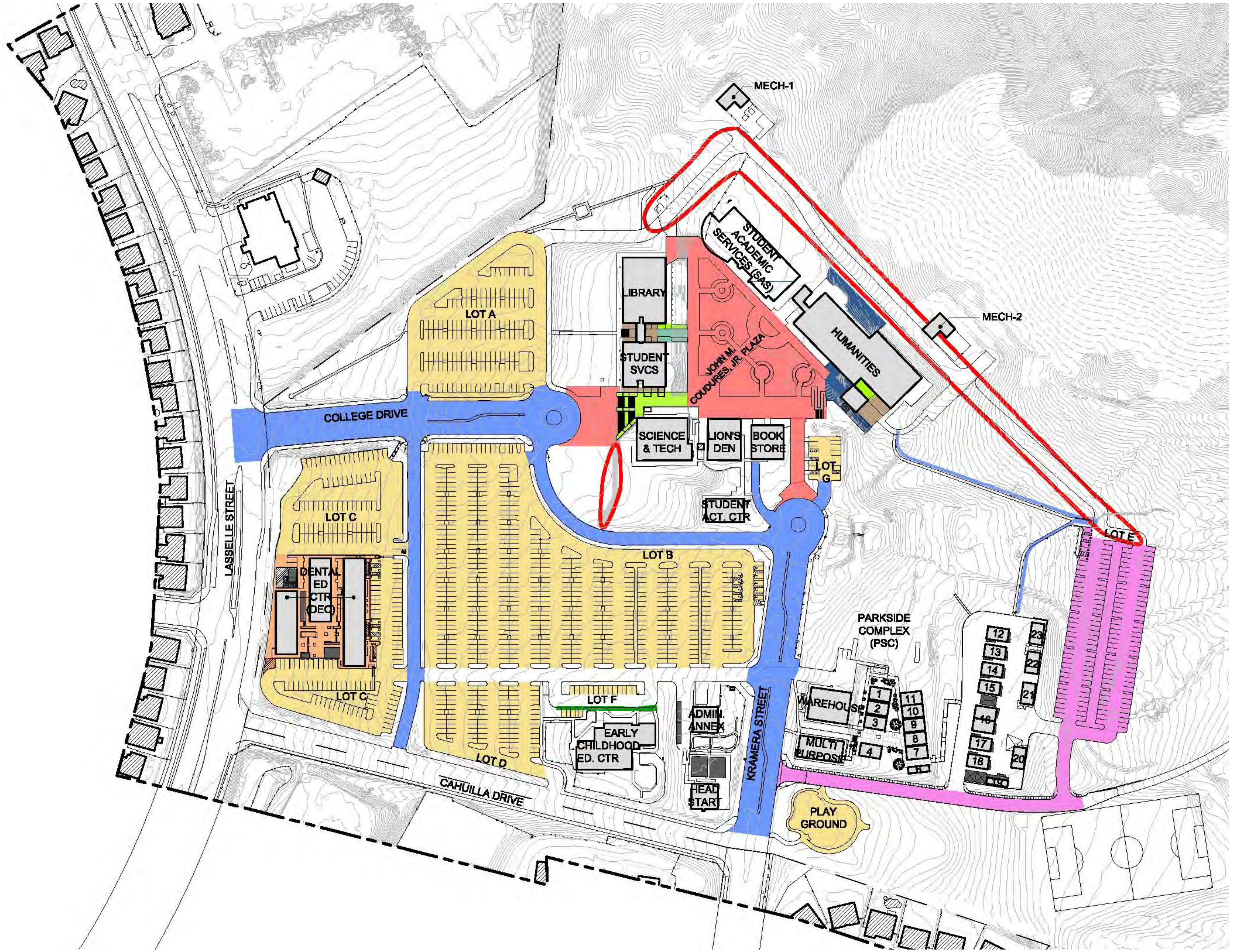
I. EXISTING EXTERIOR LIGHTING ASSESSMENT

The existing lighting at Moreno Valley College (MVC) is a composite of various phases of campus development, resulting in various light sources, and inadequate light fixtures.

- The roadway luminaires are still in their serviceable life; phased replacement with high efficiency light sources is recommended.
- The pedestrian pathway luminaires are still in their serviceable life; phased replacement with high efficiency light sources is recommended. However, the style of the pedestrian pole throughout the campus results in glare and inhibits visibility, resulting in possible safety risks. The fixtures should be replaced with the recommended cutoff fixtures in a future phrase.
- The metal halide shoebox fixtures have a significant serviceable life and are in relatively good condition. Phased replacement with high efficiency light sources and consistent color temperature is recommended.
- Wall mounted floodlights create significant glare/diminished visibility and results in safety risks. Phased replacement with high efficiency light sources which cutoff fixtures is recommended.
- The light level in the pedestrian pathway did not meet the IES Standards, additional poles and a high efficiency light source is recommended.

LEGEND

- Cobrahead Fixture
- Full Cutoff Pole: Lithonia MR Series
- Clear Glass Globe Post Top
- Square Metal Pole with Flood Light
- Shoebox Fixtures 1-4 Heads
- Acorn Post Top Fixture
- Post Top Fixture with Metal Fins & Prismatic
- Sports Flood (Currently Unoperated)
- Post Top Fixture with Glare Shield
- Sports Lighting, Cluster Array with Glare Shield & Integral Ped Lighting
- Sports Lighting, Horizontal Array with Glare Shield
- Ceiling Mount, Wall Mount Fixtures
- Post Top Fixture with Glare Shield
- Bollard with Glare Shield
- Wall Recessed Fixture
- Metal Bollard with Frosted Lens
- Round Concrete Bollard with Glare Shield



0 ft 120 ft 240 ft
SCALE: 1" = 240'-0"

EXISTING EXTERIOR LIGHTING

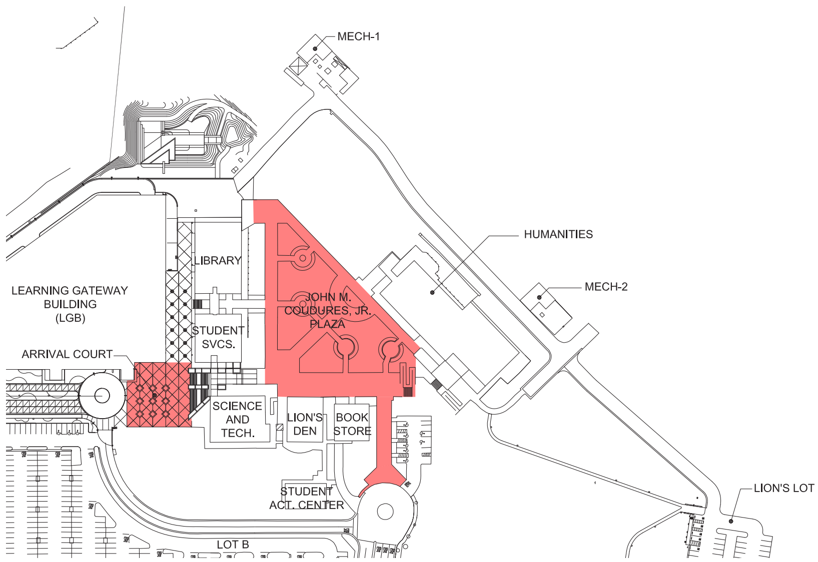
EXISTING EXTERIOR LIGHTING ASSESSMENT

Pole Lighting	Head	Pole	Base	Lamp	Location
Pole Lighting Type 1	Pedestrian pole	Standard Square pole with square metal base	Round concrete 3" Height	HID	Walkway, plazas- Throughout campus
Pole Lighting Type 2	Pedestrian pole wall mounted	Standard Square pole	wall mounted plate	HID	At the bridge between Library & Science&Technology Building
Pole Lighting Type 3	Pedestrian pole with metal fins and prismatic lens	Standard Round pole	Round concrete 3" Height	HID	Infront of Early Childhood Education Center
Pole Lighting Type 4	Pedestrian pole with sphere top	Standard Round pole			March Dental Buildings
Pole Lighting Type 5	Shoebox 1 head	Standard Square pole	Round concrete 3" Height	HID	Driveway , Parking lot - along the perimeter
Pole Lighting Type 6	Shoebox 2 heads	Standard Square pole	Round concrete 18" Height	HID	Parking lot
Pole Lighting Type 7	Shoebox 2 heads with flood light	Standard Square pole	Round concrete 18" Height	HID	Parking lot
Landscape Lighting	**Description**		**Base**	**Lamp**	**Location**
Landscape Lighting Type 1	Semi recessed -Wall with frosted lens, mounted 12-18" aff.				along entry wall/ stair ways, most of the fixture lens turn yellow, some fixtures in the same area had been replaced with fixture type 2
Landscape Lighting Type 2	Semi recessed -Wall with clear lens, mounted 12-18" aff.				Most of the fixtures located at the dental buildings, a few fixtures are mounted in the front entry area.
Landscape Lighting Type 3	Wall Recessed with glare shield				Through out the ramps in front Humanity buildings and the seat wall
Landscape Lighting Type 4	Semi recessed -Wall with prismatic lens, mounted 12-18" aff.				Through out the stairways in front Humanity buildings
Architectural Lighting	**Description**			**Lamp**	**Location**
Architectural Lighting Type 1	Wall Pack full cutoff			TBC	Lions' Den Building
Architectural Lighting Type 2	Cylinder wall sconce - full cutoff			TBC	Lions' Den Building, Science & Technology Building
Architectural Lighting Type 3	Square Wall Pack with Frosted lens			TBC	Humanities Buildings
Architectural Lighting Type 4	Regtangular Wall Pack with frosted lens			TBC	Student Activities Center Building
Architectural Lighting Type 5	Regtangular Wall Pack with frosted lens			TBC	Dental Buildings
Architectural Lighting Type 6	Round Wall Pack with frosted lens			TBC	Early Childhood Education center Building
Architectural Lighting Type 7	Wall pack floodlight			HPS, MH	Parkside Complex
Architectural Lighting Type 8	Cylinder Pendant			HPS, MH	Humanities building Entrance - Upper level
Architectural Lighting Type 9	Semi recessed downlight with frosted lens			TBC	Student Activities Center Building
Architectural Lighting Type 10	Cylinder Downlight			TBC	Covered walkay between Library and Sutdent services building - Lower level
Flood Lighting	**Description**			**Lamp**	**Location**
Flood Lighting Type 1	Flood Lighting - Wall mounted			HID	Building mount - Through out
Flood Lighting Type 2	Flood Lighting - Roof mount			HID	Building mount - Through out

II. EXISTING EXTERIOR LIGHTING FIXTURES

WALKWAYS + PLAZAS:

- Throughout campus

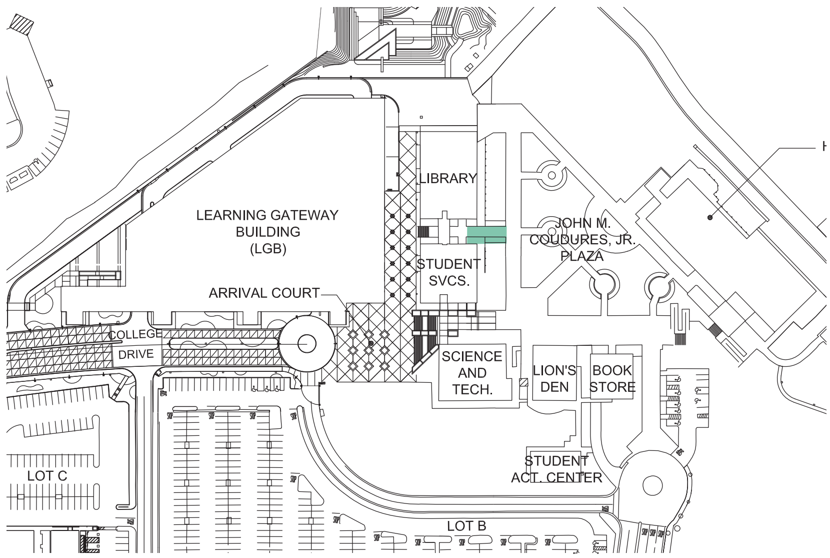


Pedestrian square post top with square metal + concrete base

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

BRIDGE:

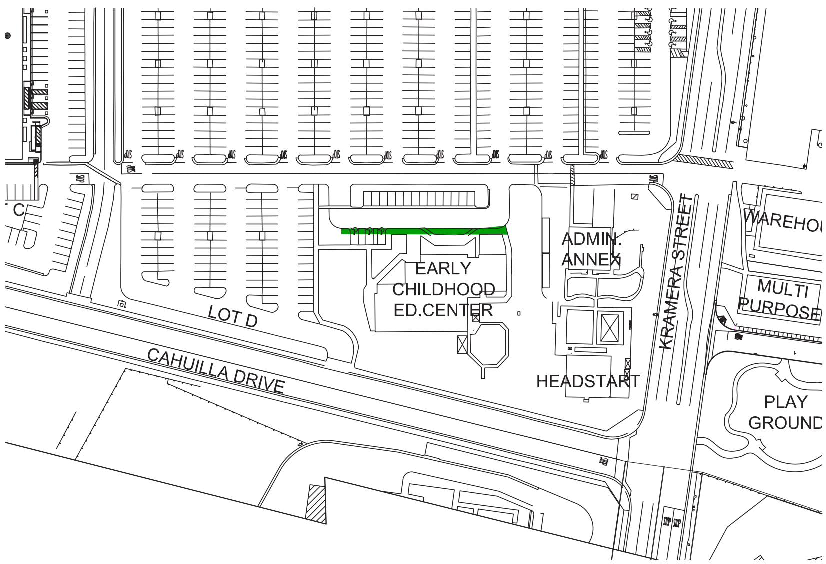
- Bridge between Library and Student Services Building



Pedestrian square post top mounted on bridge wall

WALKWAY NEAR BUILDING:

- Early Childhood Education Center Building

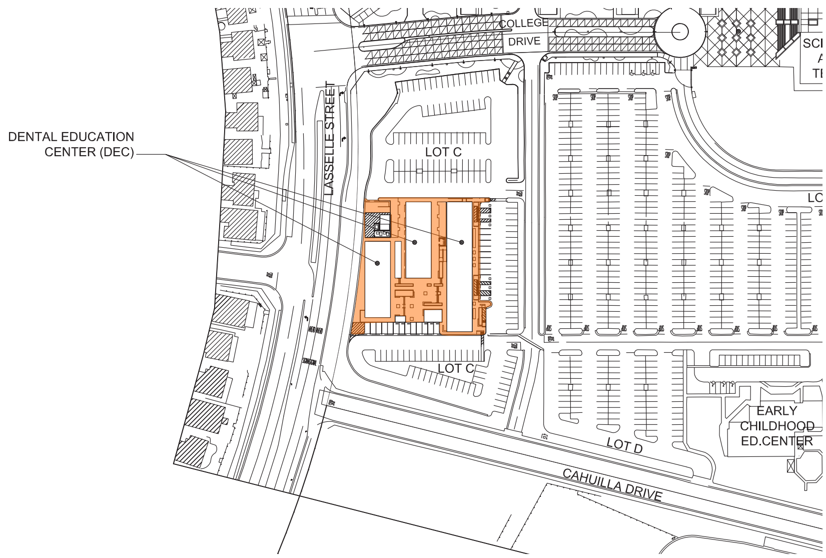


Post top fixture with metal fins

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

PARKING LOT + COURTYARD:

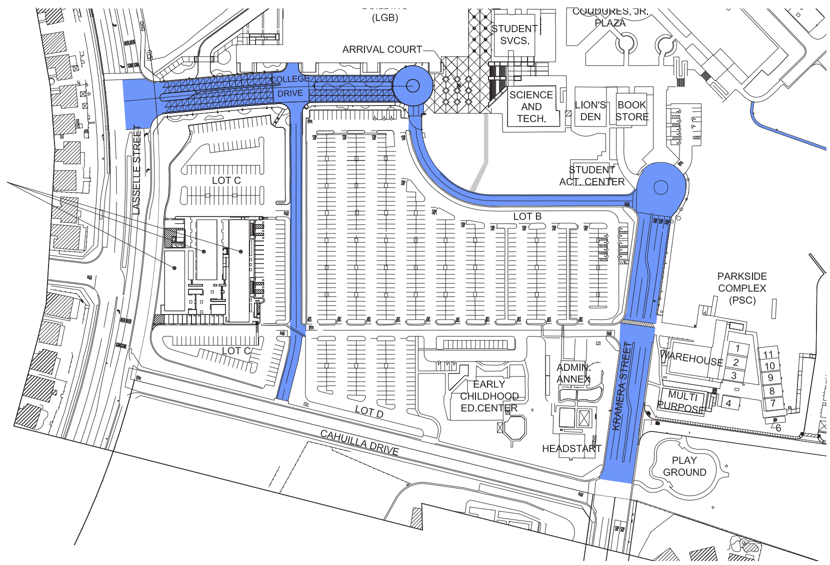
- Dental Buildings



Globe post top fixture

PRIMARY DRIVEWAY:

- Throughout campus

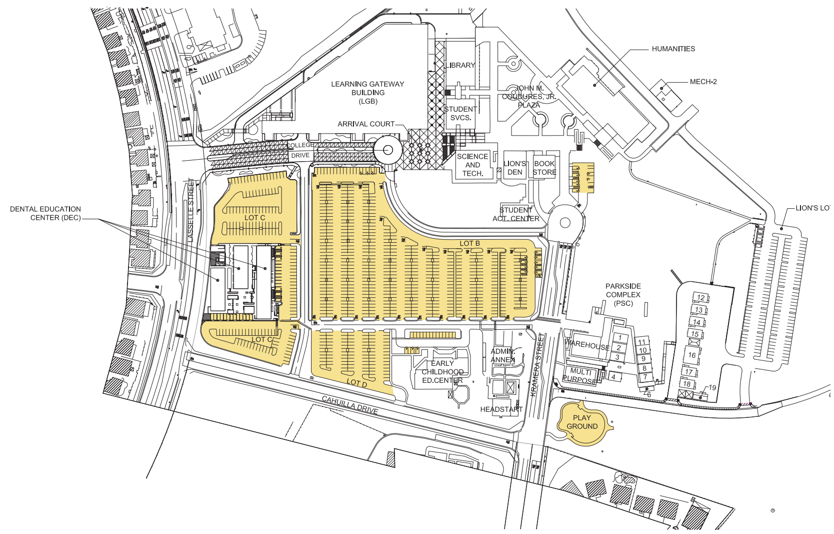


Shoebox Fixture-1 head

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

PARKING LOTS:

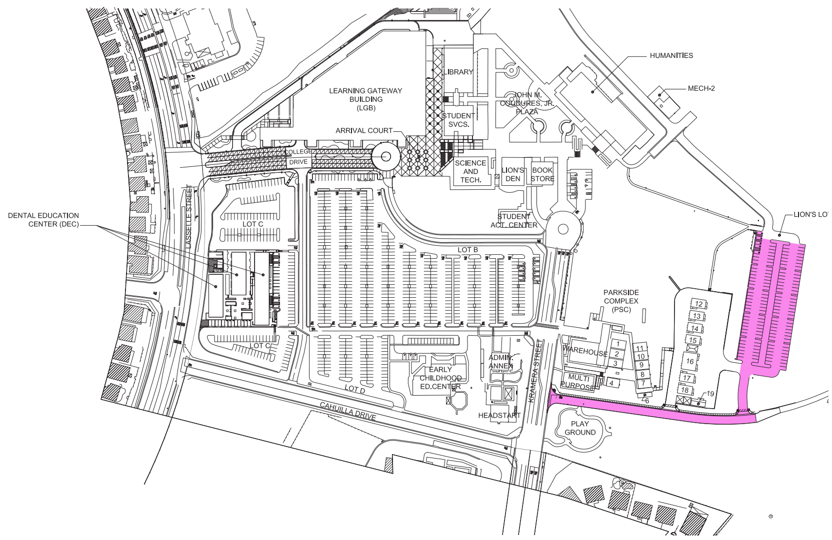
- Throughout campus



Shoebox Fixture-2 heads

PARKING LOTS :

- Parking Lot F

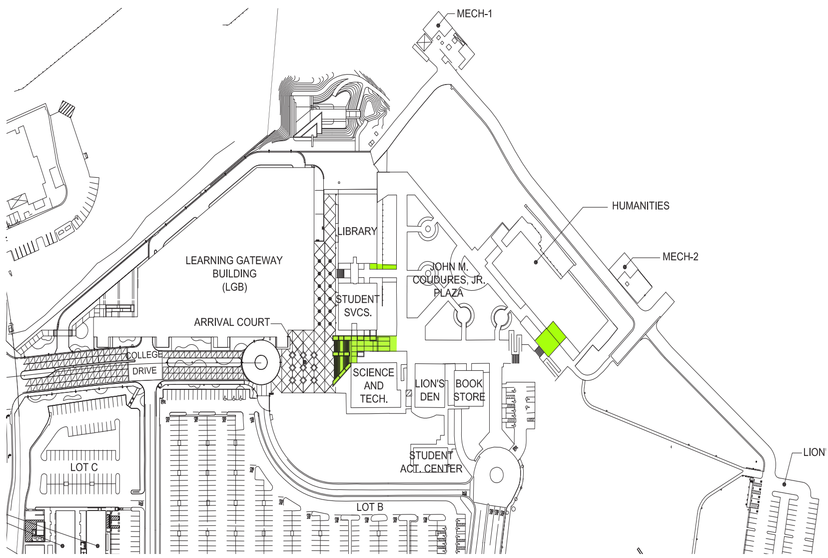


Shoe Box Fixtures-1-3 Heads: MH lamp

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

WALKWAYS + STAIRWAYS:

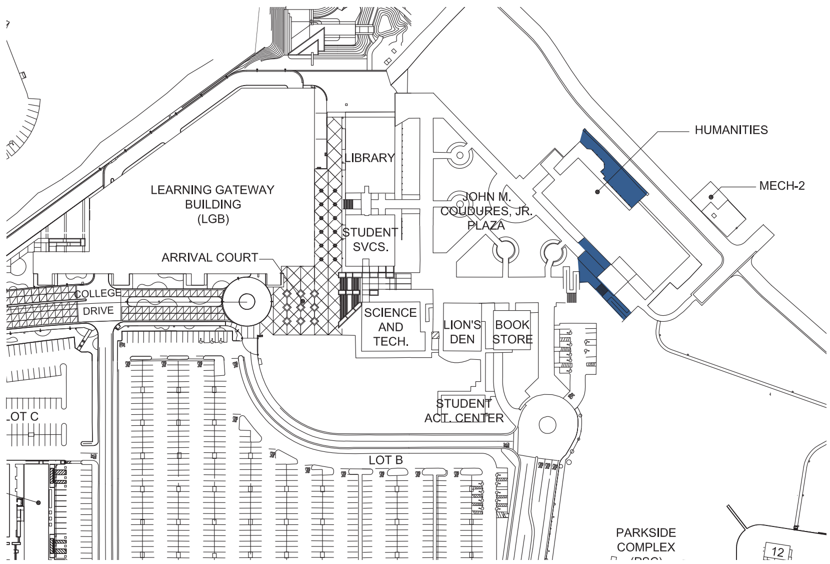
- Throughout campus



Wall mounted fixture

RAMPS + SEATWALL:

- Throughout campus

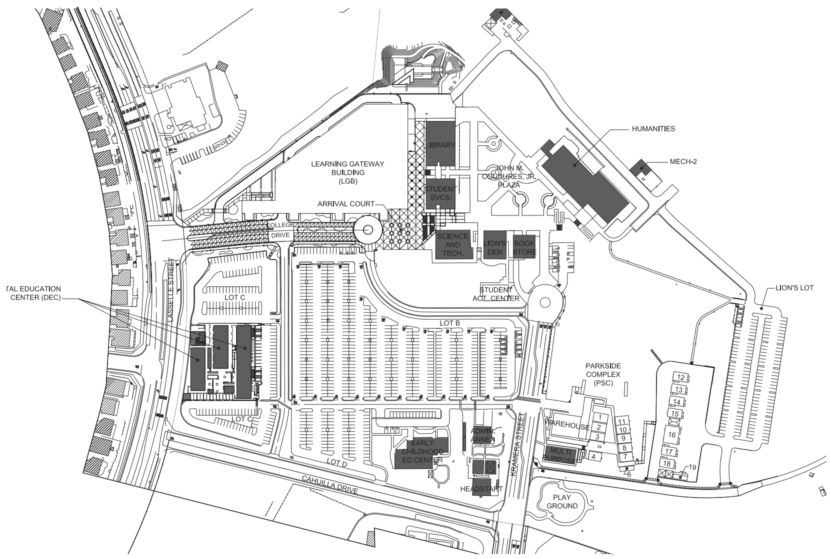


Wall recessed fixture with glare shield

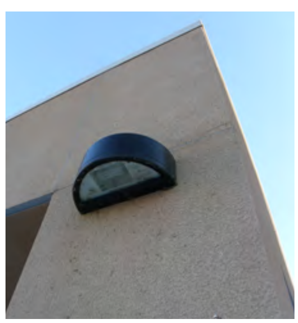
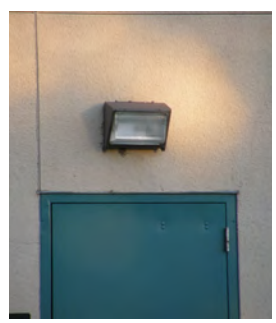
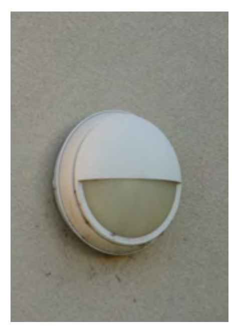
II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

CAMPUS BUILDING WALLS:

- Throughout campus



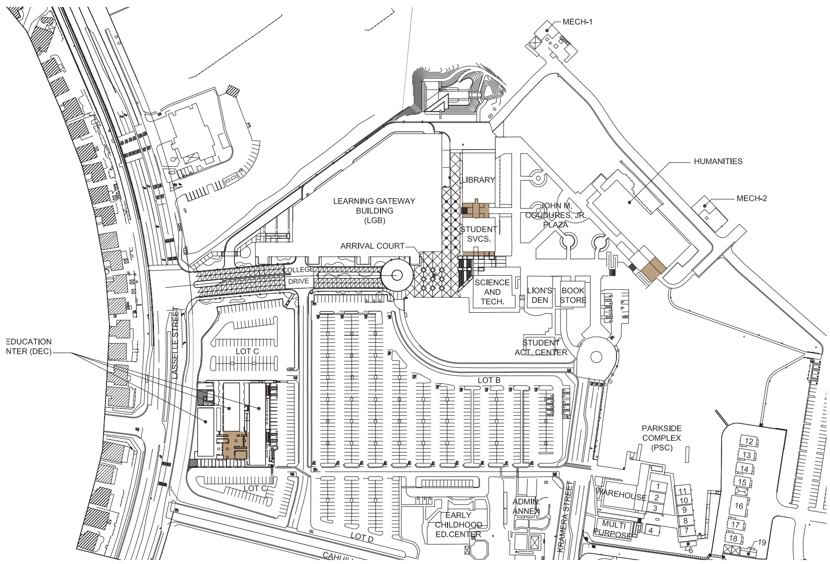
Wall mounted fixture



CAMPUS BUILDING CEILINGS:

- Throughout campus

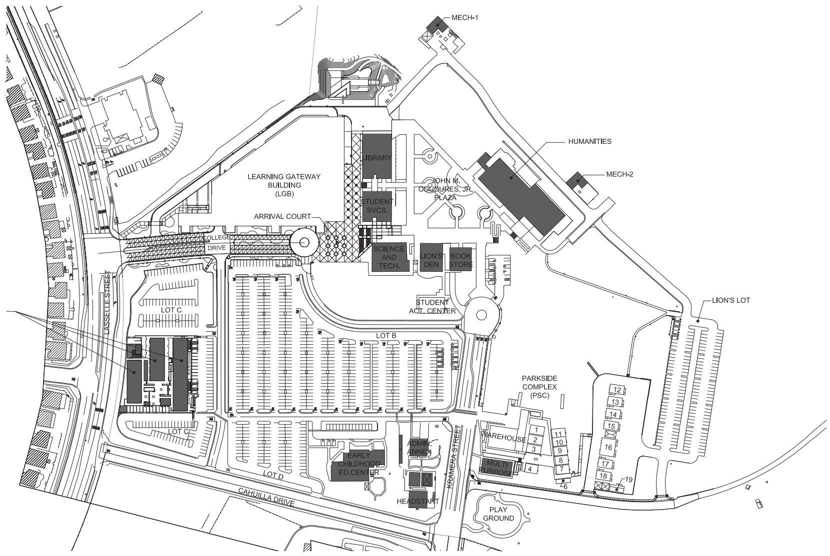


Ceiling mounted fixture

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

BRIDGE:

- Bridge between Library and Student Services Building



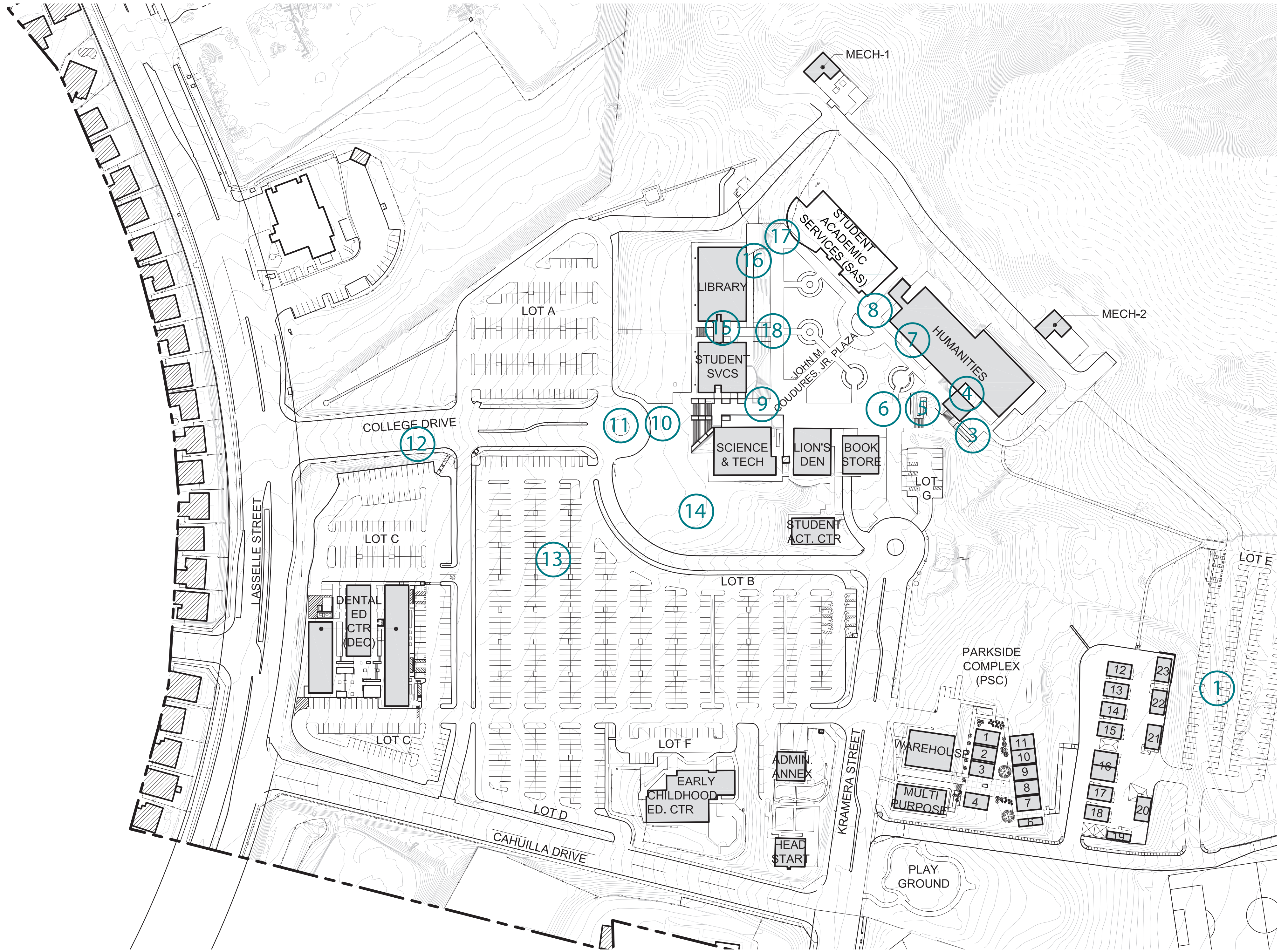
Roof mounted and wall mounted flood lighting fixtures

ILLUMINANCE MEASUREMENT

Date: 01/26/2012

Time: 06:00-07:00 PM

Weather Conditions : Clear skies



0 ft 120 ft 240 ft

SCALE: 1" = 240'-0"

EXISTING EXTERIOR LIGHTING ILLUMINANCE

EXISTING EXTERIOR LIGHTING ILLUMINANCE

MVC

Existing Illuminance (Measured on 01/26/2012 time 6:00 - 7:00 PM, Clear sky weather condition)

	Location	Fixture Type	Lamp Type	Maximum Illuminance at Fixture Location (fc)	Minimum Illuminance around Fixtures (fc)	Note
1	**Surface Parking** Lion's Lot Parking	Shoe box Pole 2 heads	MH	5.820	1.580	
2	Pedestrian walkway near Lion's Lot Parking	No lighting fixture	No lighting fixture	0.367	-	There are no ligthing fixture for the walkway, the illuminance level is from the Shoe box pole at the center of the parking lot
3	Ramp in front of Humanity Building	Recessed step ligting with glare shield		1.460	0.017	Approximately 8 of 29 fixtures are not working (27.5%)
4	Building Entrance - Upper Level (Humanity Building)	Ceiling mounted fixture and pendants	HPS, MH	1.403	-	
5	Stairs (15' wide?) infront of Humanity Building	Wall pack mounted 1' aff.	HPS	31.000	4.280	
6	Walk way near John M. Condures, JR. Plaza	Post top	HPS	2.014	1.410	
7	Walkway infron of Humanity Building	Post top	HPS	1.350	0.453, 0.888, 0.910	
8	Circular Seat wall at John M. Condures, JR. Plaza	Recessed step ligting with glare shield		1.030		Fixtures are mounted only on the walkway side of the seatwall
9	walkway between Student services building & Science & Technology Building	Wall pack mounted 1' aff.	HPS	6.090	0.060	
10	Entry plaza at the roundabout College Drive	Post top	HPS	1.500	0.689	
11	Drop off area at the roundabout College Drive	Post top	HPS	1.350	0.404	
12	Sidewalk along College Drive - Parking lot	Shoe box Pole	HPS	12.300	0.632	Not good uniformity, recommend adding Pedestrian Lighting
13	Parking Lot B	Shoe box Pole 2 heads	HPS	13.200	0.204, 0.067	
14	Walkway through the front lawn (from Parking lot B to the Entry Plaza)	No lighting fixture	No lighting fixture	0.482	-	There are no ligthing fixture for the walkway, the illuminance level is from the Flood lgithing from the roof of the Science & Technology Building
15	Lower Level walkway between Library & Student services Buildings	Ceiling mounted fixture	MH	33.300	2.300, 0.789	
16	Lower Level walkway Infront of Library	Wall mount Fixture	MH	33.300	0.850	
17	Lower Level walkway Infront of Library	Wall mount Fixture	HPS	10.900	0.046	
18	Stairs (4' wide) from Library to John M. Condures, JR. Plaza	Wall pack mounted 1' aff.	HPS	69.000	25.400	

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PART B

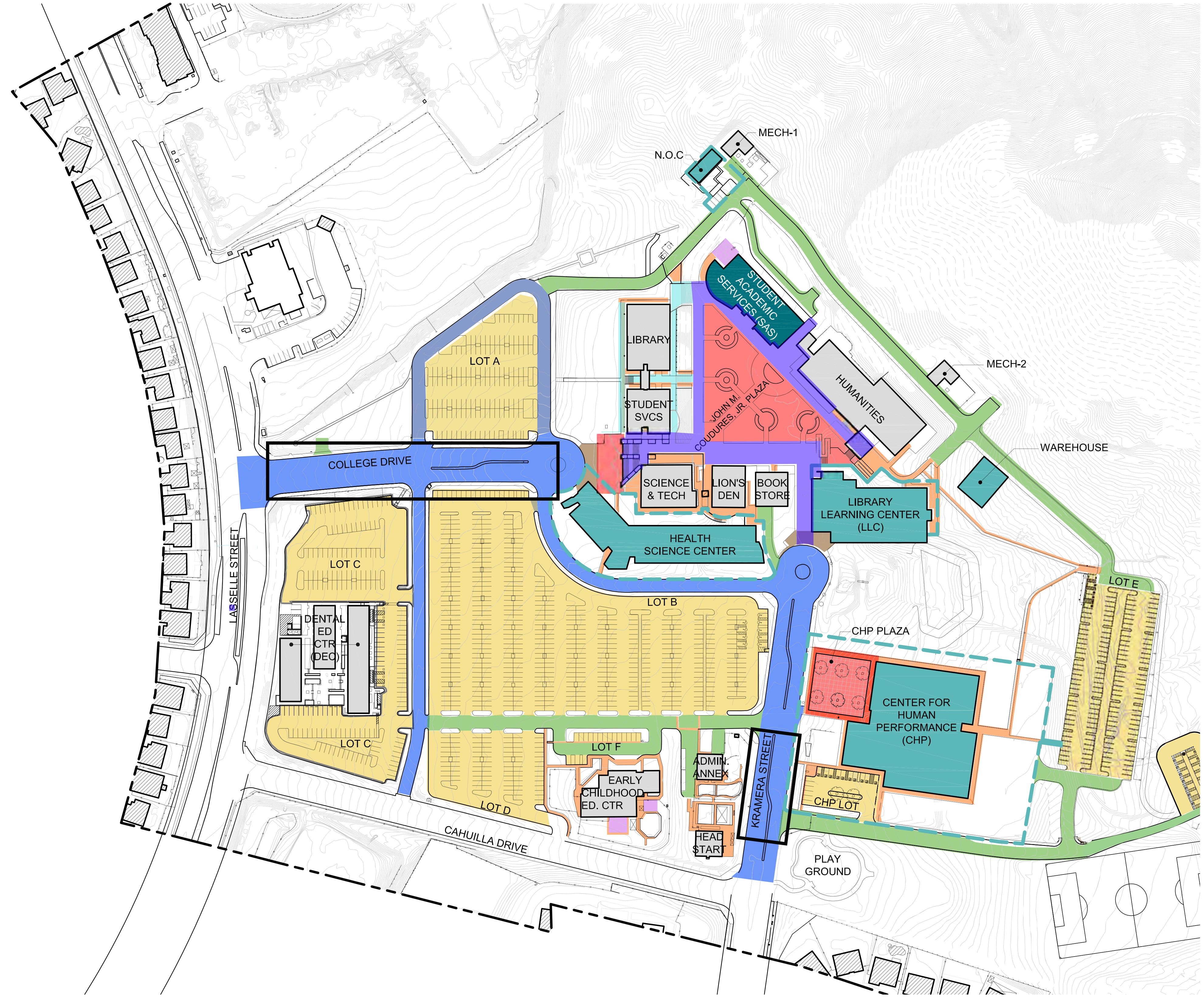
CAMPUS LIGHTING PLAN

LEGEND

PEDESTRIAN CIRCULATION
- CEREMONIAL PATHWAY
- SECONDARY PATHWAY
- TERTIARY PATHWAY

VEHICLE CIRCULATION
- PEDESTRIAN DROP OFF
- PRIMARY ROADWAY
- SECONDARY / SHARED ROADWAY
- PARKING AREAS

NODES
- LARGE PLAZA
- SMALL PLAZA
- CAMPUS GATEWAY
- PRIMARY BUILDING ENTRY
- SECONDARY BUILDING ENTRY



0 ft 120 ft 240 ft

SCALE: 1" = 240'-0"

CAMPUS LIGHTING PLAN

PART C

LIGHTING EQUIPMENT PALETTE

LIGHTING EQUIPMENT PALETTE PART C

INTRODUCTION

Lighting systems reinforce an image of a space, and can support the aesthetic notions of the architecture or landscape design. The lighting elements' appearance and arrangement are defined in a manner that provides visual cues for visual functions as well as by keeping in the stylistic themes of each distinct campus respecting existing character zones on campus.

I. PARKING LOT LIGHTING

Refer to District Lighting Plans

II. BUILDING MOUNTED LIGHTING

- Full-Cutoff Fixture
- High-Efficiency Lamp
- Finish options to be brown, to support Moreno Valley College (MVC) campus identity.


1


2


3


4

LEGEND
1. Recommended fixtures for exterior building mount: Bega - 2480 Series
2. Recommended fixtures for exterior building mount: Lighting Source - WallPack Series
3. Recommended fixtures for exterior building mount: Gardco - 111LED Series
4. Recommended fixtures for exterior step lighting: Cole Lighting - L600 Series

III. PEDESTRIAN LIGHTING

Throughout the campus, pedestrian routes have the hierarchical designation from Prominent (High Level Illuminance), Legible (Moderate Level Illuminance), and Active Ambient (Moderate Level Illuminance) as described in the previous section. All the Illuminance Level Standards will support a range of pedestrian and public activities of the spaces. The luminaire height, lamp wattage, and spacing will be configured to meet illuminance requirements per zone.

PEDESTRIAN POST TOP

- Enhance Architecture
- Reduce Glare
- High Energy Efficiency Lamp
- Control System
- Finish options to be brown, to support Moreno Valley College (MVC) campus identity.


1


2

LEGEND
1. Recommended fixture for post top: Selux - Saturn 2 Cutoff Series
2. Recommended fixture for post top: Selux - Saturn Cutoff Series

III. PEDESTRIAN LIGHTING (CONT'D)

PEDESTRIAN BOLLARD

- Reduce Glare
- High Energy Efficiency Lamp
- Durable
- Style to match the Pedestrian Pole

1

2

3

4

LEGEND
1. Recommended fixture for bollard: Beacon - Metro Series
2. Recommended fixture for bollard: Bega - 8554 LED Series
3. Recommended fixture for bollard: fega - 7762 LED Series
4. Recommended fixtures for bollard fixture: Selux - MTR Series

END OF SECTION 7 - MORENO VALLEY COLLEGE

SECTION 7
NORCO COLLEGE

PART A

EXISTING LIGHTING CONDITIONS

EXISTING LIGHTING CONDITIONS PART A

INTRODUCTION

Lighting systems implemented in conformance with the District Lighting Guidelines will improve the performance and perception of light on campus to support Norco College (NC) campus identity, create more inviting and comfortable spaces, limit environmental impact, and improve energy efficiency.

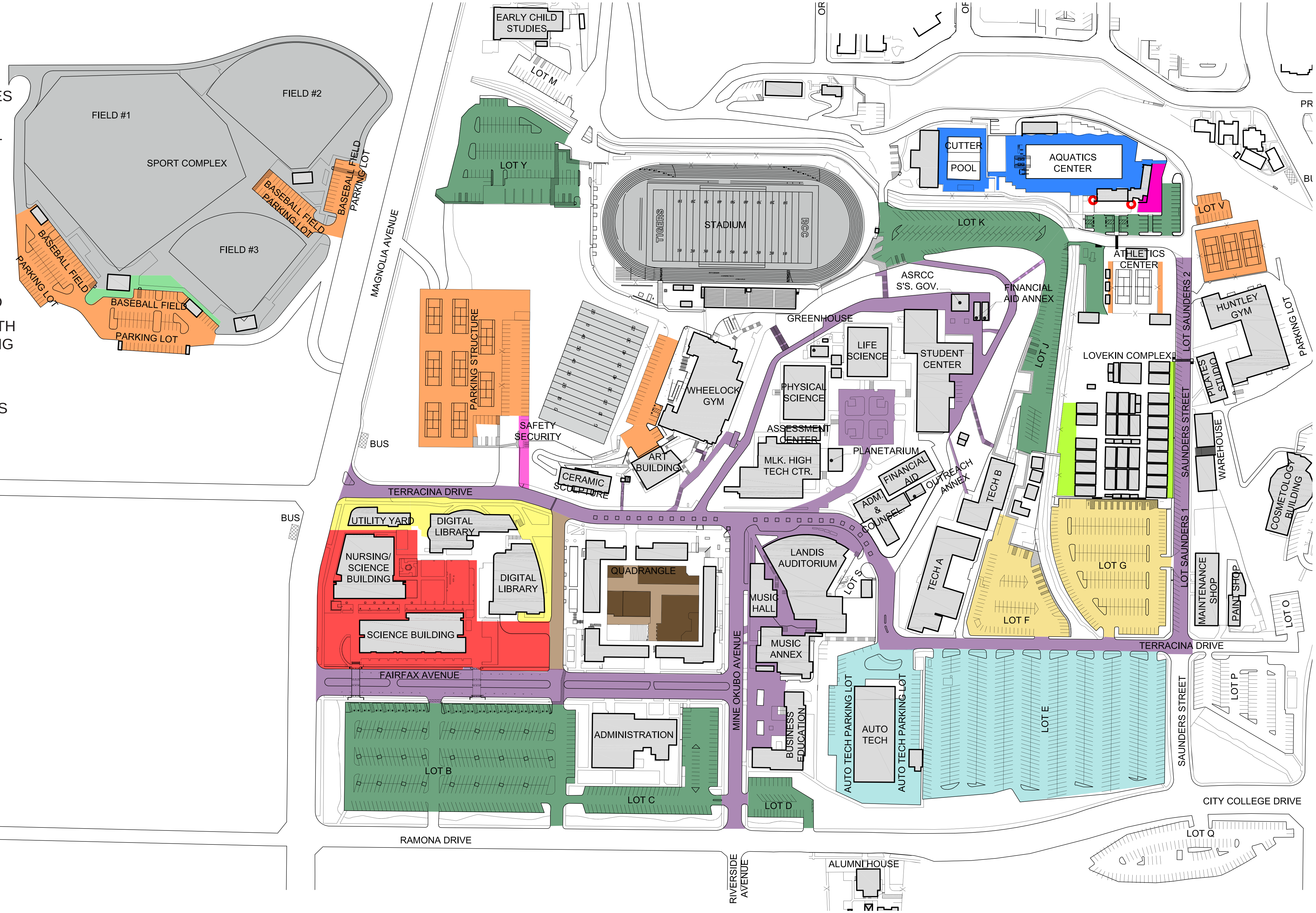
I. EXISTING EXTERIOR LIGHTING ASSESSMENT

EXISTING EXTERIOR LIGHTING

The existing lighting at Norco College (NC) is equipped with various light sources and inadequate light fixtures.

- The roadway luminaires are still in their serviceable life; phased replacement with high efficiency light sources is recommended.
- The pedestrian pathway luminaires are still in their serviceable life; phased replacement with high efficiency light sources is recommended. However, the style of the pedestrian pole throughout the campus results in glare and inhibits visibility, resulting in possible safety risks. The fixtures should be replaced with the recommended cutoff fixtures in a future phrase.
- The metal halide shoebox fixtures have a significant servicable life and are in relatively good condition. Phased replacement with high efficiency Llight sources and consistent color temperature is recommended.
- Wall mounted floodlights create significant glare/diminished visibility which results in safety risks. Phased replacement with high efficiency light sources and cutoff fixtures is recommended.
- The light level in the pedestrian pathway did not meet the IES Standards, additional poles and a high efficiency light source is recommended.

- COBRAHEAD FIXTURE
- FULL CUTOFF POLE: LITHONIA MR SERIES
- CLEAR GLASS GLOBE POST TOP
- SQUARE META POLE WITH FLOOD LIGHT
- SHOE BOX MH FIXTURE 1-4 HEADS
- ACORN POST TOP FIXTURE
- POST TOP FIXTURE WITH METAL FINS AND PRISMATIC LENS
- SPORTS FLOOD (CURRENTLY UNOPERATED)
- POST TOP FIXTURE WITH GLARE SHIELD
- SPORTS LIGHTING, CLUSTER ARRAY WITH GLARE SHIELD + INTEGRAL PED LIGHTING
- SPORTS LIGHTING, HORIZONTAL ARRAY WITH GLARE SHIELD
- CEILING MOUNT, WALL MOUNT FIXTURES
- POST TOP FIXTURE GLARE SHIELD
- BOLLARD WITH GLARE SHIELD
- WALL RECESSED FIXTURE
- METAL BOLLARD WITH FROSTED LENS
- ROUND CONCRETE BOLLARD WITH GLARE SHIELD



0 ft 120 ft 240 ft

SCALE: 1" = 240'-0"

EXISTING EXTERIOR LIGHTING

EXISTING EXTERIOR LIGHTING ASSESSMENT

Pole Lighting	Head	Pole	Base	Lamp	Location
Pole Lighting Type 1	Pedestrian pole	Standard Square pole	Round concrete 3" Height	HID	Walkway, plazas- Throughout campus
Pole Lighting Type 2	Pedestrian pole	Standard Square pole with square metal base	Round concrete 3" Height	HID	Walkway, plazas- Throughout campus
Pole Lighting Type 3	Pedestrian pole	Standard Round pole	Round concrete 3" Height	HID	Driveway, walkway at JFK high school
Pole Lighting Type 4	Pedestrian pole with metal fins and prismatic lens	Standard Round pole	Round concrete 3" Height	HID	Driveway, walkway at JFK high school
Pole Lighting Type 5	Shoebox 1 head	Standard Square pole	Round concrete 3" Height	HID	Driveway , Parking lot - along the perimeter
Pole Lighting Type 6	Shoebox 2 heads	Standard Square pole	Round concrete 18" Height	HID	Parking lot
Landscape Lighting	**Description**		**Base**	**Lamp**	**Location**
Landscape lighting Type 1	Metal Bollard with White Frosted lens		Round concrete 3" Height	CFL	Walkway - Throughout campus
Landscape lighting Type 2	Tree accent light on 2' stake		Round concrete 3" Height	MR16	Trees near the Center for Student Success Building
Landscape lighting Type 3	In grade uplighting		-	HID	Columns at the Center for Student Success Building

EXISTING EXTERIOR LIGHTING ASSESSMENT

Architectural Lighting	**Description**			**Lamp**	**Location**
Architectural Lighting Type 1	Wall Pack with frosted lens			TBC	Center for Applied & Competitive Technology Building
Architectural Lighting Type 2	Wall Pack with frosted lens			TBC	Early Child Education Center Building
Architectural Lighting Type 3	Wall Pack with Prismatic lens			TBC	Industrial Tech Buildings
Architectural Lighting Type 4	Wall Pack with Prismatic lens			TBC	West End Quad Buildings
Architectural Lighting Type 5	Wall Pack with Prismatic lens			TBC	Center for Applied & Competitive Technology Building
Architectural Lighting Type 6	Wall Pack with full cut off			TBC	Center for Applied & Competitive Technology Building
Architectural Lighting Type 7	Wall sconce downlight - building mount			TBC	College Safety & Police Building
Architectural Lighting Type 8	Wall sconce downlight - building mount			TBC	Center for Student Success Building
Architectural Lighting Type 9	Wall Recessed with frosted lens			TBC	Stairs at Industrial Tech Building
Architectural Lighting Type 10	Wall Recessed with glare shield				Center for Student Success Building and nearby hardscape elements. ** All fixtures mounted in the wrong orientation
Architectural Lighting Type 11	Ceiling Recessed				
Architectural Lighting Type 12	Ceiling Surface			TBC	

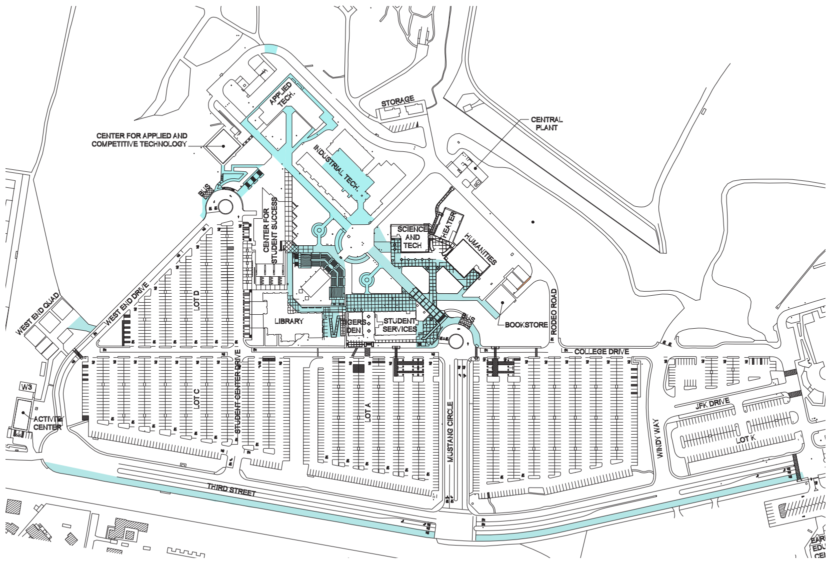
EXISTING EXTERIOR LIGHTING ASSESSMENT

Flood Lighting	Description			Lamp	Location
Flood Lighting Type 1	Flood Lighting with wire guard			HID	Building mount - Early Child Education Center Building
Flood Lighting Type 2	Flood Lighting			HID	Mounted on Pedestrian Pole - at bus stop

II. EXISTING EXTERIOR LIGHTING FIXTURES

WALKWAYS + PLAZAS:

- Throughout campus

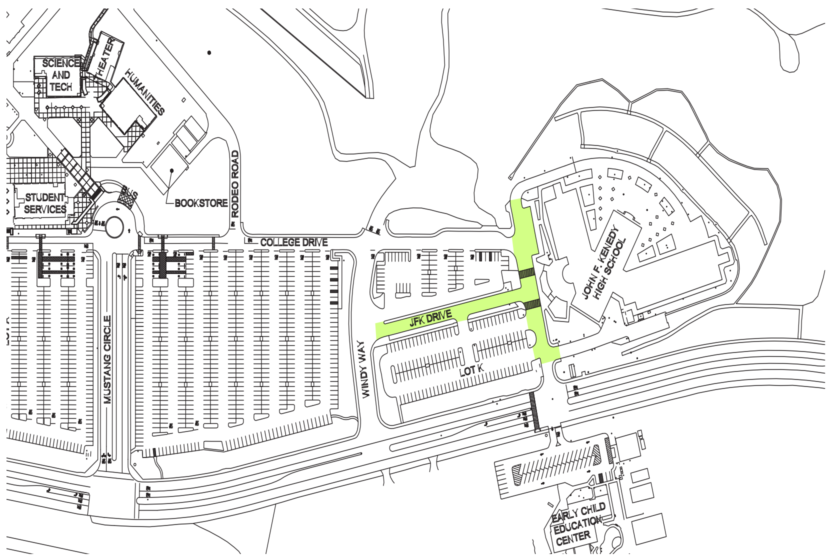


Pedestrian square post top with square metal + concrete base

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

JFK PRIMARY DRIVEWAY:

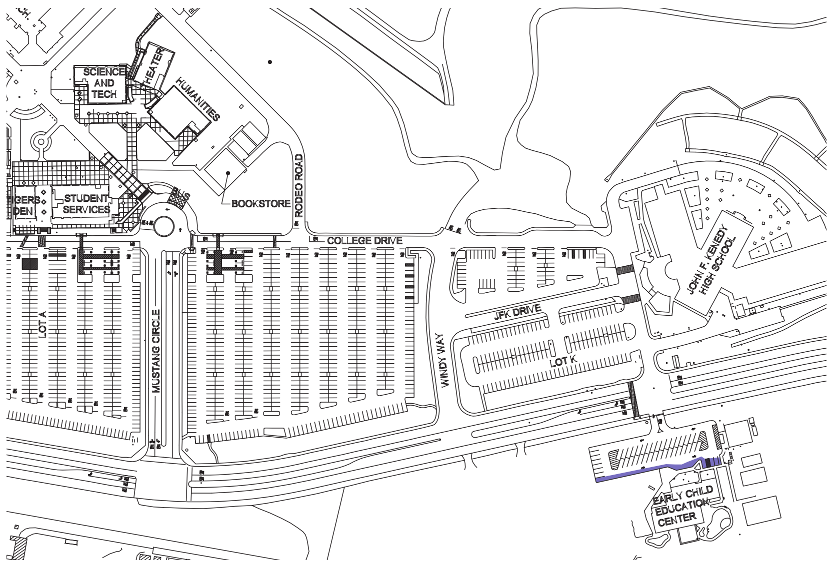
- Driveway to JFK Middle College High School



Ellipsodal post top fixture with full cutoff

WALKWAY:

- In front of the Early Childhood Education Center (ECEC)

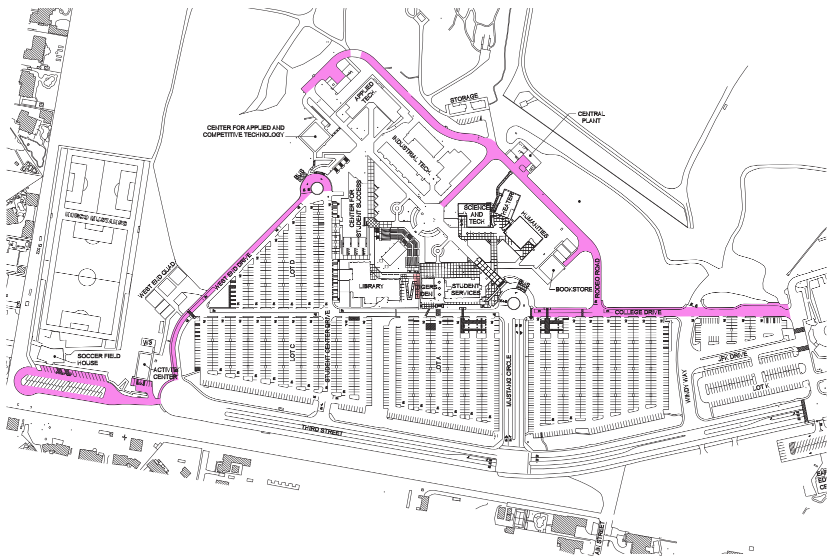


Post top fixture with metal fins and prismatic lens

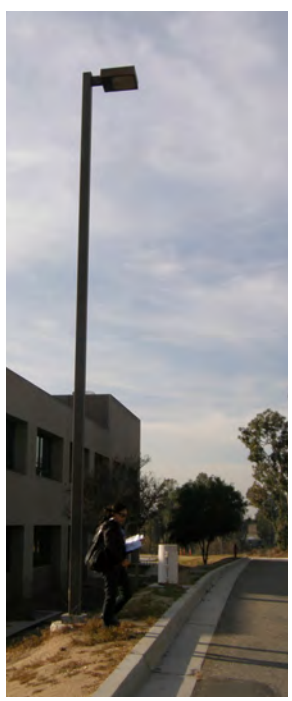
II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

PRIMARY + SECONDARY DRIVEWAY:

- Throughout campus

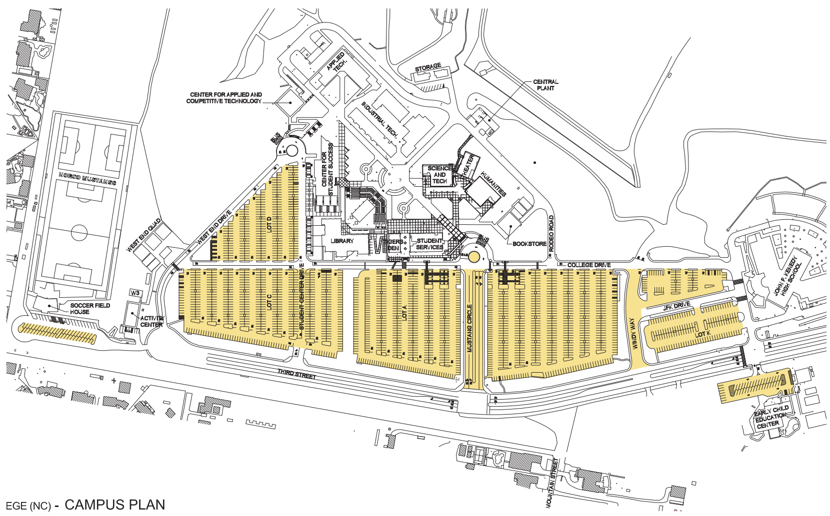


Shoebox Fixture-1 head



PARKING LOTS:

- Parking Lot A
- Parking Lot B
- Parking Lot D
- Parking Lot K
- Sports Complex Parking Lot
- ECEC Lot



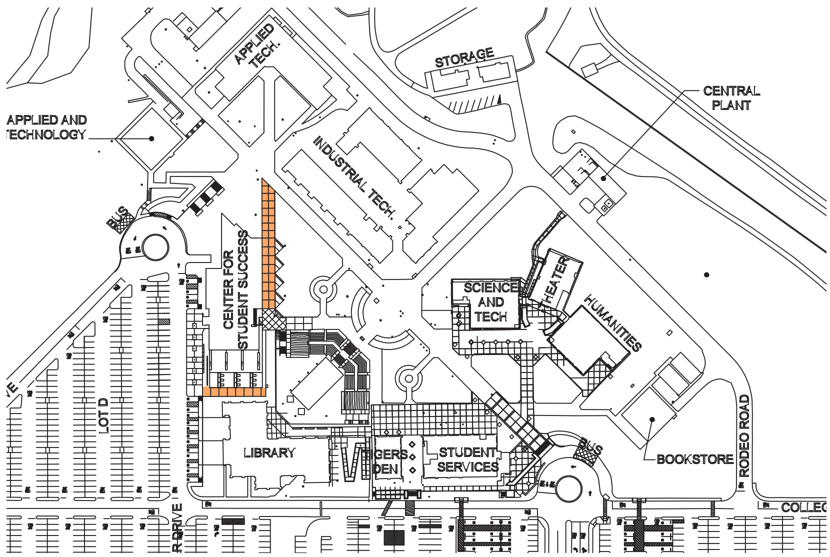
EGE (NC) - CAMPUS PLAN

Shoebox Fixture-2 heads with 18" concrete pole base

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

WALKWAYS + PLAZAS:

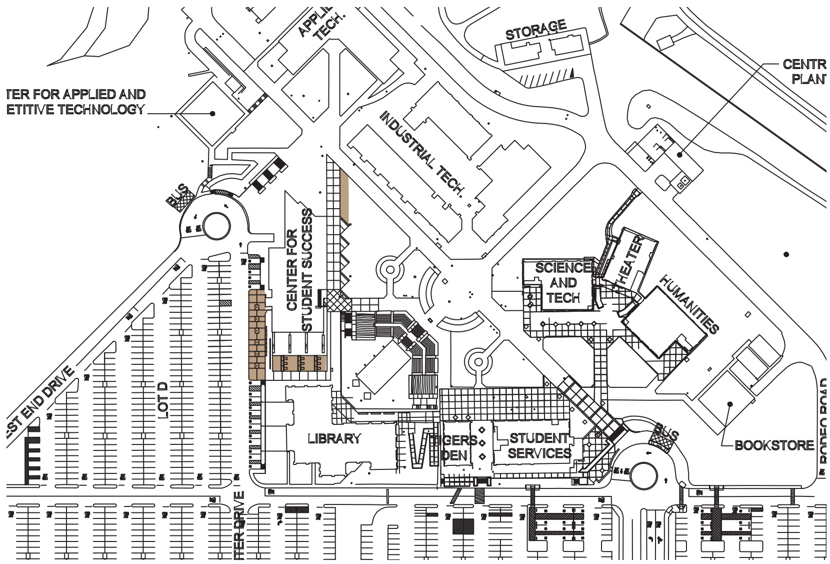
- Adjacent to Center for Student Success (CSS)



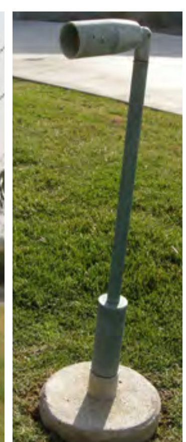
Metal bollard with 3" concrete base

SMALL TREE UPLIGHTING:

- Small trees along walkways adjacent to Center for Student Success (CSS)



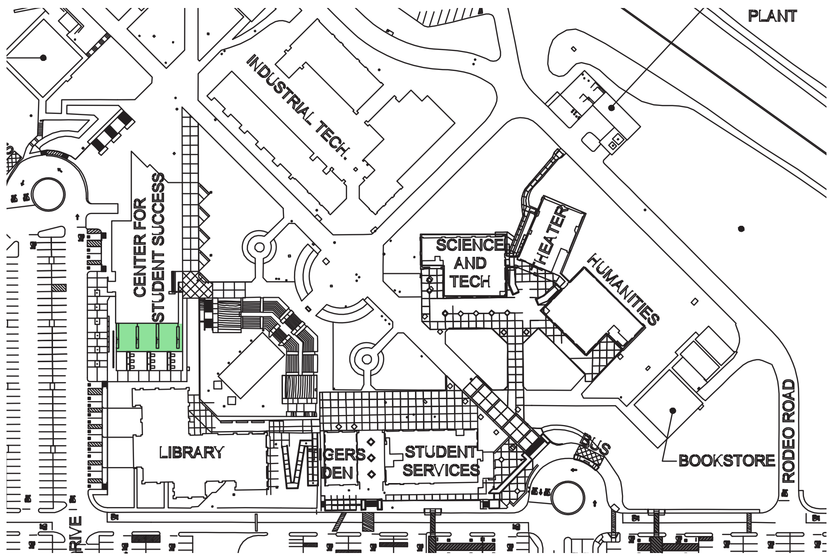
Tree Accent light mounted on 2 foot stake + concrete base painted green



II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

COLUMN/CANOPY UPLIGHT:

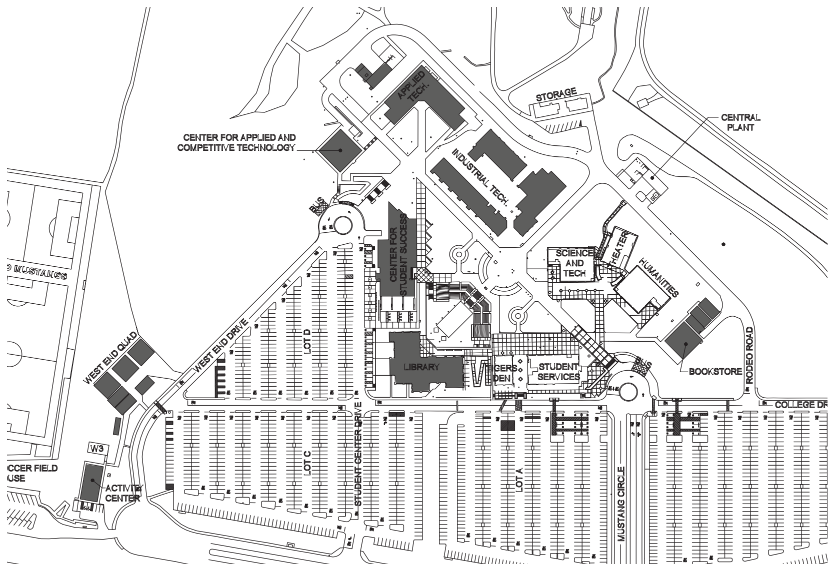
- Center for Student Success Building (CSS)



In-grade Uplight Fixture

CAMPUS BUILDING WALLS:

- Throughout campus

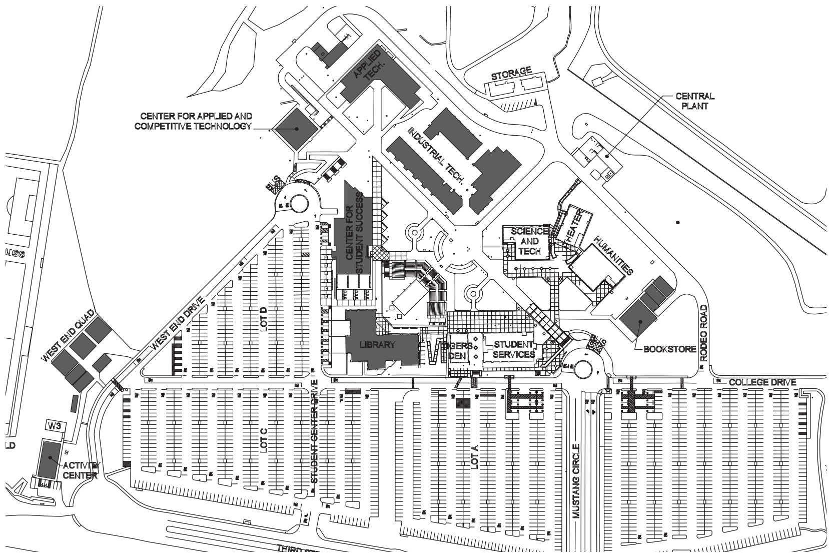


Wall mounted fixtures

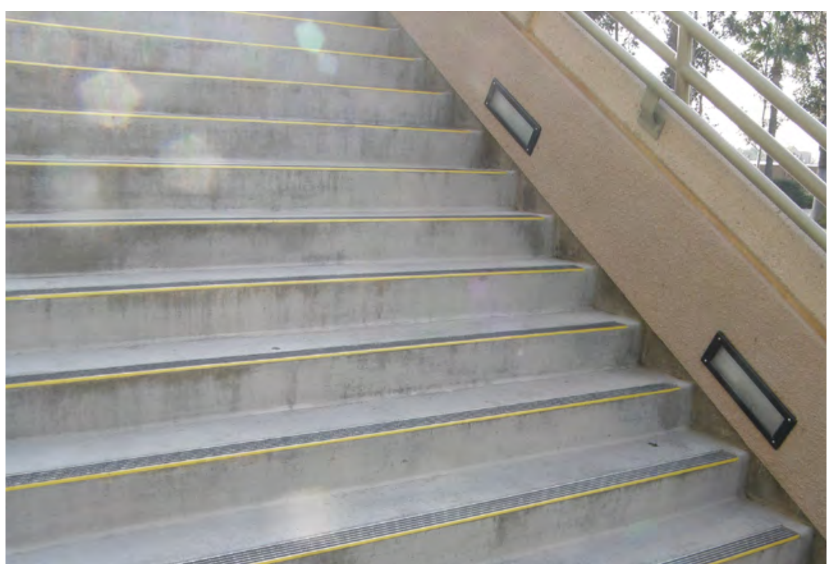
II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

STAIRWAYS:

- Throughout campus

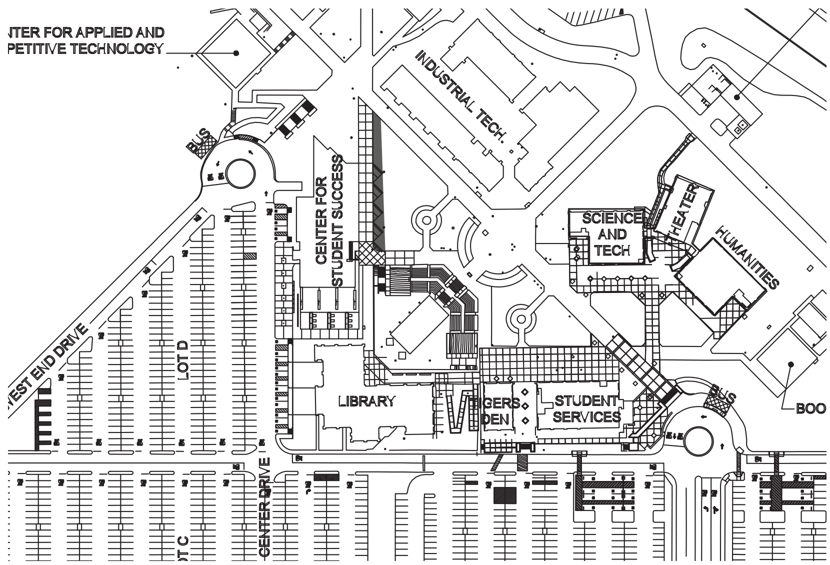


Wall recessed fixture with frosted lens



LANDSCAPE ELEMENTS:

- Landscape elements in front of Center for Student Success Building (CSS)

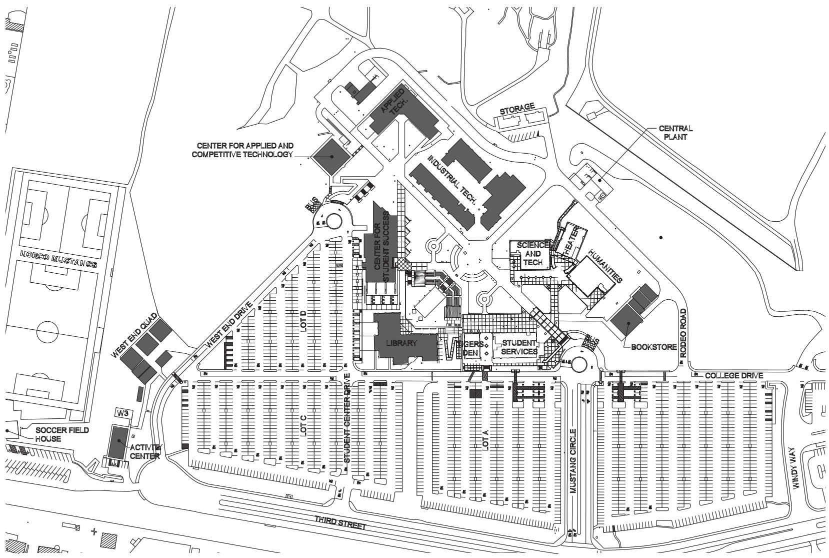


Wall recessed fixture with glare shield

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

CAMPUS BUILDINGS CEILINGS:

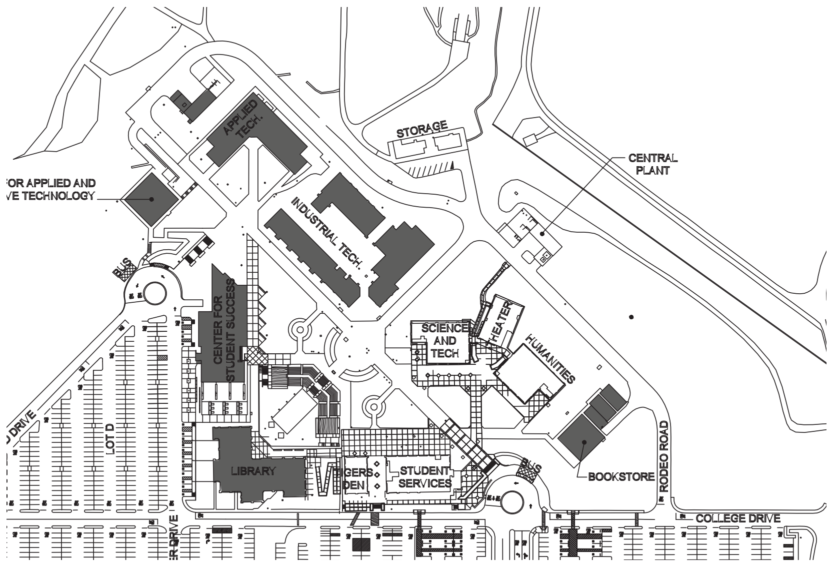
- Throughout campus



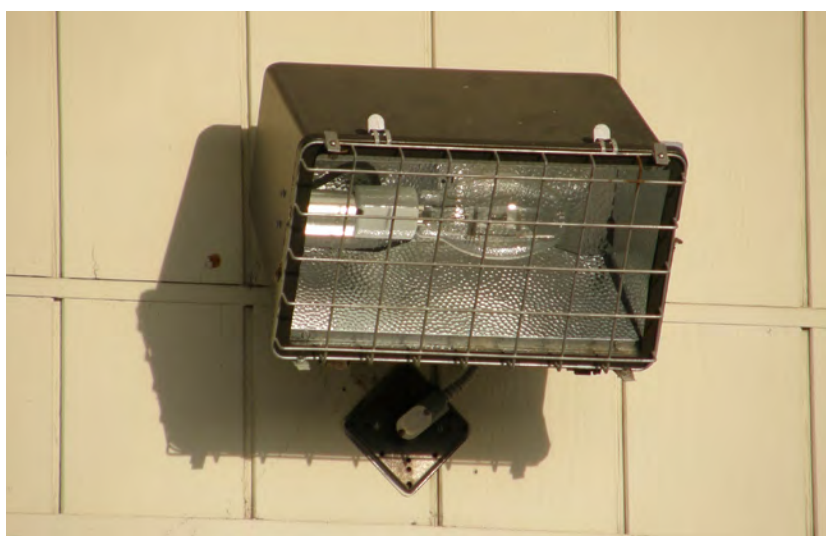
Ceiling mounted fixtures

CAMPUS BUILDING ROOFS:

- Throughout campus



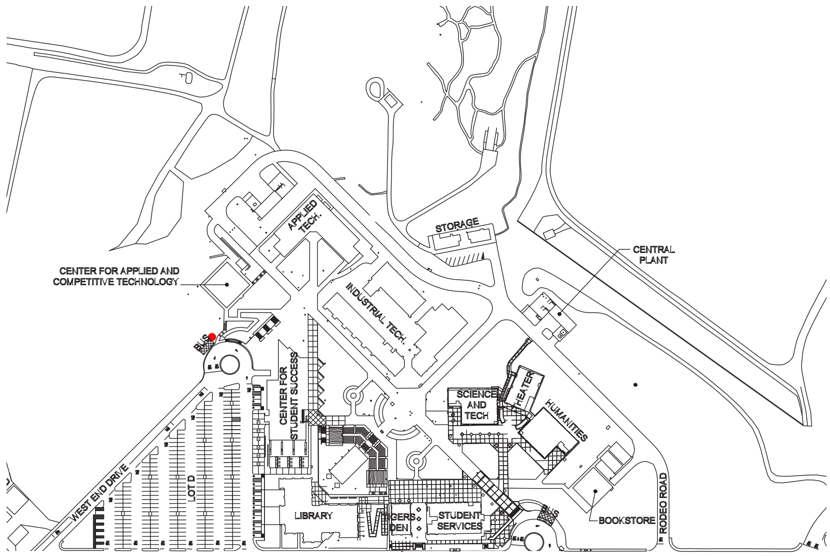
Roof and/or wall mounted flood lighting



II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

BUS STOP:

- West End Drive Circle



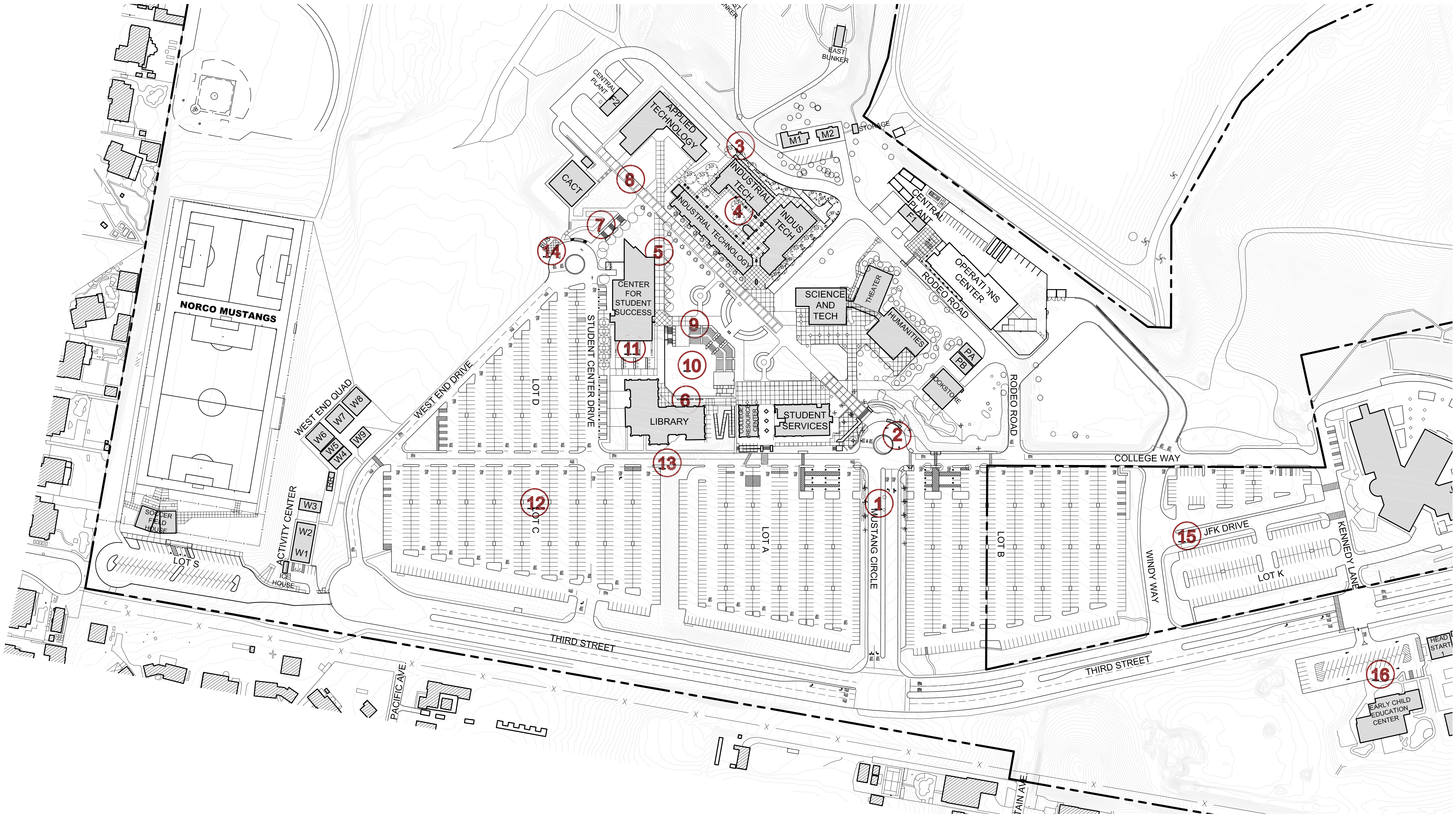
Square post top with full cutoff

ILLUMINANCE MEASUREMENT

Date: 01/19/2012

Time: 06:00-07:00 PM

Weather Conditions: Clear skies



0 ft 120 ft 240 ft

SCALE: 1" = 240'-0"

EXISTING EXTERIOR LIGHTING ILLUMINANCE

	Location	Fixture Type	Lamp Type	Maximum Illuminance at Fixture Location (fc)	Minimum Illuminance around Fixtures (fc)	Note
1	**Primary Driveway** Mustang Circle	Shoe box Pole 2 heads	HPS	8.900	0.908	The Average Illuminance is above 0.1 fc. The light level is in the good range and the fixture is fully cut off.
2	**Drop off area** Mustang Circle	Typical Pedestrian Pole1	HPS	0.154	-	Some of the fixtures were not operated during the measurement
3	**Service Road** Rodeo Road	Shoe box Pole 1 head	HPS	6.210	0.104	
4	**Small Court yard** at Industrial Tech - greenhouse Building	Typical Pedestrian Pole1	HPS	2.370	1.060	
5	**Primary Walkway** Walkway infront the Center for Student Success Building - upper level	Typical Bollard	CFL	0.056	0.049	
6	**Primary Walkway** Walkway upper level near Library	Typical Pedestrian Pole1	HPS	1.510	0.952	
7	**Primary Walkway/Stairways** Walkway from Drop off to Applied tech	Typical Pedestrian Pole1	HPS	1.530	0.055	
8	**Primary Walkway** Walkway without lighting	Typical Pedestrian Pole1	HPS	0.029	-	The distance between fixtures are not consistance, resulting too low light level in some areas.
9	**Stairways** Stairway to main Plaza	Typical Pedestrian Pole1	HPS	1.950	0.850	
10	**Main Plaza** Near Library	Typical Pedestrian Pole1	HPS	1.950	0.132	
11	**Small Court yard** Infront the Center for Student Success Building - lower level	Typical Bollard	CFL	4.510	0.523	Some of the fixtures were not operated during the measurement, The space also received some lighting fro m building interior.
12	**Surface Parking** Parking Lot C - in the center	Shoe box Pole 2 heads	HPS	8.930	0.310	
13	**Surface Parking** Parking Lot C - near the walkway	Shoe box Pole 2 heads	HPS	8.900	0.162	No pedestrian pole or bollards along the walkway, the light level achieved from the Parking lot poles
14	**Bus stop** the the end of Student Center Drive	Typical Pedestrian Pole1	HPS	1.720	1.000	
15	**Primary Driveway** JFK Drive (to JFK High school)	Typical Pedestrian Pole2	HPS	3.560	0.333	
16	**Primary Walkway** Walkway infront the Early Child Education Center	Typical Pedestrian Pole3	HPS	0.917	0.852	

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PART B

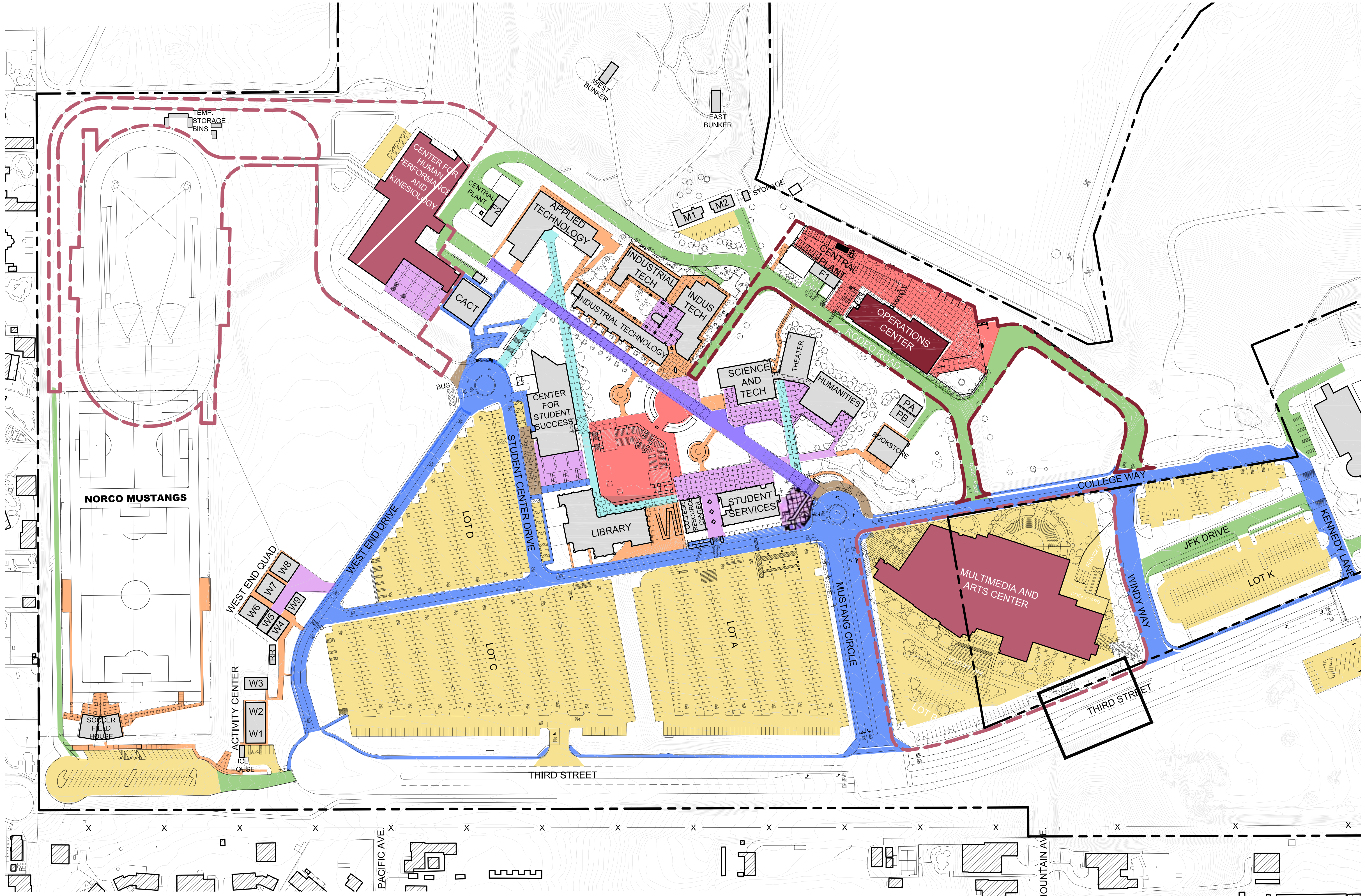
CAMPUS LIGHTING PLAN

LEGEND

PEDESTRIAN CIRCULATION
- CEREMONIAL PATHWAY
- SECONDARY PATHWAY
- TERTIARY PATHWAY

VEHICLE CIRCULATION
- PEDESTRIAN DROP OFF
- PRIMARY ROADWAY
- SECONDARY / SHARED ROADWAY
- PARKING AREAS

NODES
- LARGE PLAZA
- SMALL PLAZA
- CAMPUS GATEWAY
- PRIMARY BUILDING ENTRY
- SECONDARY BUILDING ENTRY



0 ft 120 ft 240 ft
SCALE: 1” = 240’-0”

CAMPUS LIGHTING PLAN

PART C

LIGHTING EQUIPMENT PALETTE

INTRODUCTION

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I. PARKING LOT LIGHTING

Refer to District Lighting Plans

II. BUILDING MOUNTED LIGHTING

- Full-Cutoff Fixture
- High-Efficiency Lamp
- Finish options to be aluminum or silver, to support Norco College (NC) campus identity.


1


2


3


4

LEGEND
1. Recommended fixtures for exterior building mount: Bega - 2480 Series
2. Recommended fixtures for exterior building mount: Lighting Source - WallPack Series
3. Recommended fixtures for exterior building mount: Gardco - 111LED Series
4. Recommended fixtures for exterior step lighting: Cole Lighting - L600 Series

III. PEDESTRIAN LIGHTING

Throughout the campus, pedestrian routes have the hierarchical designation from Prominent (High-level Illuminance), Legible (Moderate Level Illuminance), and Active Ambient (Moderate Level Illuminance) as described in the previous section. All the Illuminance Level Standards will support a range of pedestrian and public activities of the spaces. The luminaire height, lamp wattage, and spacing will be configured to meet illuminance requirements per zone.

PEDESTRIAN POST TOP

- Enhance Architecture
- Reduce Glare
- High Energy Efficiency Lamp
- Control System
- Finish Options to be natural aluminum or silver to support Norco College Identity

1

LEGEND

1. Recommended fixture for post top fixture: LUMEC - SoleCity series

III. PEDESTRIAN LIGHTING (CONT'D)

PEDESTRIAN BOLLARD

- Reduce Glare
- High Energy Efficiency Lamp
- Durable
- Style to match the Pedestrian Pole

1

2

LEGEND
1. Recommended fixtures for bollard: Beacon - Metro Series 2
2. Recommended fixtures for bollard: Selux - MTR Series

SECTION 7
RIVERSIDE CITY COLLEGE

PART A
EXISTING LIGHTING CONDITIONS

EXISTING LIGHTING CONDITIONS PART A

INTRODUCTION

Lighting systems implemented in conformance with the District Lighting Guidelines will improve the performance and perception of light on campus to support the Riverside City College (RCC) Campus identity, create more inviting and comfortable spaces, limit environmental impact, and improve energy efficiency.

I. EXISTING EXTERIOR LIGHTING ASSESSMENT

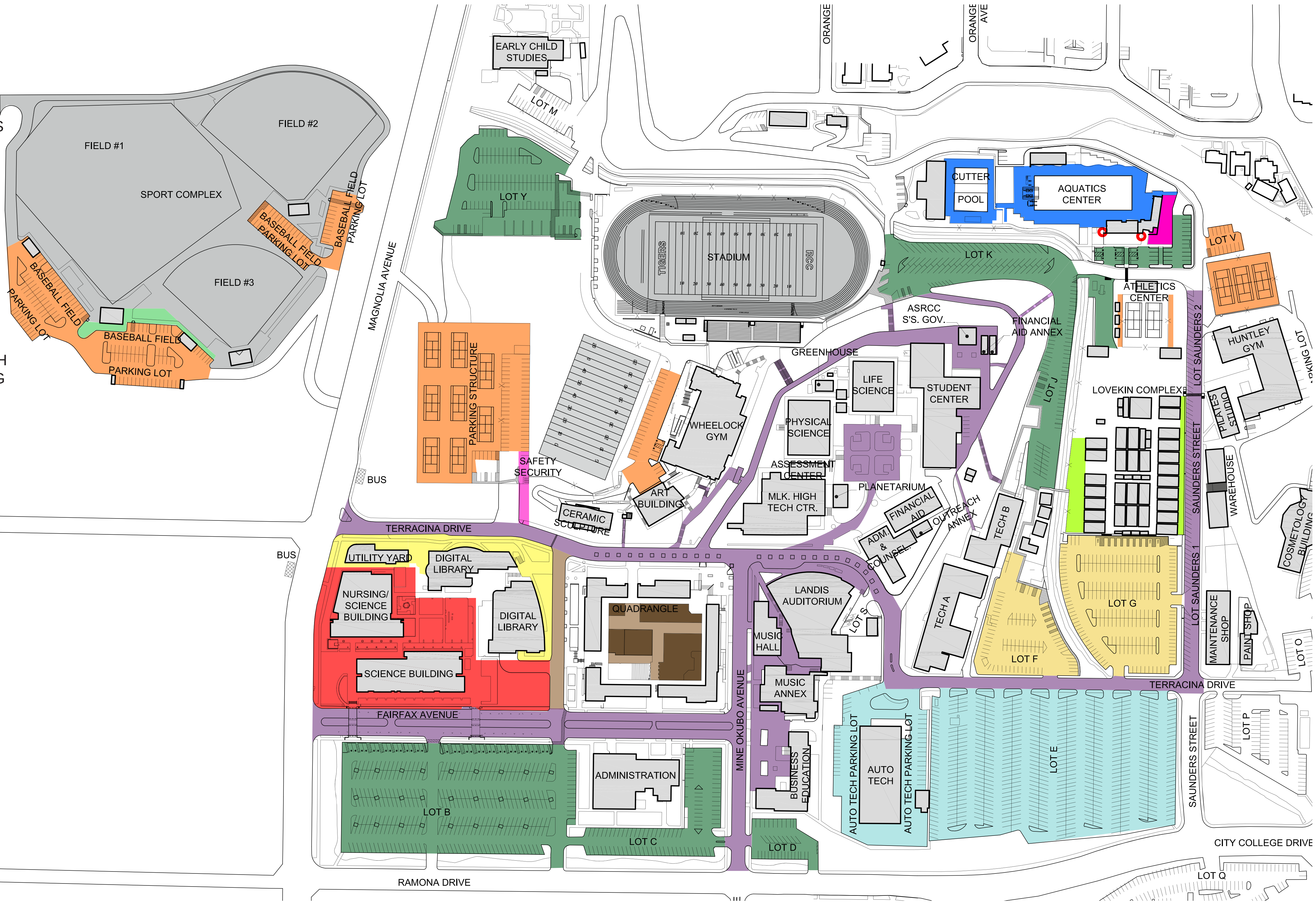
EXISTING EXTERIOR LIGHTING

The existing lighting at Riverside City College (RCC) is a composite of many periods of development and expansion.

- The pedestrian pathway and roadway luminaires are largely past their serviceable life and need to be replaced.
- Globe fixtures and unshielded sources result in significant glare and inhibit visibility, resulting in possible safety risks. All globe fixture should be replaced.
- The metal halide shoebox fixtures have a significant serviceable life and are in relatively good condition. Phased replacement with high efficiency light sources is recommended.
- Wall mounted floodlights create significant glare/ diminished visibility which results in safety risks. Phase replacement with high efficiency light sources and cutoff fixtures is recommended.

LEGEND

- COBRAHEAD FIXTURE
- FULL CUTOFF POLE: LITHONIA MR SERIES
- CLEAR GLASS GLOBE POST TOP
- SQUARE META POLE WITH FLOOD LIGHT
- SHOE BOX MH FIXTURE 1-4 HEADS
- ACORN POST TOP FIXTURE
- POST TOP FIXTURE WITH METAL FINS AND PRISMATIC LENS
- SPORTS FLOOD (CURRENTLY UNOPERATED)
- POST TOP FIXTURE WITH GLARE SHIELD
- SPORTS LIGHTING, CLUSTER ARRAY WITH GLARE SHIELD + INTEGRAL PED LIGHTING
- SPORTS LIGHTING, HORIZONTAL ARRAY WITH GLARE SHIELD
- CEILING MOUNT, WALL MOUNT FIXTURES
- POST TOP FIXTURE GLARE SHIELD
- BOLLARD WITH GLARE SHIELD
- WALL RECESSED FIXTURE
- METAL BOLLARD WITH FROSTED LENS
- ROUND CONCRETE BOLLARD WITH GLARE SHIELD



0 ft 120 ft 240 ft

SCALE: 1" = 240'-0"

EXISTING EXTERIOR LIGHTING

EXISTING EXTERIOR LIGHTING ASSESSMENT

Pole Lighting	Head	Pole	Base	Lamp	Location
Pole Lighting Type 1	Cobra Head 1 head	Metal Pole	Concrete?	HPS	Driveway, Parking lots
Pole Lighting Type 2	Cobra Head 2 heads	Metal Pole	Concrete?	HPS	Driveway, Parking lots
Pole Lighting Type 3	Lithonia MR series 1 head	Metal Round Pole - Medium Height	Round concrete 4" Height	HPS, MH	Pedestrian Walkway
Pole Lighting Type 4	Lithonia MR series 1 head	Metal Round Pole - Tall Height	Round concrete 12" Height	HPS, MH	Parking Lots
Pole Lighting Type 5	Lithonia MR series 2 heads	Metal Round Pole - Tall Height	Round concrete 12" Height	HPS, MH	Parking Lots
Pole Lighting Type 6	Clear Glass Globe Post Top	Decorative Concrete Pole	Decorative Square concrete 12" Height	HPS, MH, CFL	Pedestrian Walkway
Pole Lighting Type 7	Clear Glass Globe Post Top	Decorative Concrete Pole	Decorative Square concrete 12" Height with metal bar	HPS, MH, CFL	Parking Lots
Pole Lighting Type 8	Clear Glass Globe Post Top	Metal Round Pole	Round concrete 4" Height	HPS, MH, CFL	Pedestrian Walkway
Pole Lighting Type 9	Clear Glass Globe Post Top	Metal Square Pole	Round concrete 4" Height	HPS, MH, CFL	Pedestrian Walkway
Pole Lighting Type 10	Shoe Box Flood 2, 4 Heads Vertical Aiming	Metal Pole	Square Metal Pole	TBC	Parking Lots
Pole Lighting Type 12	Shoe Box Flood 1, 3 Heads Downward Aiming	Metal Pole	Square Metal Pole	TBC	Tennis Courts
Pole Lighting Type 13	Acorn with Glare shield	Decorative Metal Pole	Round concrete 4" Height	TBC	Court Yards, Pedestrian Walkway
Pole Lighting Type 14	Shielded Post Top	Metal Round Pole - Medium Height	Round concrete 4" Height	MH	Walkway in Aquatic center area
Pole Lighting Type 16	Shielded Post Top	Metal Round Pole - Medium Height	Round concrete 4" Height	MH	Nurse & Science Building court
Pole Lighting Type 17	Old Sports flood lighting	Conduit		TBC	Lovekin Complex - currently unused

EXISTING EXTERIOR LIGHTING ASSESSMENT

Sports Lighting	Head	Pole	Base	Lamp	Location
Sports Lighting Type 1	Typical Sports Lighting without glare shield	Metal pole	N/A	TBC	Sports Fields
Sports Lighting Type 2	Typical Sports Lighting with glare shield	Metal pole	N/A	TBC	Sports Fields
Sports Lighting Type 3	Typical Sports Lighting with glare shield and additional Area Lighting	Metal pole	N/A	TBC	Aquatics Center Area
Landscape Lighting	**Description**		**Base**	**Lamp**	**Location**
Landscape Ligthing	Concrete Bollard with glare shield		None	CFL	Aquatics Center Area
Landscape Ligthing Type 2	Metal Bollard with White Frosted lens		Round concrete 4" Height	CFL	Through out around Buildings
Landscape Ligthing Type 3	Metal Bollard with glare shield		None	CFL	Through out around New Buildings
Landscape Ligthing Type 4	Wall Recessed with White Frosted lens		None	CFL	Aquatics Center Area
Landscape Ligthing Type 5	Wall Recessed with glare shield		None	CFL	Low wall along the bridge from parking lot
Landscape Ligthing Type 6	Linear ground mounted uplight for signage		None	FL	Aquatics Center Area
Architectural Lighting	**Description**			**Lamp**	**Location**
Architectural Lighting Type 1	Ceiling surfaced with White Frosted lens			TBC	Through out Campus Buildings
Architectural Lighting Type 2	Wall Recessed with White Frosted lens			TBC	Through out Campus Buildings
Architectural Lighting Type 3	Wall Recessed with Prismatic lens			TBC	Through out Campus Buildings
Architectural Lighting Type 4	Wall Recessed with White Frosted lens			TBC	Through out Campus Buildings
Flood Lighting	**Description**			**Lamp**	**Location**
Flood Lighting Type 1	Flood Lighting wall mounted on exterior of the buildings			HPS	Through out Campus Buildings
Flood Lighting Type 2	Flood Lighting mounted over the roof for plazas, courtyards, walkways area			TBC	Through out Campus Buildings

0 ft 120 ft 240 ft
SCALE: 1" = 240'-0"

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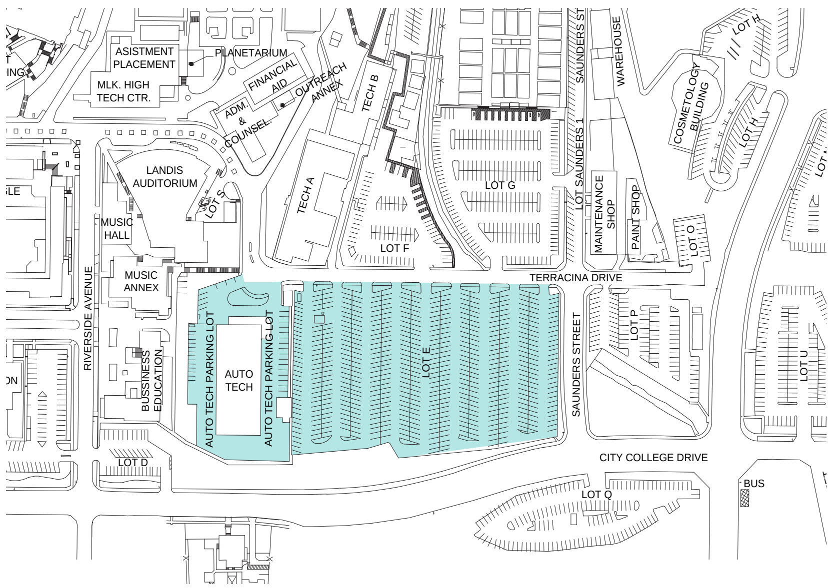
II. EXISTING EXTERIOR LIGHTING FIXTURES

SURFACE PARKING:

- Parking Lot E

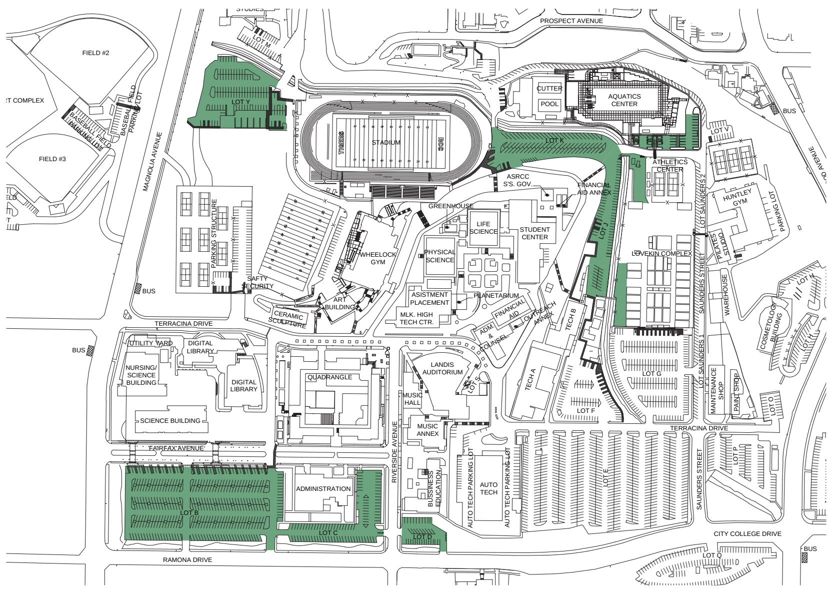


Cobra head fixture

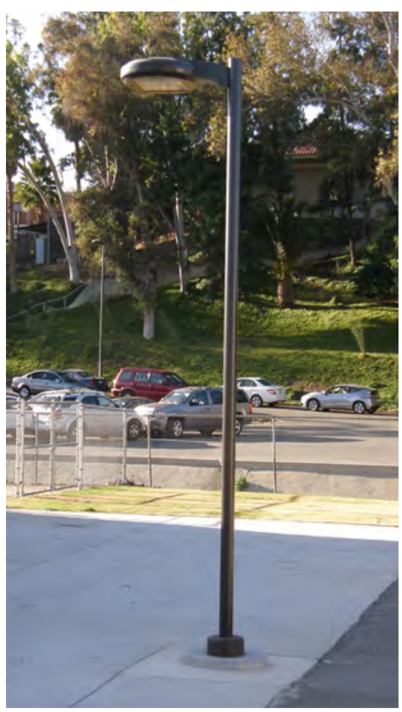
II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

SURFACE PARKING + PATHWAY:

- Parking Lot B
- Parking Lot C
- Parking Lot D
- Parking Lot J
- Parking Lot Y
- Walkway near Fitness + Lovekin Complex

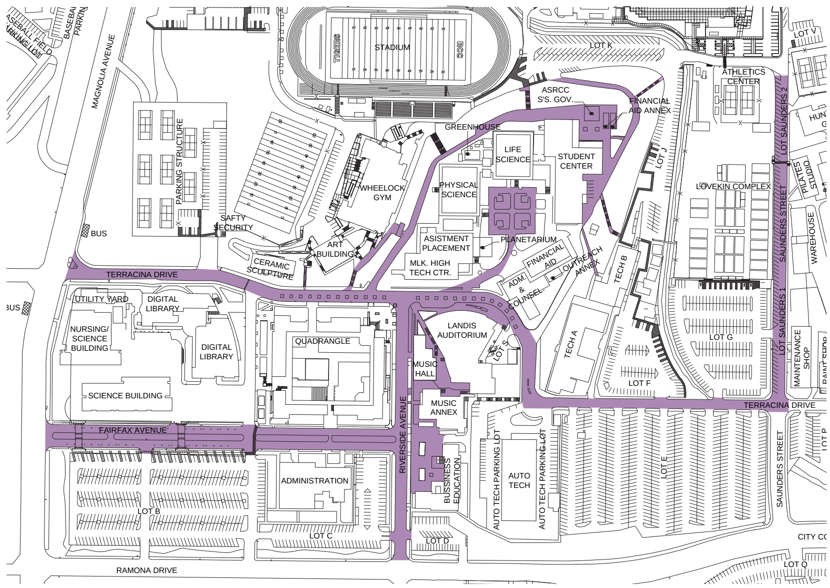


Low profile Circular Roadway Pole Fixture full cutoff Lithonia Omero MR Series

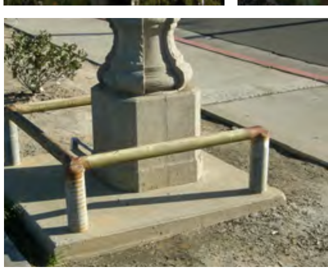


PRIMARY + SECONDARY DRIVEWAY:

- Throughout campus



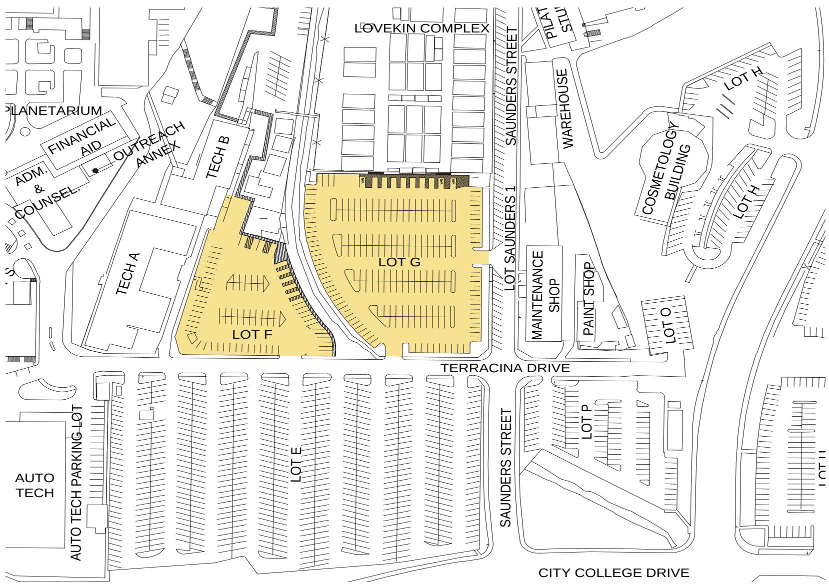
Clear glass globe post top



II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

PARKING LOTS:

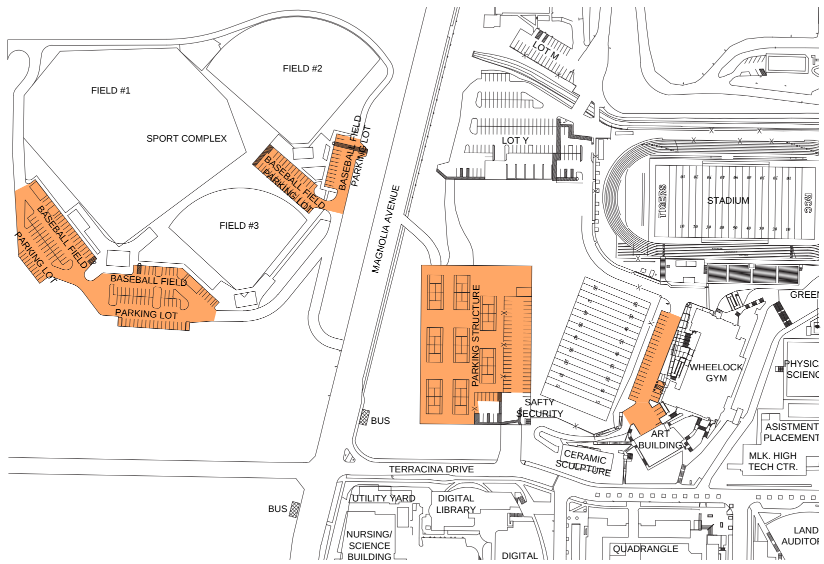
- Parking Lot F
- Parking Lot G



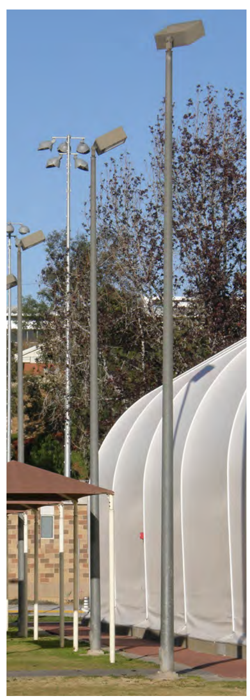
Square metal pole with flood light

TENNIS COURT + SURFACE PARKING:

- Parking Structure Upper Level
- Parking Lot V
- Baseball Field Parking Lots



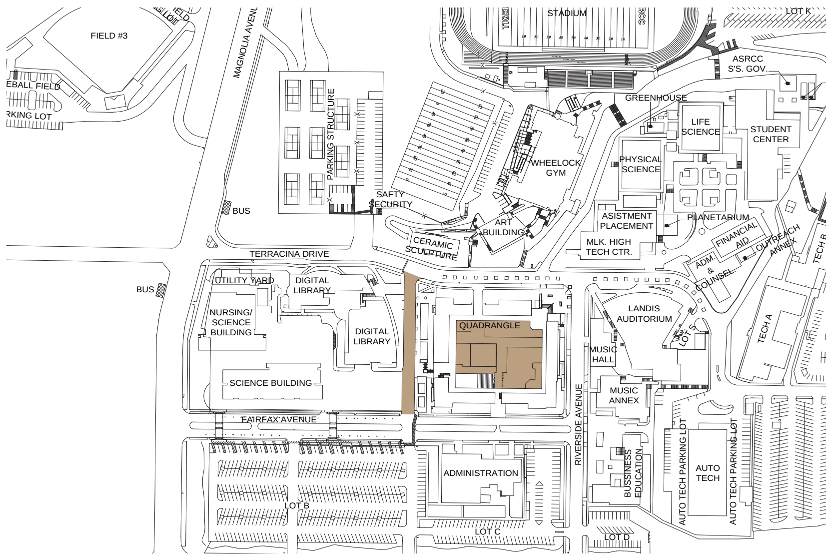
Shoebox fixture 1-4 heads:



II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

COURTYARD + PRIMARY WALKWAY:

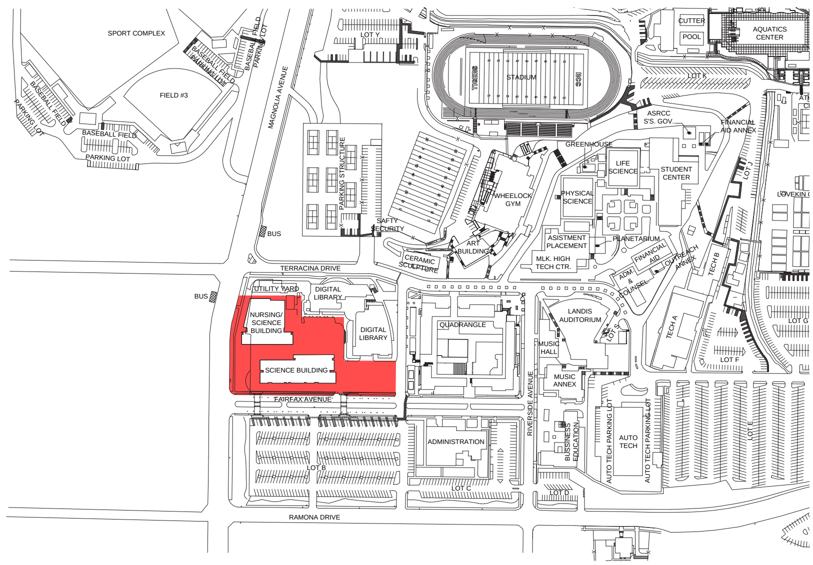
- Quadrangle courtyard



Acorn post top fixture

COURTYARD:

- Nursing + Science Building
- Science Building

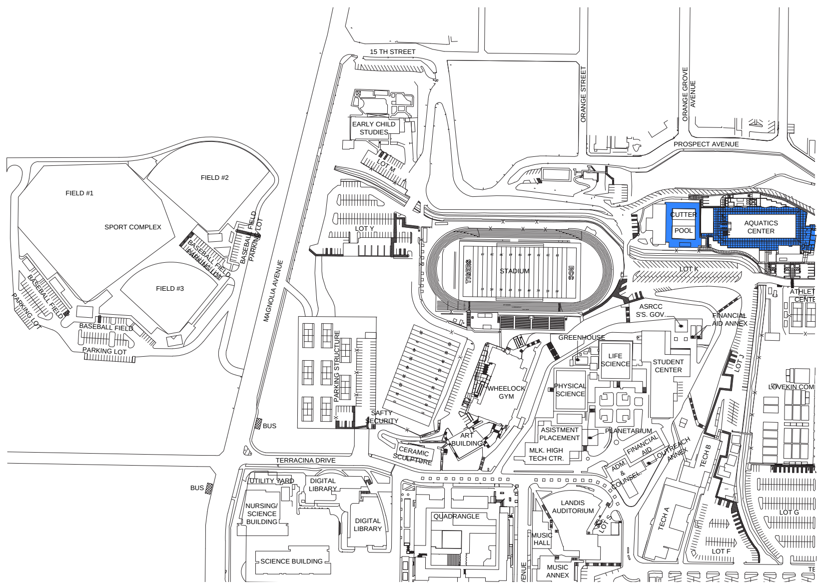


Post top fixture with glare shield: Louis Poulsen, KIPP Series

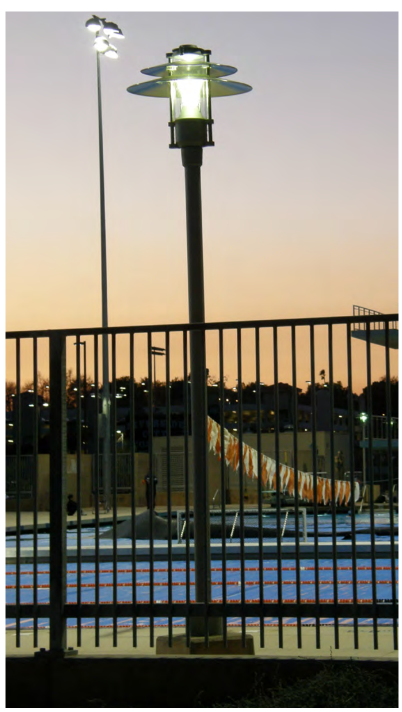
II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

POOL DECK:

- Aquatics Center

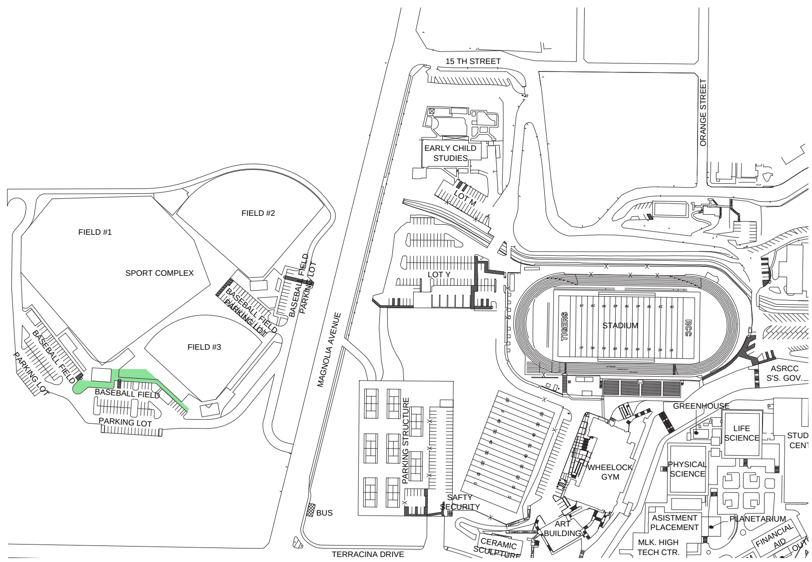


Double Hood Post top fixture with glare shield architectural area lighting. Spectra SP1 Series



SPORTS FIELD ENTRY:

- Baseball Field Entry

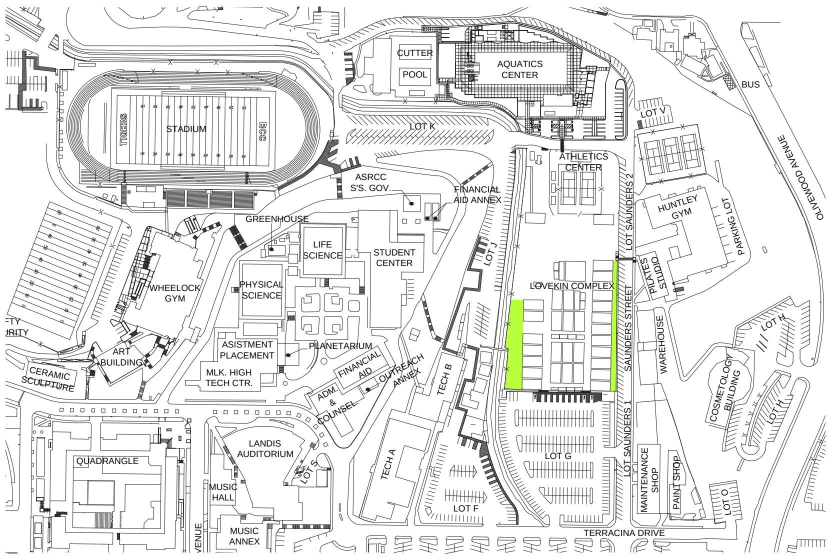


Post top fixture with metal fins + prismatic lens

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

SMALL BUILDING COMPLEX:

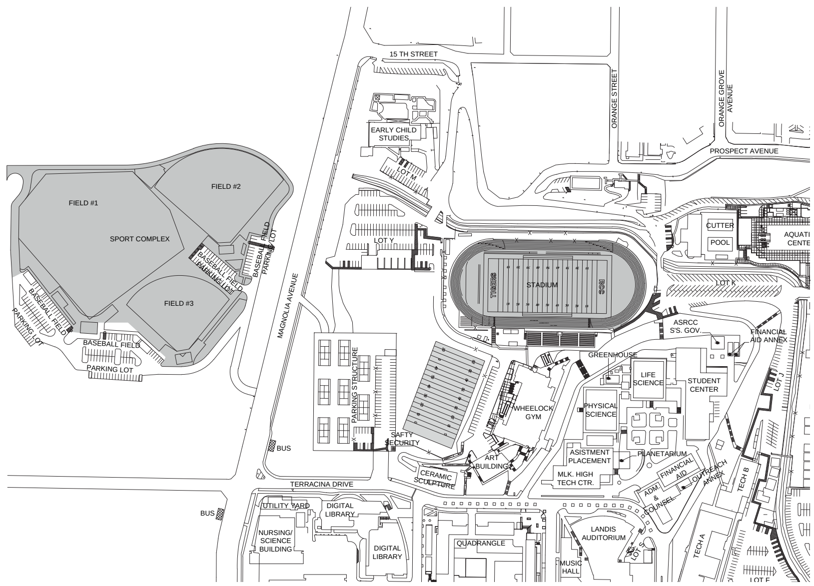
- Lovekin Complex



Sport Flood light
(Currently unoperated)
roof-mounted

SPORT FIELDS:

- Throughout campus

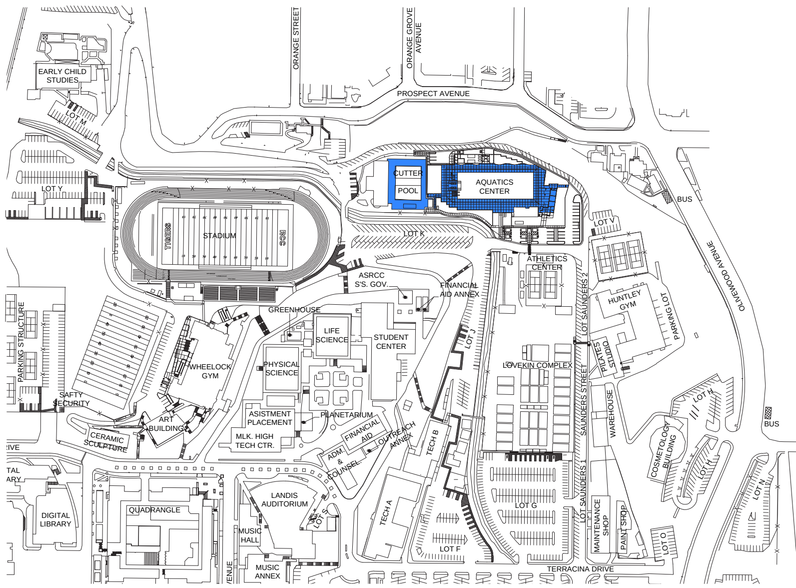


Sports lighting :
Horizontal array with glare shield

II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

SPORTS LIGHTING:

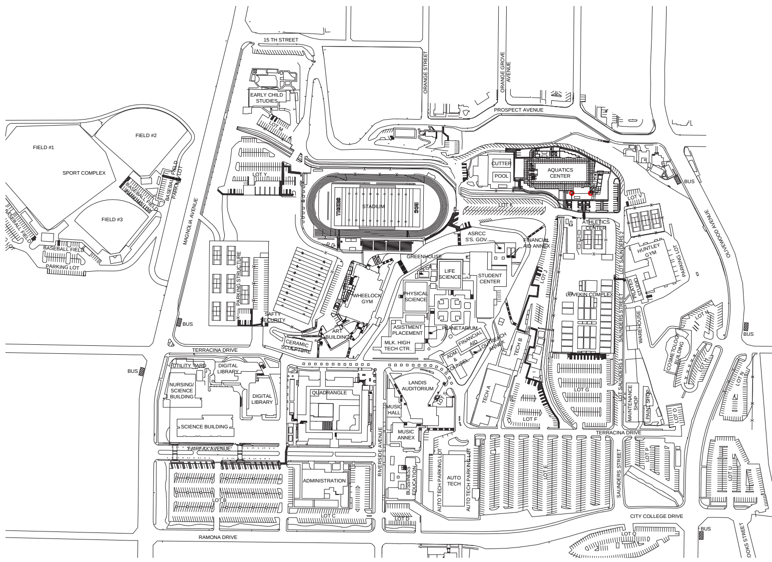
- Cutter Pool
- Aquatics Center Area



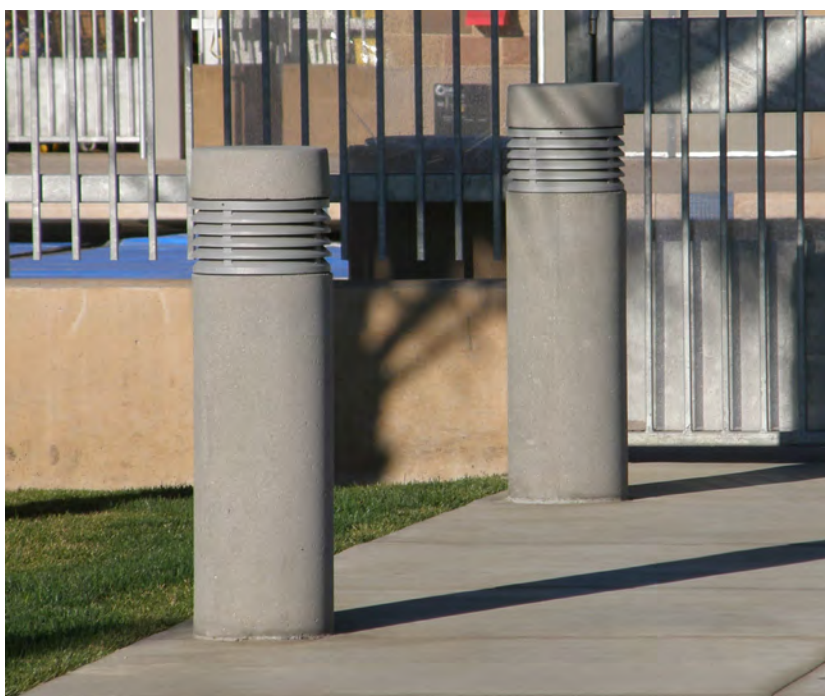
Cluster array with glare shield +
integral pedestrian lighting
MUSCO 5-head cluster +
Lithonia MR Series +

BUILDING ENTRANCE:

- Aquatics Center



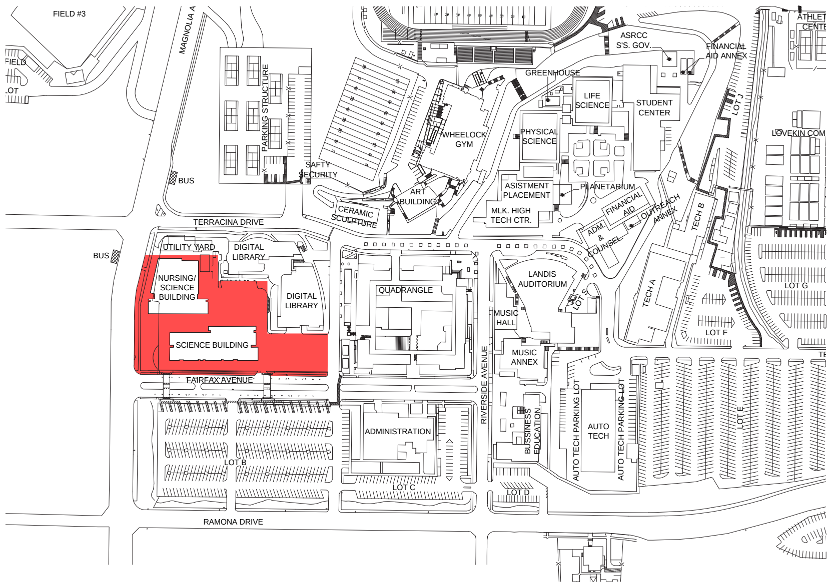
Flat top round concrete bollard with cutoff grille. Architectural area lighting CB Series



II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

COURTYARD:

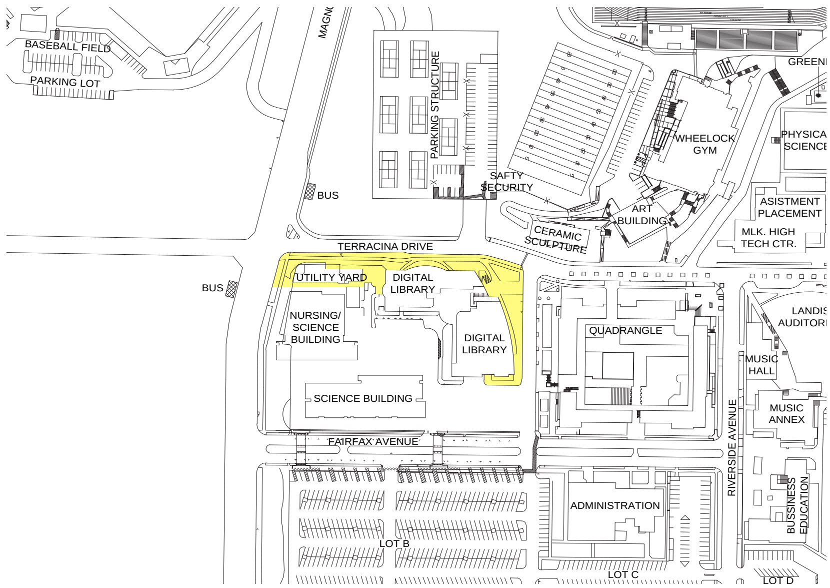
- Nursing + Sciences Building
- Science Building



Bollard with glare shield. Series 2000 Selux BFA

PEDESTRIAN WALKWAY:

- Digital Library Resource Center (DLRC)

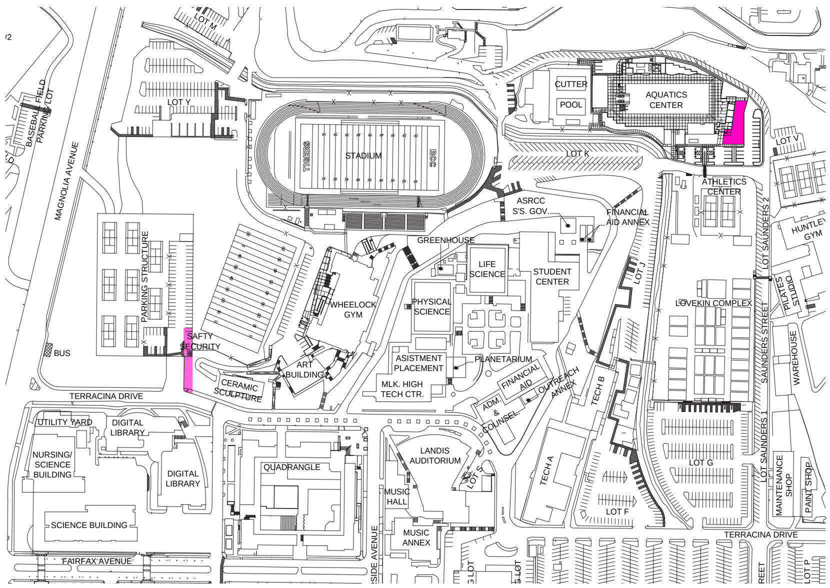


Bollard with glare shield

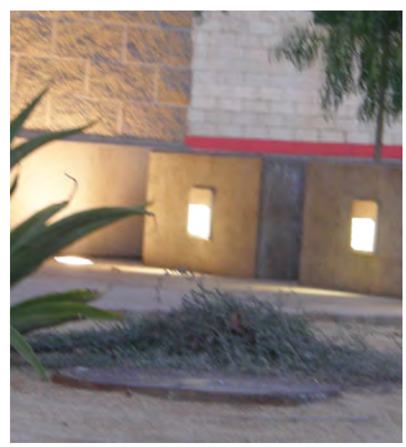
II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

LOW WALL LIGHTING:

- At the bridge from Parking Structure
- Low wall at Aquatics Center

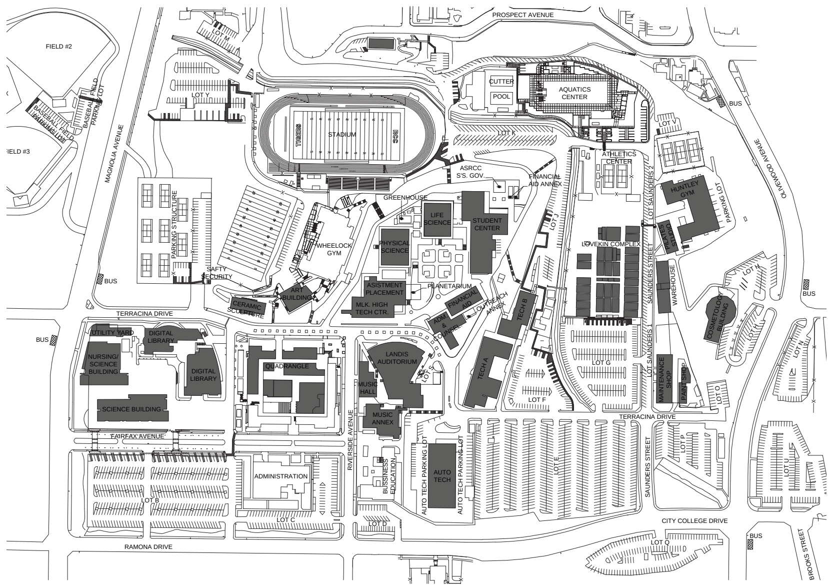


Wall recessed fixture



BUILDING MOUNTED LIGHTING:

- Throughout campus

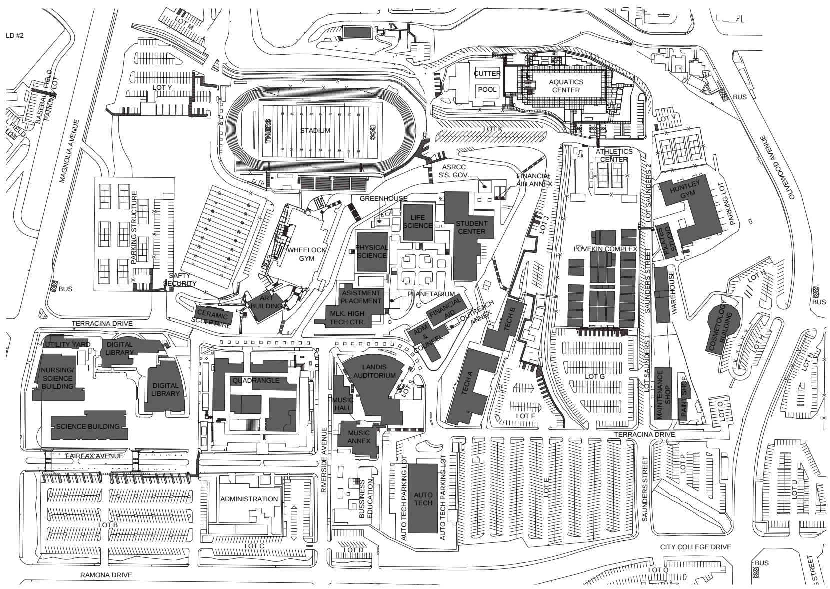


Canopy ceiling mounted and wall mounted fixtures

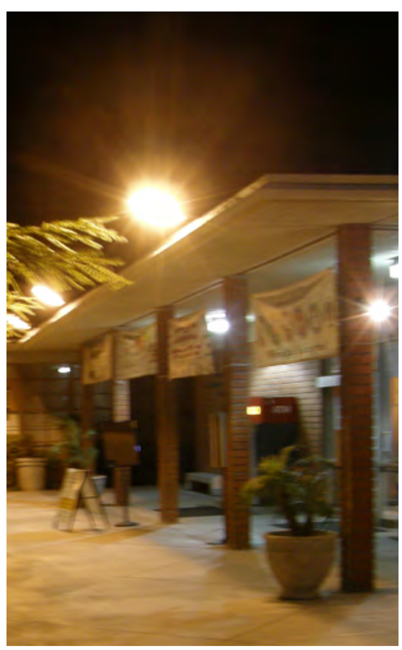
II. EXISTING EXTERIOR LIGHTING FIXTURES (CONT'D)

FLOOD LIGHTING:

- Parking Lots B, C, D, J, Y
- Throughout campus



Wall mounted and roof mounted flood lighting fixtures

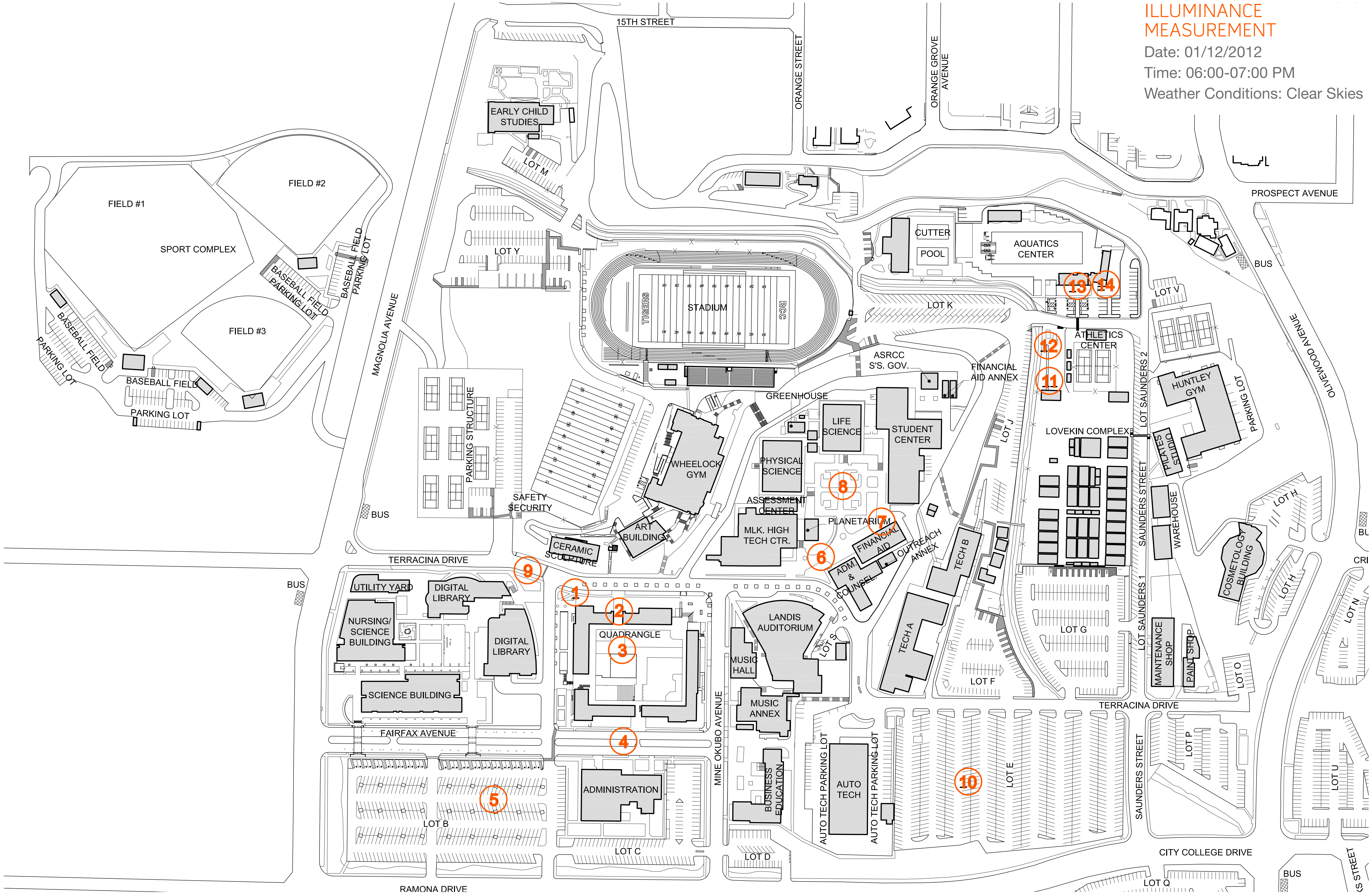


ILLUMINANCE MEASUREMENT

Date: 01/12/2012

Time: 06:00-07:00 PM

Weather Conditions: Clear Skies



0 ft 120 ft 240 ft

SCALE: 1" = 240'-0"

EXISTING EXTERIOR LIGHTING ILLUMINANCE

EXISTING EXTERIOR LIGHTING ILLUMINANCE

	Location	Fixture Type	Lamp Type	Maximum Illuminance at Fixture Location (fc)	Minimum Illuminance around Fixtures (fc)	Note
1	**Pedestrian Walkway** On Terracina Drive, in front of the Quadrangle	Clear Glass Globe Post Top	MH	1.50	0.11	The Average Illuminance is above 0.1 fc. The light level is in the good range but the clear glass globe fixtures produce glare.
2	**Pedestrian Walkway - Building Entrance** Quadrangle Building Entrance	Clear glass Lantern at columns	Halogen	5.00	1.50	
3	**Courtyard** Quadrangle Courtyard	Acorn Post top Fixture with inside Louver and outer ---glass	MH	3.00	0.40	
4	**Primary Driveway** On Fairfax Avenue, in front of the Quadrangle	Clear Glass Globe Post Top	MH/ HPS	1.50	0.04	
5	**Surface Parking** Parking Lot B	Full cut off pole fixture top - Lithonia MR series	MH	4.00	0.60	
6	**Small Plaza** At the small plaza in front of the Admission & Counselling Building.	Clear Glass Globe Post Top	HPS	1.80	-	
7	**Small Plaza** At the small plaza in front of the Student Financial Services Building	Flood lighting on top of the roof	HPS	25.00	-	
8	**Small Plaza** Small Plaza in front of Life Science & Physical Science Buildings	Clear Glass Globe Post Top	HPS	1.00	0.23	
9	**Primary Driveway** On Terracina Drive, between the Quadrangle and the Digital Library Building	Clear Glass Globe Post Top	MH	0.20	0.35	The distance between fixtures are not consistance, some of the fixtures are destroyed.
10	**Surface Parking** Parking Lot E	Cobra heads Fixture	HPS	2.00	0.07	
11	**Primary Walkway** Walkway between Loveskin Complex and the Fitness	Pedestrian Pole fixture	MH	2.00	3.00	Fixtures in this same area have different lamp type & wattage
12	**Primary Walkway** Walkway between Loveskin Complex and the Fitness	Pedestrian Pole fixture	MH	6.00	0.20	Fixtures in this same area have different lamp type & wattage
13	**Building Entrance** Aquatic Center Building Entrance at the Door	Wall sconce	CFL	3.70	-	Part of the illuminance measured is from the interior lighting
14	**Building Entrance** Aquatic Center Building Entrance at the Canopy	Wall sconce	CFL	1.60	-	Part of the illuminance measured is from the interior lighting

III. EXISTING EXTERIOR LIGHTING ILLUMINANCE (CONT'D)

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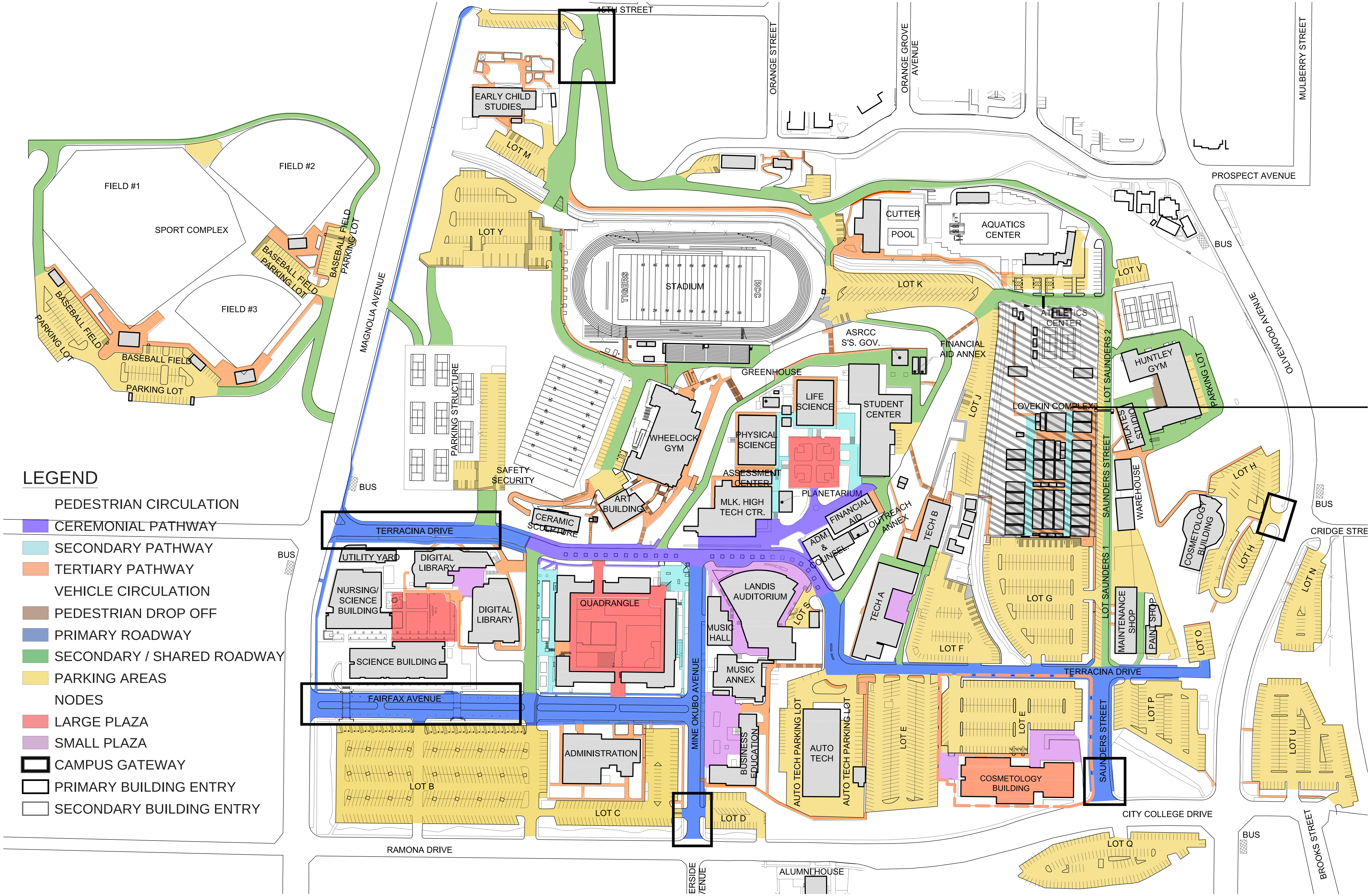
PART B
CAMPUS LIGHTING PLAN



0 ft 120 ft 240 ft

SCALE: 1" = 240'-0"

HORIZON 1 CAMPUS LIGHTING PLAN

PART C

LIGHTING EQUIPMENT PALETTE

INTRODUCTION

Lighting systems reinforce an image of a space, and can support the aesthetic notions of the architecture or landscape design. The lighting elements' appearance and arrangement are defined in a manner that provides visual cues for visual functions as well as by keeping in the stylistic themes of each distinct campus respecting existing character zones on campus.

I. PARKING LOT LIGHTING

Refer to District Lighting Plans

II. BUILDING MOUNTED LIGHTING

- Full-Cutoff Fixture
- High-Efficiency Lamp
- Finish options to be aluminum or silver to support Riverside City College (RCC) campus identity.

1

2

3

4

LEGEND

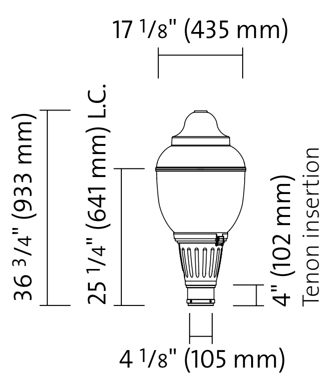
1. Recommended fixtures for exterior building mount: Bega - 2480 Series
2. Recommended fixtures for exterior building mount: Lighting Source - WallPack Series
3. Recommended fixtures for exterior building mount: Gardco - 111LED Series
4. Recommended fixtures for exterior step lighting: Cole Lighting - L600 Series

III. PEDESTRIAN LIGHTING

Throughout the campus, pedestrian routes have the hierarchical designation from Prominent (High-level Illuminance), Legible (Moderate Level Illuminance), and Active ambient (Moderate Level Illuminance) as described in the previous section. All the Illuminance Level Standards will support a range of pedestrian and Public activities of the spaces. The Luminaire height, Lamp Wattage, and Spacing will be configured to meet illuminance requirements per zone. All the Luminaire must meet the following criteria:

PEDESTRIAN POST TOP - NEW POLE IN TRADITIONAL CAMPUS AREA

- Historic Retrofit
- Reduce Glare
- High Energy Efficiency Lamp
- Control System



1

1

LEGEND
1. Recommended fixtures for acorn post top fixture in traditional area: LUMEC - Serenade DSX Series S56-SFX

III. PEDESTRIAN LIGHTING (CONT'D)

PEDESTRIAN POST TOP

- Transitional Contemporary + Contemporary
- Reduce Glare
- High Energy Efficiency Lamp
- Control System

1

LEGEND
1. Recommended fixtures for post top fixture in contemporary area: Louis Poulsen - Nyhavn Park

To provide outlet at pole/base

PEDESTRIAN POLE

- Existing historic concrete poles
- New fluted concrete pole to match existing pole

1

2

LEGEND

1. Existing pole with retrofit luminaire, including Source and Diffuser
2. New pole to match existing pole, when requires: Stresscrete Group King Luminaire. The Pacific Collection

III. PEDESTRIAN LIGHTING (CONT'D)

PEDESTRIAN BOLLARD

- Reduce Glare
- High Energy Efficiency Lamp
- Durable
- Style to match the Pedestrian Pole

1

2

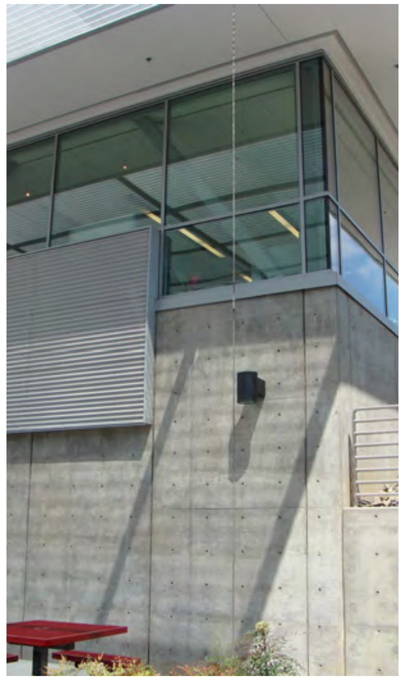
3

LEGEND
1. Recommended Fixtures for Bollard Fixture: Bega - 7762 Series
2. Recommended Fixtures for Bollard Fixture: Beacon - Metro Series
3. . Recommended Fixtures for Bollard Fixture: Selux - MTR Series

END OF SECTION 7 - RIVERSIDE CITY COLLEGE

8 BUILDING DESIGN GUIDELINES

RIVERSIDE COMMUNITY COLLEGE DISTRICT - DISTRICT STANDARDS + CAMPUS GUIDELINES HANDBOOK



INTRODUCTION

The building design guidelines presented within are not intended to be substantially prescriptive for a specific design outcome. The intent is to define parameters within which a compatible design can be achieved. The goal of the design guidelines is to improve the overall aesthetic character and visual unity of each College as a whole. They represent the District's and each College's commitment for future buildings to create a more cohesive, attractive, productive, and sustainable campus environment.

The guidelines will enable future buildings at Moreno Valley College, Norco College, and Riverside City College to integrate with, but not mimic, the architectural vernacular on each campus in order to create a unified atmosphere for generations of students, staff, and community to come. The guidelines are the result of a study of the existing aesthetics and style of buildings on each campus, as well as an analysis of how the buildings interact with exterior spaces.

Lastly, materials and colors are identified that are compatible with those used in the earliest and most current campus buildings at each site.

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SECTION 8
MORENO VALLEY COLLEGE

PART A

CAMPUS DESIGN VERNACULAR

The purpose of the campus is to bring together diverse people and their ideas in an environment that creates potential for intellectual and social success. The physical character and quality of a campus is defined by both its buildings and its open shared space of campus. The outdoor rooms also promote the sense of community derived from actively shared space.

Moreno Valley College is notable for its spectacular mountain backdrop, elevated from the neighboring residential community. The local habitat hosts a desert climate and a richer diversity of wildlife species. The campus is nestled into a slope, framed by rock outcroppings occurring on the steeper slopes. The College has a uniform style and building materials palette: stucco and red tile roof (common to Southern California). The campus site currently sits aloof, set back from the streets and the community. Future developments will potentially establish the campus at lower levels, engaging the street and the community.

As tools for campus development, the intentions of these guidelines are to identify the range of materials and features that are shared by the collection of buildings and to limit and exclude materials and features which are visually disruptive to the recognition of cohesive campus places. The following pages outline and identify the existing campus vernacular as it stands today, as well as precedents for the future fabric of the campus, in which recommendations are put forth.

PART B
ORIGINAL CAMPUS ARCHITECTURE

I. PLAY ON SOLID + VOID

- Building Entry
- Openings

II. ARCHITECTURAL CHARACTER

- Massing
- Horizontality
- Symmetry
- Asymmetry
- Rhythm
- Repetition
- Visible Circulation
- Heavy Columns
- Datum
- Roofline

III. CONNECTION TO SURROUNDINGS

- Line of Sight
- View Corridor

I. PLAY ON SOLID + VOID

BUILDING ENTRY

Many entrances on the campus are recessed and located behind other architectural elements.

The main entrance of the Humanities Building is situated behind the adjacent monumental stair. Students and visitors need to walk around the heavy columns as there is no straight visible path to the entry from the main campus walkways.

Difficult to find entries and are unfriendly to visitors and students.

OPENINGS

- Deep inset windows

Windows are regularly spaced and arranged symmetrically.

- Ribbon windows

The horizontal bands of windows tend to be located on elevated walkways and bridges. They are a typical feature on campus.

- Framed openings

Large framed openings occur along walkways and bridges allowing for a direct connection with the outdoors. The punctures also introduce depth into the facade.

II. ARCHITECTURAL CHARACTER

MASSING

Building designs are strongly identified by geometric massing, often expressing the structures as “objects” in a “field”.

Massing is most often symmetrical, lending to a more formal character.

Buildings are monolithic and boxy, lending to a homogenous character.

Building massing is broken up and offset to create conditions that often result in spaces where users can congregate, such as terraces and balconies. When it occurs, variation in the mass of individual buildings helps break the scale, transition spaces from outside to inside, and create a more diverse palette of spaces.

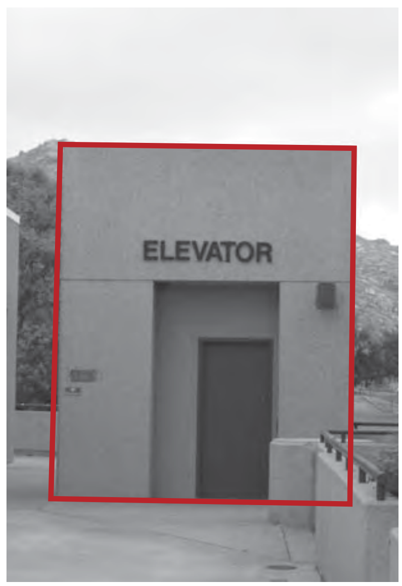
HORIZONTALITY

The overall building proportions on campus tend to be horizontal in nature, consisting of two or three stories, which contributes to a pleasant human scale.

- Horizontal articulation
- Grounded volumes

II. ARCHITECTURAL CHARACTER

VISIBLE CIRCULATION



Visible vertical circulation is an strong component of the architectural language used in the original buildings. Because the campus resides on a hilly site, the need for stairs, elevators, and ramps is high, and thus manifests in detached vertical circulation volumes.

- Dominant vertical elements
- Independent massing

HEAVY COLUMNS

The design of solid, heavy elements is universal throughout the campus, anchoring and grounding the spaces and elements.

DATUM

The horizontal outdoor balconies act as datums and planes of reference that help break the scale of large surfaces, and clarify the internal organization of the building by identifying floors.

II. ARCHITECTURAL CHARACTER

ROOFLINE

Roofs on campus are both pitched and flat and at times, or a combination of both. Where both forms are present, pitches are used to call out and emphasize important segments of the building, such as entryways or vertical circulation.

The consistent use of pitched roof elements visually unifies the buildings on campus.

III. CONNECTION TO SURROUNDINGS

LINE OF SIGHT/VIEW CORRIDOR

All buildings at Moreno Valley College are oriented to take advantage of the dramatic views to the valley below and to the hills above.

Where buildings are obstructing the views, breezeways are utilized to open up vistas across the campus.

PART C

2007 FACILITIES MASTER PLAN DIRECTION

2007 FACILITIES MASTER PLAN DIRECTION PART C

INTRODUCTION

The 2007 Moreno Valley Campus Long Range Educational & Facilities Master Plan (EFMP)conceptually identifies three axes, one responds to the mountains (both adjacent and distant), one to the community, and one to the main campus entry.

The EFMP sought to address architectural identity and three critical issues:

- Accessibility and the need for redundancy in accessible vertical circulation.
- Terracing and response to the mountain slope.
- Creating gathering spaces for student interaction.

The 2007 EFMP sought to address these critical issues with the implementation of an URBAN ENVIRONMENT by means of creating a PROGRESSION OF EXPERIENCES. The benefit of this strategy were many:

- Creating shade
- Connecting multiple buildings on multiple levels
- Establishing spaces hospitable to pedestrian interaction
- Creating an identifiable presence for the campus within the community

PART C

2007 FACILITIES MASTER PLAN DIRECTION

The EFMP posited that focus on public space was critical to the development of an urban environment. Further, it recommended that these spaces be pursued as a “progression of experiences”

The following were identified as the most critical architectural elements:

- Plazas and Towers as Nodes
- Gateways and Boundaries
- Line of Sight/View Corridors
- A Sense of Discovery
- Human Scale
- Public to Private Gradation
- Creating Space for Interaction
- Colonnades
- Entrance and Skin
- Fenestration
- Grid and Scale
- Communicate Presence to Community

COMMUNICATE PRESENCE TO THE COMMUNITY

The EFMP suggested that Moreno Valley College, similar to the Acropolis, is sited on a hilltop location. Unlike the Acropolis, the EFMP intended the College to become a presence at the base of the hill.

- Create iconic nodes + tower elements
- Terrance public spaces down to the main street
- Contrast “connection” spaces with “elevation” spaces

PART D
CURRENT ARCHITECTURAL AESTHETICS

CURRENT ARCHITECTURAL AESTHETICS PART D

Current planning design, and construction for the campus has deviated from the vernacular of the original campus architecture. New buildings emphasize translucency, transparency, diversity and introduce progressive and modern architecture to the campus.

Translucency = "said of a building that transmits lights and diffuses it sufficiently so that an image cannot be seen through the material clearly"

Transparency = "made visible by light shining though from behind"

Diversity = "the condition of having or being composed of differing elements, variety"

I. STUDENT ACADEMIC SERVICES BUILDING (SAS)

The predominant massing of the new building is based on geometric proportioning with flat roofs and parapets, modulation of surfaces and fenestration, and interplay of simple geometric shapes.

The SAS building is envisioned as the “Gateway to the College” in both a physical and functional sense. The exterior of the building is designed as a layered facade. A large curved glass curtain wall connects visually to the campus quad and the community.

This project completes the campus quad, developed by the original campus buildings.

HORIZONTALITY

Although the building is predominantly horizontal in nature, a play on sizes and composition of architectural elements creates variation and aesthetically pleasing facades. The overall horizontality is brought through in each element.

ENTRY + TRANSPARENCY

Located on the edge of campus on a higher level elevation of the adjacent mountain, the SAS is the first building that will be visible as students, faculty, staff, and visitors approach the campus.

The large glass exterior, when lit at night, will act as a beacon for the College.

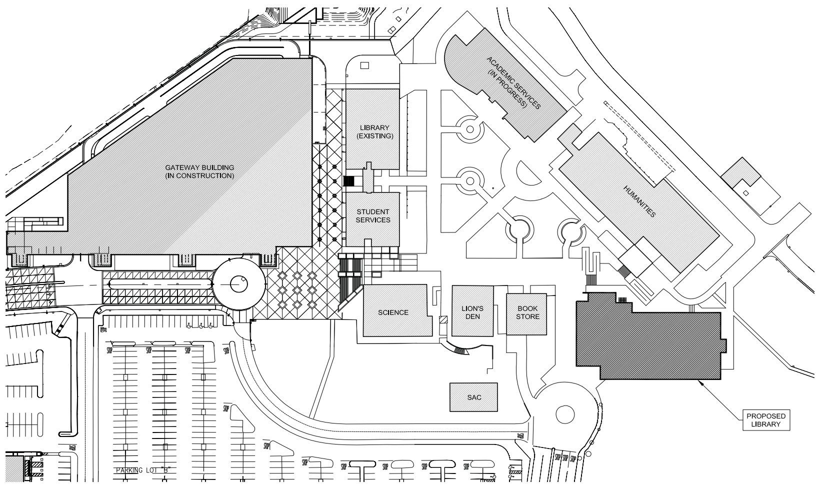
II. LIBRARY/LEARNING CENTER

Siting

The Library Learning Center (LLC) will be located at the southeast corner of the main academic quad. Understanding the campus' climate, the east-west orientation affords a multitude of high performing design opportunities. The eastern half of the two story building is engaged in the hillside. This established a fundamental design philosophy that speaks about the building as "being of the earth." Strong horizontal building features emerge from the hill, and compliment the dramatic mountain backdrop. Materials and massing reinforce the connection the building has to its site and setting.

Presence and Permeability

The LLC is a departure from the existing campus in terms of composition and materials. The goal of the project is to create a welcoming and easily identifiable learning experience for students. The building massing affords ground floor permeability - thus strengthening the building's connection to the student experience. The entrance is easily identified from within the campus quad. As one enter that campus from the south, large glass windows erode anonymity and ambiguity and give people an instant view in the heart of the library.



Front Door

The LLC forms the terminus of the triangular campus quad. It is located at the intersection of a major pedestrian passageway and the entrance to the Humanities Building. The two-story lobby faces directly into this student-rich nexus, and welcomes students and faculty with a large canopy. The two story glass volume is screened from the western sun by a series of diffuse channel glass panels. This allows gracious views in and out while tempering the environment immediately adjacent to the front door.

Massing

The building massing merges social with environmental needs. The second floor is stretched and shifted off the first floor. This shift creates deep overhangs along the south and west facades. This reduces glare and heat gain while giving students a shaded canopy to walk under or gather. Expanding the second floor allows light to permeate the first floor from multiple directions via light monitors and clerestories.

MATERIALS

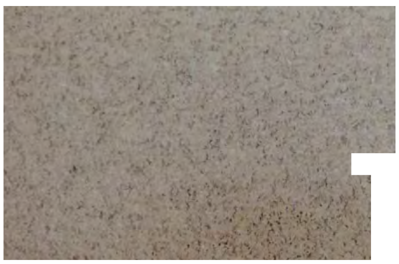
The proposed material palette is conceived as a compliment to the natural setting. Warm materials "of the earth" such as stone veneer, cement plaster, and wood are complimented by the cool tones of channel glass and metal panel. Materials are chosen based on their ability to perform multiple functions. Durability is paramount in this climate; therefore materials facing south and west have low life cycle cost. Aesthetically, stone is used at the ground level to reinforce the building's connection to the ground. Transversely, ephemeral glass is used where the building meets the sky.

PART E

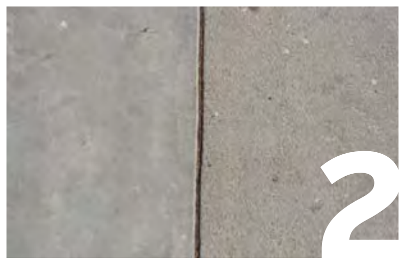
EXISTING MATERIALS + COLOR PALETTE

Natural, raw materials typically used on site are: stucco, precast sandblast concrete aggregate panels, glazing and metal. The color palette is within the range of warm earth tones established in the Main Quad. Walls are a medium to light color and roofs are mostly a red terra-cotta color.

Exposed materials need to withstand wind corrosion from the Moreno Valley atmosphere.



STUCCO



CONCRETE

CLAY ROOF TILES

GREEN GLAZING

CLEAR GLAZING

BRONZE GLAZING

- Multiple colors of glass of window mullions detract from the visual unity of the campus.

PART F

FUTURE BUILDING FABRIC

DESIGN INTENT

The intent of these building design guidelines is to create a cohesive collegiate campus identity while supporting an attitude of architectural diversity and discovery. The guidelines are not intended to be prescriptive, but rather to establish the basic premises and clear intent within which creative design decisions should be made.

These guidelines are the result of the study of existing aesthetics combined with study of the rich natural setting. As such they build upon the positive traditions set by the original campus architecture and introduce new elements that support the campus vision and goals for the future.

Visually speaking, all new buildings should contribute as supporting members of the campus image and as components of the network of public spaces. Unique "object" buildings, which in their architectural expression or form are far away from the campus vocabulary will be evaluated and allowed if the intent is to give focus or visual delight within a specific area of the campus.

Moreno Valley College is located in a desert community, therefore using desert-inspired architecture as inspiration drives appropriate response to the local climate, context, and ecology.

Scottsdale First Assembly, Scottsdale, Arizona

MASSING

- Response to Topography

Varied topography creates interesting opportunities - a structure can visually become part of the site by engaging the surrounding landscape. A building with broken massing is an appropriate response to the terraced site conditions and is encouraged. It enables users to experience the building at various elevations.

Manipulating building massing breaks down the scale of large surfaces and creates welcoming entries, retreats, and vistas. Creation of open spaces such as courtyards and patios should be viewed as a positive outcome of building siting, rather than a residual by-product.

Future buildings at Moreno Valley College should embrace the site topography and focus on the identity of the campus within its hillside setting.

Copper Haus
Las Vegas, Nevada

MASSING

- Response to Human Scale

In the future, the campus should break away from its monolithic character. Human scale is affected by many elements, including the size, proportion, and volume of a building mass and materials.

Offsetting masses change in planes, materials, and/or volumes creates hierarchy and breaks down the scale of large buildings.

The shift in massing can also create conditions that help to shield a building from solar heat gain and result in spaces where users can congregate.

Mush House
Los Angeles, California

Mush House
Los Angeles, California

ENTRIES

- Building Entry

Entries need to provide clear and memorable transitions between indoor and outdoor spaces. They are an element that can be used to continue the campus tradition of play on solid and void.

Building entrances are frequently occupant meeting and gathering places, and should be designed to encourage interaction.

Bangkok University Kluaynamtai Campus, Bangkok, Thailand

Merricks House Mornington Peninsula, Victoria, Australia

ENTRIES

- Entry Portals + Gateway

Entries should be better defined through careful siting, orientation, and architectural expression. Entries provide a great architectural opportunity, and lend themselves to specialized lighting. Though signage and lighting can help wayfinding, it is preferred that building entries are expressed through architectural elements.

There is an opportunity to include a large surface for media projection.

MK'MIP Desert Cultural Center
Osoyoos, British Columbia

xxx

OPENINGS

- Horizontality

To visually tie the existing buildings with newly designed buildings, architectural elements from both can be used in the composition. The openings on the original campus buildings utilize deep inset openings, ribbon windows, and framed openings. Recessed, deep inset window frames provide opportunities for Cliff Swallows (a protected species in California) to nest, an undesired architectural feature to be avoided on future projects in campus.

Scottsdale First Assembly, Scottsdale, Arizona

- Volumetric Openings

Strip windows should be used as they allow direct connection to occur between the building interior and its surroundings. This openness encourages integration across disciplines and allows passerby to see directly into the classrooms, witnessing the educational component first hand.

Waubonsee Community College Plano, Illinois

- Transparent Building Masses

Newly designed buildings on the campus have volumetric openings and transparent building masses, which help break down the solid masses that occur on the campus, as well as creating visual hierarchy in the facades.

Cliff Swallow

Kaiser Franz Joseph Hospital School of Nursing, Vienna, Austria

RHYTHM

- Repetitive Volumes

The architectural language of the original buildings on campus primarily has one method of using rhythm: repetitive columns with glass openings in between.

Repetitive volumes can also create a sense of rhythm. The goal is to continue the tradition of rhythm, but interpret or express this element in new ways to create cohesive architectural variety on campus.

House on Lot 23
Colombia

VISIBLE VERTICAL CIRCULATION

Visible vertical circulation is a strong tradition on campus that should be retained.

Exterior circulation spaces become impromptu gathering areas for students before and after their classes and is encouraged as a way to help preserve a consistent campus architectural language.

Humanities Building
El Camino, California

Exterior circulation can help identify access points to buildings.

Paradise Valley Community College, Life Science Building
Phoenix, Arizona

ROOFLINE

As a response to the topography, and as a way to tie the original buildings to the newly designed buildings, future buildings should utilize flat roofs in conjunction with slanted, pitched, shed, and /or tilted roofs. This new roof language becomes part of Moreno Valley College's unique identity.

Gateway to the McDowell Sonoran Preserve Scottsdale, Arizona

Paradise Valley Community College, Life Science Building Phoenix, Arizona

SOLAR CONTROL

- Horizontal Shading

Ideal southern solar control involves using horizontal overhangs which create ideal conditions for Cliff Swallows to nest. Design of horizontal shade elements should refrain from creating nooks and small spaces in which swallows may nest.

Cliff Swallow

The Cliff Swallow is a bird protected under the Federal Migratory Bird Treaty Act that have become a nuisance at the campus. Horizontal planes with nooks and hiding spaces are to be avoided since they provide nesting opportunities for the protected Cliff Swallow population.

xxx

SOLAR CONTROL

- Vertical Shading

- Vertical Fin

During the hottest months of July and August, solar heat gain can be a problem resulting in higher energy costs. Recommendations for minimizing the effects of solar heat gain include an east-west building orientation, solid east and west vertical walls and double skin screen walls.

Projecting vertical walls/ fins can be used to identify entrances and protect glass storefront from solar heat gain.

Scottsdale First Assembly, Scottsdale, Arizona

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Arizona Science Center, Phoenix, Arizona

SOLAR CONTROL

- Vertical Screening

Vertical screen walls can be very effective in controlling solar heat gain. This type of system consists of an outer skin made up of a screening material or louvered panels placed in a way that it shields against direct solar light and allows air flow in an intermediate cavity.

University of Arizona CALA
Tucson, Arizona

- Louvers

Closely spaced louvered shading devices may help to mitigate the issue of direct southern sunlight without compounding the problem of the Cliff Swallow.

Paradise Valley Community College,
Phoenix, Arizona

xxx

TRANSPARENCY

- Curtain Wall

New buildings should be designed, where appropriate, with a level of transparency that encourages a visual fusion of indoor and outdoor spaces or takes advantage of north diffused light. East, west, or southern facing glass walls can be used, but direct solar exposure will need to be mitigated with shading devices.

Kaiser Franz Joseph Hospital School of Nursing, Vienna, Austria

INDOOR-OUTDOOR RELATIONSHIP

Indoor-outdoor relationships of spaces help to achieve programmatic flexibility and help to reduce energy costs through daylighting while creating interesting spaces that bring the beauty of the outdoors to interior spaces. These connections support the idea of embracing site topography and the idea that buildings grow from the earth.

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VIEW CORRIDOR / FRAMED VIEWS

- Observation Deck

Moreno Valley College is situated on a site with many visual opportunities. Capitalizing on and framing these views from key spaces within new buildings is recommended. The elevated site has vistas to the hills on the east and the valley to the west. Existing circulation corridors line up with these views and future development should be conscious of preserving these sight lines.

Pinnacles Interpretive Center
Nambung National Park, Australia

GATHERING SPACES

Gathering is an important part of the educational process. Informal interaction between students, teachers, staff, etc. encourages collaboration and augments the educational experience. Design of these spaces should be a part of every building design strategy as a way to tie into the adjacent landscape and the campus as a whole.

University of Arizona CALA
Tucson, Arizona

PART G
FUTURE MATERIALS + COLOR PALETTES

FUTURE MATERIALS + COLOR PALETTE PART G

INTRODUCTION

Materials and colors selected for future projects should be appropriate to both the design concepts of the individual projects as well as to the campus as a whole. Appropriateness can be loosely defined by how well the materials and colors contribute to creating harmony in mass, scale, form, color, and context thus establishing desirable learning environments and experiences.

A simple, consistent color palette can do more to provide a sense of visual unity across a campus than any other element. It is closely tied, of course, to the actual materials. A variety of materials and textures can be unified by sharing a common color.

A warm, earth tone, climate-appropriate material and color palette is proposed for Moreno Valley College to integrate with the natural context of the campus. Colored concrete, concrete masonry, terra-cotta, and exterior plaster in browns, reds, rust, and ochre are suggested. The palette has been developed to create a unique culture of place for Moreno Valley College.

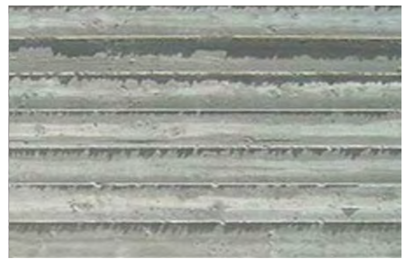
FUTURE MATERIALS PALETTE

PRIMARY PALETTE

CONCRETE MASONRY

STUCCO

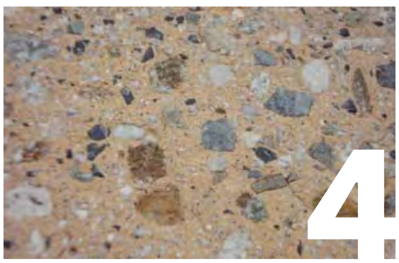
- Finish as approved by College
- Use as secondary/accent material



BOARD FORMED CONCRETE

- Fair faced natural concrete finish w/ reveals

**Note: Colors as printed in this document are an approximation, at best, of the actual paint colors.*



EXPOSED AGGREGATE CONCRETE

- Finish as approved by College
- Use as secondary/accent material

TERRA-COTTA

METAL SCREENING

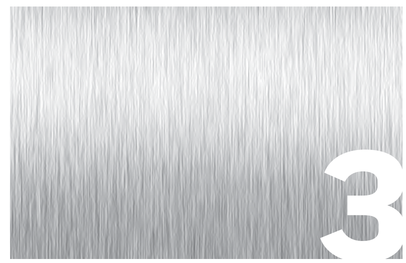
FUTURE MATERIALS PALETTE

SECONDARY PALETTE

SLATE

STAINLESS STEEL

- Brushed stainless steel 304 #4 or high performance coated in a color as approved by College and compatible with existing conditions.

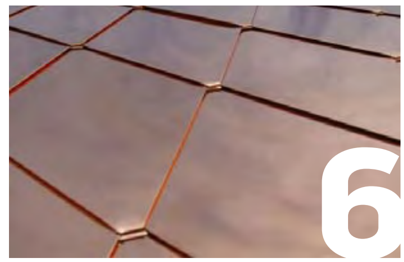


ALUMINUM

**Note: Colors as printed in this document are an approximation, at best, of the actual paint colors.*

FLAGSTONE

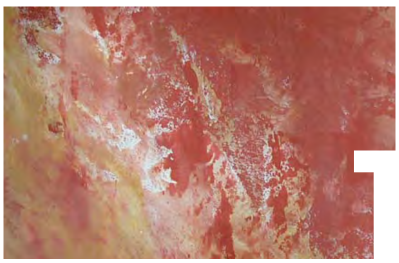
COR-TEN STEEL



COPPER

FUTURE COLOR PALETTE

PRIMARY PALETTE



RUST

CLAY

SAND

OCHRE

**Note: Colors as printed in this document are an approximation, at best, of the actual paint colors.*

SECONDARY PALETTE

PLUM

SAGEBRUSH

TAUPE

FUTURE MATERIALS + COLOR PALETTE

RECOMMENDATIONS FOR EXTERIOR DOORS

- Do not use school color.
- Primary entrances - utilize accent palette colors.
- Support services (electrical, mechanical, storage, etc.) - paint to match adjacent wall surfaces to avoid calling unnecessary attention to these functions.

END OF SECTION 8 - MORENO VALLEY COLLEGE

SECTION 8
NORCO COLLEGE

PART A

CAMPUS DESIGN VERNACULAR

The purpose of the campus is to bring together diverse people and their ideas in an environment that creates potential for intellectual and social success. The physical character and quality of a campus is defined by both its buildings and its open shared space of campus. The outdoor rooms also promote the sense of community derived from actively shared space.

Norco College is committed to improving the visual unity of the campus as a whole. Each new building project should be sited, designed, and oriented to improve the image, sense of place, and functionality of the campus. The majority of buildings on campus were constructed in the 1990s and have one homogenous architectural language.

As tools for campus development, the intentions of these guidelines are to identify the range of materials and features that are shared by the collection of buildings; to limit and exclude materials and features which are visually disruptive to the recognition of cohesive campus places. The following pages outline and identify the existing campus vernacular as it stands today, as well as precedents for the future fabric of the campus, in which recommendations are put forth.

PART B
ORIGINAL CAMPUS ARCHITECTURE

I. ARCHITECTURAL CHARACTER

- Massing
- Solid + Void
- Horizontally
- Thick Building Elements
- Openings
- Covered Openings
- Covered Walkways
- Building Entry

II. EMPHASIS ON SIMPLICITY

- Symmetry
- Rhythm
- Limited Ornamentation
- Simple Geometry
- Exterior Circulation
- Roofline
- Sense of Order

III. CONNECTION TO SURROUNDINGS

- Portals + Gateways
- Indoor-Outdoor Transition
- Framed Portal
- Open Vista
- Change of Material
- Outdoor Room
- Amphitheater
- Courtyard
- Arcade
- Solar Control

I. ARCHITECTURAL CHARACTER

MASSING

The existing monolithic massing and location of the buildings helps shield the campus from driving winds

Human scale elements such as covered walkways are used to break down the scale of large buildings at the Norco Campus and make them more approachable. Arcades along the front of the buildings create a language of solid + void that further helps to break down the scale of the buildings.

However lends to a homogeneous architectural character and is too similar to Moreno Valley College.

SOLID + VOID

The original buildings are characterized by their solid walls and punctured openings (void).

This narrative of solid + void creates occasional glimpses of building occupants.

The articulation of the buildings is enhanced by the thickness of the exterior walls that creates shadows on the facades.

The patters of light + shadow becomes the articulation of the buildings.

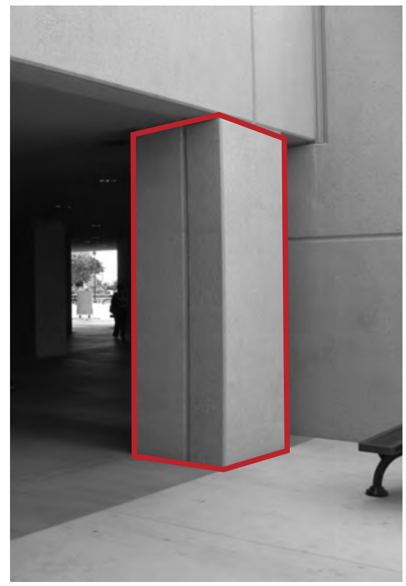
The thick exterior walls and deep openings enhance this pattern.

I. ARCHITECTURAL CHARACTER (CONT'D)

HORIZONTALITY

Norco College sits on a "mesa" surrounded by rolling hills. The existing buildings are generally low horizontal structures, two-three stories high, with prominent horizontal banding across the facades.

THICK BUILDING ELEMENTS



Some exterior elements appear to be too deep and not of a human proportion, which makes the buildings appear excessive bulky.

OPENINGS

The openings of the original buildings are characteristically deep and recessed.

The new Center for Student Success (CSS) building is a departure from the original structures and utilizes different opening types. Ribbon windows, individual openings and volumetric openings are used throughout this building.

COVERED WALKWAYS

One of the unique characteristics of the Norco campus is the use of covered walkways. These walkways serve purposes other than just providing dry, shaded pathways for users to circulate around the campus. They also serve to define the campus quad and as a threshold to the campus interior.

I. ARCHITECTURAL CHARACTER (CONT'D)

BUILDING ENTRY

- Clearly defined entry

Main entries to the original campus buildings usually occur at building corners or intersections where two building masses meet.

- Clearly defined corner entry

Whether a symmetrically balanced façade or an asymmetrical design, the entrances are obvious, either through prominent appendages or dramatic recesses and overhangs.

II. EMPHASIS ON SIMPLICITY

SYMMETRY

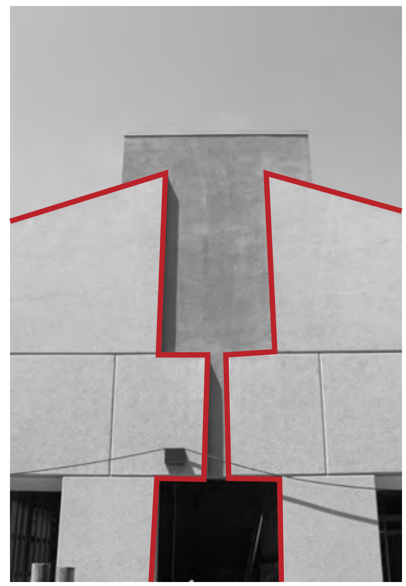
Symmetry at the Norco campus is a strong architectural element. Hardscape elements further emphasize building symmetry by bisecting the building along the axis.

II. EMPHASIS ON SIMPLICITY (CONT'D)

RHYTHM

The patterned repetition of columns and framed openings are characteristic of the buildings on campus. The rhythm that is set up in the campus buildings are also evident in the hardscape and covered walkways.

LIMITED ORNAMENTATION



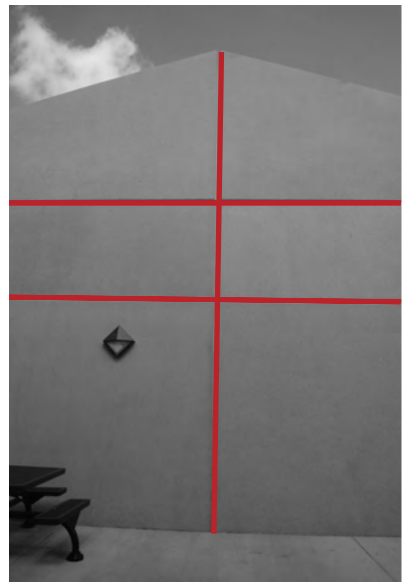
Campus buildings are very simple and characterized by limited applied ornament reminiscent of postmodernism. Structure, function, siting, and orientation are the elements that influence the design aesthetics.

ROOFLINE

Roofs are used as unifying elements. They are normally uniformly sloped with gabled or hipped ends. From afar or at certain angles they often appear flat.

The two-story pitched roofs respond to the adjacent residential and navy structures, rather than create a unique campus identity.

SIMPLE GEOMETRY



Text

II. EMPHASIS ON SIMPLICITY (CONT'D)

EXTERIOR CIRCULATION

text

The horizontal architectural expression is contrasted only by the occasional vertical form of an open stair or solid service core enclosures. This helps to break up the building mass and provide preconditioned space for entries to the buildings.

III. CONNECTION TO SURROUNDINGS

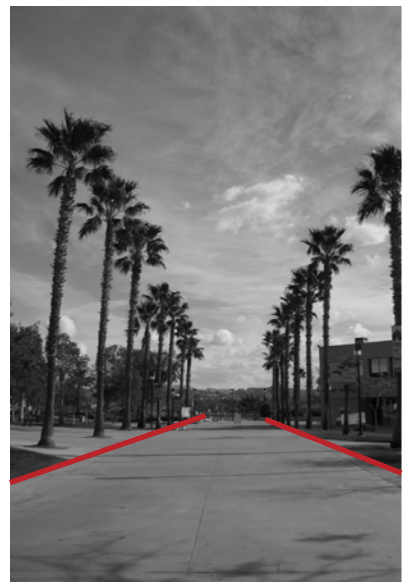
PORTALS + GATEWAYS

The primary purpose of gateways, whether pedestrian or vehicular, should be the symbolic passage into the campus realm. Secondarily, gateways may also be made operational, where appropriate, to regulate access.

INDOOR-OUTDOOR TRANSITION + FRAMED PORTAL

III. CONNECTION TO SURROUNDINGS (CONT'D)

OPEN VISTAS



The Norco campus was initially planned and designed to take advantage of open vistas and views to its surroundings. These vistas that open out on both ends of the main circulation spine and those framed at the campus entries and exits, are important assets to the campus.

OUTDOOR ROOM

Interaction between indoor and outdoor spaces, in the form of courtyards, arcades, and other interstitial spaces, is a significant element of the Norco campus. Other than student gathering areas, they also function as wind breaks.

III. CONNECTION TO SURROUNDINGS (CONTINUED)

AMPHITHEATER

The amphitheater is one of the primary architectural elements on campus; however, it's large scale and exposure to the wind results in its minimal use.

COURTYARD

Arcades provide shelter from sun and rain, and courtyards create a comfortable environment well protected from the wind.

The courtyard at the Industrial Technology (IT) Building feels isolated and is not used to its maximum potential; there are no seating areas and no umbrellas/shade structures, but it does protect from wind.

The District is also concerned that isolated courtyards could be unsafe and are hard to supervise.

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PART D
CURRENT ARCHITECTURAL AESTHETICS

CURRENT ARCHITECTURAL AESTHETICS

INTRODUCTION

Current planning, design, and construction for Norco College has deviated from the vernacular of the original campus architecture.

New buildings introduce a modern vocabulary and an institutional presence.

I. CENTER FOR STUDENT SUCCESS (CSS)

In September 2010, Norco College unveiled its brand new Center for Student Success (CSS). The modern steel and glass design of the building sets it apart from the surrounding campus structures and serves to draw students into the main destination/gathering place on campus.

The building features exterior seating, adjacent to the new cafeteria, that is shielded from the wind by natural and man-made wind barriers.

The facility's design, placement on site, and transparency encourages students as the commuter campus to linger after class, participate in students activities on campus, and become part of the campus culture.

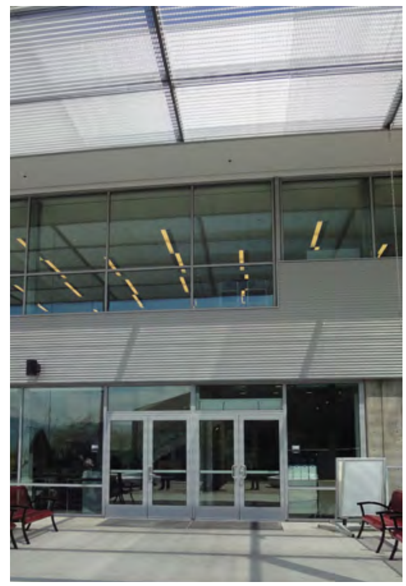
OPENINGS

This building is a departure for the original campus architecture and utilizes different opening types. Ribbon windows, individual openings, and volumetric openings are used throughout this building.

Building entrances are identified by planar elements and material changes.

Perforated metal panels are used in the building as an excellent mean of achieving sustainable design objectives. Perforated sunscreens provide privacy for building occupants without blocking the view. And they offer a comfortable level of natural lighting during daylight hours while deflecting heat to reduce the load on the HVAC system. Perforated façades can also be used to help control interior climate and save energy.

BUILDING BASE



I. CENTER FOR STUDENT SUCCESS (CSS) (CONT'D)

BUILDING BASE

- Anchored to the ground

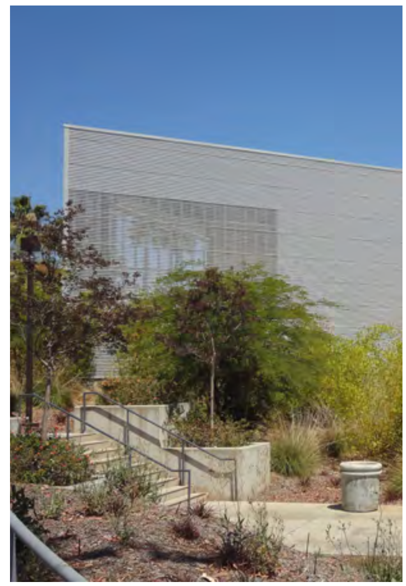
The CSS introduces a strong building base into the campus architecture.

The CSS introduces a strong building base into the campus architecture.

SOLAR CONTROL
HORIZONTAL

The broad overhand protects both openings to the building and the users in the courtyard and below.

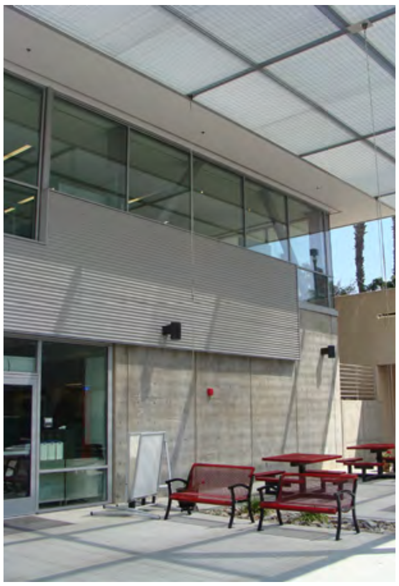
VERTICAL

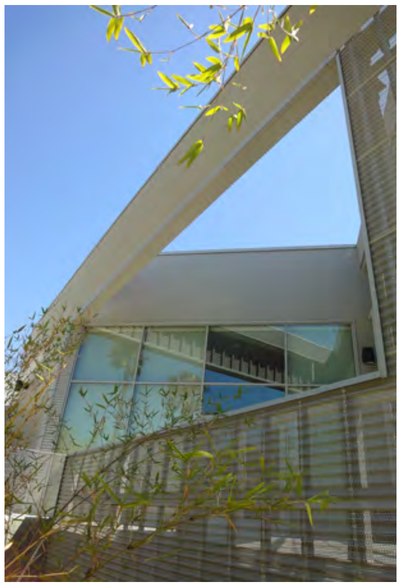


The vertical metal screen shields the western facing openings and allows airflow to the porch adjacent to the board room.

I. CENTER FOR STUDENT SUCCESS (CSS) (CONT'D)

CHANGE OF MATERIAL





- Layering of planes and materials

The building layers planes of different materials—glass, concrete, metal, siding, metal screening—to create a low-relief, articulate facade that is enhanced by subtle shadows and screened light patterns.

INDOOR-OUTDOOR CONNECTION

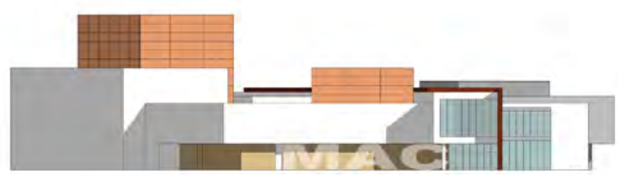
The CSS is the first building on the campus to blur the line between interior and exterior spaces.

TEXT

The courtyard adjacent to the cafeteria and dining area is directly connected and its overhead canopy and thoughtful furnishings make it one of the most successful outdoor spaces on campus.

II. MULTIMEDIA AND ARTS CENTER (MAC)

Text



Text

III. CENTER FOR HUMAN PERFORMANCE + KINESIOLOGY (CHPK)

The building will be located at the northwest side of the campus, and will serve as an anchor along the main axis which runs through the campus interior. The CHPK will work with the terrain by serving as a bridging element between the main part of campus and the playfields to the west.

The building is designed as a split level structure, with two entries: a formal, vehicular-friendly entry on the north, and a pedestrian entry off of the campus main axis on the south. The north facade is highlighted by a modular series of columns which lead to the main first floor lobby.

The Center for Human Performance and Kinesiology will be a high performance building which maximizes solar passive design techniques. By locating low-e, dual pane glazing along the north façade, utilizing the thermal mass of the terrain itself, incorporating shade structures along the east and west façades and horizontal canopies along the south facades, and ensuring high insulation values for the envelope

ENTRY

From the south, a horizontal canopy will greet and guide pedestrians as they approach the building from the campus interior. This entry will open to a second floor level lobby space. The second floor will afford views of the playfields to the west.

MATERIALS & COLOR PALETTE

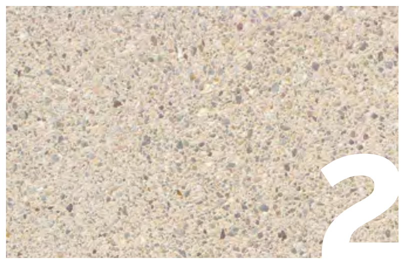
The building will be composed of a palette of concrete, metal panel, steel, vision glazing, and Kalwall. Neutral tones will be highlighted with a rusticated red tone, which references the vernacular roof tiles on the main campus buildings. This palette aims to respect the existing aesthetic of the main campus, while providing the College with a contemporary appeal.

PART E

EXISTING MATERIALS + COLOR PALETTE

The original buildings on the Norco campus are constructed of a sand color exposed aggregate concrete with stucco infill panels. This natural palette of colors and materials are very similar to the surrounding environment and therefore buildings blend in the surrounds without a sense of hierarchy.

STUCCO

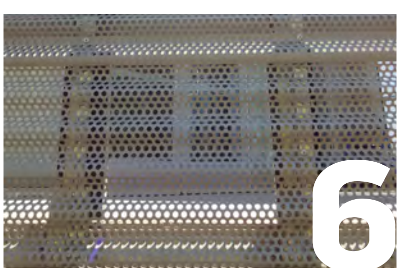


AGGREGATE CONCRETE

RED TILE ROOF

CONCRETE MASONRY

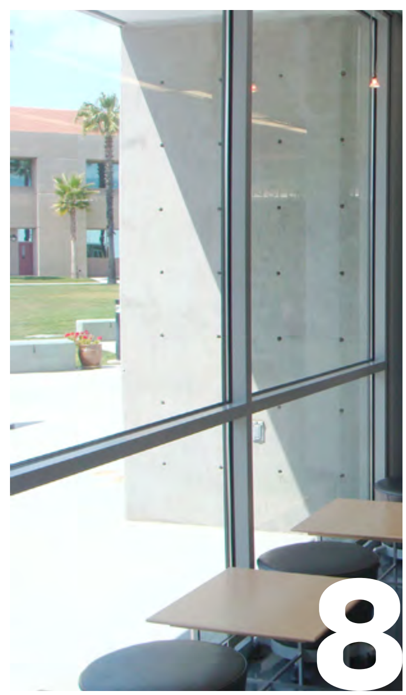
CONCRETE



METAL SCREEN

Perforated corrugated metal in a stainless or a galvanized finish

METAL SIDING



NEUTRAL GLAZING

PART F

FUTURE BUILDING FABRIC

DESIGN INTENT

The intent of these building design guidelines is to create a cohesive collegiate campus identity while supporting an attitude of architectural diversity and discovery. The guidelines are not intended to be prescriptive, but rather to establish the basic premises and clear intent within which creative design decisions should be made.

These guidelines are the result of the study of existing aesthetics combined with study of the rich natural setting. As such they build upon the positive traditions set by the original campus architecture and introduce new elements that support the campus vision and goals for the future.

Visually speaking, all new buildings should contribute as supporting members of the campus image and as components of the network of public spaces. Unique “object” buildings, which in their architectural expression or form are far away from the campus vocabulary will be evaluated and allowed if the intent is to give focus or visual delight within a specific area of the campus.

*Note: Norco College is currently completing a new Facilities Master Plan that should be referenced for all future building design

DongWha Pharmaceuticals Laboratory
Gyeonggi-do, Republic of Korea

MASSING

The existing architectural character of the Norco campus is one that responds to the pedestrian character of its use as well as the context of the surrounding structures. As the campus expands and grows, the relative scale of buildings will also increase. It will be necessary for new buildings to respond to the scale of existing buildings to ensure that the campus remains sensitive to the overall pedestrian scale that currently exists.

Massing is one of the more significant factors that contribute to establishing the character of a specific building. The design should contribute to the human scale and proportions of a pedestrian-oriented campus.

Gardiner Museum
Toronto, Canada

OPENINGS

- Volumetric openings

Curtain walls or storefront windows can be used in certain location to accentuate a volumetric expression, create openings between inside and outside, and highlight a specific activity in a building.

Any vertical articulation should be used sparingly so that the low-lying character of the campus is not overpowered.

Kupferberg Holocaust Resource Center, Bayside, New Yor

- Ribbon windows

Windows can be expressed as horizontal bands that allow direct connection to occur between the building interior and surroundings.

School of Nursing Kaiser Franz Joseph Hospital, Vienna Austria

ENTRIES

Building entrances help to orient users to the campus. It is important that building orientation and siting work within the existing framework of campus circulation to establish clear wayfinding to building entrances. Forecourts or outdoor pre-function spaces to building entrances can be used to clearly delineate primary entrances and help create a progression of entry experiences into the building.

Well-designed lighting not only helps to identify building entrances but also provides safety and security for its users.

University of New Mexico, Albuquerque, New Mexico

Littleton Church of Christ Centennial, Colorado

MATERIAL COMPOSITION

Continuing the precedent set by the CSS building, subtle planar and material shifts are recommended as a form of facade articulation

DongWha Pharmaceutical Laboratory, Gyeonggi-do, Republic of Korea

RHYTHM

Existing buildings utilize patterned repetition of columns and framed openings.

New buildings should continue the tradition of rhythm but reinterpret the concept in new and interesting ways.

Milwaukee Art Museum, Milwaukee, WI

VISIBLE VERTICAL CIRCULATION

Stairways are not only an important functional element of buildings, but can be an opportunity for chance encounters and social interaction, if designed as an integral part of the campus experience, rather than a purely practical application.

Where possible, exit stairs shall be incorporated into the design of the exterior facades of buildings. This continues the tradition of expressed vertical circulationbegun by the original campus architecture.

School of Arts, Canterbury, England

ROOFLINE

The flat roof language continues the tradition set by the CSS building and becomes part of Norco College's unique identity.

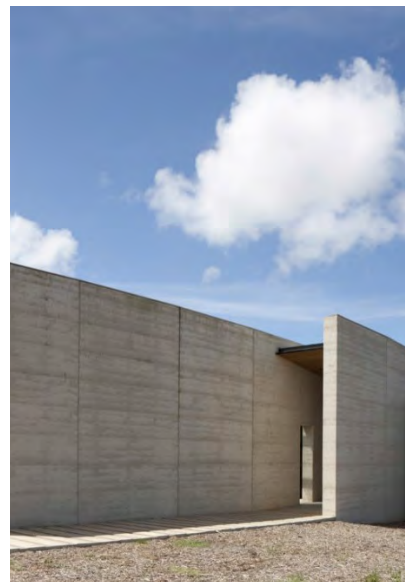
Roofs are one of the final ingredients in the composition of a building, and play not only a functional role but an aesthetic one as well.

- Roofs shall be flat, yet designed to drain appropriately.
- Roofs shall be light in color to reflect sun and reduce heat gain.
- Roof terraces, if well connected to interior spaces, are encouraged.

Sammamish Library, Sammamish, Washington

Villa B te O, Oldeholtpade, Netherlands

SOLAR CONTROL



- Vertical Shading

Vertical walls can be used to shield against solar radiation from the east and west. This will reduce heat gain in the building in the early mornings and late afternoons.

Arizona Science Center, Phoenix, Arizona

Merricks House, Mornington Peninsula, Victoria, Australia

- Horizontal Shading

Horizontal shading protects the building from direct solar radiation during the midday hours and helps identify building entrances, and creates comfortable sheltered space for gathering.

- Vertical Screening

Glazing on walls to the east and west can use semitransparent screening to help reduce direct solar heat gain but help to maintain day lighting within a building. The screening material filters direct sunlight and the cooler air space between the screen and building acts as an insulator during hot weather.

INDOOR-OUTDOOR RELATIONSHIP

Educational communities such as a college campus rely on interaction between people. Buildings that engage their exterior spaces blur the line between indoor and outdoor and foster interaction among its users. It is important that buildings be designed with human scale in mind where they engage their exterior spaces.

Paradise Valley Community College
Phoenix, Arizona

TRANSPARENCY

The use of transparent building lobbies to connect pedestrian paths visually and to demarcate building entryways and passageways, enhances connections between interior and exterior spaces, aid in wayfinding and shift the inwardly focused campus outward towards the larger community.

- Carefully placed glazing optimizes natural daylighting, and ventilation improving energy efficiency and building occupant comfort.
- Decorative semi-transparent materials add visual interest and provide screening.
- Transparent entry lobbies assist in wayfinding, accenting building entries, and improving safety.

Buildings that engage exterior areas blur the line between indoor and outdoor which helps foster interaction among its users.

The Apartment House
Singapore

VIEW CORRIDOR/FRAMED VIEWS

The creation and preservation of vistas to distant landmarks should be preserved and enhanced. These vistas could be framed with building elements, arcades, and other linking elements.

Deliberate framing of the natural site and context turns windows into ever changing pictures.

Arizona State University, Polytechnic Campus

- Expand space visually by connecting to the views beyond.

GATHERING SPACES

Pedestrian-friendly design elements should be incorporated throughout the campus, including its surrounding parking lots and street crossings. Varying scales of plazas, formal and informal gathering spaces, and amenities catering towards pedestrians are encouraged to facilitate spontaneous interactions and a sense of community.

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New Jersey Institute of Technology,
Newark, New Jersey

PART G

FUTURE MATERIALS + COLOR PALETTES

INTRODUCTION

The building materials used on the Norco Campus are influenced by its natural surroundings. The materials used have a warm palette that blend in with the warm colors of the surrounding plant life. Expression of materials in their natural state contributes to the modest, dignified character of a College and is recommended for future buildings on the Norco campus.

Materials selected for future buildings should be sensitive to the overall context of the Norco Campus as well as the adjacent buildings to maintain a sense of continuity throughout the campus.

Color on the Norco Campus should be used to complement and harmonize with both the existing and future materials palette. Because of the natural surroundings of the campus, a calm warm neutral palette is appropriate.

FUTURE MATERIALS PALETTE

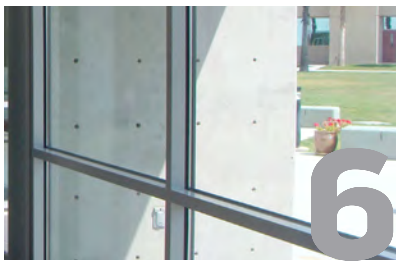
PRIMARY PALETTE

STUCCO

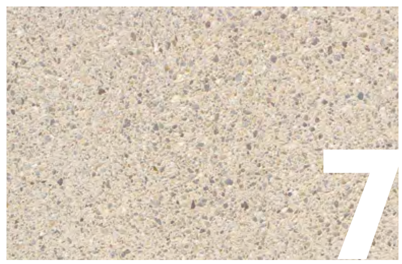
CONCRETE

CONCRETE MASONRY

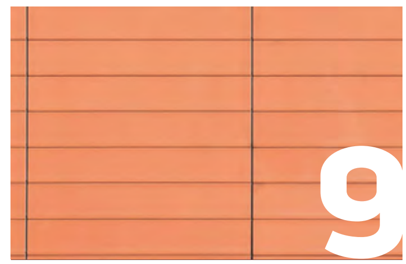
**Note: Colors as printed in this document are an approximation, at best, of the actual paint colors.*



NEUTRAL GLAZING



EXPOSED AGGREGATE CONCRETE

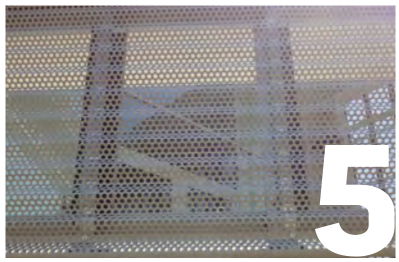


TERRACOTTA

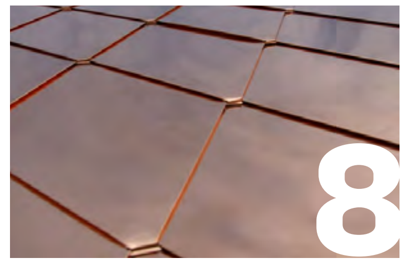
FUTURE MATERIALS PALETTE

SECONDARY PALETTE

METAL SIDING



METAL SCREEN



COPPER ROOFING

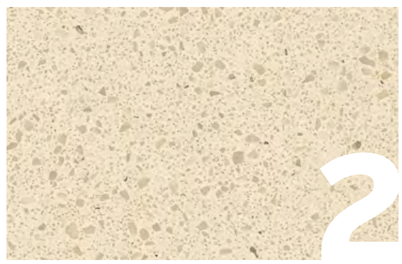
FUTURE COLOR PALETTE

The proposed neutral light warm grey primary palette is appreciated. An accent palette that presents a more collegiate and institutional presence.

PRIMARY PALETTE

OFF-WHITE

Exposed aggregate concrete was used in the construction of the original campus buildings



BEIGE

GREIGE

NATURAL CONCRETE

Concrete in its natural color contributes to the honest dignified architectural character of the campus.

FUTURE COLOR PALETTE

SECONDARY PALETTE

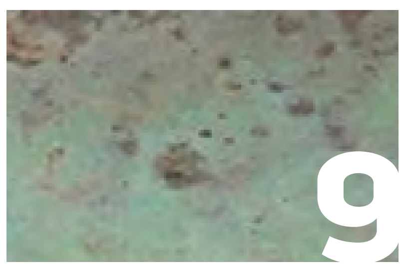
WHITE

STAINLESS STEEL

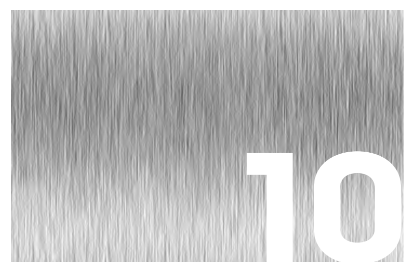
TAUPE

DARK COPPER

A a modern reinterpretation of the red tile roof is weathered copper-colored standing-seam metal.



COPPER VERDIGRIS



ALLUMINUM

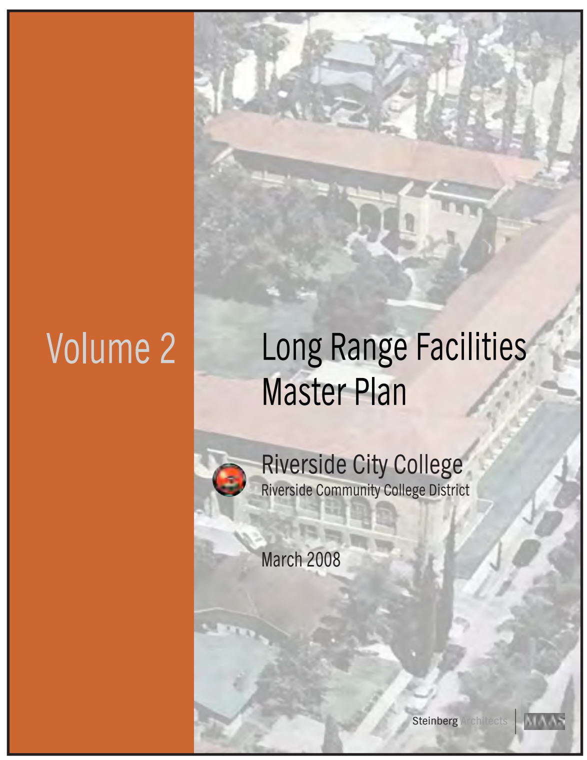
END OF SECTION 8 - NORCO COLLEGE

SECTION 8
RIVERSIDE CITY COLLEGE

The following document has been excerpted from:

Riverside City College Long Range Facilities Master Plan - Chapter 4 - Guidelines

March 2008



ARCHITECTURAL SUMMARY

The Architectural Guidelines are created to give a framework and sense of what the campus architecture could be in the future. The campus architecture in the future will aspire to create a distinguishable campus identity as well as respond to the immutable natural conditions like the arroyo. These guidelines provide a general framework from which the architects and designers of future campus projects can draw upon to help in achieving that campus identity.

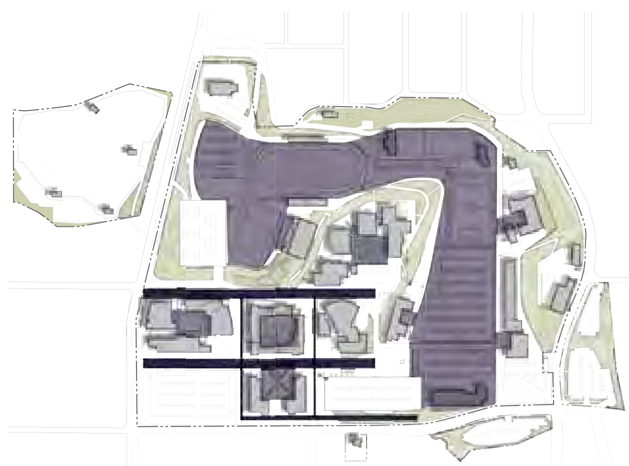
The process began by examining the existing character defining features of the buildings on campus. A map of the existing materials and styles of the campus was created in order to help understand the development of the campus buildings. Of the existing buildings on campus, the Quadrangle represents the identity of the campus both in the past and present. It was consistently cited as a prime generator of memory for the members of the Master Planning Steering Committee and is clearly a link to the college's history. As such an important building, an analysis of the Quad was undertaken to better understand the qualities that made it such an iconic building on campus.

In the examination of the Quad, a notion of Formal and Informal presented itself early in the process. The building's architecture, while deeply rooted in a stylistic response, was distilled into the two timeless ideas of Formal and Informal. It became clear that these same ideas could be expanded from a particular building's language to a future common campus language as well.

These guidelines have been formed by looking at examples of building responses that could also be interpreted for similar use Riverside City College. The examples included are intended to serve as a framework and not as a perscriptive instruction on specific building language. With this framework, future architects and planners can contribute to a more cohesive and identifiable campus for generations of students, staff and community to come.

Occidental College, Los Angeles, California

Claremont College, Claremont, California



Planning principle diagram for future architectural aesthetics

ARCHITECTURE

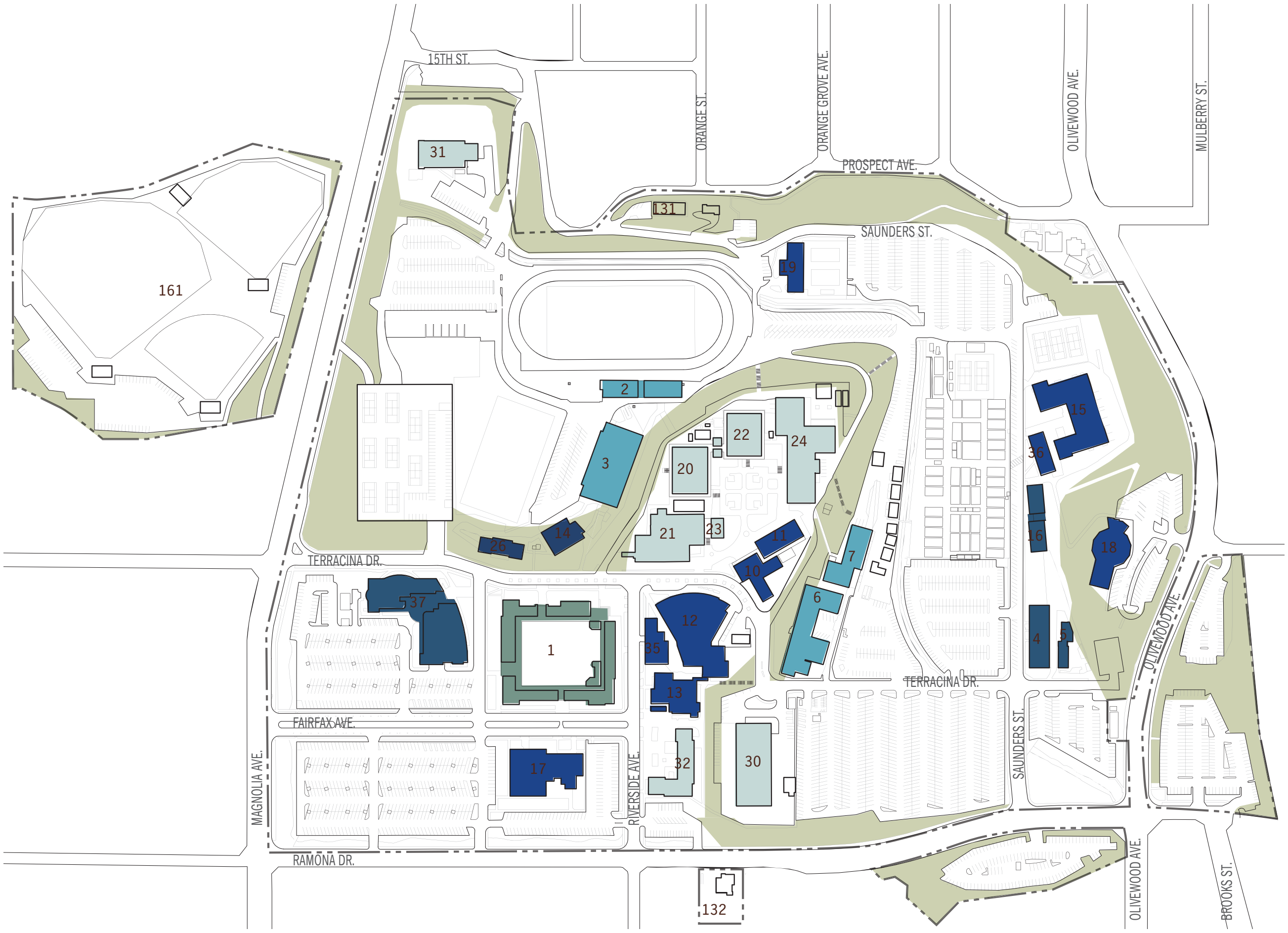


FIGURE 4-2. Materials and Styles - Primary architectural materials and styles on campus

LEGEND

- CALIFORNIA MISSION
- CONCRETE
- CONCRETE BLOCK
- BRICK / PLASTER
- OTHER

BUILDING LEGEND

1	QUADRANGLE
2	STADIUM
3	WHEELOCK
4	MAINTENANCE SHOP
5	MAINTENANCE PT SHOP
6	TECHNOLOGY A
7	TECHNOLOGY B
10	ADMISSIONS/COUNSEL
12	LANDIS AUDITORIUM
13	MUSIC BUILDING
14	ART
15	HUNTLEY GYM
16	MAIN WAREHOUSE
17	ADMINISTRATION
18	COSMETOLOGY
19	CUTTER POOL
20	LIFE SCIENCE
21	MLK HIGH TECH CENTER
22	PHYSICAL SCIENCE
23	PLANETARIUM
24	STUDENT CENTER
26	CERAMICS SCULPTURE
27	ATHLETICS CENTER
28	CAMPUS POLICE/SAFETY
29	PORTABLE 3
30	AUTO TECHNOLOGY
31	CHILD DEVELOPMENT
32	BUSINESS EDUCATION
33	GREENHOUSE
34	ASSESSMENT
35	MUSIC HALL
36	PILATES
37	DIGITAL LIBRARY
131	NORTH HALL
132	ALUMNI HOUSE
161	EVANS SPORTS COMPLEX A
162	EVANS SPORTS COMPLEX B
163	EVANS SPORTS COMPLEX C
164	EVANS SPORTS COMPLEX D

0' 250' 500'

ARCHITECTURE

CALIFORNIA MISSION


AG Paul Quandrangle building in the California Mission Revival style

•Massive walls with broad unadorned surfaces

•Low pitched clay tiled roofs

•Arched windows and doors

•Exterior plaster, stucco, or concrete

•Towers on larger buildings

•Curved gables

•Arcaded corridors

•Piered arches

•Exposed rafters

CONCRETE


Tehcnology A building in board formed concrete

•Board formed / smooth

•Punched openings

•Low pitched or flat roofs

ARCHITECTURE

CONCRETE BLOCK

•Small punched openings

•Articulated datum line

•Red clay tile hip roof

•Overhanging eaves

Martin Luther King, Jr. Library with concrete block

BRICK

•Expressed concrete structural frame

•Red brick infill

•Various brick coursing

Landis Auditorium has an extensive use of brick

OTHER

•Plaster, stucco

•Brick veneer

•Various opening types

•Various roof types

New parking structure on campus

ARCHITECTURE

QUADRANGLE ANALYSIS

When mapping the existing materials and styles of the campus, the Quad stood out as a successful building that contributes to the identity of the campus. Originally completed in 1923, it is the oldest facilty on campus and renovated numerous times over the years. It's longevity on the campus is a testament to its positive impact on the college's built environment.

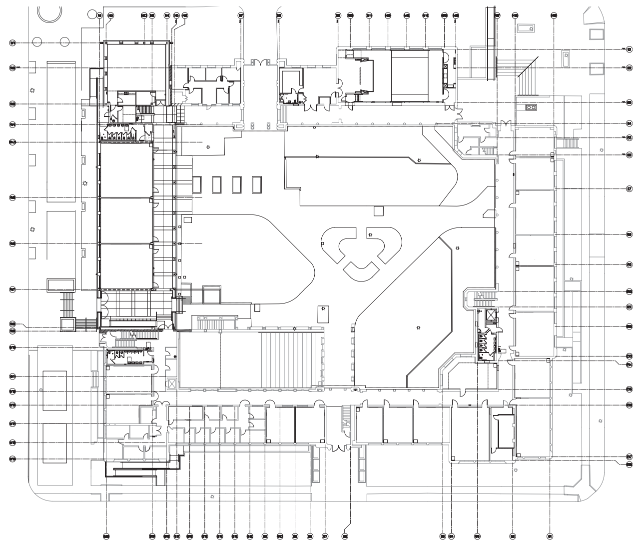
In analyzing the Quad, a number of characteristics were examined to categorize how its architecture was successful:

- Scale - the proportion between two sets of dimensions or objects
- Opening - characteristics of the openings in the walls of the building
- Entry - characteristics of the access to the building and its relation to circulation
- Roof - use of roof form and material

On its exterior, the Quad responds in a particular manner that is quite different than it's interior courtyard. For the purposes of the analysis, those two types of responses have been described as Formal and Informal. The Formal responses correspond with the exterior of the building while the Informal responses correspond with the interior courtyard.

With the Architectural Guidelines, the notions of Formal and Informal were diagrammed to respond to future master planned conditions of the campus. Conditions where a building was to hold a street or campus edge were seen as Formal while conditions where a building formed the edge of an open space, such as a courtyard, were seen as Informal.

Ultimately, these categories and their Formal and Informal responses would be translated into an architecture that was cohesive across the future buildings on campus. As more and more projects implement architectural responses within the framework, a common language of the built environment would emerge and reinforce the college's identity.



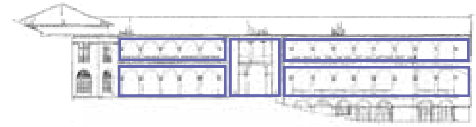
Quadrangle Floor Plan - 2007

Quadrangle Aerial - mid 1900's

Quadrangle Diagram - Hip and Gabled roofs

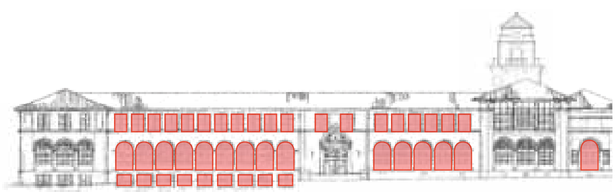
ARCHITECTURE

Formal two story campus scale

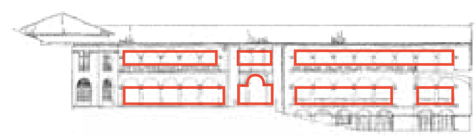


Informal single story human scale

SCALE



Formal repetition of openings



Informal opening mass

OPENING

Formal building scale entry

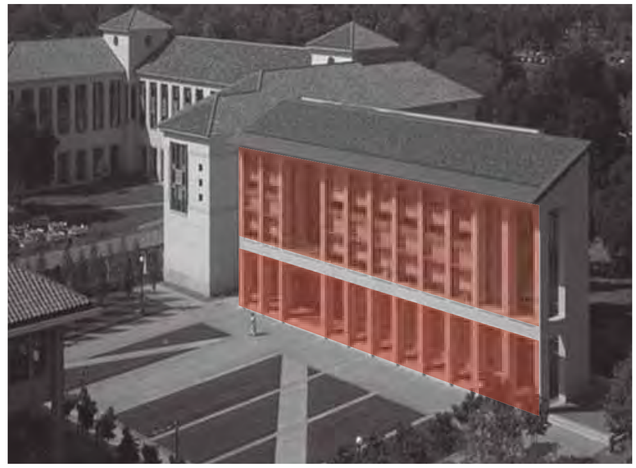
Informal numerous human scale entries

ENTRY

ARCHITECTURE

SCALE - FORMAL

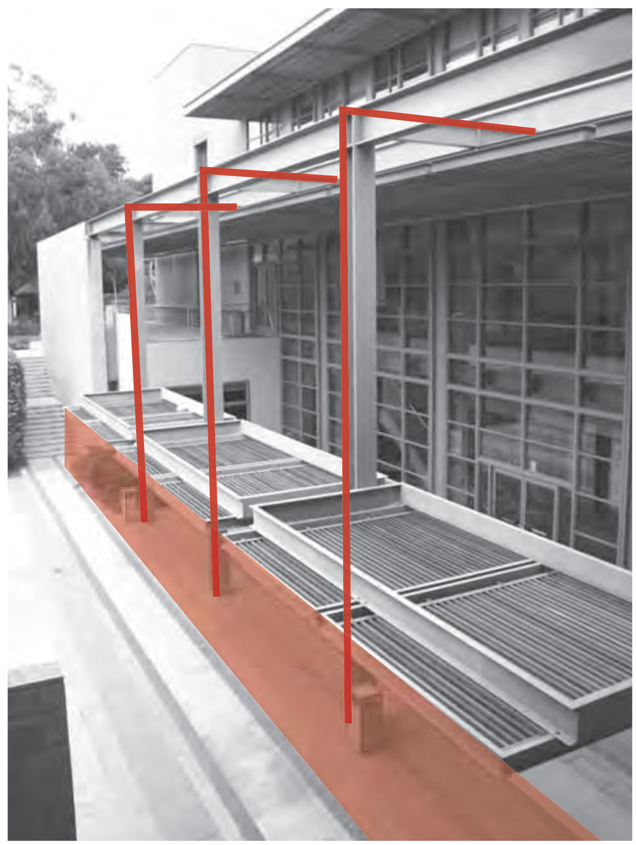
- Campus Scale
- Expressed Multi-Story Volume / Mass



Campus scale articulation at Stanford University.

SCALE - INFORMAL

- Human Scale
- Expressed Single Story Volume / Mass



Multi-story articulation with smaller scale elements at Claremont College.

ARCHITECTURE

ENTRY - FORMAL

- Main Building Entry
- Campus Scale
- Adjacent to Campus Circulation

Single building entry expressed at a large scale at Stanford University

ENTRY - INFORMAL

- Multiple Entries
- Human Scale
- Adjacent to Building Circulation or Court

Multiple entries expressed with smaller scale elements at Otago University

ARCHITECTURE

OPENING - FORMAL

- Punched
- Wall Primary, Opening Secondary
- Regular Rhythm

Punched articulation of openings at Occidental College

OPENING - INFORMAL

- Open
- Opening Primary, Wall Secondary

Open articulation of openings at Claremont College

ARCHITECTURE

ROOF - FORMAL

- Uniformity
- Pitched or Flat

Gabled roof at Claremont College

ROOF - INFORMAL

- Material Variety: PV, Green, Cool Roof Systems

Vancouver Pulbic Library's green roof appication

9 SPACE STANDARDS

INTRODUCTION

It is Riverside Community College District's intention to standardize spaces across the various district locations to a size that is equitable and functional for the expected use over the life of the building, and remain within the guidelines of the California Community College Chancellor's Office (CCCCO) capacity guidelines ("Cap Load"). The proposed standards reflect the clearances required for the effective utilization of furniture and equipment within each space. The desired minimum usable square footage is noted on each diagram. Additional width or depth within the spaces would be acceptable, particularly in spaces that have structural elements, more specialized areas, or renovations of existing buildings and will be approved on a project by project basis.

PART A
INTERIOR SPACE DESIGN

It is important to create rooms that are **adaptable**, **flexible**, and **functional**. This allows rooms to adapt to constant changes in **technology**, while flexible and functional classrooms enable instructors and students to work together in a **variety** of learning environments which may best suit different programs. This flexibility is compatible with an interdisciplinary approach to instruction and current teaching **pedagogies**. Creating environments which **promote learning**, **collaboration**, and **interaction** between individuals and groups is highly desirable. Different sizes and types of gathering places are essential throughout the district campuses, and within the buildings.

The interior architecture should clarify the elements that the buildings are composed of. Color and materials should inhabit one plane which flows from inside to outside. All planes, whether walls, floors, ceilings or partitions should be treated as distinct entities, in a singular way. Colors and materials selected for future Riverside Community College District projects should lend an **air of permanence and quality**, while providing an overall sense of welcome. Colors and materials should be appropriate to both the design concepts of the individual projects, as well as to the **campus as a whole**.

Appropriateness can be loosely defined by how well the colors and materials contribute to creating harmony in mass, scale, form, color, and context, thus establishing desirable learning environments and experiences. Public spaces such as lobbies and corridors should incorporate more interesting and lively colors or patterns. In contrast, private spaces such as classrooms, study spaces, labs, etc. should incorporate materials and colors of a professional nature befitting the use of each space. There is no identifiable use of a signature or accent color therefore, accent colors should be appropriate for each building's color scheme.

Universal Design principles should be incorporated in all spaces and environments across the campuses, to allow for the integration and usability of all users equally. Designs should accommodate a range of individual abilities, preferences, experience, knowledge, language skills, education level, sensory abilities, and mobility (5, 6). Refer to Section 2 for detailed information on Universal Design principles and implementation techniques.

BEST PRACTICES

FURNISHINGS

- Should be accommodated a variety of postures; standing, leaning, lengthy sitting at a computer, casual use of a laptop, and lounging.
- Provide marker boards in key areas supports creative ideation in a casual way.

SIGNAGE

- A wayfinding system should embody a collective strategy; unified in color, design, proportions, and text.
- Should be positioned at consistent heights.
- Should be strategically located for ease of visibility and to allow for intuitive wayfinding.
- See Part B.I for more information.

DOORS

- Locate doors in a manner to minimize congestion in corridors.

ACCESSIBILITY

- All spaces should be designed based on Universal Design principles and ADA standards. See Section 2.
- Circulation clearances, seating capacities, furnishings, reach heights and depths.

LIGHTING

- Energy management systems should be considered, such as the installation of automatic sensors.
- Daylighting in all spaces is encouraged and should be coordinated in AV equipment placement and furniture layouts accordingly.
- Daylight harvesting systems should be considered for energy management and savings. See Section 2 for more information.

POWER, DATA, WI-FI

- Access to technology, power, data, and Wi-Fi throughout the facilities is vital given today's use of multiple mediums to absorb and share digital information.
- Connectivity throughout the campus's spaces will allow any space to be readily accessible to students and faculty alike. Co-locate outlets on all walls for a clean and organized design.

PART B
INTUITIVE ENVIRONMENTS

CONTENTS:

Design for intuitive use of spaces allows a facility to function at maximum efficiency through its user interactions. Designing elements in a **rigorous** manner, through standardized placement, alignment and orientation within similar types of spaces, optimizes the organization for a user to recognizing specific uses, and boosts productivity for students, faculty, and staff alike.

Ergonomic strategies encourage the optimization of organizational systems to be designed through consideration of relevant personnel, technological and environmental variables, **logical usability**, and their **logical interactions**.

On the macro campus level, room numbering and signage should be designed for the campus as a whole to facilitate ease of wayfinding for any user. On the micro space level, careful consideration should be given to such things as; consistent grouping and alignment of control switches, and the layouts of instructional spaces' furnishings, fixtures, and equipment to consistently facilitate any faculty or student using any room at any given time. This includes power outlet locations, control switch location, Wi-Fi connectivity, projector and projection screen location and operation, light zones and control settings, light fixture orientation and suspension depth, storage and clock locations.

BEST PRACTICES

CEILING HEIGHTS

- Vary depending on space type and use.
- 9 feet clear minimum to accommodate sight lines, suspended light fixtures, and projectors while avoiding ease of access and vandalism.
- Plenums to be accessible for servicing of lights, HVAC.

ACOUSTICS / SOUND ISOLATION

- Attention to instructional spaces, meeting rooms, and office design.
- Full height partition construction, to be coordinated between architect and acoustic consultant.

CLOCKS

- Battery atomic are ideal to minimize maintenance and manual time-change errors.
- Placement on side wall for visibility, with no obstruction by any projection equipment or collaborative surfaces.

COLLABORATIVE SURFACES

- Any surface in any space can be a potential collaborative surface.
- Fixed and mobile white boards, tack panels, and table surfaces.

LIGHTING

- Orient lighting fixtures to be perpendicular to front “teaching” wall, so as to not obstruct projector.
- Fixtures in rooms with ceilings in the 10 to 13 foot range should be suspended direct-indirect for maximum light distribution.
- Fixtures should be suspended 18 inches below the ceiling level.
- Two to four zones depending on room size.
- See Part P for lighting approach.

PROJECTORS

- Ceiling recessed.
- Align with top of image, with a maximum of 5 degree variation.

PROJECTION SCREENS

- Ceiling recessed.
- Oriented diagonally in Classrooms.
- Oriented straight against teaching wall in Lecture Halls.
- Either motorized or manual screens can be used, to be determined on a project by project basis.

FLAT PANEL DISPLAYS

- FPD’s are encouraged across the facilities. Non-reflective screens.
- Should be a maximum of 4 inches deep.
- 16:9 aspect ratio.
- 4 feet mounting height.
- Sizes vary based on sight lines, see following sections for information.

VIEWING ANGLES / SIGHT LINES

- Space configuration should accommodate the optimum viewing angles to any screen and marker board.
- In larger spaces, floor level tiers should be considered to maximize sight lines.
- See following sections for more information.

higher in public areas?

MEDIA RACKS

- Placement at the “front” of a room is ideal to minimize cable runs.
- Should be locked at all times, and only accessible to IMC personnel.

SWITCH CONTROLS

- To be placed in a locked wall panel or in the lectern.
- Provide limited lockable controls in instructional spaces and meeting rooms to faculty and staff.

CLEANOUTS / ACCESS PANELS

- Types and locations to be coordinated with architect.

WINDOW SHADES

- Window treatment in instructional spaces and meeting rooms should be dual motor, one layer containing solar blocking or blackout to prevent glare for audio visual use.
- Should be tied to AV controls.

MICROPHONES

- Ceiling mounted.
- Wireless handheld optional in instructional spaces.

SPEAKERS

- Ceiling recessed.

CAMERAS

- Two wall-mounted cameras in each instructional space and meeting room.
  One to capture the front of the room / presenter.
  One to capture rear of room / audience.
  Mounted at 92 inches above finish floor.

POWER / DATA

- Co-located electrical and data outlets.
- Power should be provided on all walls.
- Data should be provided on all walls except door walls.
- Furnishing systems with power and data connections are desired, and should be coordinated with furniture manufacturer.

WI-FI

- Access point should be available in all public and instructional spaces.

ASSISTIVE LISTENING SYSTEM

- Built-in transmitter to be located in every instructional space.
- Listening devices can be checked out from DSPS office.

HVAC

- Diffusers to be ceiling recessed or linear if wall mounted.
- Thermostats to be wall mounted and grouped with other locked controls.
- Thermostat user control is acceptable only in offices.

LIFE SAFETY

- Strobes and fire alarm pull station to be wall mounted and grouped or aligned with other wall devices.
- All sprinklers to be ceiling recessed.
- Exist signs to be wall mounted above doorways and must follow building codes.

I. ROOM NUMBERING

PURPOSE

UNIFORMITY:

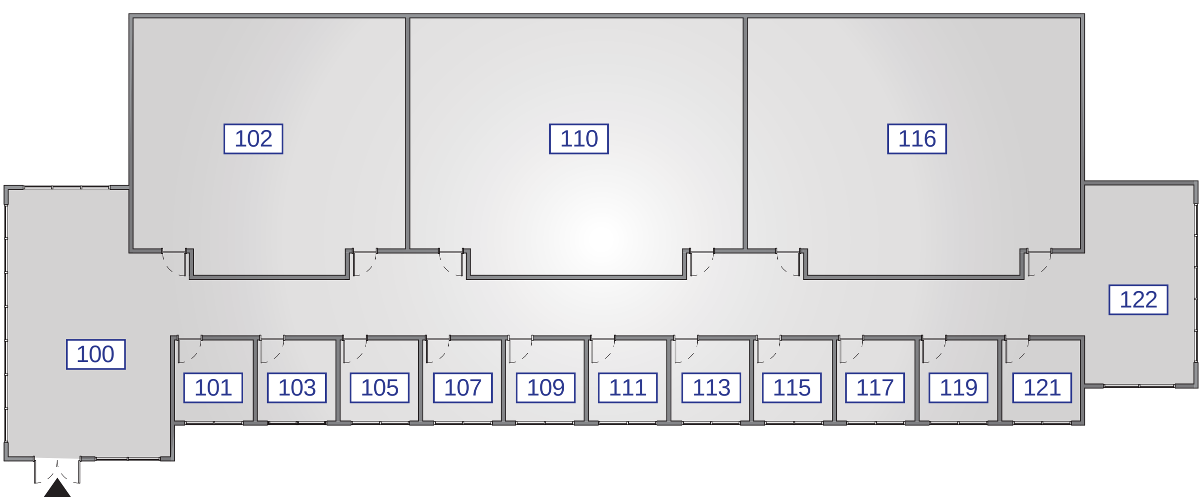
- A standard pattern of room numbers shall be applied to the working drawings before a building is approved.

FLEXIBILITY:

- A standard pattern of room numbers permits the assignment of new room numbers in a logical relationship to existing room numbers, when new rooms are created by the addition and removal of partitions.

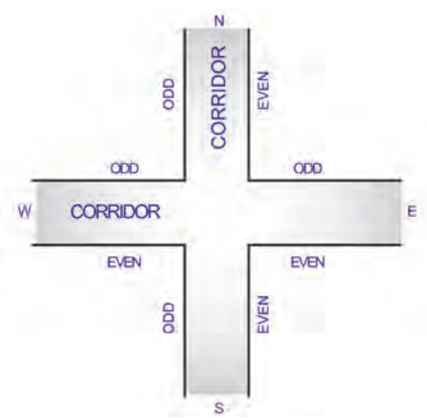
CONVENIENCE:

- Assign room numbers on all floors of a building according to a single basic pattern to enable users of the building to find rooms with the least possible difficulty.



ROOM NUMBERING DIAGRAM

HORIZONTAL PROGRESSION



STARTING POINT:

- Preferably at or near the principal entrance, and at an end or corner of the building. (If both conditions cannot be met, the choice must be based on a judgement as to which starting point will permit the simpler and more logical progression.)

DIRECTION OF PROGRESSION:

- The direction of heaviest flow of traffic entering the building.

EVEN + ODD NUMBERS:

- Assign only one number to a room even though the room may have two or more doors. Even numbers should align along the north side of the building and odd numbers along the south.

DESIGNATION FLOOR

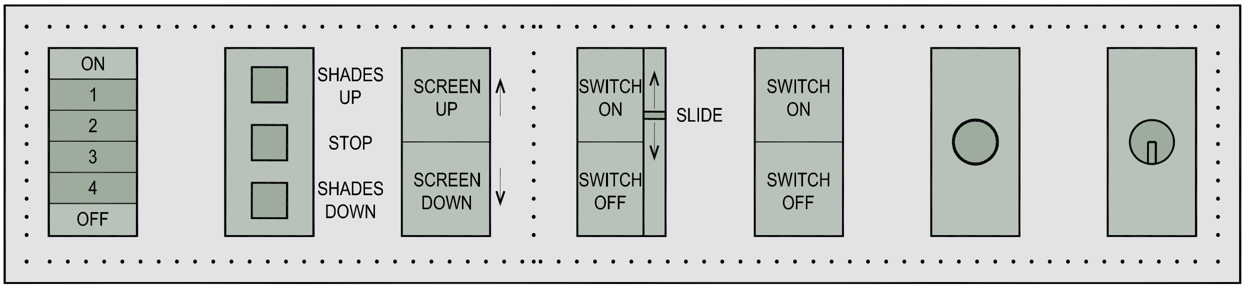
Sub-Basement	S-00 to S-99
Basement or MainFloor	00 to 99
First Floor	100 to 199
Second Floor	200 to 299
Third Floor	300 to 399

VERTICAL IDENTITY

- Application of the principle generally ensures that corresponding numbers (e.g., S-27, 27, 127, 227, 237, etc.) occupy the same relative position on all floors of the building.

Refer to the *California Community College Space Inventory Handbook* for suggested standard patterns for numbering.

II. ALIGNMENT OF SWITCHES + DEVICES

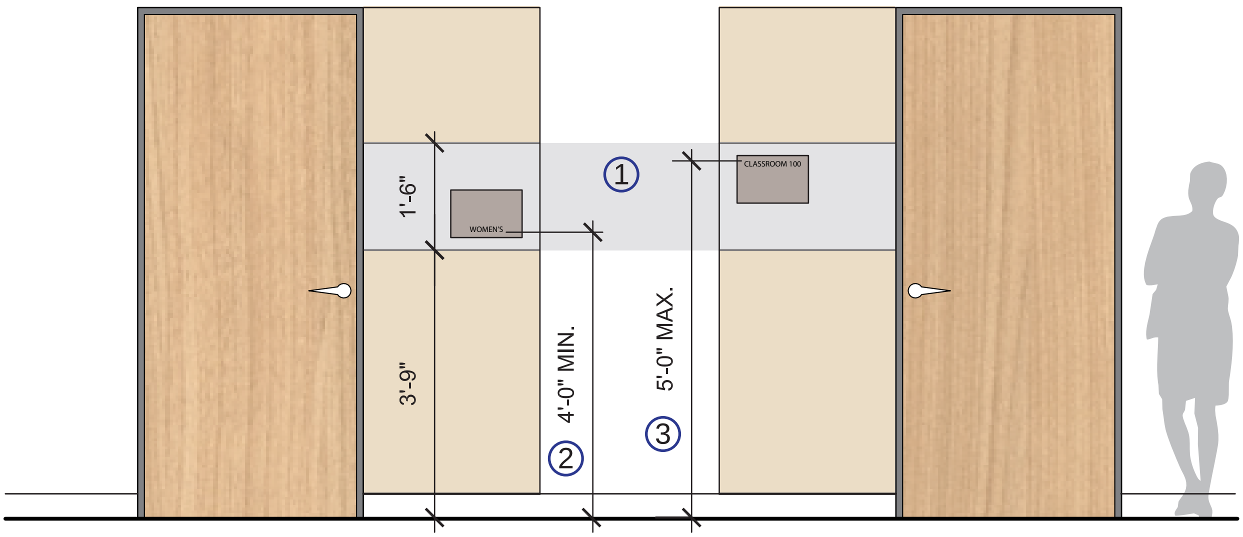


Audio/Visual (Lutron Graphic QS)	Window covering (shades)	Projection screen	Lighting (dimmers)	Lighting (switch)	Audio	Specialty (keyed)
4 scene presets: 1: Video teleconference (shades lower, lights dim, A/V activated) 2: Meeting 3: Lecture 4: A/V (shades up, lights full, no A/V)	Manual switch (up/ stop/ down)	Manual switch (up/ down)	Manual switch (on/ off) Rocker switch (adjust levels)	Manual switch (on/ off)	Volume control (rotate levels up/ down)	Keyed operation (up/down)

NOTES:

- Perimeter dotted line indicates (double/ triple/ quad) gang box behind cover plate. General Contractor mount as required for devices to be installed per diagram.
- All switching to be organized under one common cover plate. Leviton Decora screwless - type.
- Gang together where possible.
- Separate box if required.

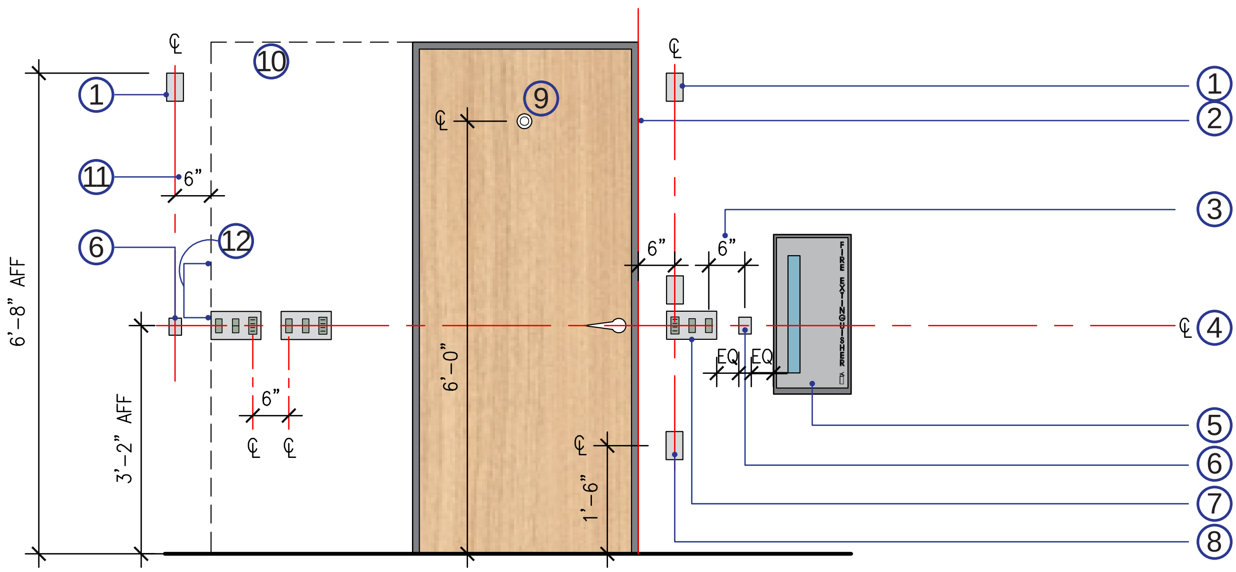
SWITCH ORGANIZATION DIAGRAM (SINGLE COVERPLATE INTENT)



1. Signage zone to host room signs on door exterior, and Assistive Listening sign on the interior of designated spaces.
2. Minimum height: baseline of lowest copy mounted to be no lower than 4 feet above finish floor.
3. Maximum height: baseline of highest copy mounted to be no Ihigher than 5 feet above finish floor.

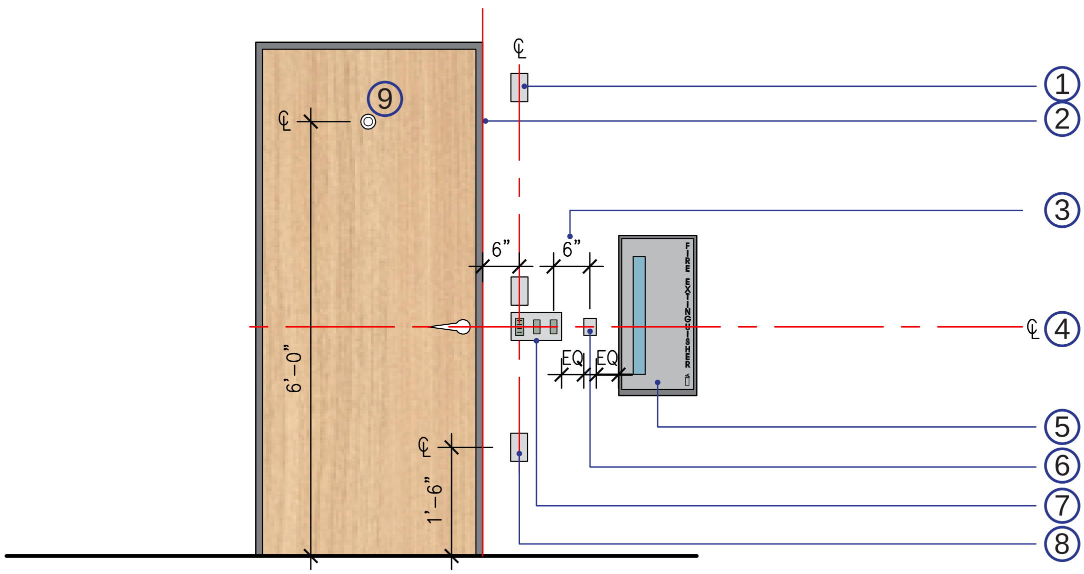
ROOM SIGNAGE

II. ALIGNMENT OF SWITCHES + DEVICES



1. Strobe. Confirm height with local code.
2. Edge of door frame, wall, or end of wall.
3. Additional 6" offsets to occur only if multiple devices are required, otherwise align devices vertically.
4. Centerline of door hardware, light switches, thermostats, dimmers etc.
5. FEC where occurs.
6. Thermostat.
7. Multiple light switches, dimmers, exhaust fans, electric Screen, and mechoshades ganged under one coverplate as required.
8. Electrical outlet where occurs. Confirm height with local code.
9. Coat hook installed at all private offices and conference rooms. Finish to match door hardware. Match existing where occurs.
10. Dotted line indicates switchback locations on opposite side, if switchbacks are required at both sides of partition.
11. In case of glass sidelite at door, mount switches and thermostat on adjacent wall mount ganged coverplate behind door swing and thermostat 6" beyond edge of door in open position with strobe aligned above, if required.
12. Align last switch with edge.

LOCATION DIAGRAM OF LIGHT SWITCHES & DEVICES (TYPICAL)



1. Strobe. Confirm height with local code.
2. Edge of door frame, wall, or end of wall.
3. Additional 6" offsets to occur only if multiple devices are required, otherwise align devices vertically.
4. Centerline of door hardware, light switches, thermostats, dimmers etc.
5. FEC where occurs.
6. Thermostat.
7. Multiple light switches, dimmers, exhaust fans, electric Screen, and mechoshades ganged under one coverplate as required.
8. Electrical outlet where occurs. Confirm height with local code.
9. Coat hook installed at all private offices and conference rooms. Finish to match door hardware. Match existing where occurs.

LOCATION DIAGRAM OF LIGHT SWITCHES & DEVICES (BACK TO BACK INSTALLATION)

III. CLASSROOM / LECTURE HALL LIGHTING (TYPICAL CEILING PLAN LAYOUT)

BEST PRACTICES

CEILING HEIGHTS

LIGHTING

PROJECTORS

PROJECTION SCREENS

SHADES

MICROPHONES

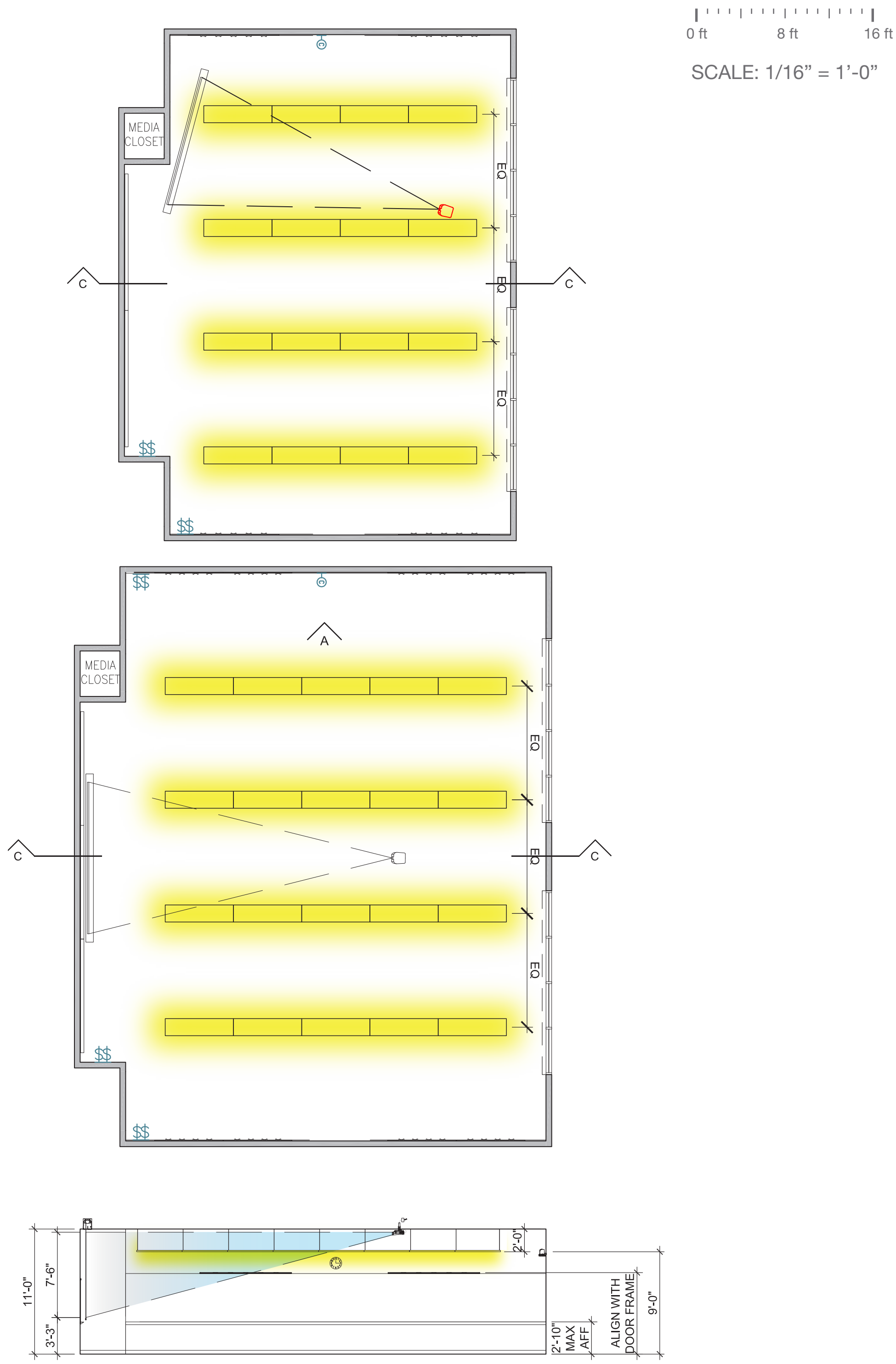
SPEAKERS

SPRINKLERS

HVAC REGISTERS

STROBES

Place these best practices subjects here, or group on pages 9-8 & 9-9?



CEILING PLAN DIAGRAM

PART C
PUBLIC SPACES

CONTENTS:

Public spaces are essential for the daily life of students, faculty, staff, and visitors. They foster the widest variety of activities, and should support the informal, spontaneous, casual collisions and socializing that supports behaviors, attitudes, and goals that lead to trust, collaboration, and in turn, innovation and education (3).

Planning a campus's facilities should strategically distribute a mix of quiet and loud, public and semi-private spaces such as lounges, cafés, common areas, and study rooms throughout buildings. They should be created within easy to locate areas such as atria, corridors, outside classrooms and offices, in transition spaces, and outdoors. Consideration should be given to designing a variety of configurations to define a space within a space, to give users a sense of enclosure. They should support a variety of student uses including study, waiting between classes, socializing, interacting with one another or with instructors, eating, or reading.

Every space is a potential learning or collaborating environment, and should be supported with power, data, and Wi-Fi technology so information and communication is made readily available. AV varies per space, typically lighting should be suited for study. Design alcoves for garbage and recycling containers in major circulation and public areas, so as to encourage a clean campus in a manner that is both aesthetically pleasing and not interfering with space functions or circulation.

PUBLIC SPACES

BEST PRACTICES

LOCATION
- Distributed throughout buildings.
- Open louder spaces such as lounges and cafes, should be located near public entrances or circulation.

GEOMETRY
- Spaces can vary pending location and type.
- Corridor widths should be 8 feet clear for comfortable circulation.
- Where collaborative seating is designed, the recommended corridor width is 13 feet (1).

CEILING HEIGHTS
- Can vary pending space type and use.
- Consider variation to create a dynamic set of environments.
- Corridor should be at 10 feet (1).

ACOUSTICS / SOUND ISOLATION
- When adjacent to instructional spaces, meeting rooms, or offices, full height partition construction is recommended.
- Coordinate between architect and acoustic consultant.

ACCESSIBILITY
- See Part A.

COLLABORATIVE SURFACES
- See Part B.

FURNITURE SYSTEMS
- A variation of systems should be incorporated, flexible to accommodate various uses and postures.

LIGHTING
- See Parts B and P.

FLAT PANEL DISPLAYS
- See Part B.

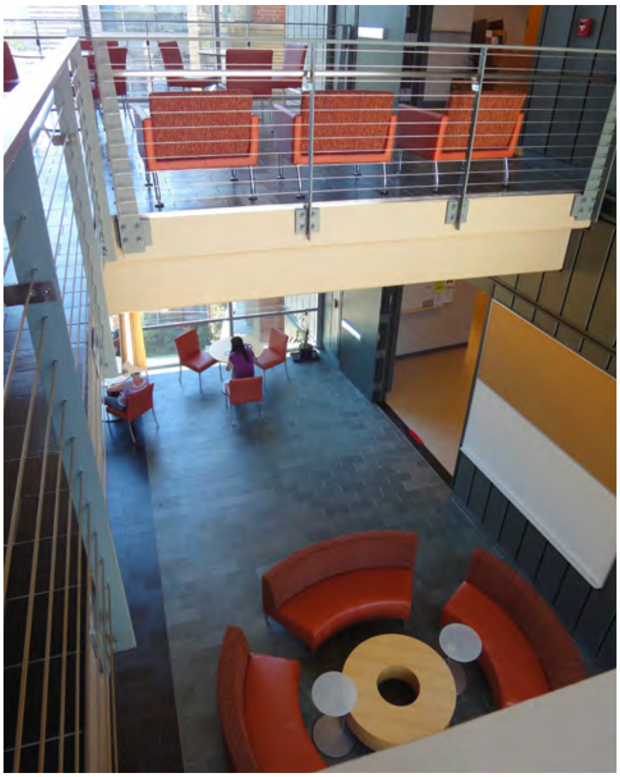
POWER / DATA
- See Part B.

WI-FI
- See Part B.

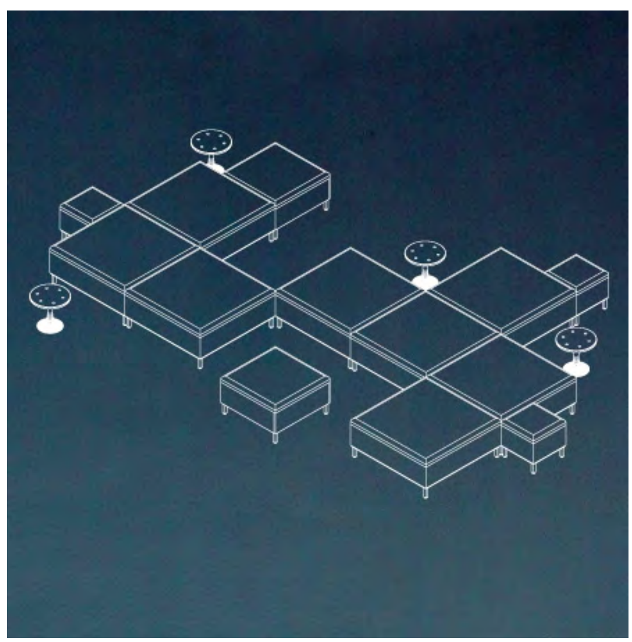
HVAC
- See Part B.

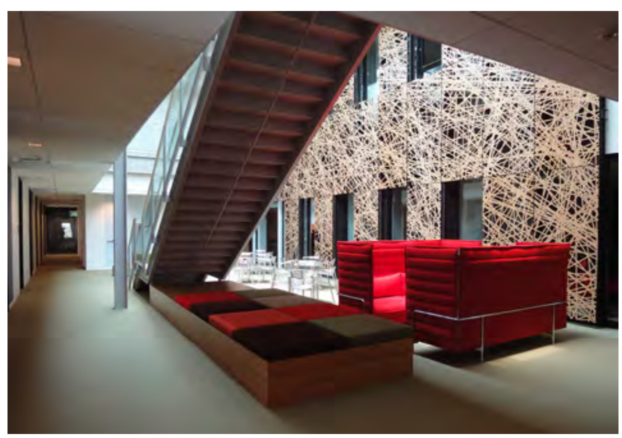
LIFE SAFETY
- See Part B.

I. COLLABORATIVE COMMON AREAS



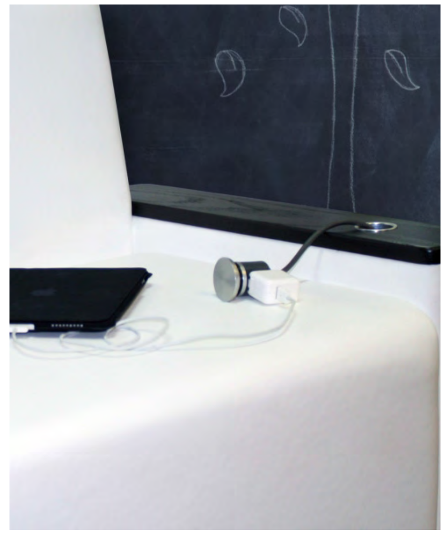
Interior gathering spaces should be provided in each building, with furniture layouts that will accommodate multiple types of configurations and activities within the space. Places for rest and quiet study enhance the campus experience.

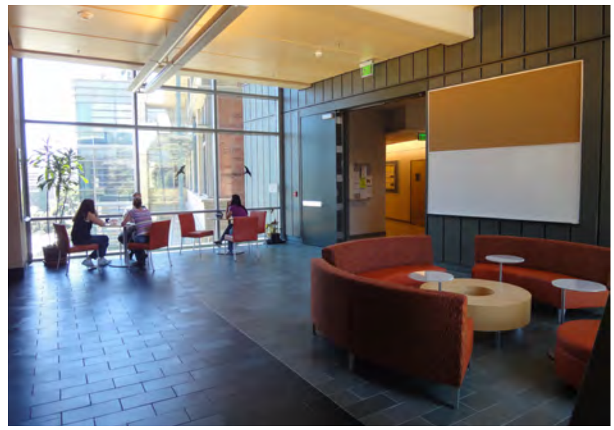


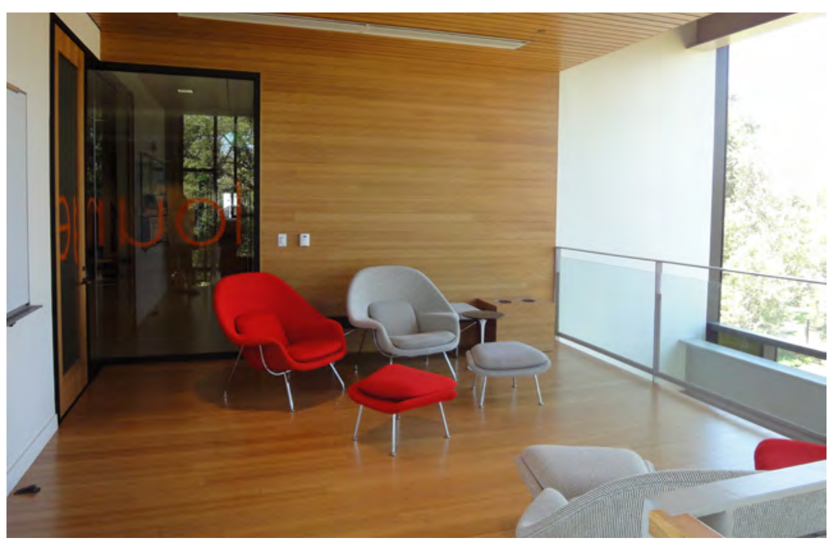


Buildings on campus should be designed with awareness and sensitivity for human interaction within the built environment. Designers should consider these often “un-planned” areas when designing new buildings and spaces and think first and foremost about the people who will occupy them. These flexible spaces should foster collaboration and social interaction as well as provide opportunities for individual focus and reflection.

I. COLLABORATIVE COMMON AREAS

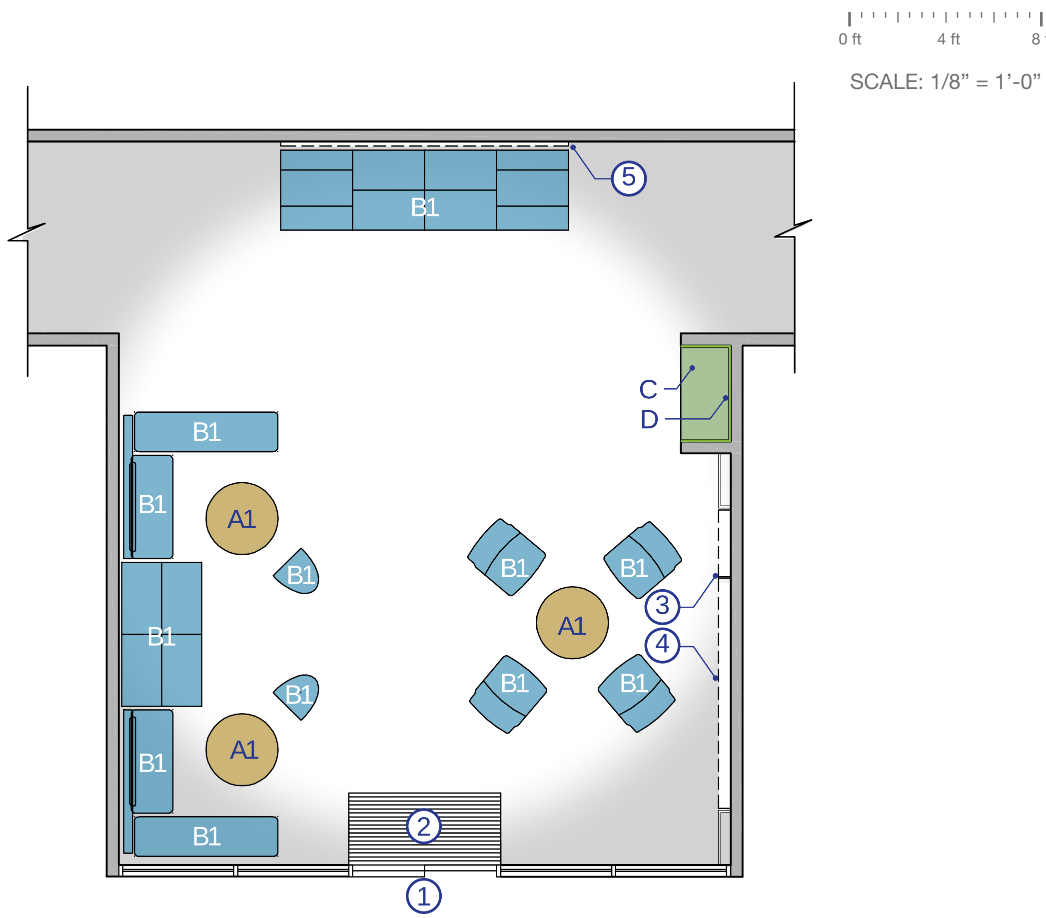






II. LOBBIES

Lobbies are the first and foremost place a visitor experiences when entering the building and thus should be well designed for comfort and aesthetics. Furniture should match the decor of the space and welcome guests as they transition into the building. Riverside Community College District encourages designers to incorporate artwork into the fabric of the Lobby's design. Proper lighting designating a place for permanent or rotating exhibits should be incorporated, even if the budget will not cover the cost of the original art.



PLAN

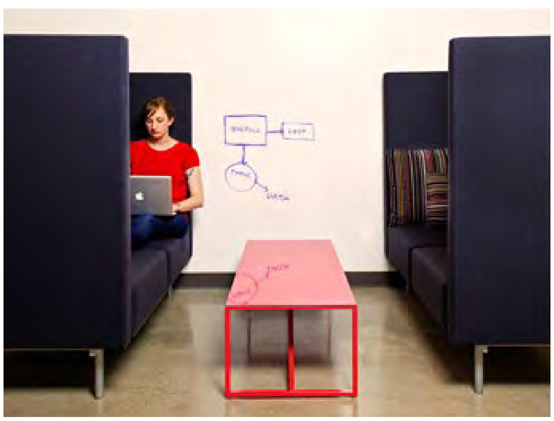
LEGEND

- A1 Side tables
- B1 Informal seating area
- C Recycling/trash area
- D Protective surface area
- 1 Automatic sliding doors
- 2 Recessed walk-off mat
- 3 Directory
- 4 Display case or flat panel display
- 5 Artwork

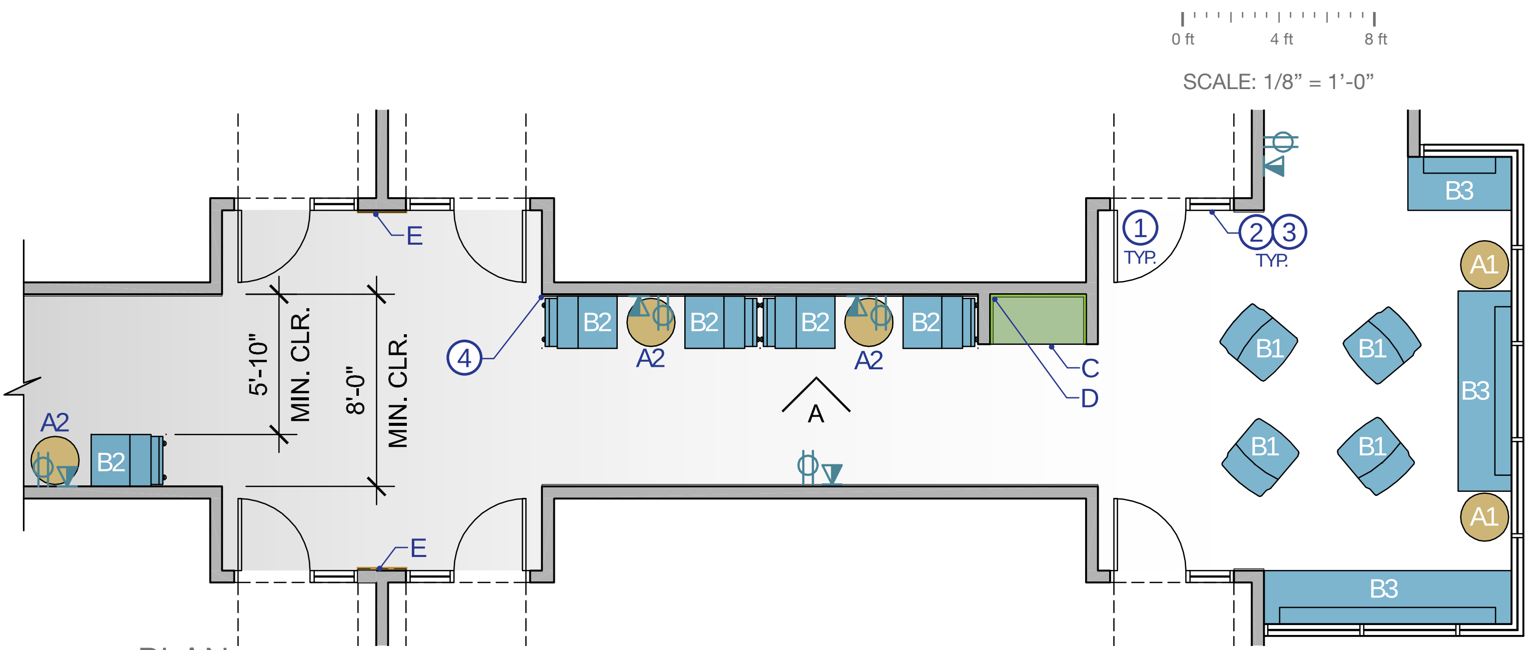
SURFACES

Floor:	Porcelain tile, recessed area rug
Wall:	Painted drywall, wood paneling
Ceiling Ht:	Varies
Ceiling Type:	Painted drywall, acoustic material

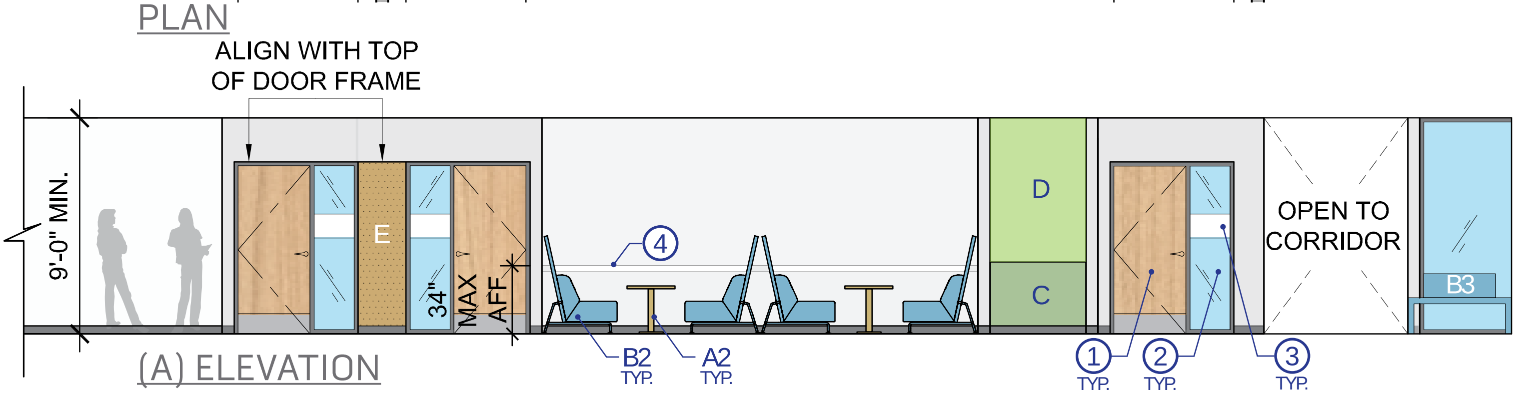
III. PUBLIC CORRIDORS



Public corridors adjacent to student classrooms should be comprised of highly durable materials and configured to provide students with opportunities for interaction. Break out spaces at the ends are encouraged as they allow for informal dialogue and gatherings.



PLAN



(A) ELEVATION

LEGEND

- A1 Side tables
- A2 Casual meeting + study tables
- B1 Informal seating area
- B2 Casual meeting + study seating
- B3 Bench seating
- C Recycling/trash area
- D Protective surface area
- E Tackable surface area

- 1 Solid wood door
- 2 Sidelight
- 3 Room signage
- 4 Chair rail

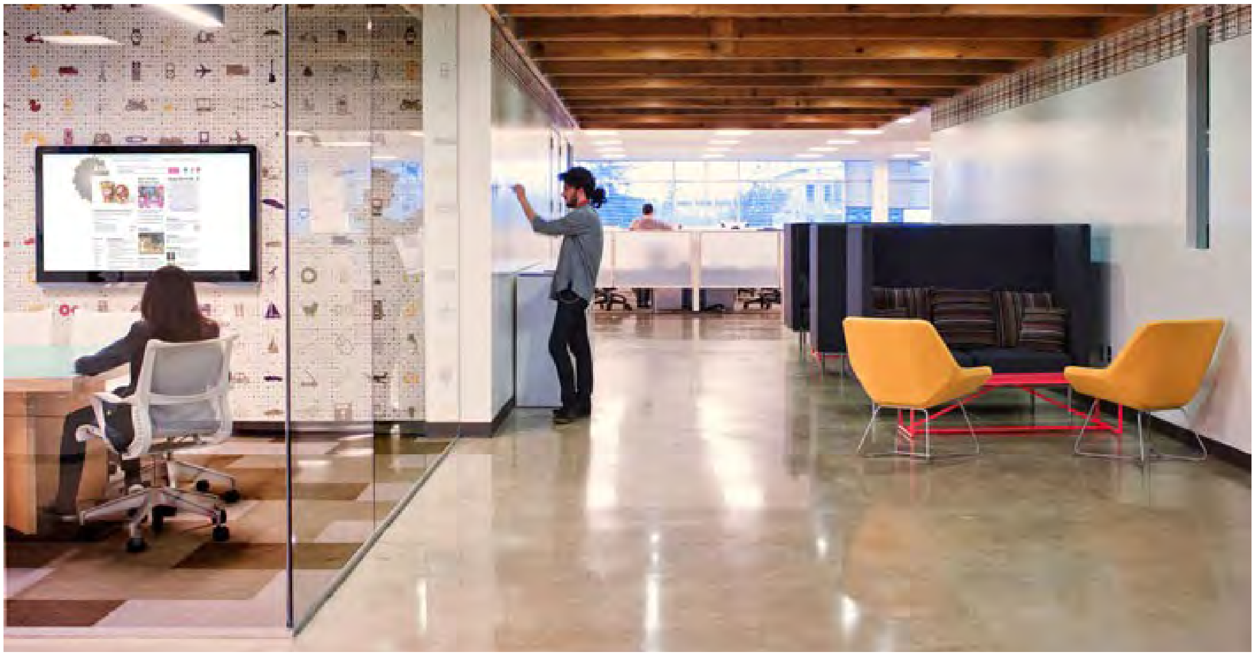
SURFACES

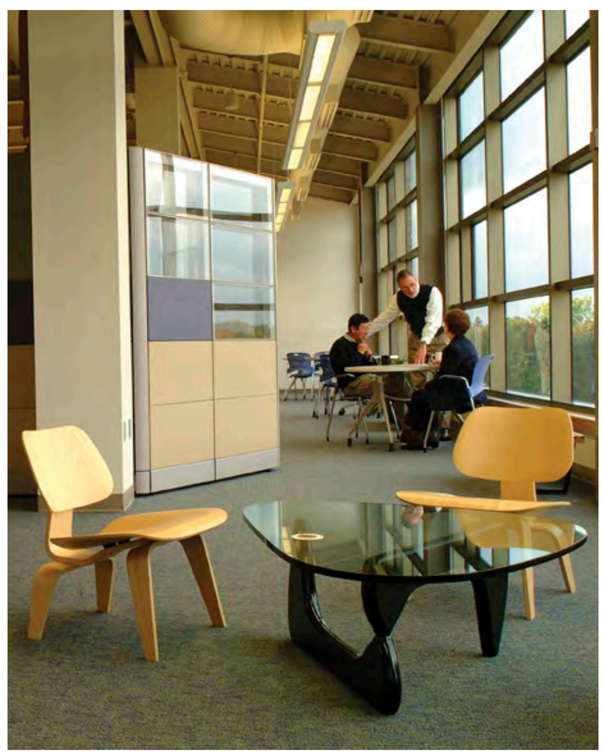
Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

SYMBOLS

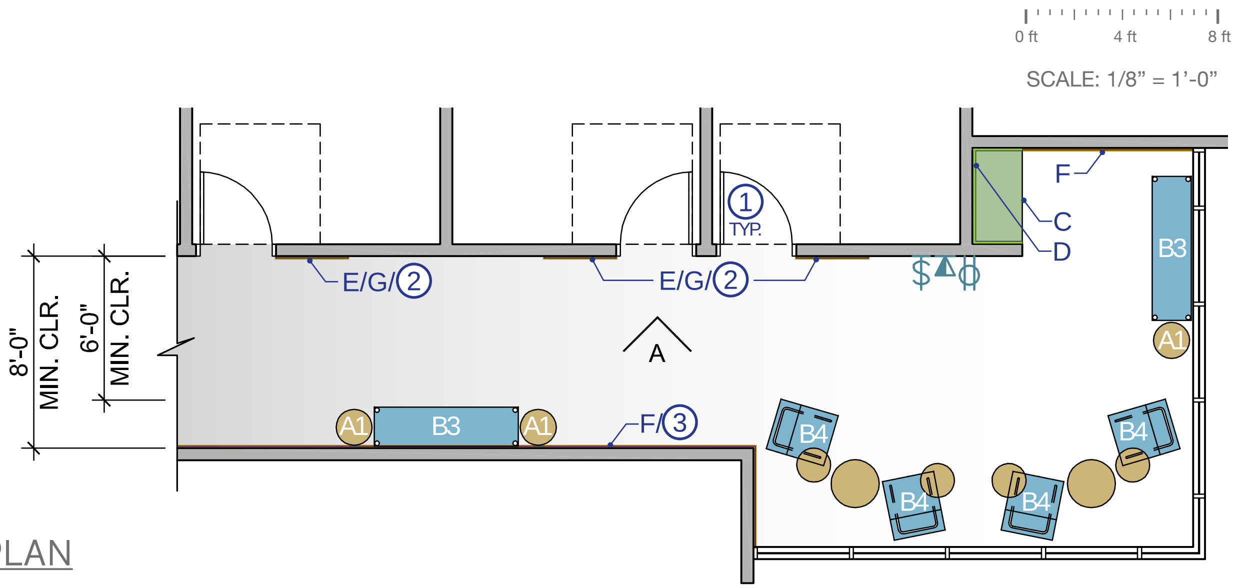
- Duplex
- Tel/Data

IV. OFFICE SUITE CORRIDORS (PRIVATE)

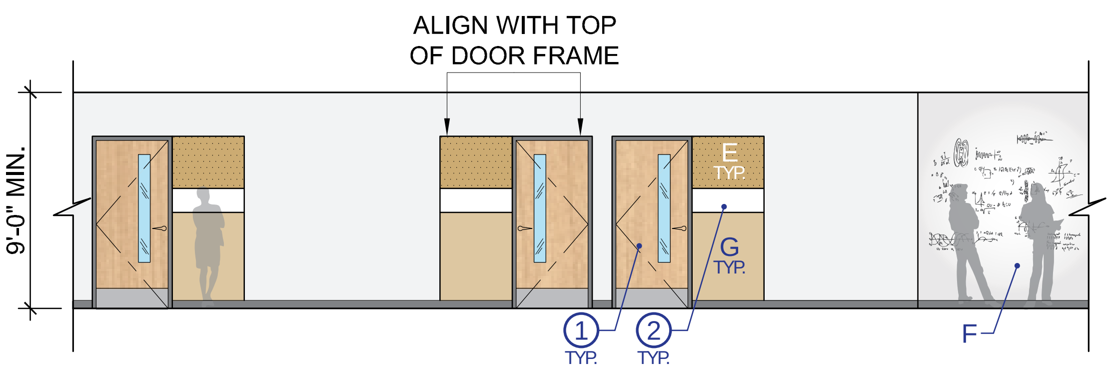




Faculty office suite corridors should provide space for interaction and collaboration among faculty members and between faculty and their students. Providing adequate seating groups along with tackboards and markerboards will foster this type of environment.



PLAN



(A) ELEVATION

LEGEND

- A1 Side tables
- B3 Bench seating
- B4 Lounge seating with tablet
- C Recycling/trash area
- D Protective surface area
- E Tackable surface area
- F Writable surface area
- G Wall covering

1. Solid wood door with vision panel
2. Room Signage
3. Chair rail

SURFACES

Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

SYMBOLS

- Duplex
- Tel/Data

PART D
CLASSROOMS

CONTENTS:

SEATING CHART DEFINITION:

TOTAL SEATS	NUMBER OF **WHEELCHAIR** SPACES	NUMBER OF **COMPANION** SEATS	NUMBER OF **TRANSFER** (AISLE) SEATS	NUMBER OF **SEMI-AMBULANT** SEATS	**ASSISTIVE LISTENING** RECEIVERS

As the primary spaces for instruction, classrooms are where students and faculty spend a significant amount of time together, and should be designed large enough to accommodate seat count, pedagogies, learning technologies, furnishings, accessibility and building code requirements.

Faculty should have intuitive ease of access to light zoning, window shade, and projection controls from a wall panel or the fixed lectern. Classrooms should be geometrically wide and shallow, with the wide side as the front teaching wall, to maximize view angles and make it easier for the instructor to be close to all the students even in the most distant seats. The back wide wall can host windows with shades maximize daylighting.

Classrooms should foster communication by maximizing the white board on the front teaching wall, provide projection communication, Wi-Fi connectivity, and assisted listening systems. Furthermore, tack panels on side walls support student work and collaboration. Given the ways in which teaching and learning is moving, every classroom should be equipped with video / tele conferencing infrastructure; microphones, speakers, and cameras.

Three types of classroom design options should be considered; traditional, flexible, and active. The number of each type of classrooms included in a building project will be determined by the needs of the specific programs that will occupy the building.

BEST PRACTICES

GEOMETRY

- Wider and shallower rooms.
- Wide wall as the front teaching wall. This brings the instructor in close proximity to all the students, and encourages eye contact.
- Windows should be located on the back wide wall, to provide daylighting yet minimize daydreaming.

CEILING HEIGHTS

- 11 feet minimum should be considered to accommodate suspended light fixtures and projectors.

ACOUSTICS / SOUND ISOLATION

- See Part B.

ACCESSIBILITY

- See Part A.

LECTERN

- Accessible and fixed.

INSTRUCTOR DESK

- Accessible and mobile.

STUDENT FURNITURE

- Movable tables and chairs for variety of pedagogical approaches, group work, and interaction layouts.

MARKER BOARDS / RAILS
- Maximize marker board at the front teaching wall.
- Marker board rails on side walls for additional mobile writable surfaces.

TACK PANELS
- Maximize tack panels on side walls.
- Align with other elements in the room for a clean design.
- On the front teaching wall, create a zone that other elements occupy.

CLOCKS
- See Part B.

LIGHTING
- See Parts B and P.

PROJECTORS
- See Part B.

PROJECTION SCREENS
- See Part B.

FLAT PANEL DISPLAYS
- Provide infrastructure (wall blocking and back box) for future installation needs.
- The number of FPDs to be purchased will be determined on a project by project basis.
- 16:9 aspect ratio.
- 4 foot mounting height.

VIEWING ANGLES
- See Part B.

MEDIA RACKS
- House the racks in either a media closet or in a media console, to be determined on a project by project basis.
- See Part B.

SWITCH CONTROLS
- See Part B.

CLEANOUTS / ACCESS PATHS
- See Part B.

MICROPHONES
- See Part B.

SPEAKERS
- See Part B.

CAMERAS
- See Part B.

WINDOW SHADES
- See Part B.

POWER / DATA
- Power over Ethernet (POE) connection.
- See Part B.

WI-FI
- See Part B.

ASSISTIVE LISTENING SYSTEM
- See Part B.

HVAC
- See Part B.

LIFE SAFETY
- See Part B.

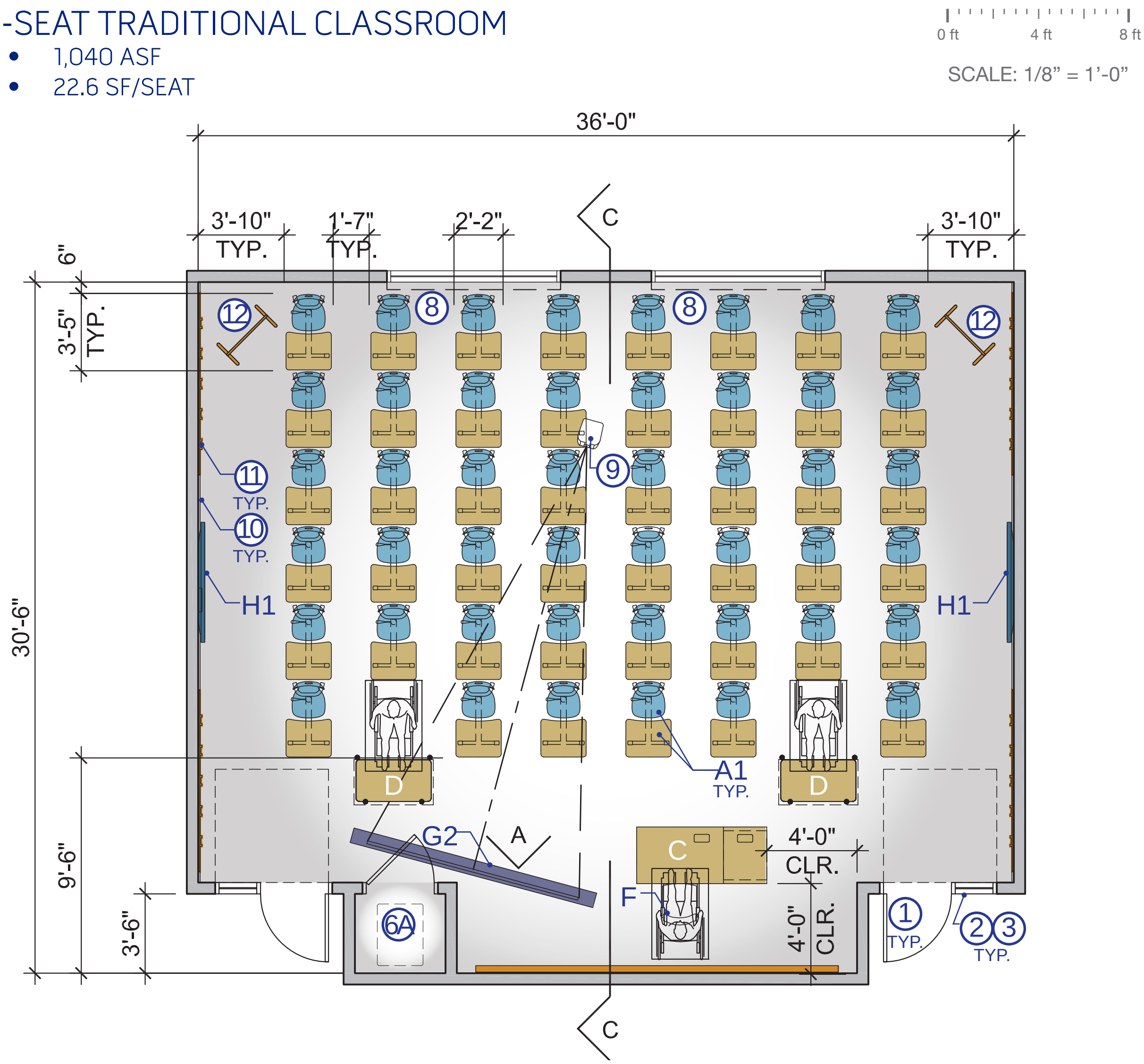
I. TRADITIONAL CLASSROOMS

Traditional and flexible classroom layouts are generally based on several key assumptions:

- Furniture consists of rows of chair desks or moveable tables and chairs.
- The room is oriented so that there is an obvious “front” suggested by the location of the writing and/or projection surface.
- The instructor’s station is typically located toward the front of the room.
- Proportions are generally wider than deep for line of sight to whiteboard and instructor.

48-SEAT TRADITIONAL CLASSROOM

- 1,040 ASF
- 22.6 SF/SEAT



PLAN

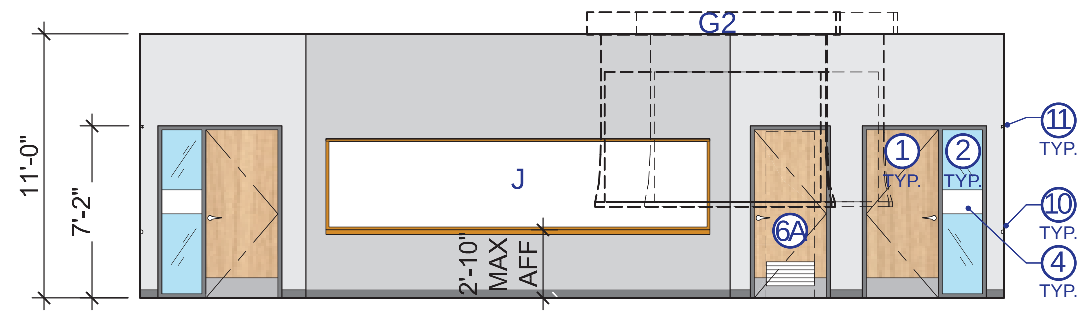
Call out required, or provided?
Indicate C, T, S on plan?

SEATING CHART

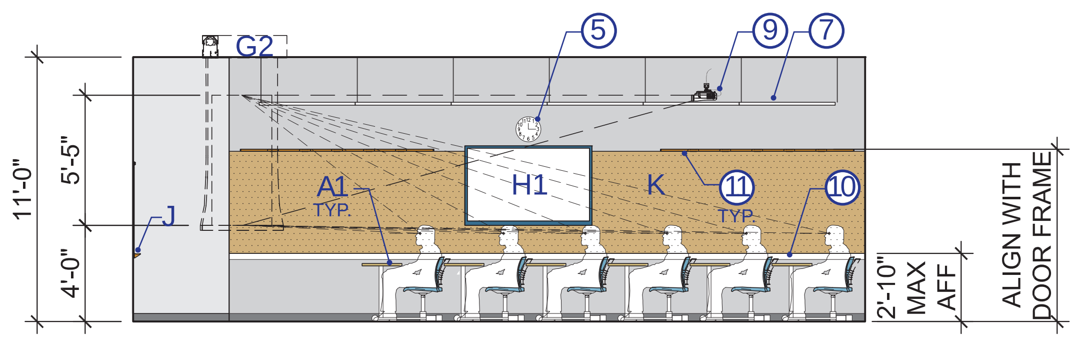
	W	C	T	S	ALS
48	2	2	2	2	2

0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”



(A) FRONT ELEVATION



(C) SECTION

LEGEND

- A1 Mobile (or sled base) chair/desk unit
- B Mobile instructor station
- C Fixed accessible lectern
- D Accessible workstation
- F Mobile instructor seating
- G2 65”x116” projection screen, recessed ceiling mounted
- H1 70” flat panel display (FPD), wall mounted
- J Writable surface area
- K Tackable surface area

- 1 Solid wood door
- 2 Sidelight
- 3 Room signage
- 4 ALS signage
- 5 Battery operated atomic clock
- 6A Media closet (42”x48” clear)
- 7 Direct / indirect pendant lighting
- 8 Double roller shade (window treatment and room darkening)
- 9 Projector, ceiling mounted

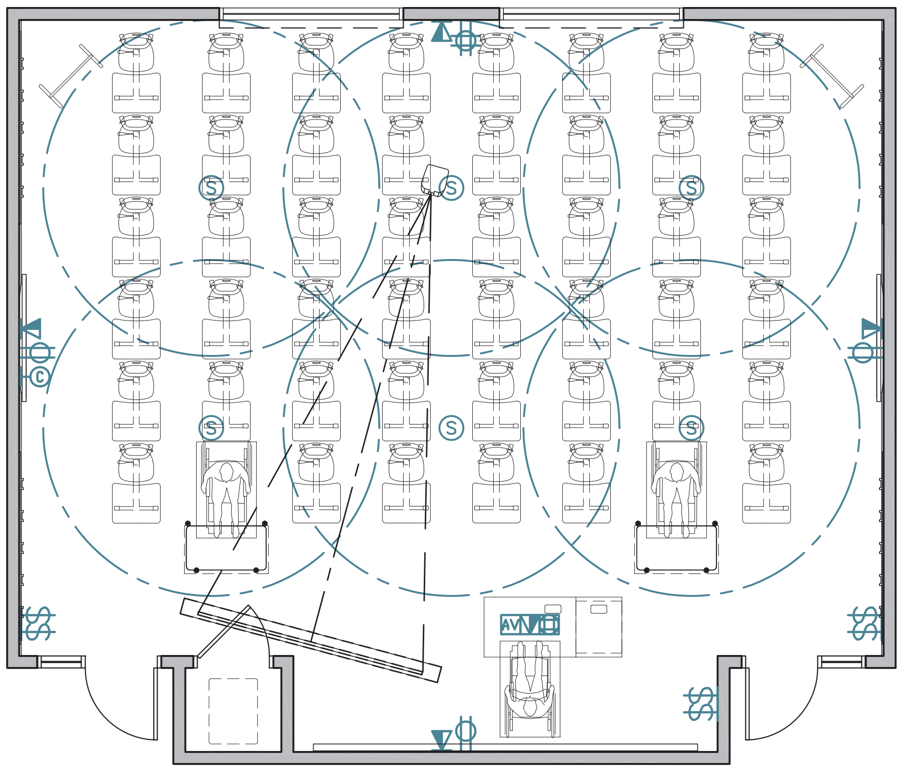
- 10 Chair rail
- 11 Markerboard rail
- 12 Whiteboard easel

SURFACES

Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	9’-0” to 11’-0”
Ceiling Type:	Acoustical ceiling tile

48-SEAT TRADITIONAL CLASSROOM

SCALE: 1/8" = 1'-0"

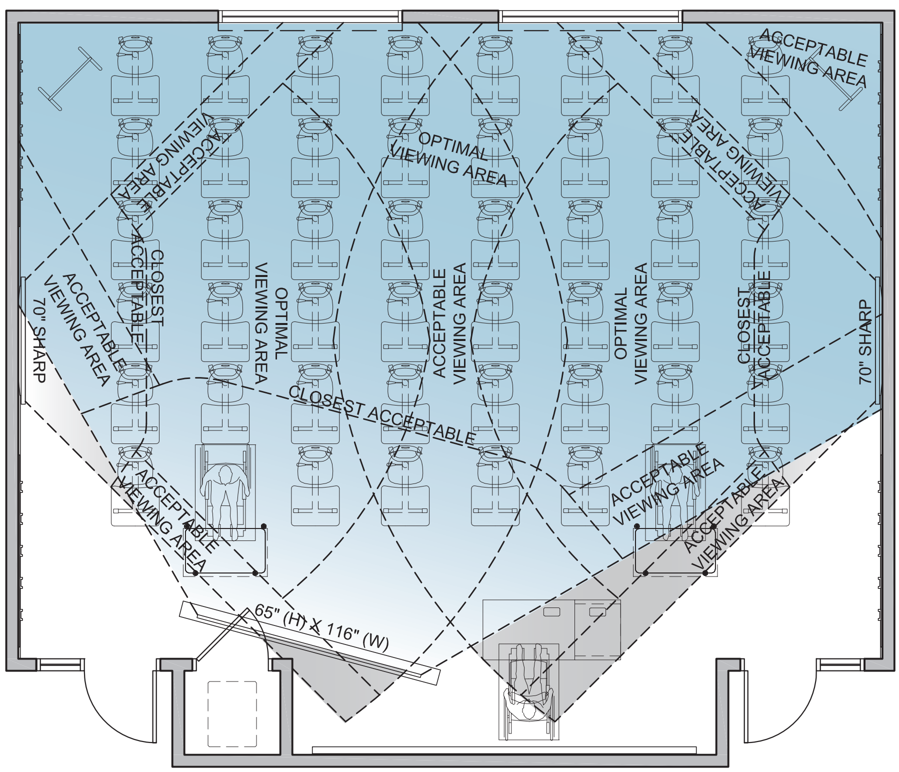


POWER/DATA/AV PLAN

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (duplex)
- Flush floor-mounted quadruplex
- Flush floor-mounted data (6 outlets at instructor station)
- A/V connector
- Light switch
- Ceiling Speaker

SCALE: 1/8" = 1'-0"

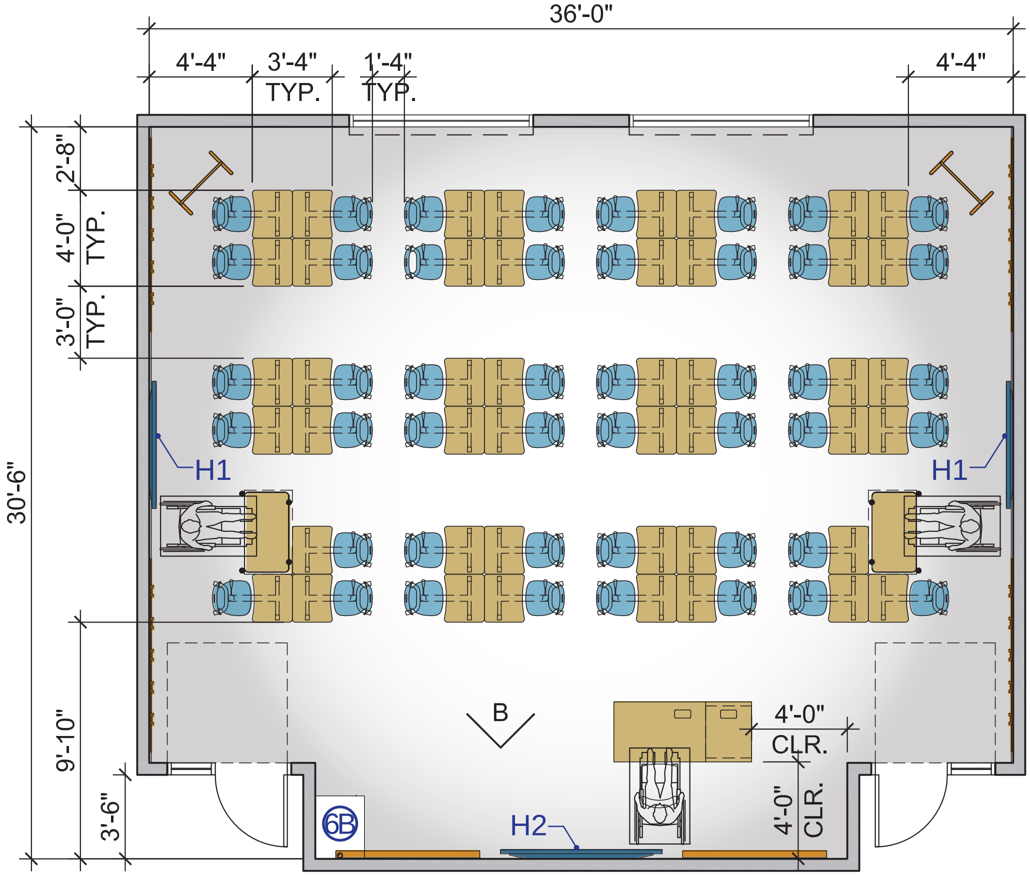


VIEWING ANGLE PLAN

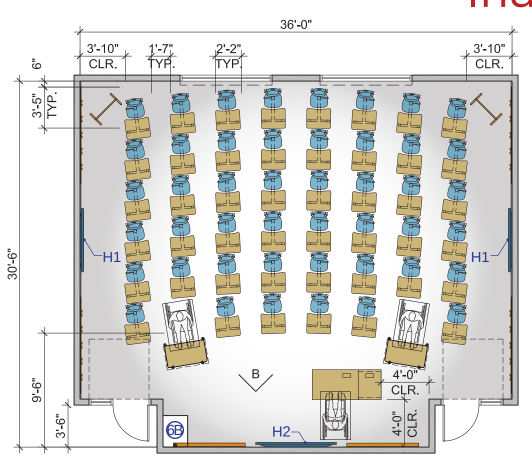
48-SEAT TRADITIONAL CLASSROOM

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



Indicate C, T, S SEATS on plan?



0 ft 8 ft 16 ft

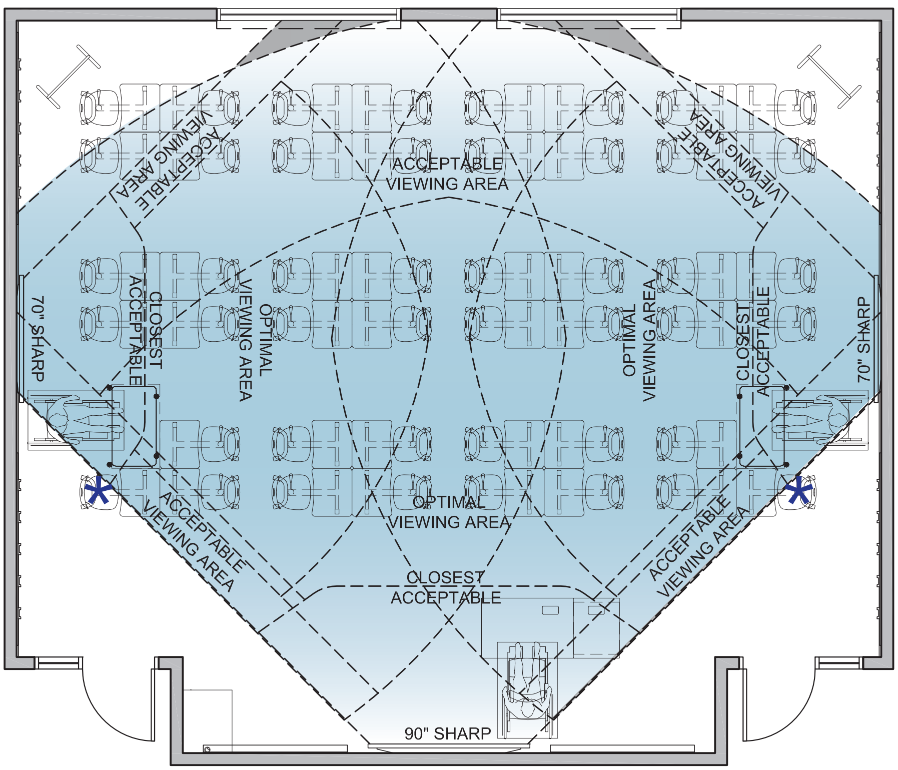
SCALE: 1/16" = 1'-0"

LEGEND

- H1 70" flat panel display (FPD), wall mounted
- H2 90" flat panel display (FPD), wall mounted
- 6B Media console

ALTERNATE LAYOUTS

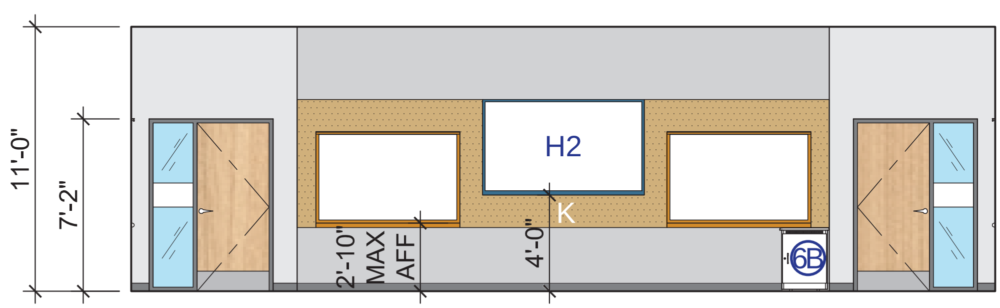
SCALE: 1/8” = 1’-0”



SYMBOLS

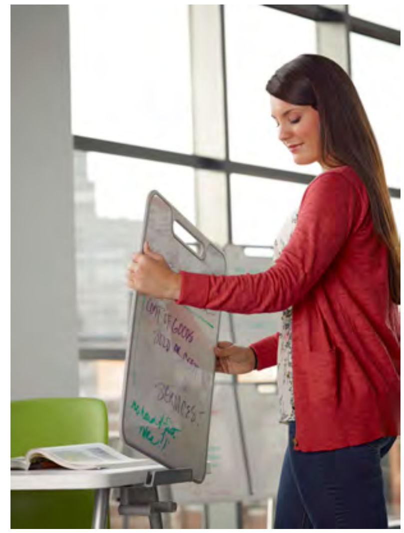
* Outside of acceptable viewing area

ALTERNATE LAYOUT VIEWING ANGLE PLAN



(B) FRONT ELEVATION

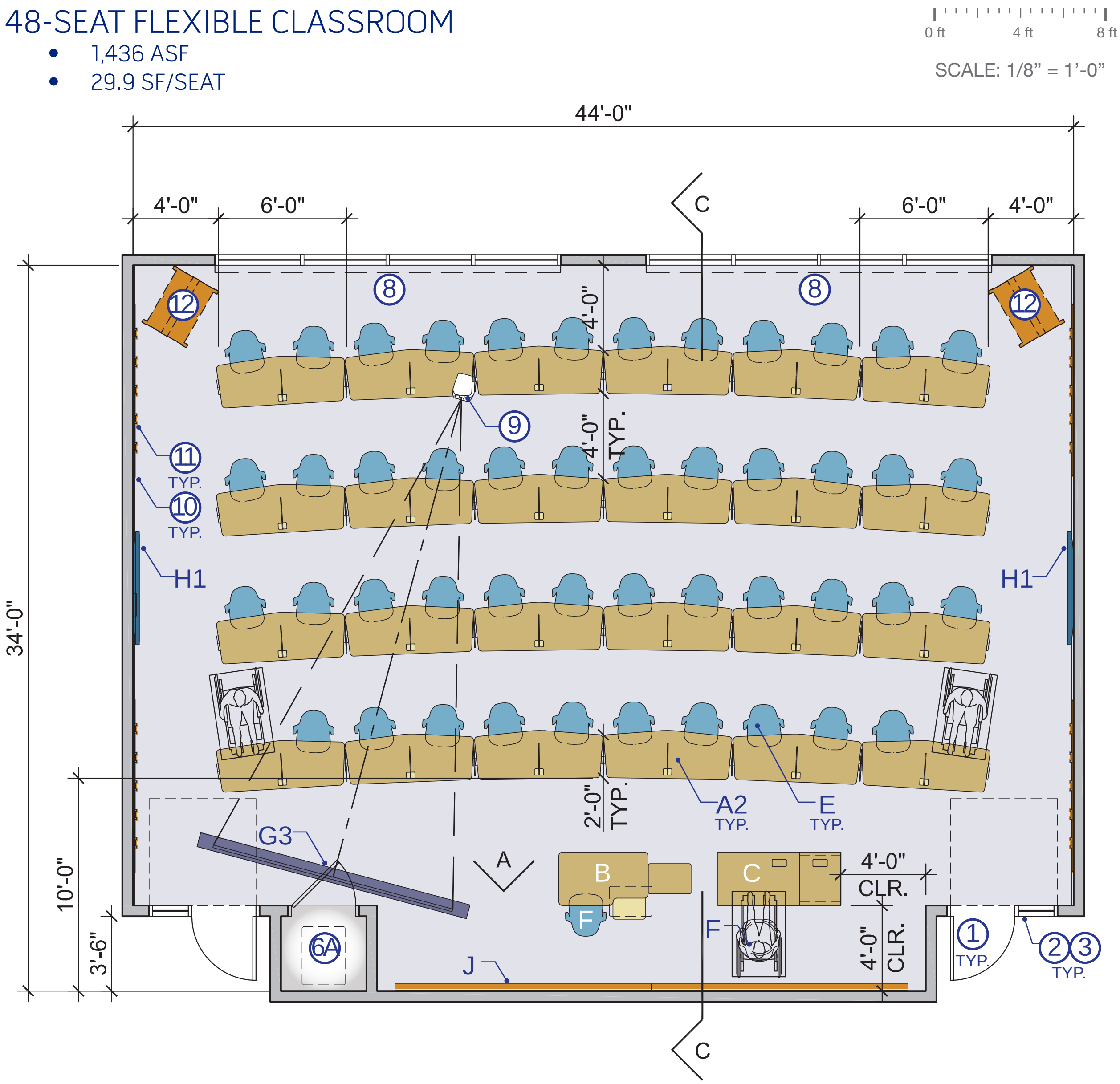
II. FLEXIBLE CLASSROOMS



48-SEAT FLEXIBLE CLASSROOM

- 1,436 ASF
- 29.9 SF/SEAT

SCALE: 1/8” = 1’-0”

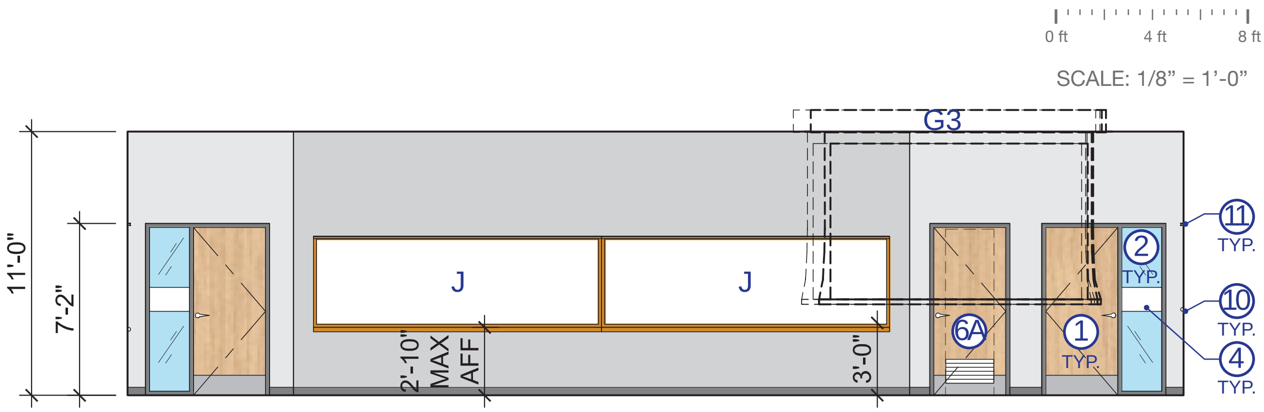


PLAN

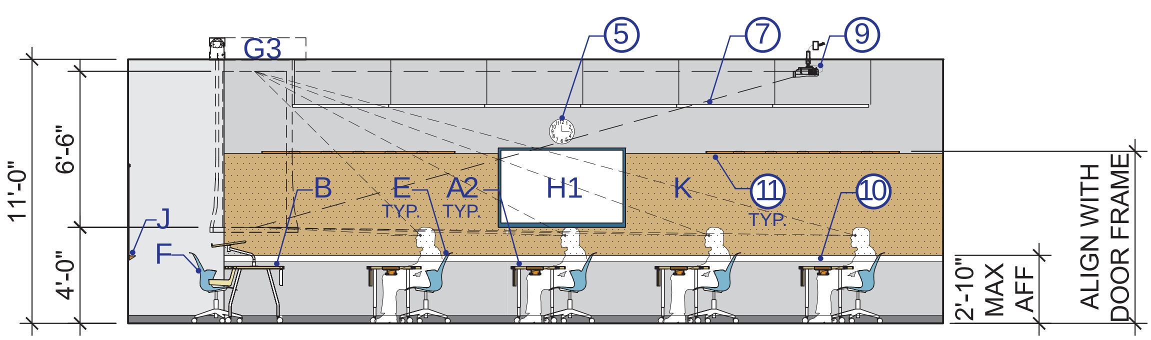
Call out required, or provided? Indicate C, T, S on plan?

SEATING CHART

	W	C	T	S	ALS
48	2	2	2	2	2



(A) FRONT ELEVATION



(C) SECTION

LEGEND

- A2 Mobile student tables
- B Mobile instructor station
- C Fixed accessible lectern
- E Mobile student seating
- F Mobile instructor seating
- G3 78”x139” projection screen, recessed ceiling mounted
- H1 70” flat panel display (FPD), wall mounted
- J Writable surface area
- K Tackable surface area

- 1 Solid wood door
- 2 Sidelight
- 3 Room signage
- 4 ALS signage
- 5 Battery operated atomic clock
- 6A Media closet (42”x48” clear)
- 7 Direct / indirect pendant lighting
- 8 Double roller shade (window treatment and room darkening)
- 9 Projector, ceiling mounted

- 10 Chair rail
- 11 Markerboard rail
- 12 Whiteboard easel

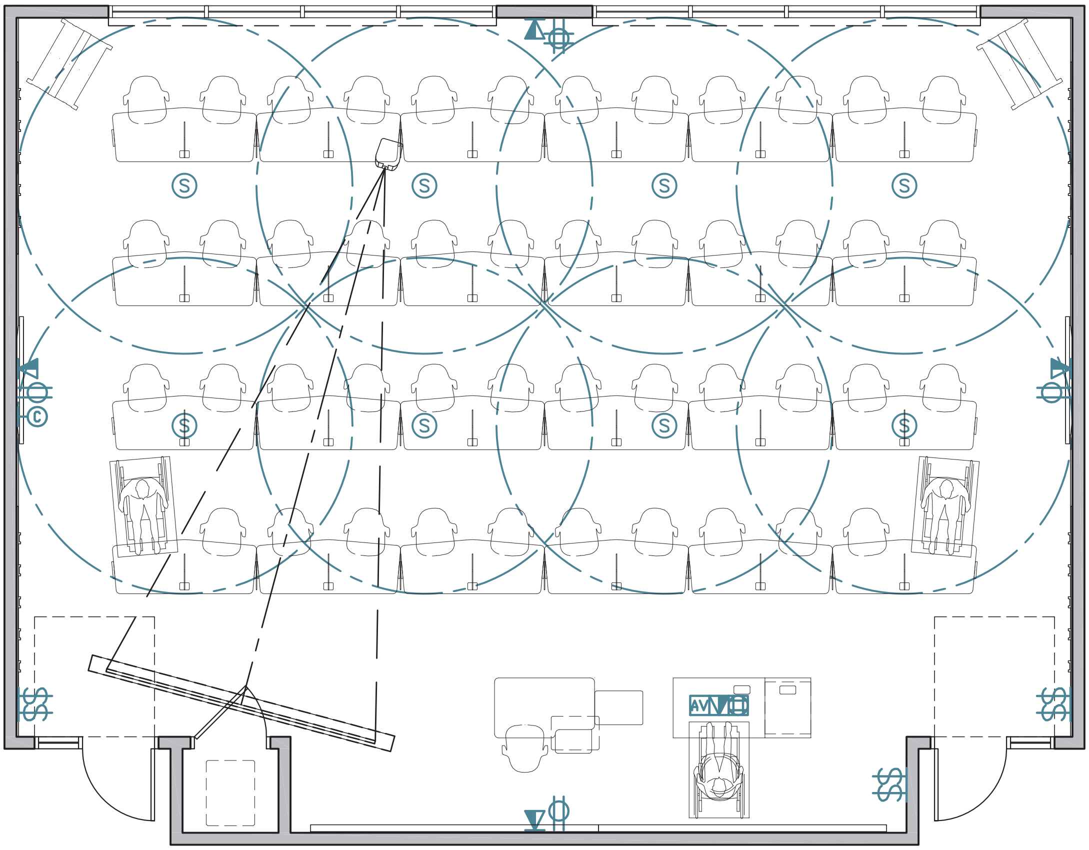
SURFACES

Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	9’-0” to 11’-0”
Ceiling Type:	Acoustical ceiling tile

48-SEAT FLEXIBLE CLASSROOM

0 ft 4 ft 8 ft

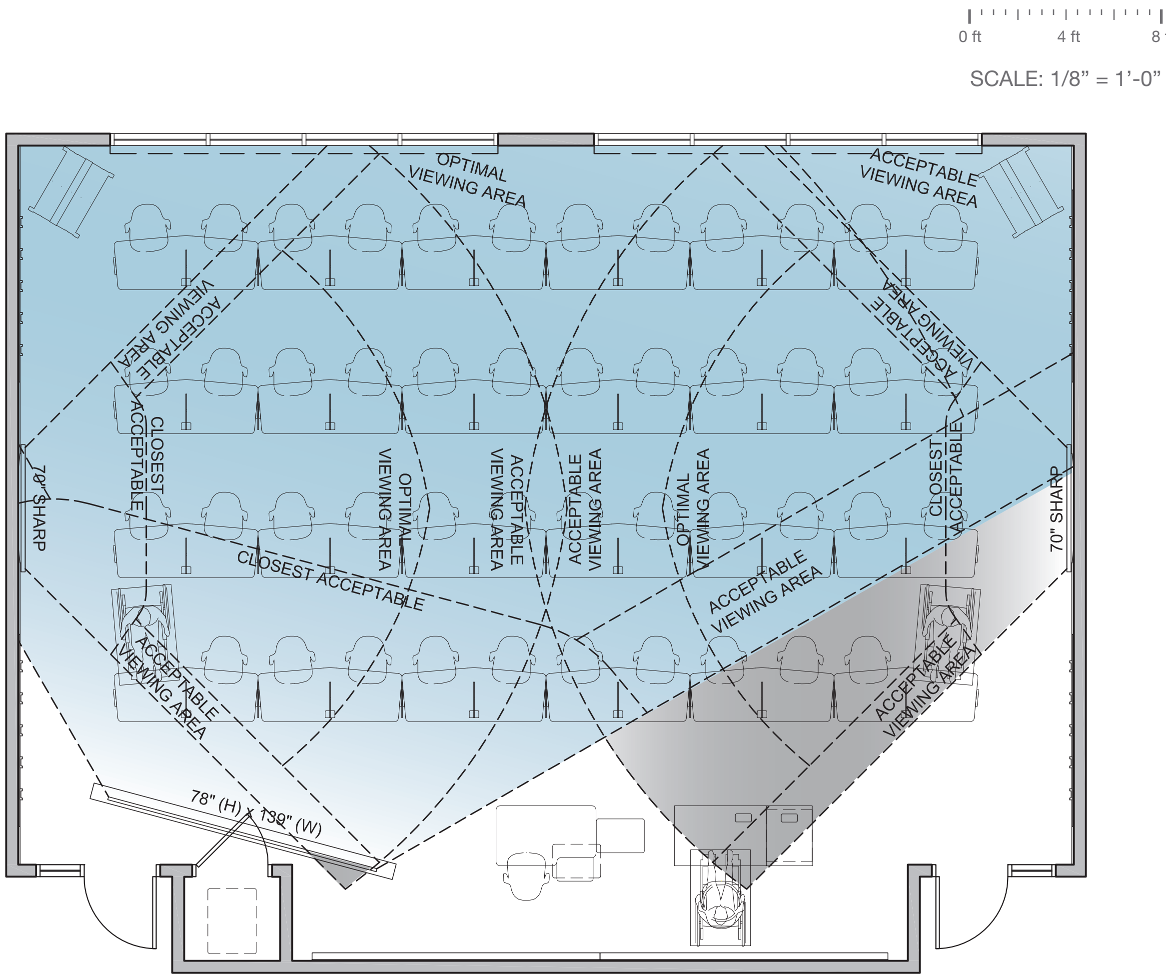
SCALE: 1/8" = 1'-0"



POWER/DATA/AV PLAN

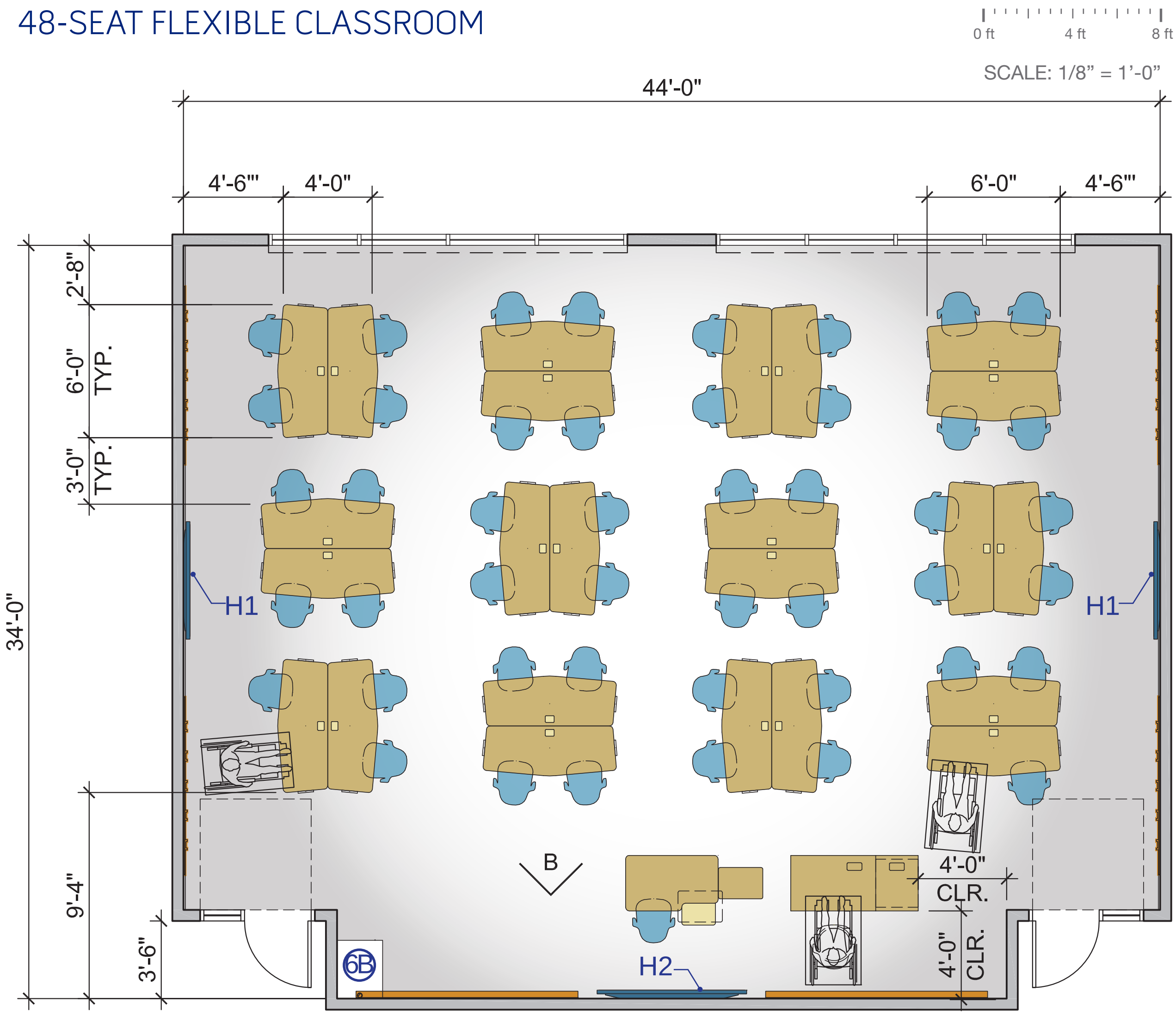
SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (duplex)
- Flush floor-mounted quadruplex
- Flush floor-mounted data (6 outlets at instructor station)
- A/V connector
- $ Light switch
- Ceiling Speaker



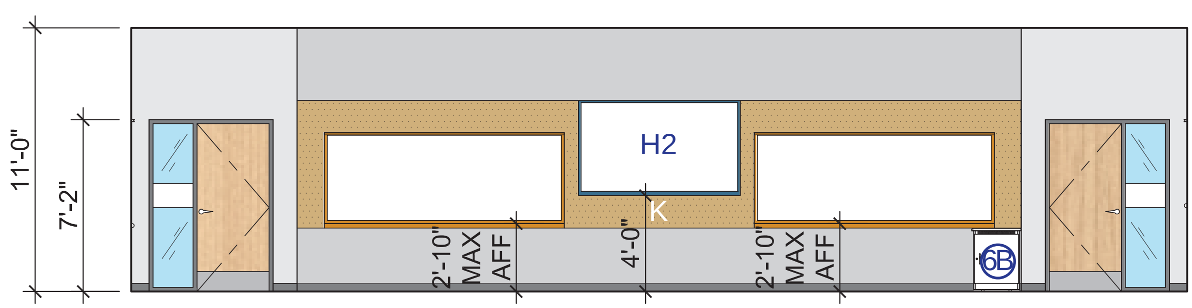
VIEWING ANGLE PLAN

48-SEAT FLEXIBLE CLASSROOM

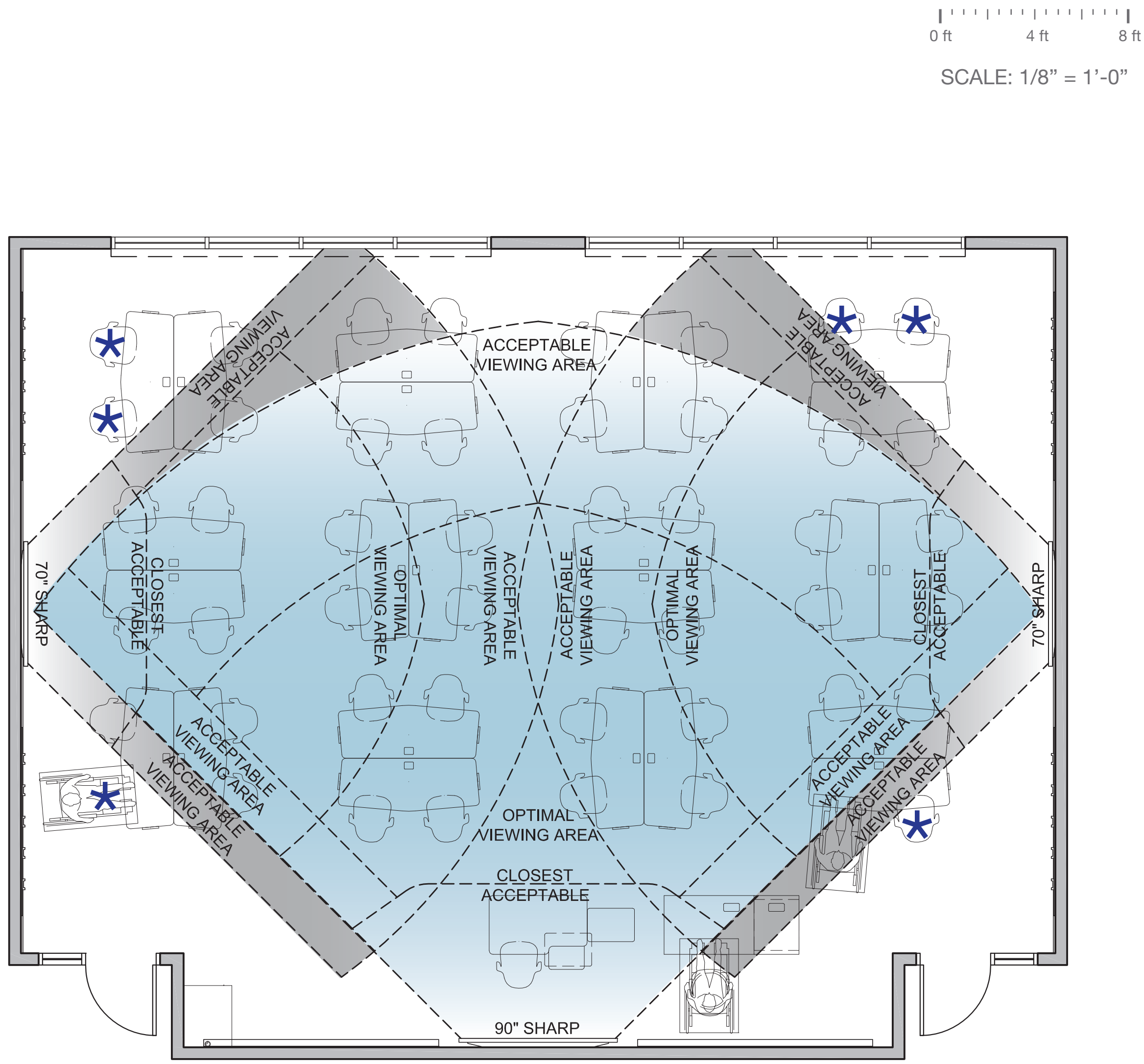


ALTERNATE LAYOUT

Indicate C, T, S SEATS on plan?



(B) FRONT ELEVATION



ALTERNATE LAYOUT VIEWING ANGLE PLAN

LEGEND

- H1 70" flat panel display (FPD), wall mounted
- H2 90" flat panel display (FPD), wall mounted
- 6B Media console

SYMBOLS

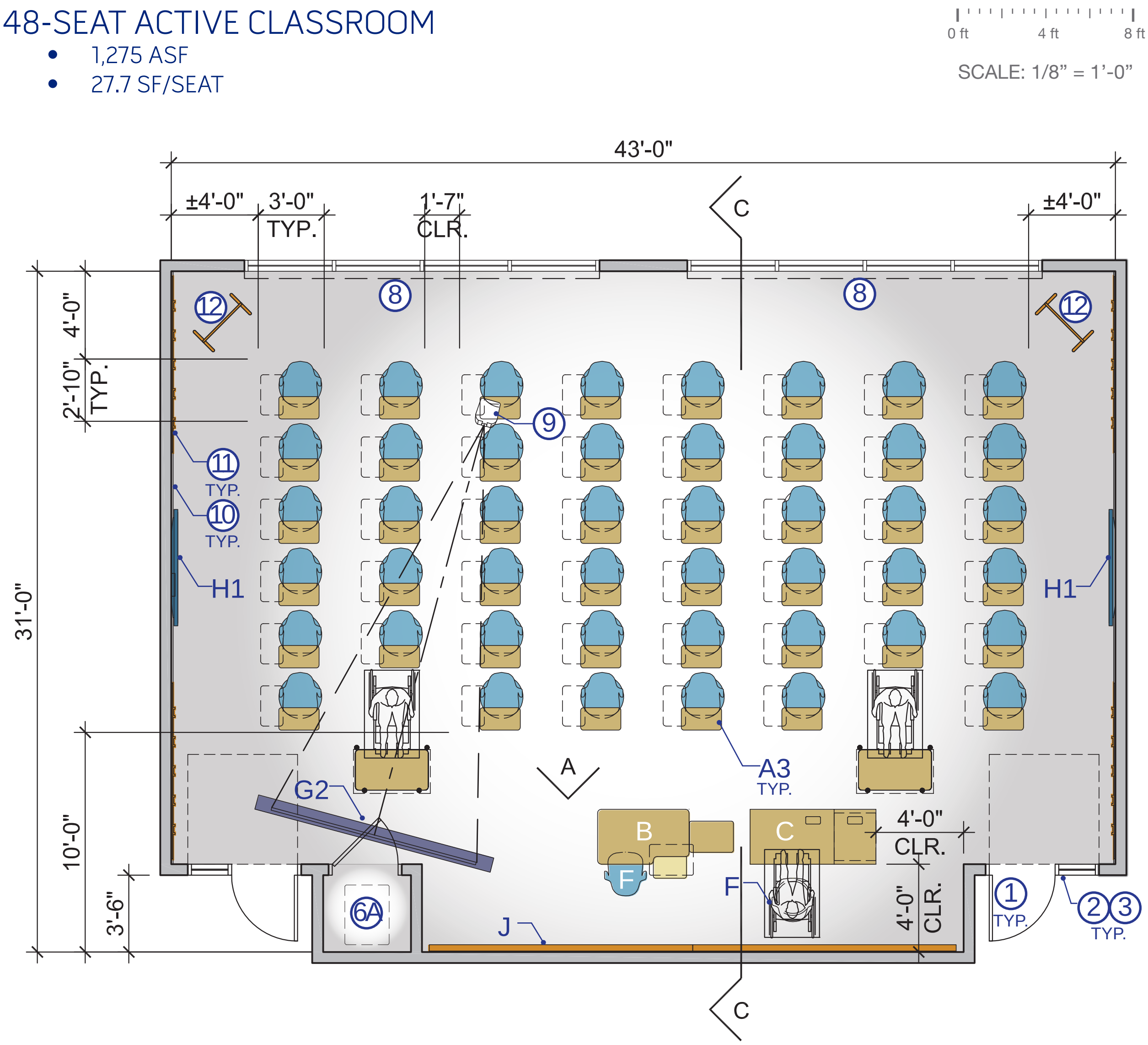
- * Outside of acceptable viewing area

III. ACTIVE CLASSROOMS

One important teaching trend is moving the instructor away from their didactic role as “sage-at-the-stage” to one of active facilitator. Students are more engaged in learning together, frequently working in groups and interacting with peers. In this model of problem-based learning, students work in groups, at shared work surfaces, with chairs on wheels. Tables, which may also be on wheels, can be reoriented to allow for different workgroup methodologies. The instructor moves about the room interacting with different groups, offering suggestions and guidance.

48-SEAT ACTIVE CLASSROOM

- 1,275 ASF
- 27.7 SF/SEAT



PLAN

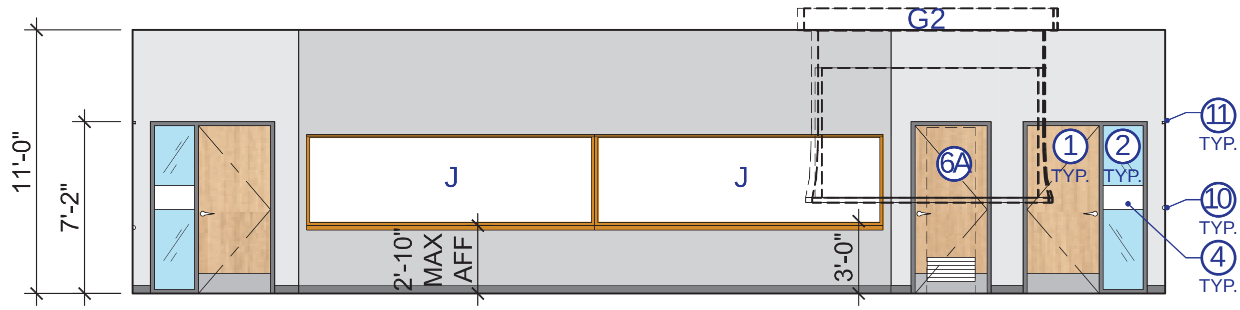
Call out required, or provided?
Indicate C, T, S on plan?

SEATING CHART

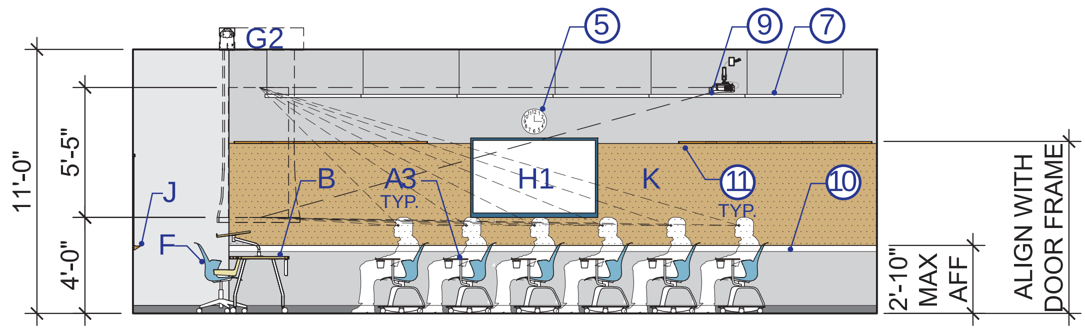
	W	C	T	S	ALS
48	2	2	2	2	2

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



(A) FRONT ELEVATION



(C) SECTION

LEGEND

- A3 Mobile student chair with worksurface
- B Mobile instructor station
- C Fixed accessible lectern
- D Accessible workstation
- F Mobile instructor seating
- G2 65"x116" projection screen, recessed ceiling mounted
- H1 70" flat panel display, wall mounted
- J Writable surface area
- K Tackable surface area

- 1 Solid wood door
- 2 Sidelight
- 3 Room signage
- 4 ALS signage
- 5 Battery operated atomic clock
- 6A Media closet (42"x48" clear)
- 7 Direct / indirect pendant lighting
- 8 Double roller shade (window treatment and room darkening)
- 9 Projector, ceiling mounted

- 9 Projector, ceiling mounted
- 10 Chair rail
- 11 Markerboard rail

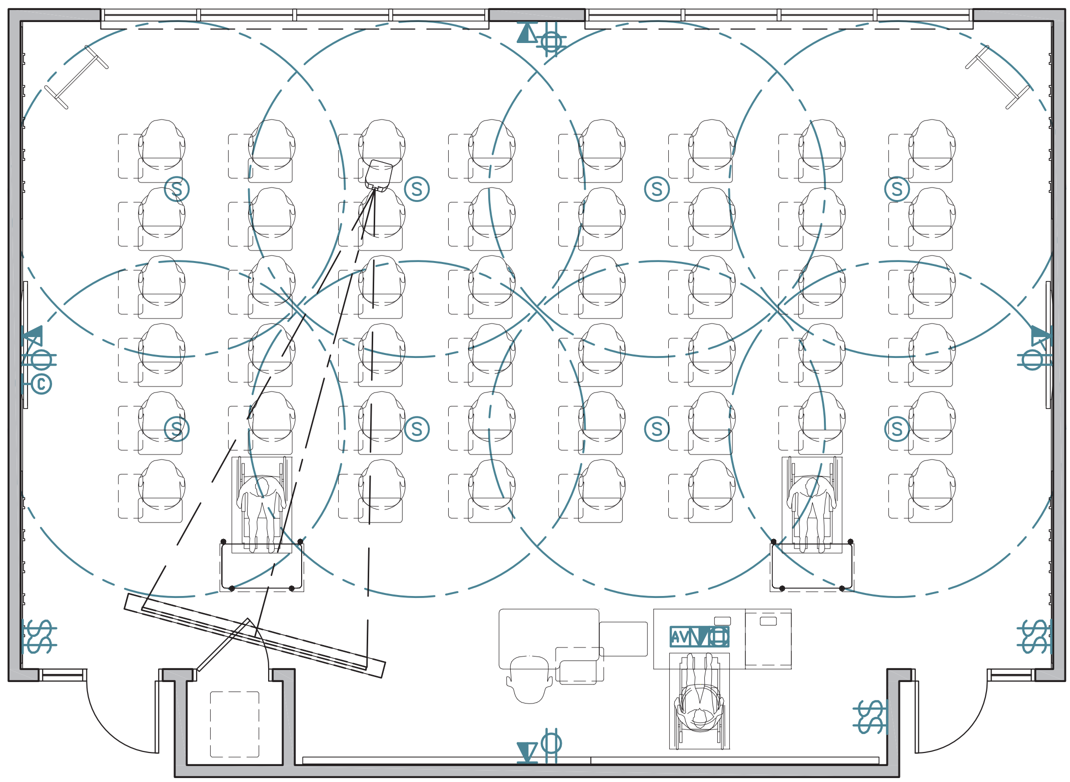
SURFACES

Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

48-SEAT ACTIVE CLASSROOM

0 ft 4 ft 8 ft

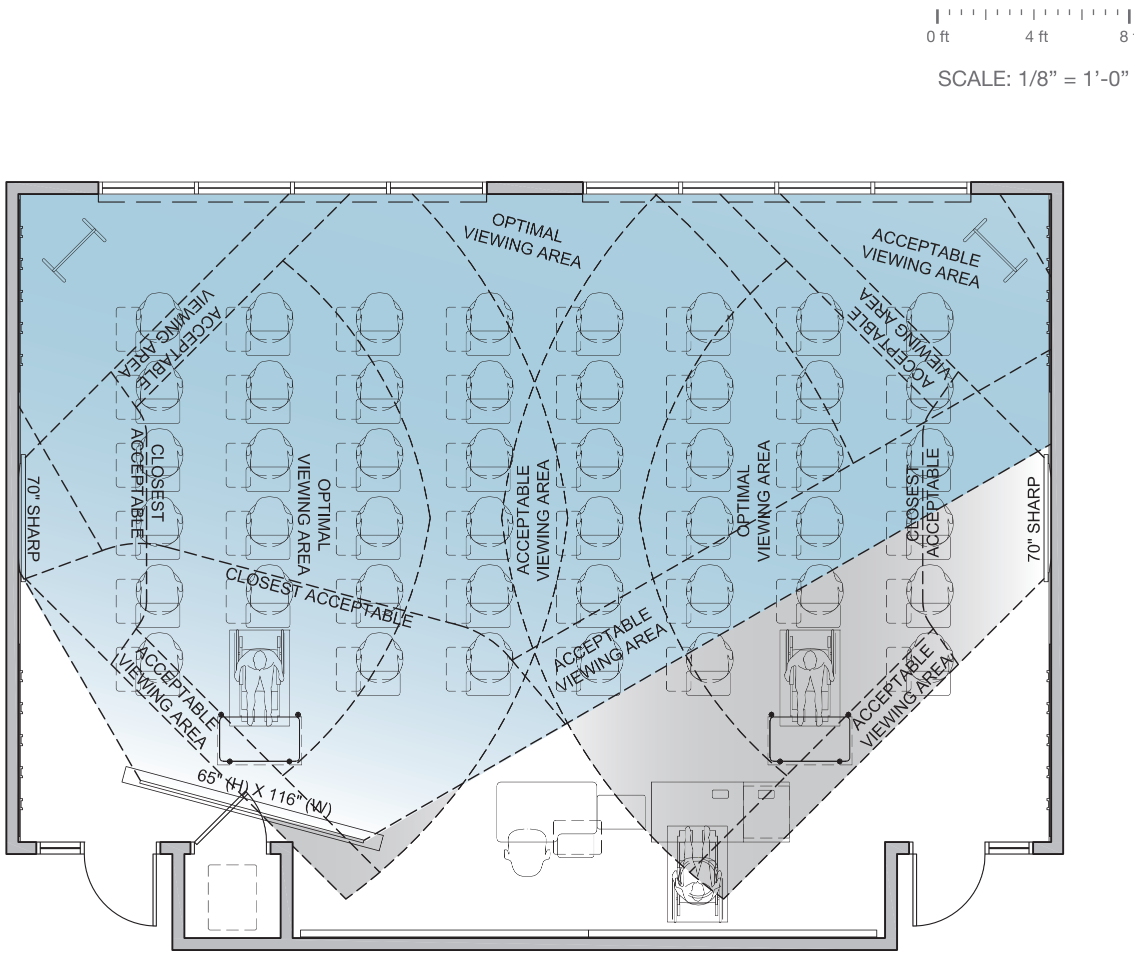
SCALE: 1/8" = 1'-0"



POWER/DATA/AV PLAN

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (duplex)
- Flush floor-mounted quadruplex
- Flush floor-mounted data (6 outlets at instructor station)
- AV A/V connector
- $ Light switch
- S Ceiling Speaker

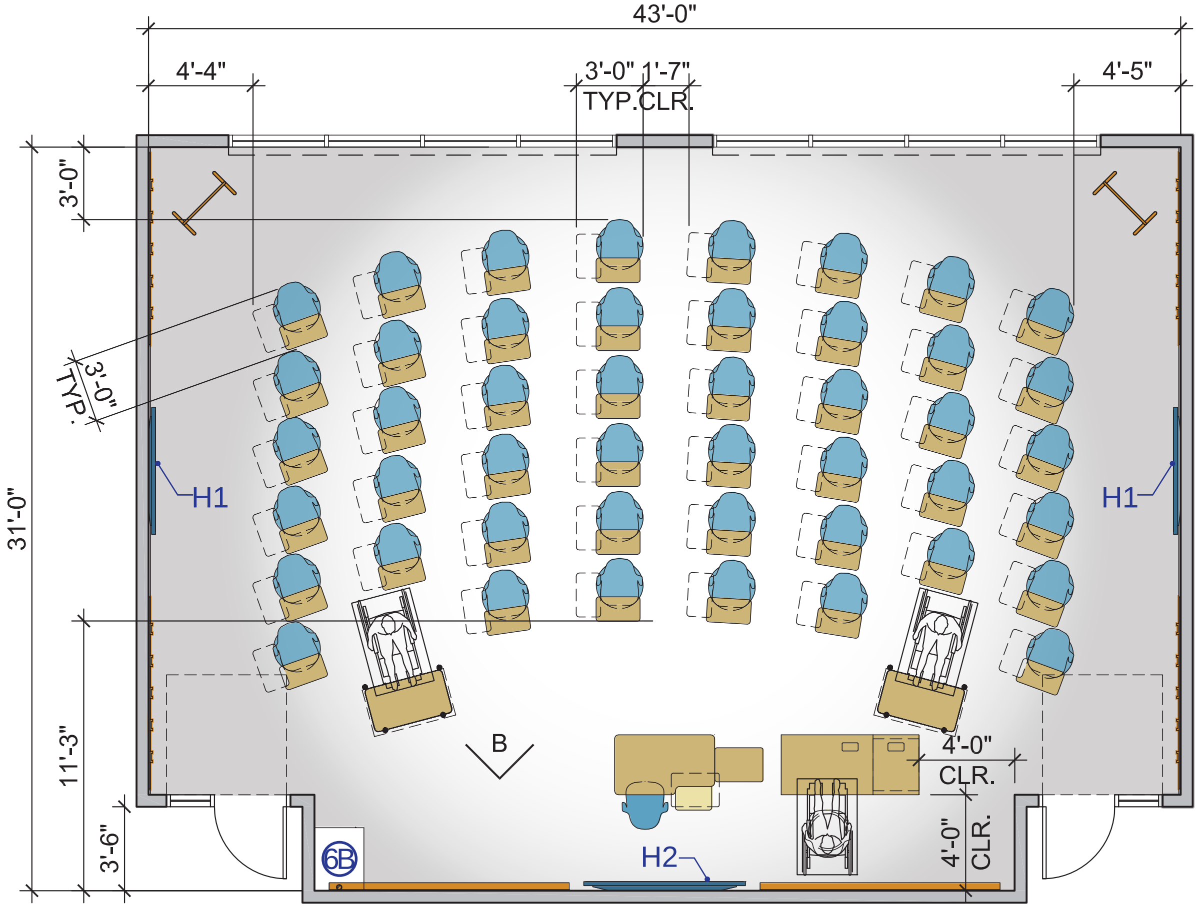


VIEWING ANGLE PLAN

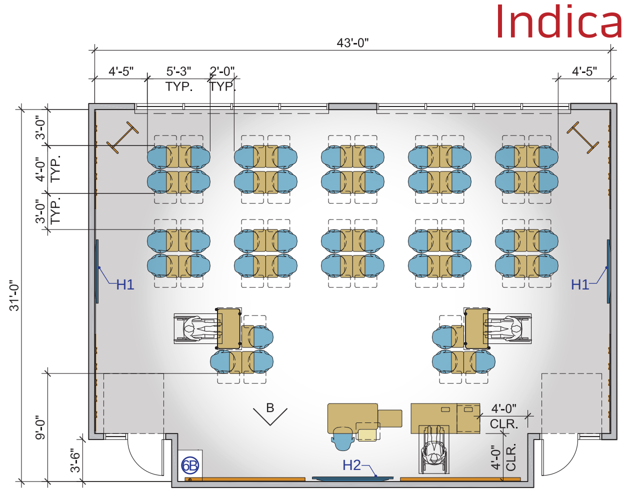
48-SEAT ACTIVE CLASSROOM

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



Indicate C, T, S SEATS on plan?



0 ft 8 ft 16 ft

SCALE: 1/16" = 1'-0"

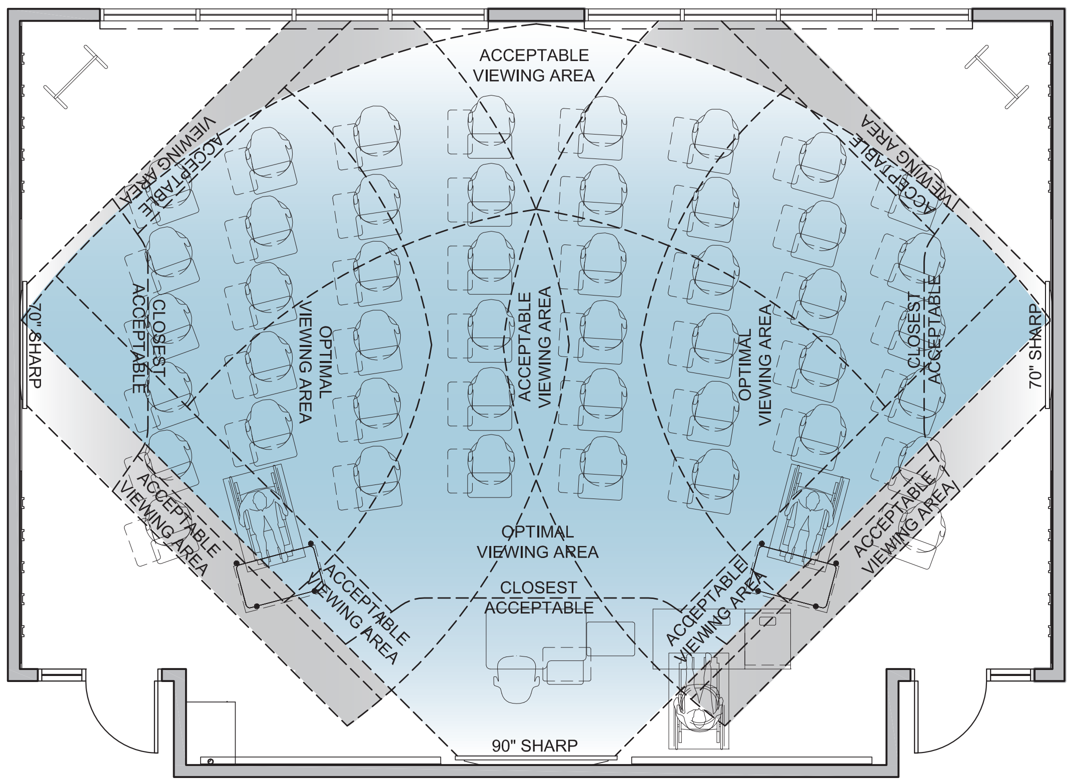
LEGEND

- H1 70" flat panel display (FPD), wall mounted
- H2 90" flat panel display (FPD), wall mounted
- 6B Media console

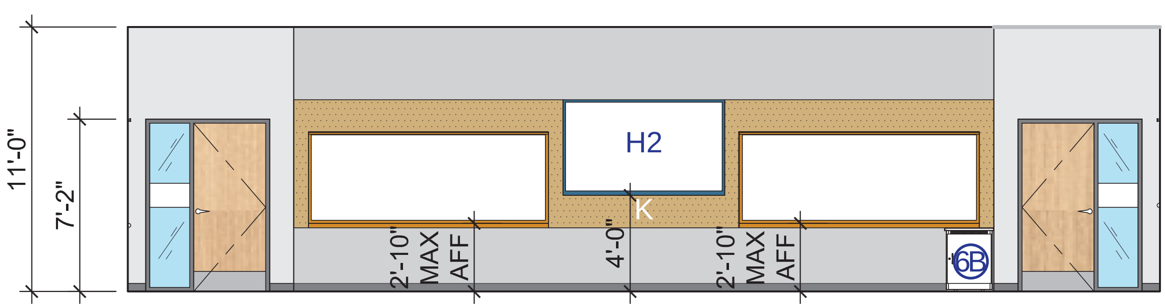
ALTERNATE LAYOUTS

0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”



ALTERNATE LAYOUT VIEWING ANGLE PLAN



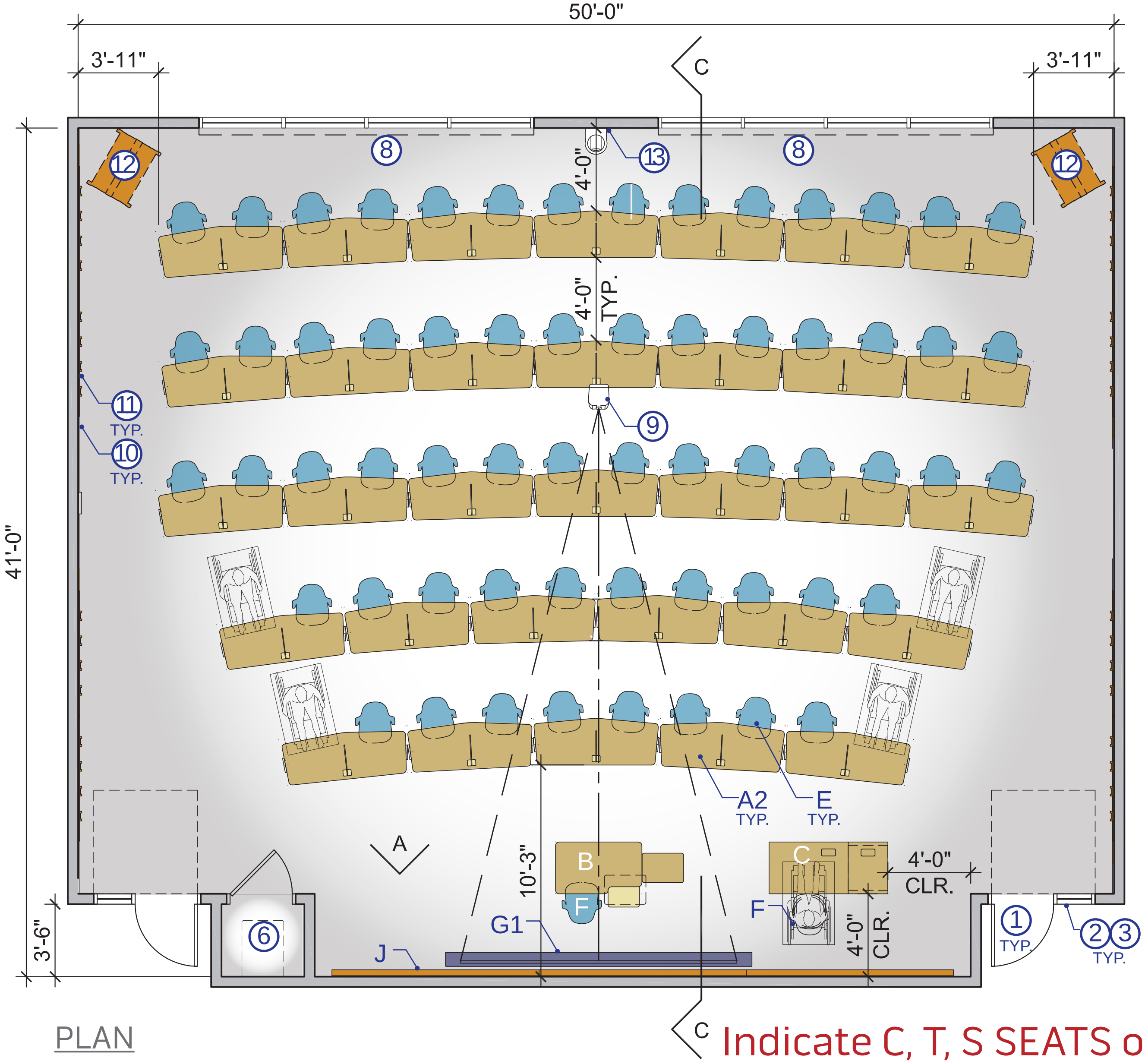
(B) FRONT ELEVATION

64-SEAT ACTIVE CLASSROOM

- 1,990 ASF
- 31.1 SF/SEAT

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



PLAN

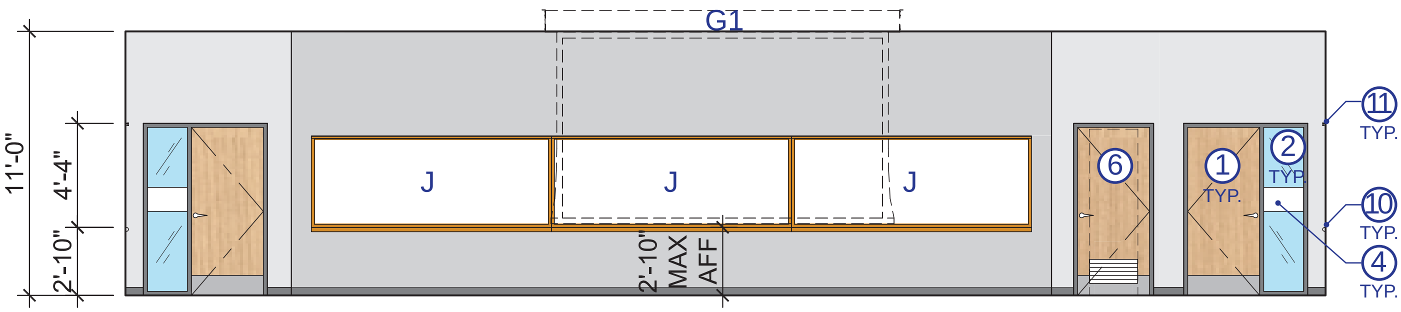
Indicate C, T, S SEATS on plan?

SEATING CHART

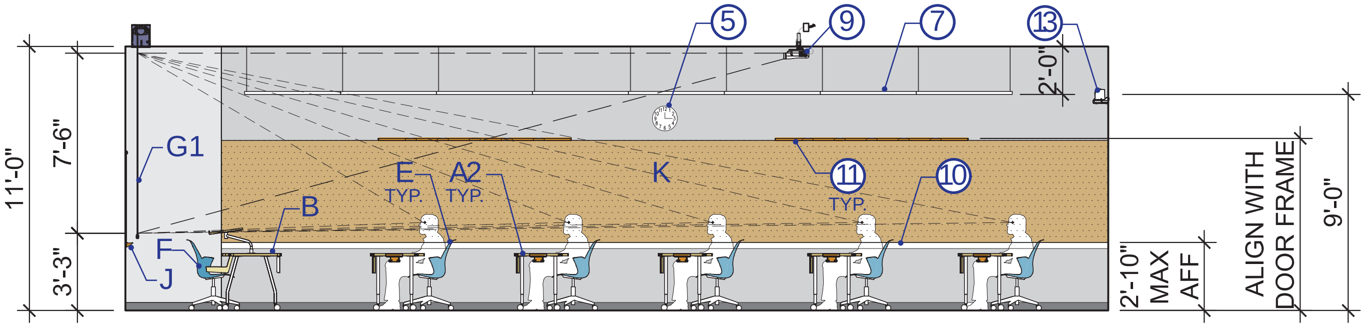
	W	C	T	S	ALS
64	4	4	2	2	4%

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



(A) FRONT ELEVATION



(B) SECTION

LEGEND

- (A2) Mobile student tables
- (B) Mobile instructor station
- (C) Fixed accessible lectern
- (E) Mobile student seating
- (F) Mobile instructor seating
- (G1) 90"x160" projection screen, recessed ceiling mounted
- (J) Writable surface area
- (K) Tackable surface area

- (1) Solid wood door
- (2) Sidelight
- (3) Room signage
- (4) ALS signage
- (5) Battery operated atomic clock
- (6A) Media closet (42"x48" clear)
- (7) Direct / indirect pendant lighting
- (8) Double roller shade (window treatment and room darkening)
- (9) Projector, ceiling mounted

- (10) Chair rail
- (11) Markerboard rail
- (12) Whiteboard easel
- (13) Pan-tilt-zoom camera

SURFACES

Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

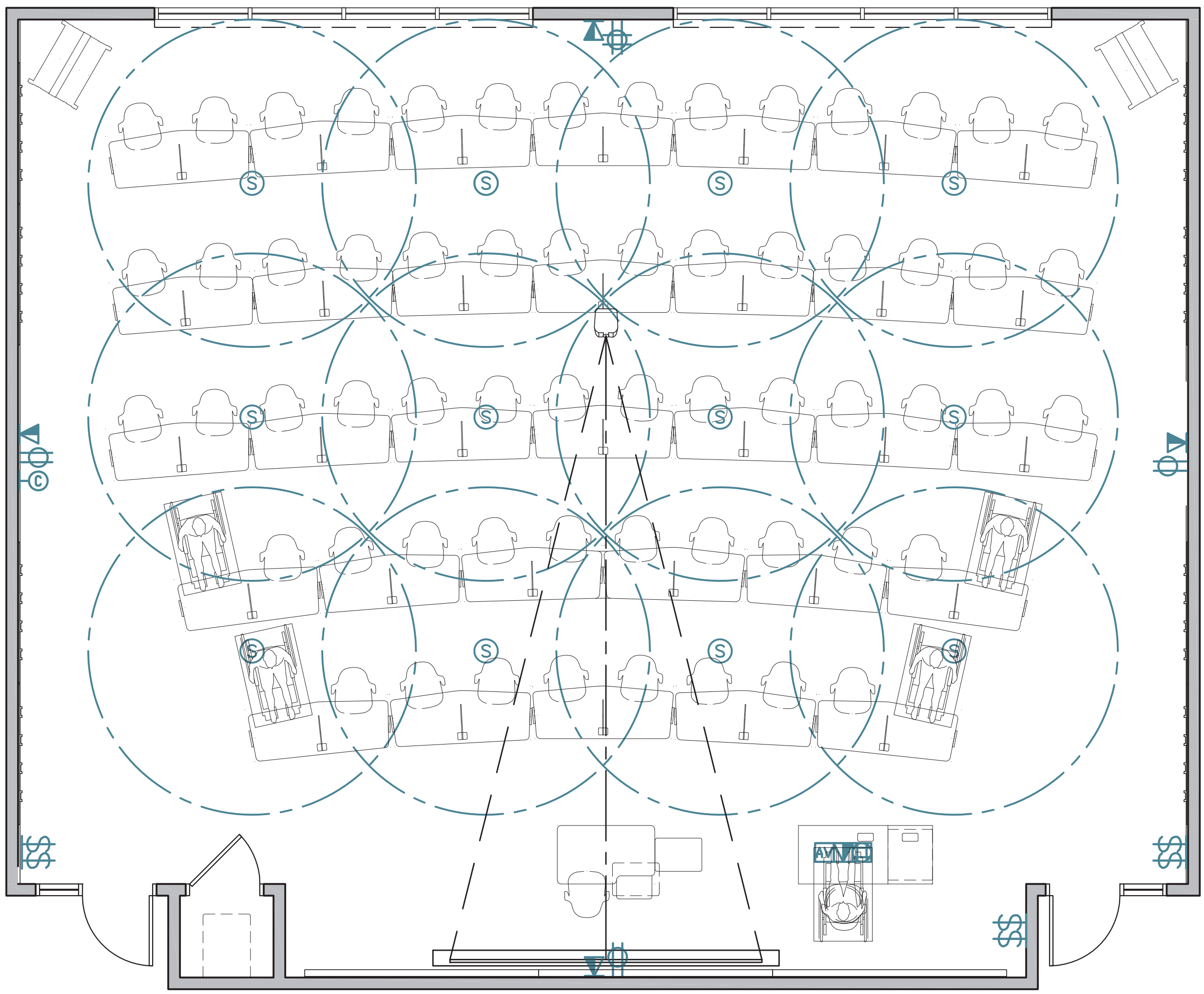
NOTE

Similar to 48-seat flexible classroom

64-SEAT ACTIVE CLASSROOM

0 ft 4 ft 8 ft

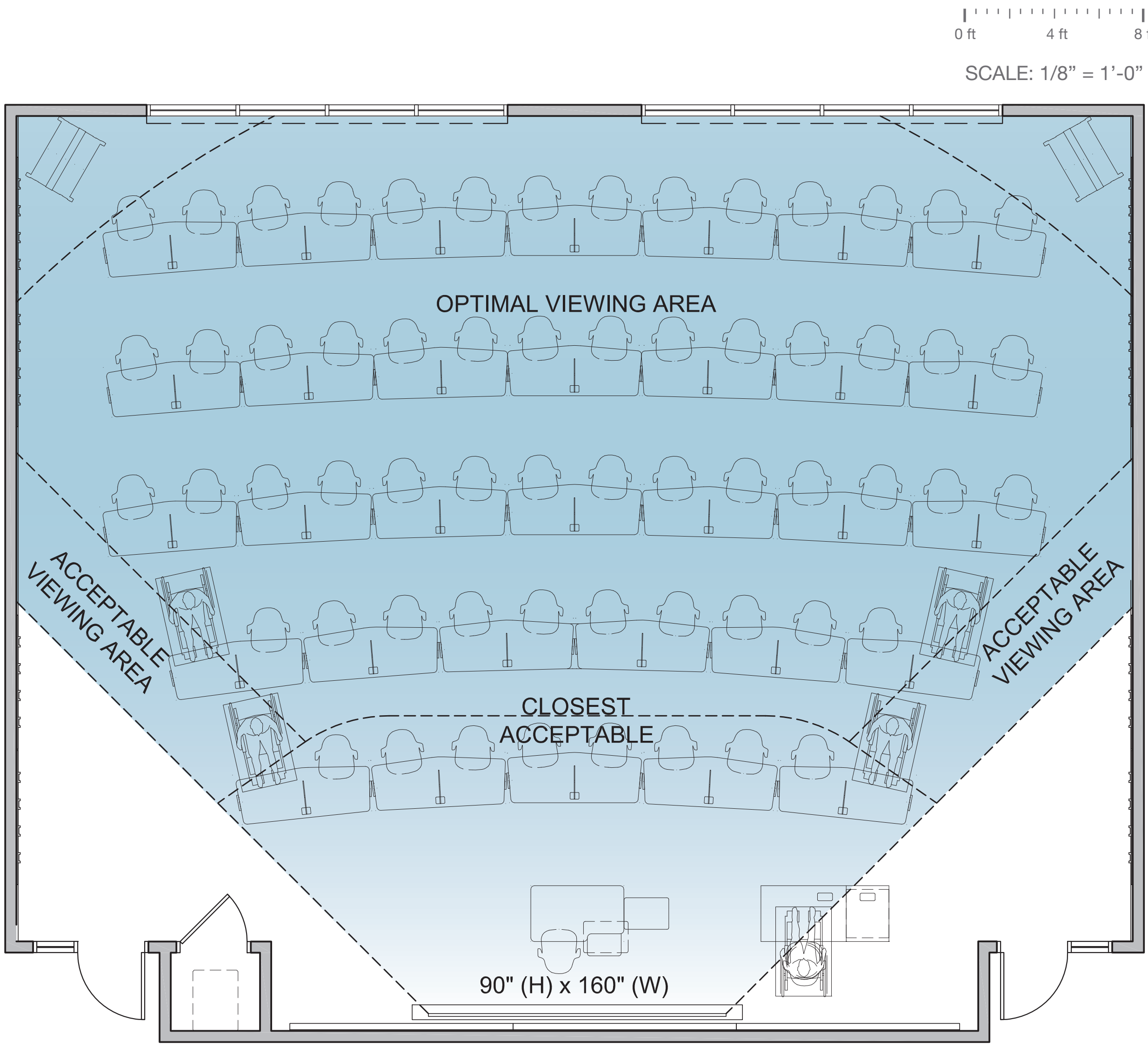
SCALE: 1/8" = 1'-0"



POWER/DATA/AV PLAN

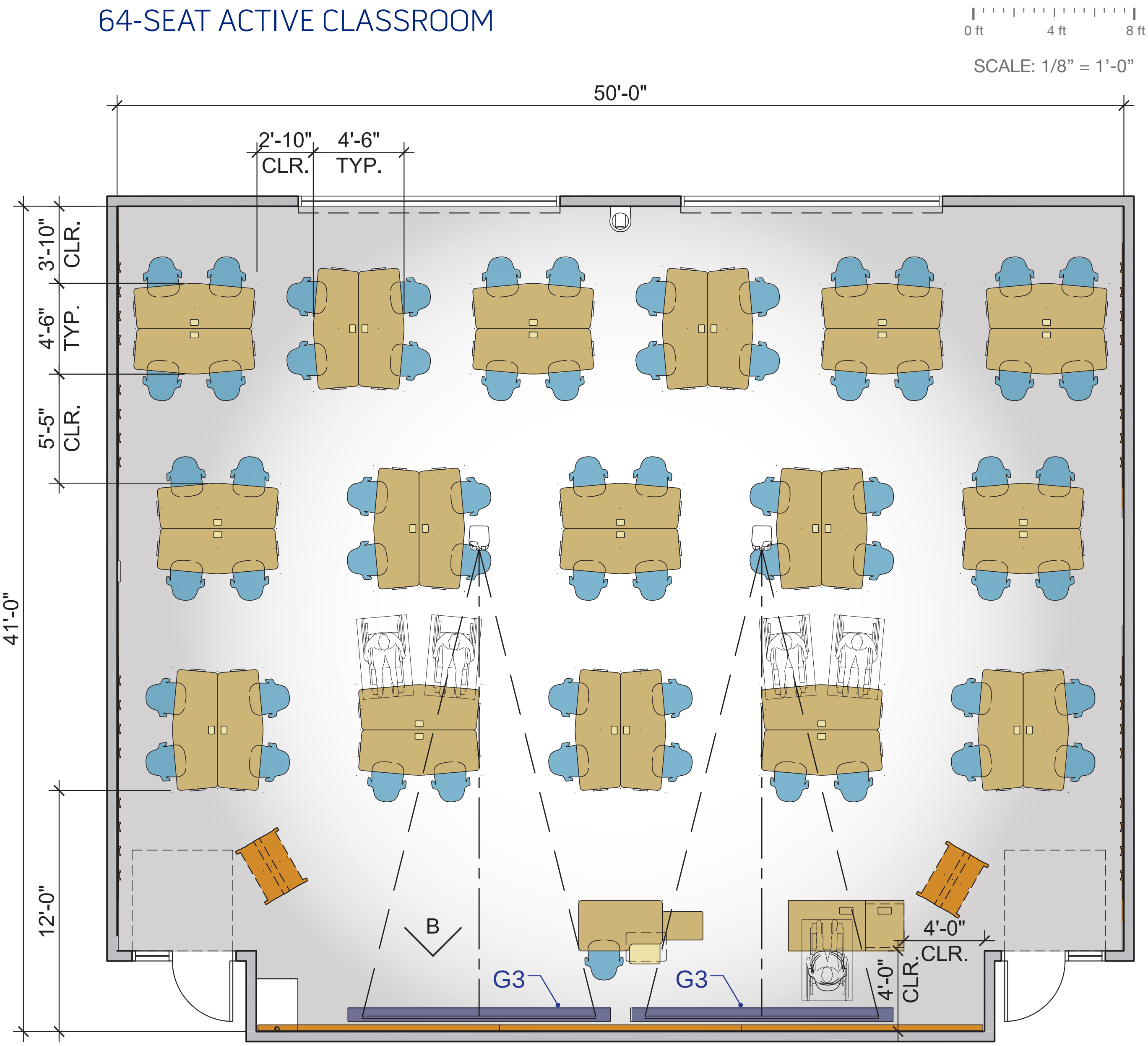
SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (duplex)
- Flush floor-mounted quadruplex
- Flush floor-mounted data (6 outlets at instructor station)
- AV A/V connector
- $ Light switch
- S Ceiling Speaker



VIEWING ANGLE PLAN

64-SEAT ACTIVE CLASSROOM

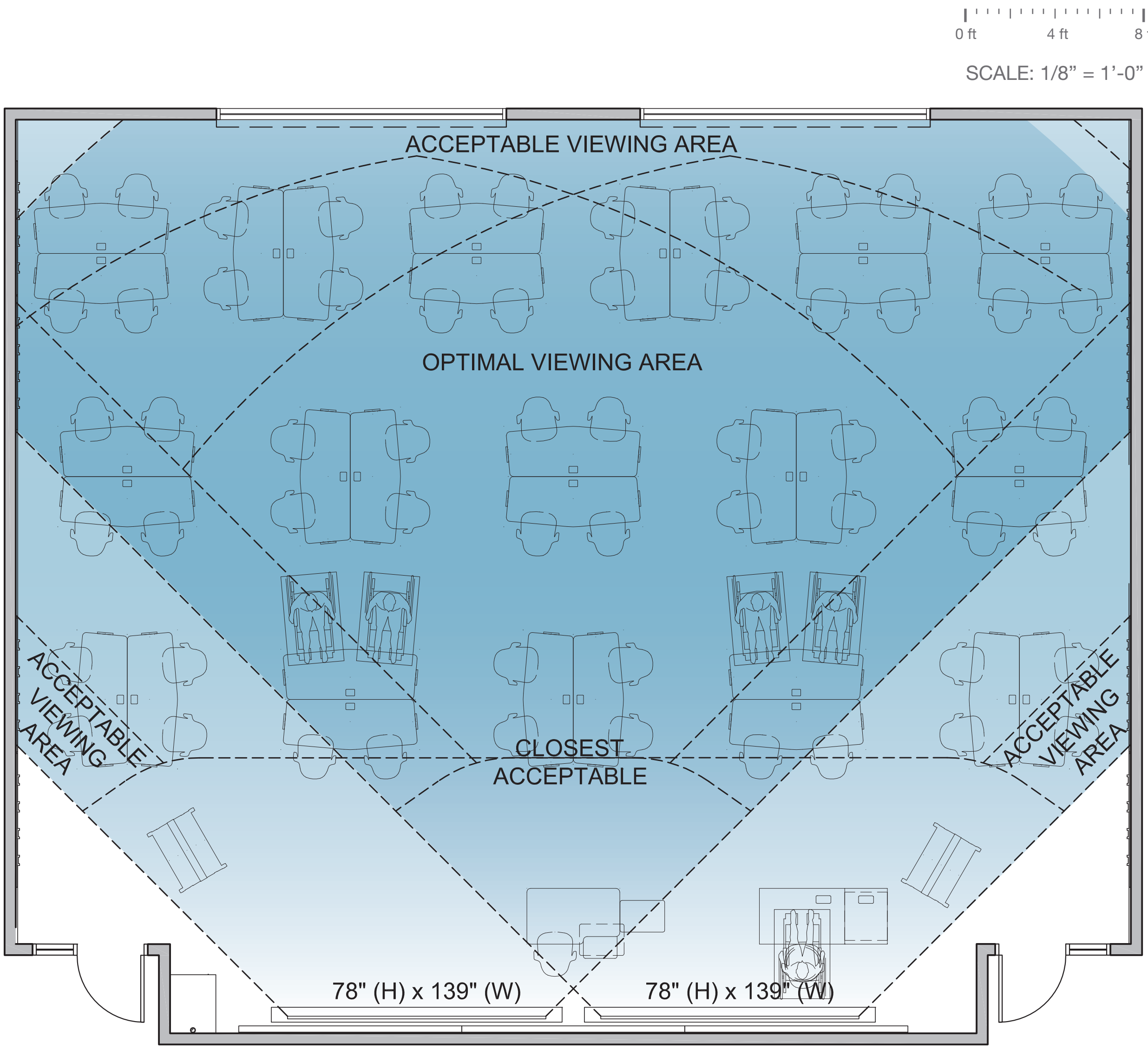


ALTERNATE LAYOUT

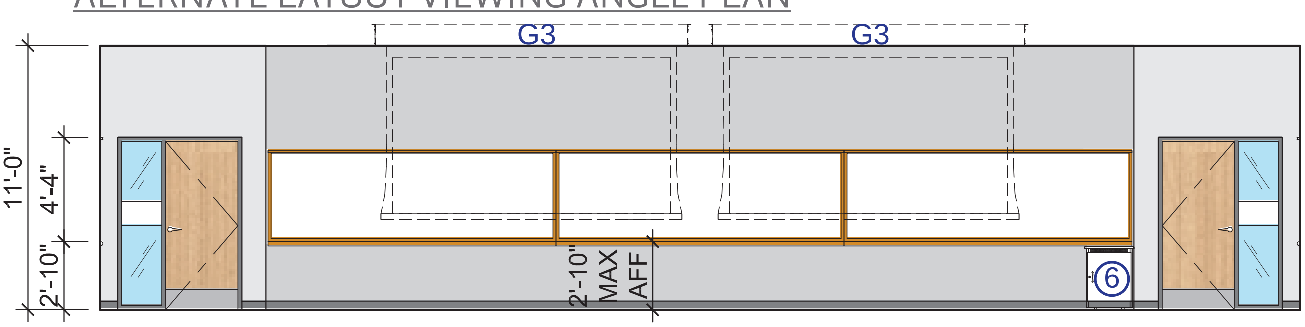
Indicate C, T, S SEATS on plan?

LEGEND

- G3 78"x139" projection screen, recessed ceiling mounted
- 6B Media console



ALTERNATE LAYOUT VIEWING ANGLE PLAN



(A) FRONT ELEVATION

PART E
LEARN LABS

SEATING CHART DEFINITION:

TOTAL SEATS	NUMBER OF **WHEELCHAIR** SPACES	NUMBER OF **COMPANION** SEATS	NUMBER OF **TRANSFER** (AISLE) SEATS	NUMBER OF **SEMI-AMBULANT** SEATS	**ASSISTIVE LISTENING** RECEIVERS

Learn Labs are the most popular learning spaces due to their **engaging**, **flexible**, and **high tech** design. Movable furniture can be configured to suit a range of pedagogies and learning modalities, supporting small or large group **interaction** and **active learning**. There is no real "front" to the classroom since every wall hosts a Flat Panel Display and white boards to act as public "**thinking spaces**". The instructor's workstation can be located anywhere in the room, with fixed lectern at the imaginative "front" for media control.

Learn Labs spaces should:

- Encourage meaningful interactions between all users, to enable active and collaborative exchanges, learning, and socializing.
- Provide appropriate up to date technology to support modern, diverse, and flexible learning experiences.
- Provide healthy sustainable learning environments that take advantage of day lighting and material use.
- Be flexible to support a range of current and future pedagogies and learning styles. (2)

PART E LEARN LABS

BEST PRACTICES

GEOMETRY
- Close to square is acceptable.

CEILING HEIGHTS
- 10 feet minimum.

ACOUSTICS / SOUND ISOLATION
- See Part B.

ACCESSIBILITY
- See Part A.

LECTERN
- Accessible and fixed.

INSTRUCTOR DESK
- Accessible and mobile.
- To be located anywhere in the room.

STUDENT FURNITURE
- Movable tables and chairs for a variety of layouts.

MARKER BOARDS / RAILS
- Maximize marker board “thinking spaces” on all walls.

TACK PANELS
- Maximize tack panels to support student work.

CLOCKS
- Avoid conflict with equipment, maker boards, and tack panels.
- See Part B.

LIGHTING
- See Parts B and P.

FLAT PANEL DISPLAYS
- One FPD on each wall.
- See Part B.

VIEWING ANGLES
- See Part B.

MEDIA RACKS
- House in either a media closet or in a media console, to be determined on a project by project basis.
- See Part B.

SWITCH CONTROLS
- See Part B.

CLEANOUTS / ACCESS PATHS
- See Part B.

MICROPHONES
- See Part B.

SPEAKERS
- See Part B.

CAMERAS
- See Part B.

WINDOW SHADES
- See Part B.

POWER / DATA
- Power over Ethernet (POE) connection.
- See Part B.

WI-FI
- See Part B.

ASSISTIVE LISTENING SYSTEM
- See Part B.

HVAC
- See Part B.

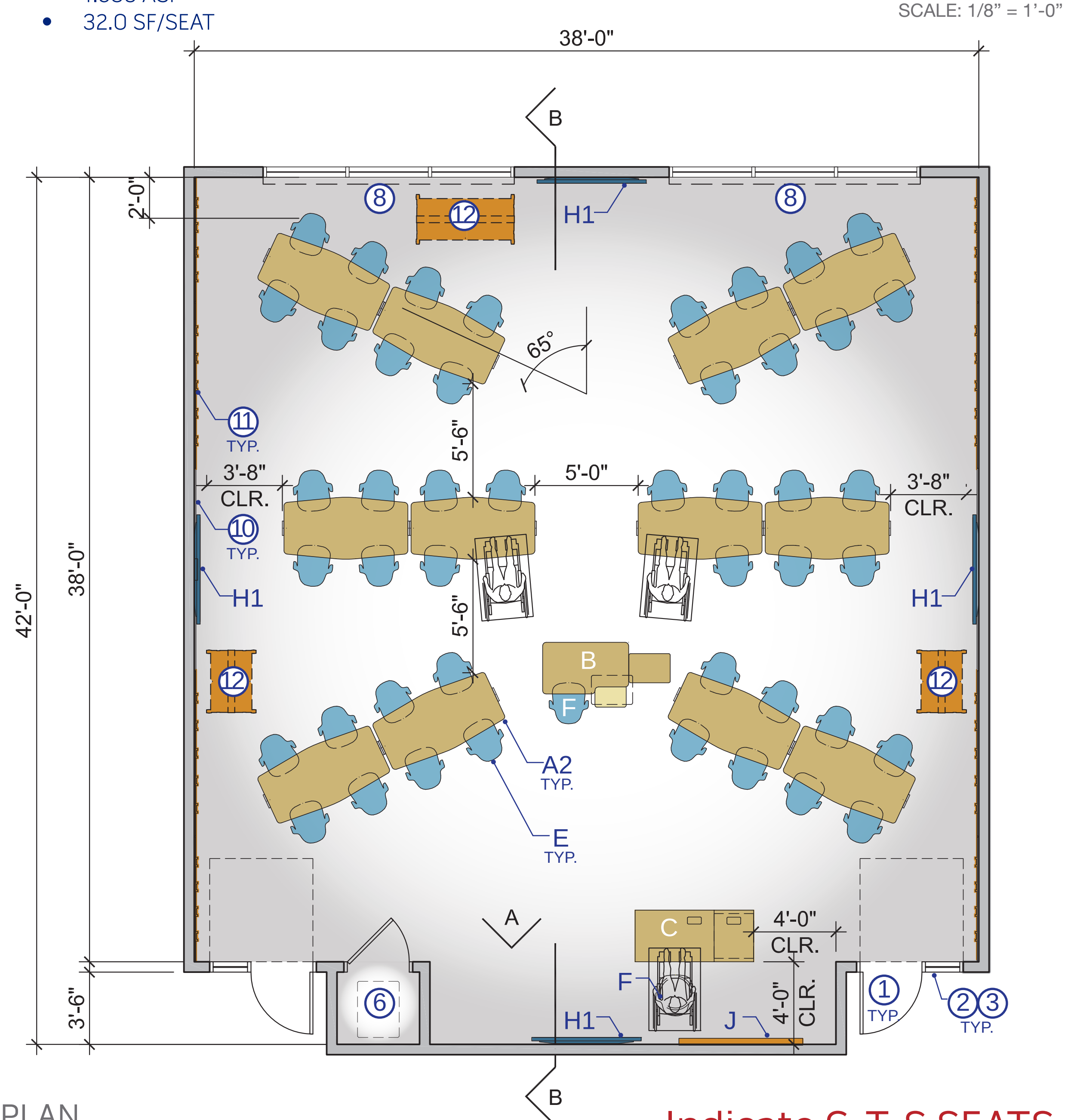
LIFE SAFETY
- See Part B.

48-SEAT LEARN LAB

- 1.538 ASF
- 32.0 SF/SEAT

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



PLAN

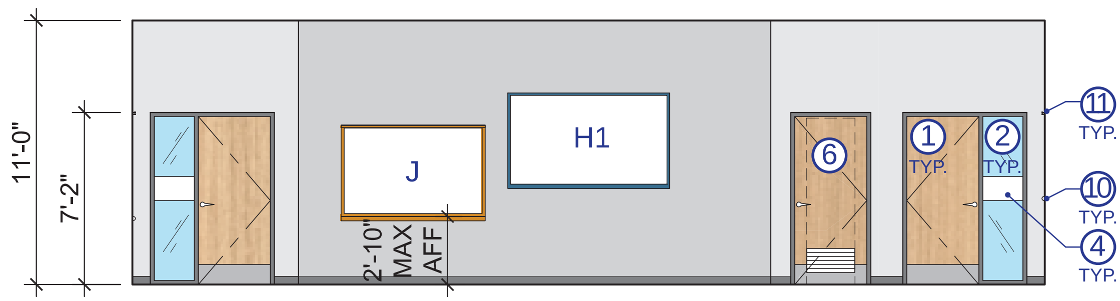
Indicate C, T, S SEATS on plan?

SEATING CHART

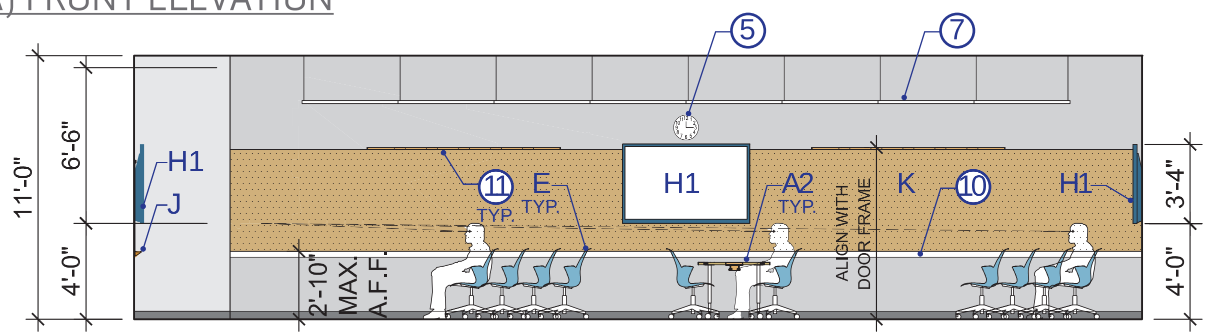
	W	C	T	S	ALS
48	2	2	1	2	2

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



(A) FRONT ELEVATION



(B) SECTION

LEGEND

- A2 Mobile student tables
- B Mobile instructor station
- C Fixed accessible lectern
- E Mobile student seating
- F Mobile instructor seating
- H1 70" flat panel display, wall mounted
- J Writable surface area
- K Tackable surface area

1. Solid wood door
2. Sidelight
3. Room signage
4. ALS signage
5. Battery operated atomic clocl
6. Media closet (42"x48" clear)
7. Direct / indirect pendant lighting
8. Double roller shade (window treatment and room darkening)
10. Chair rail
11. Markerboard rail
12. Whiteboard easel

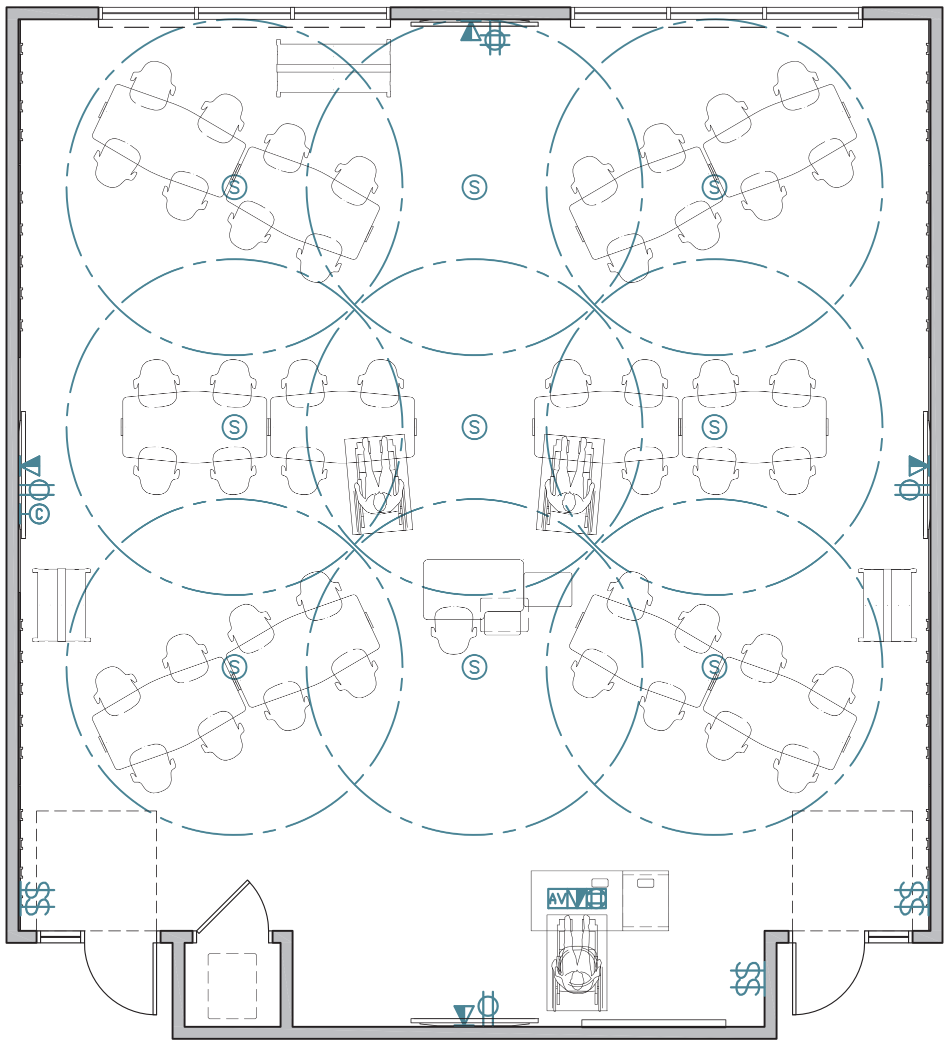
SURFACES

Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

48-SEAT LEARN LAB

0 ft 4 ft 8 ft

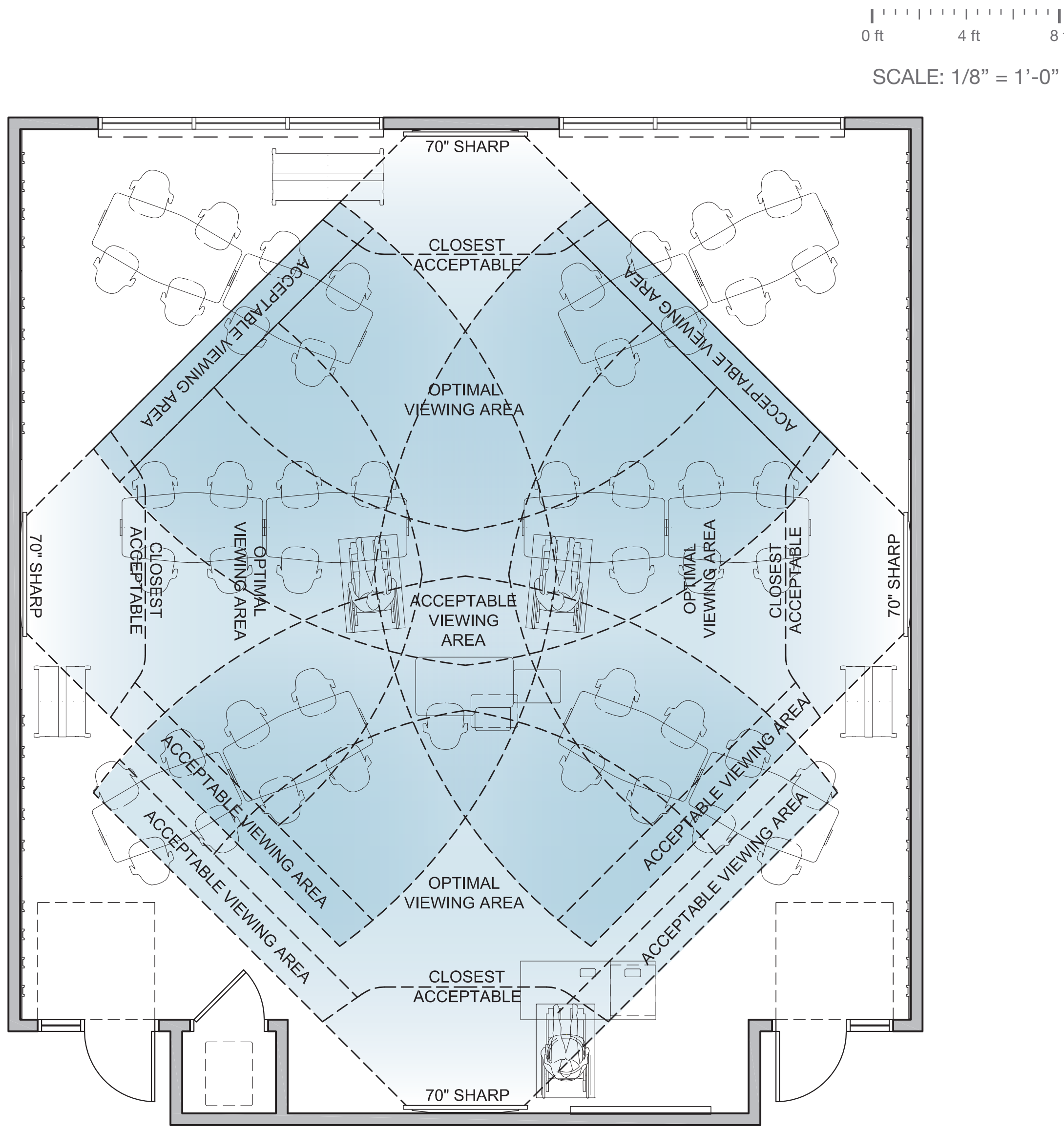
SCALE: 1/8" = 1'-0"



POWER/DATA/AV PLAN

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (duplex)
- Flush floor-mounted quadruplex
- Flush floor-mounted data (6 outlets at instructor station)
- AV A/V connector
- $ Light switch
- Ⓢ Ceiling Speaker



VIEWING ANGLE PLAN

PART F
LECTURE HALLS

CONTENTS:

SEATING CHART DEFINITION:

TOTAL SEATS	NUMBER OF **WHEELCHAIR** SPACES	NUMBER OF **COMPANION** SEATS	NUMBER OF **TRANSFER** (AISLE) SEATS	NUMBER OF **SEMI-AMBULANT** SEATS	**ASSISTIVE LISTENING** RECEIVERS

Lecture halls may serve as instructional spaces and double as assembly halls in support of non-instructional purposes. Lecture halls are unique in that their capacities yield a multi-level tiered floor system to accommodate sight lines. The number of lecture halls included in a building project will be determined by the needs of the specific programs that will occupy the building.

Modesty panels that double as writable surfaces mounted to the tables, coupled with alternate row seats that turn 180 degrees, encourage collaboration even in these large spaces.

Ramps have typically been located inside these large spaces, however an option exploring the placement of the ramps outside, gives more space back to the Lecture Halls and maximizes the square footage. To minimize opportunities for instructors to stumble while moving about the space, handrails and consistent rise and run on steps should be considered.

Faculty should have intuitive ease of access to light zoning, window shade, and projection controls from a wall panel or the fixed lectern. The spaces should foster communication by maximizing triple sliding white boards at the front teaching wall, provide large projection communication, Wi-Fi connectivity, and assistive listening systems. Every lecture hall should also be equipped with video / tele conferencing infrastructure; microphones, speakers, and cameras.

The back wall should incorporate a ledge and tack panels for informational material, as well as windows where possible. Transom lights above doors should also be considered, with dual shade mechanisms to control daylight.

PART F LECTURE HALLS

BEST PRACTICES

GEOMETRY

- Wide wall as the front teaching wall. This brings the instructor in close proximity to all the students, and encourages eye contact.
- Transom lights above doors and windows along the back wide wall provide daylighting.

LOCATION

- The larger the room, the lower the building floor level.

CEILING HEIGHTS

- 13 feet minimum.
- Primarily a function of sight lines, projection screen and marker board heights.

ACOUSTICS / SOUND ISOLATION

- See Part B.

ACCESSIBILITY

- Provide an accessible ramp and appropriate handrails.
- See Part A.

LECTERN

- Accessible and fixed.

INSTRUCTOR DESK

- Accessible and mobile.

DEMONSTRATION TABLE

- To be determined on a project by project basis if needed.
- The standards graphically show where the table should be located, allowing for all clearances.

STUDENT FURNITURE

- Tables should be fixed and continuous in rows oriented to front of room teaching wall.

- Floor-mounted base 30" on center, each supporting two swing-away self-returning seats.
- Two rows per tier with seats in alternate rows to rotate 180 degrees to facilitate student group work and collaboration.
- Space between seat and table should accommodate a 4 inches for additional belly room.

COLLABORATIVE SURFACES
- Student tables create great horizontal collaborative surfaces.
- The modesty panel can double as a vertical writing surface for alternate rows to utilize.
- Maximize tack panels on back walls.

MARKER BOARDS / RAILS
- Triple sliding marker boards at the front teaching wall.

TACK PANELS
- On front teaching wall, create a zone that other elements occupy.
- Align with other elements in the room for a clean design. See diagram on the following pages.

CLOCKS
- See Part B.

LIGHTING
- See Parts B and P.

PROJECTORS
- See Part B.

PROJECTION SCREENS
- Two projection screens can be installed to maximize conformable viewing angles, or for the flexibility of projecting multiple images simultaneously. To be determined on a project by project basis.
- See Part B.

VIEWING ANGLES / SIGHT LINES
- Student tables should angle at the ends of the room to maximize viewing angles.
- Raised floor tiers maximize sight lines to the furthest seats.

MEDIA RACKS
- A media closet at 42 inches deep by 48 inches wide to be located at the front of the room to minimize cable runs.
- Access to IMC staff only.

SWITCH CONTROLS
- See Part B.

CLEANOUTS / ACCESS PATHS
- See Part B.

MICROPHONES
- See Part B.

SPEAKERS
- See Part B.

CAMERAS
- See Part B.

WINDOW SHADES
- See Part B.

POWER / DATA
- Power to be provided at each fixed table seat.
- Electrical conduits to be fed through fixed seat bases.
- Power over Ethernet (POE) connection.
- See Part B.

WI-FI
- See Part B.

ASSISTIVE LISTENING SYSTEM
- See Part B.

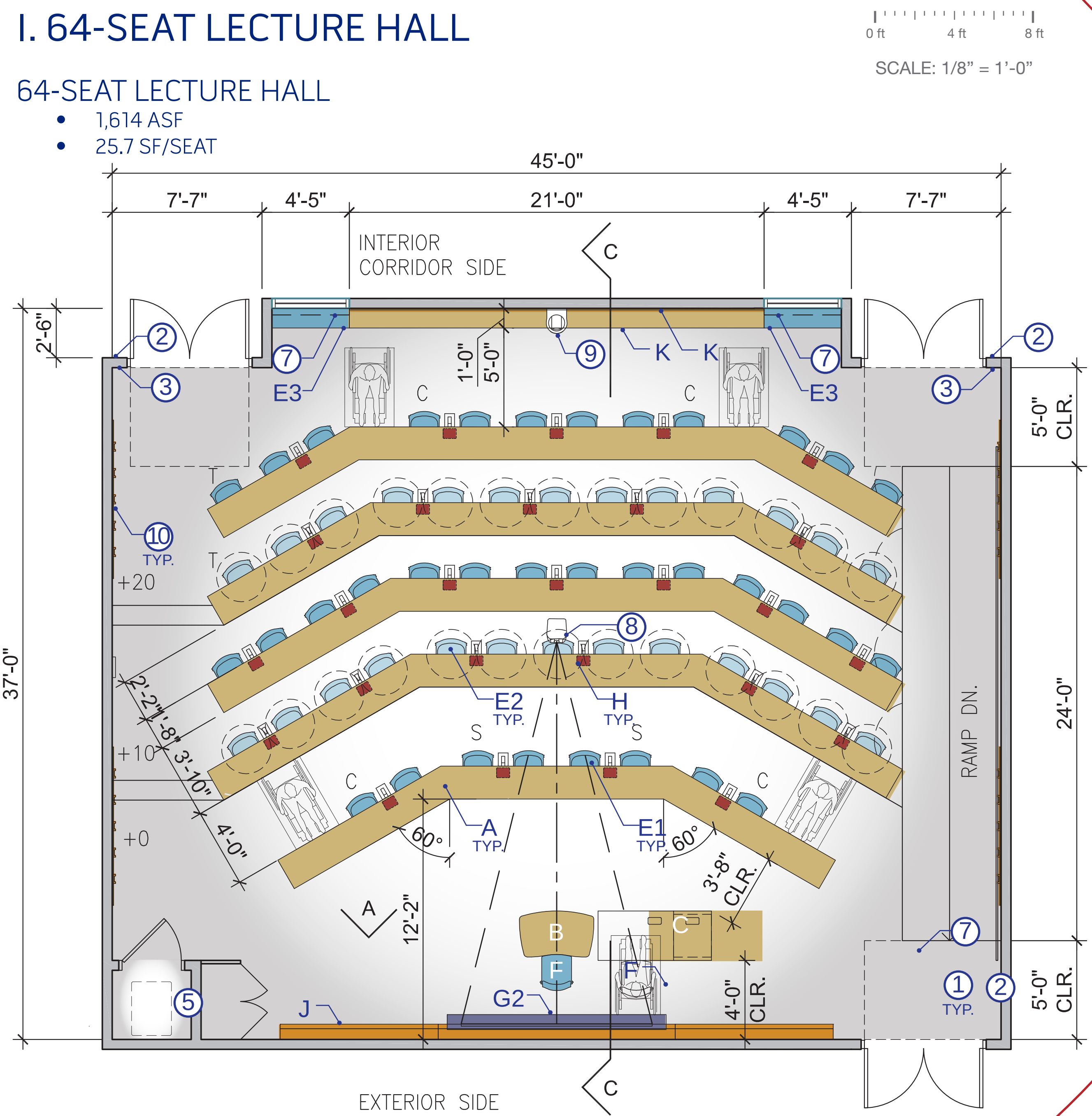
HVAC
- See Part B.

LIFE SAFETY
- See Part B.

I. 64-SEAT LECTURE HALL

64-SEAT LECTURE HALL

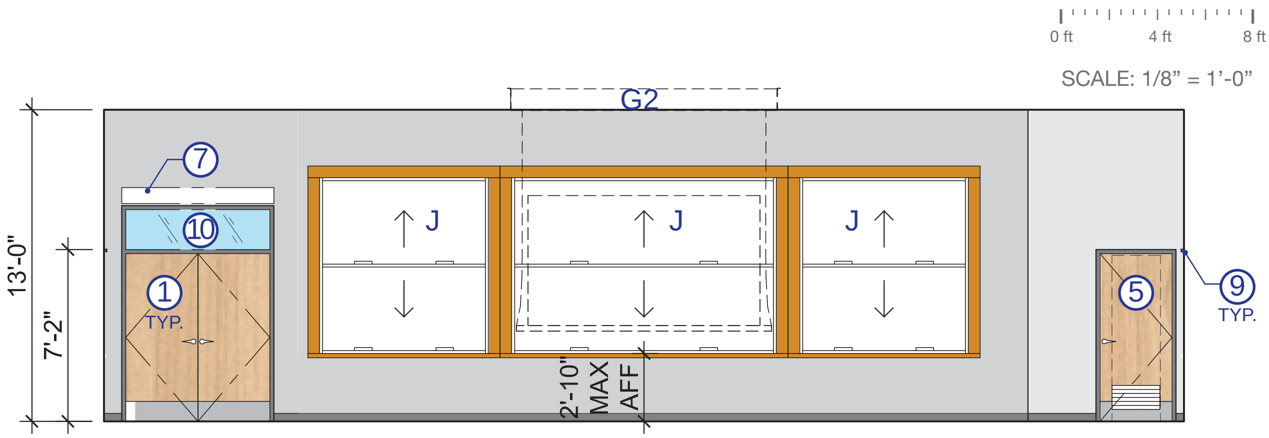
- 1,614 ASF
- 25.7 SF/SEAT



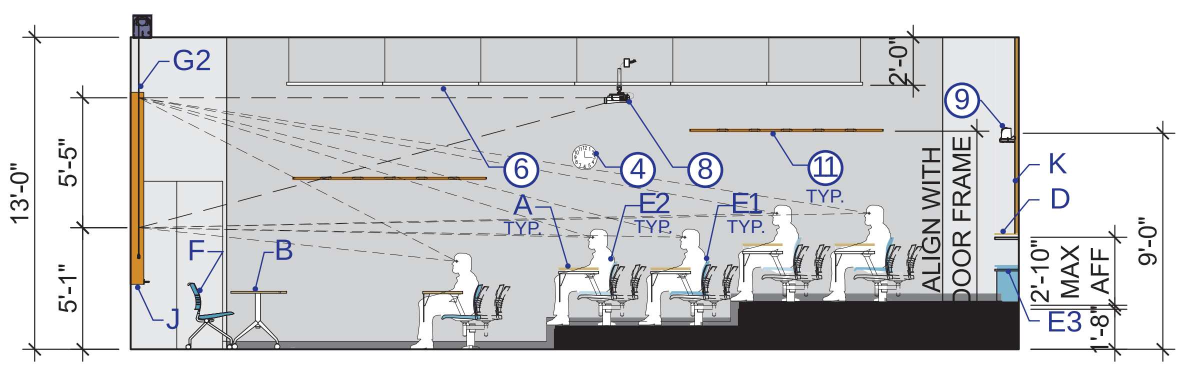
PLAN

SEATING CHART

	W	C	T	S	ALS
64	4	4	2	1	4%



(A) FRONT ELEVATION



(C) SECTION

LEGEND

- (A) 20" deep fixed continuous student tables with continuous modesty panels
- (B) Mobile instructor station
- (C) Fixed accessible lectern
- (D) Information area
- (E1) Fixed collaborative student seating
- (E2) Fixed collaborative student seating with 360º swivel
- (E3) Bench seating
- (F) Mobile instructor seating
- (G2) 65"x116" projection screen, recessed ceiling mounted
- (H) Undersurface power and data module
- (J) Writable surface area
- (K) Tackable surface area
- (1) Solid wood door
- (2) Room signage
- (3) ALS signage
- (4) Battery operated atomic clock
- (5) Media closet (42"clear depth)
- (6) Direct / indirect pendant lighting
- (7) Double roller shade (window treatment and room darkening)
- (8) Projector, ceiling mounted
- (9) Pan-tilt-zoom camera
- (10) Transom window
- (11) Markerboard rail

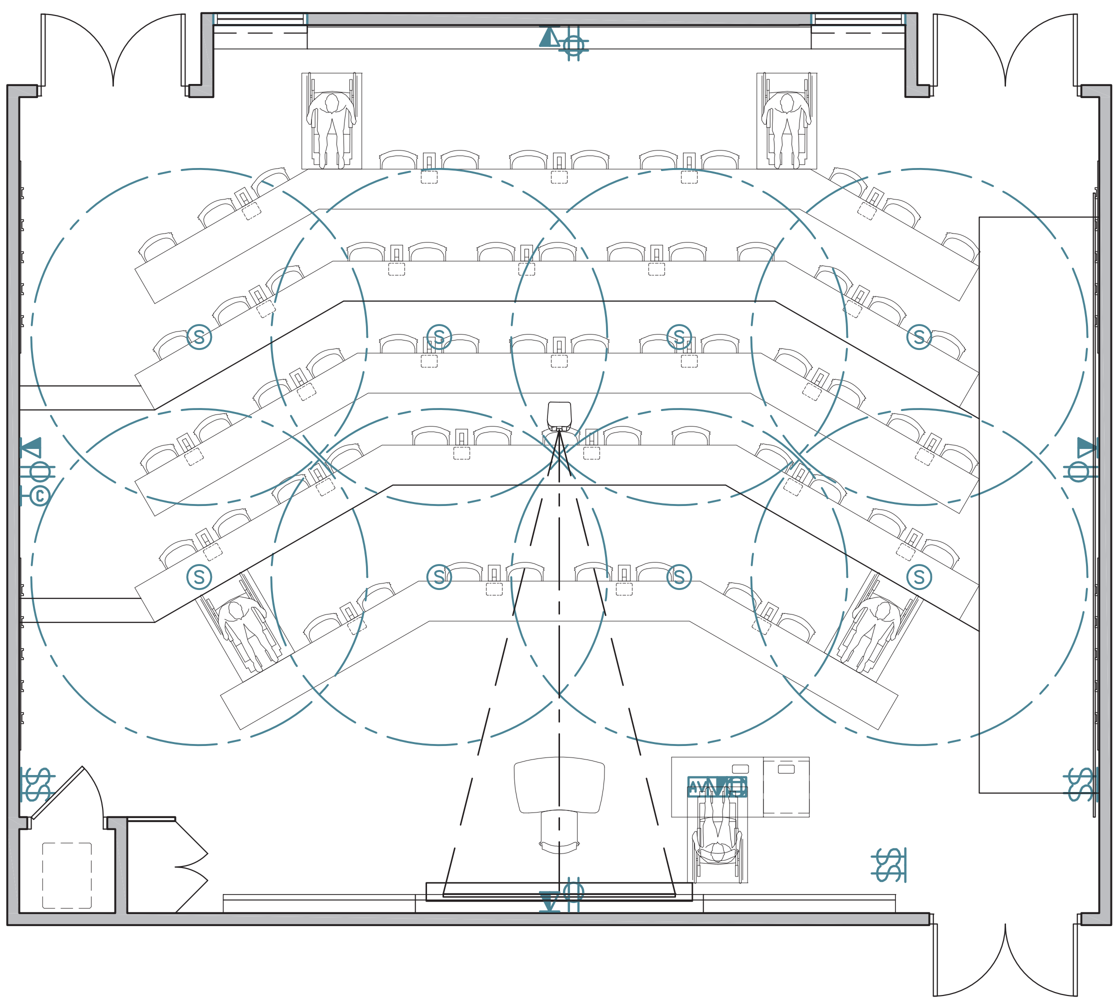
SURFACES

Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	11'-0" to 13'-0"
Ceiling Type:	Acoustical ceiling tile

64-SEAT LECTURE HALL

0 ft 4 ft 8 ft

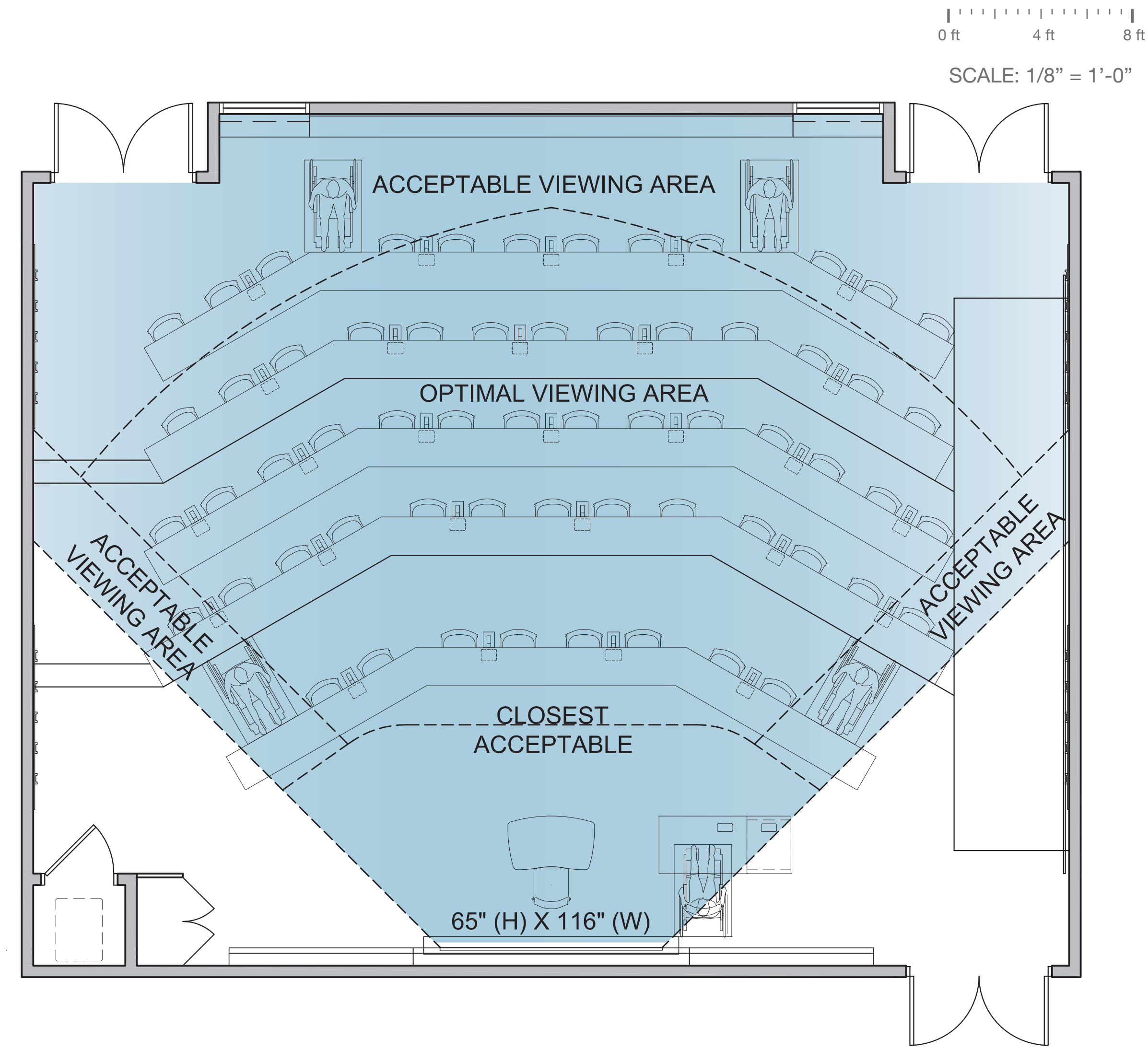
SCALE: 1/8" = 1'-0"



POWER/DATA/AV PLAN

SYMBOLS

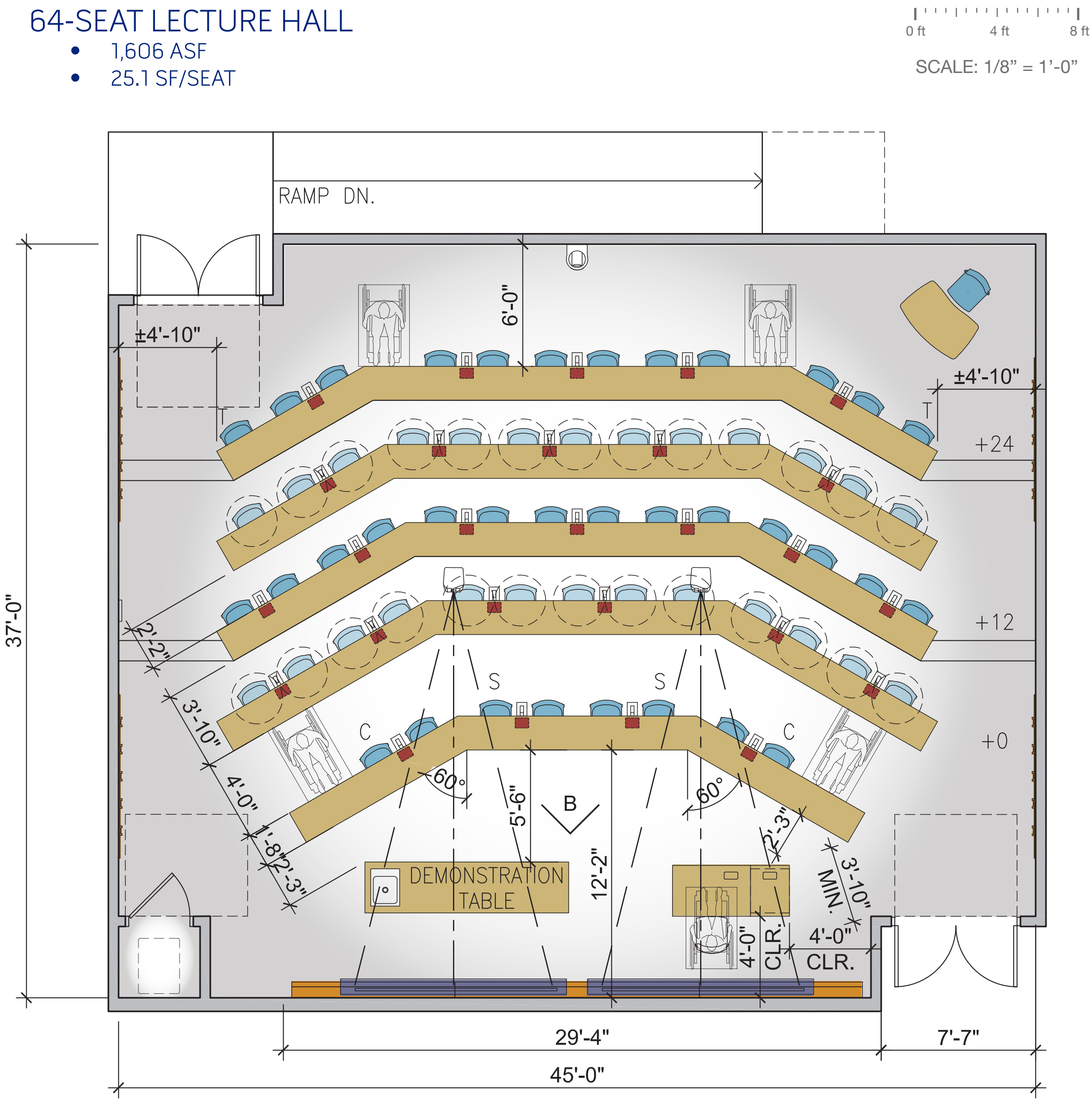
- Duplex
- Quadruplex
- Tel/Data (duplex)
- Flush floor-mounted quadruplex
- Flush floor-mounted data (6 outlets at instructor station)
- AV A/V connector
- $ Light switch
- S Ceiling Speaker



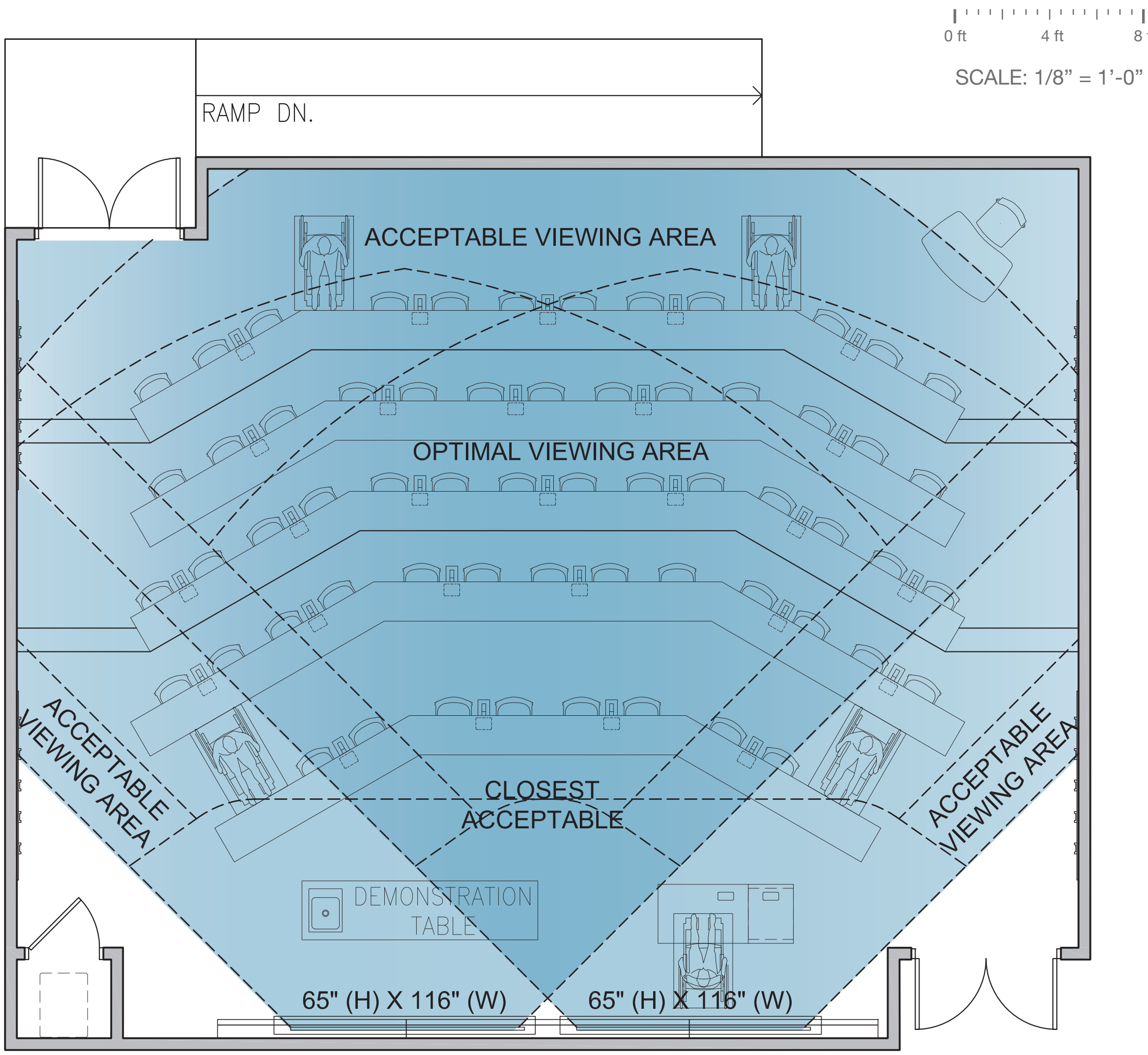
VIEWING ANGLE PLAN

64-SEAT LECTURE HALL

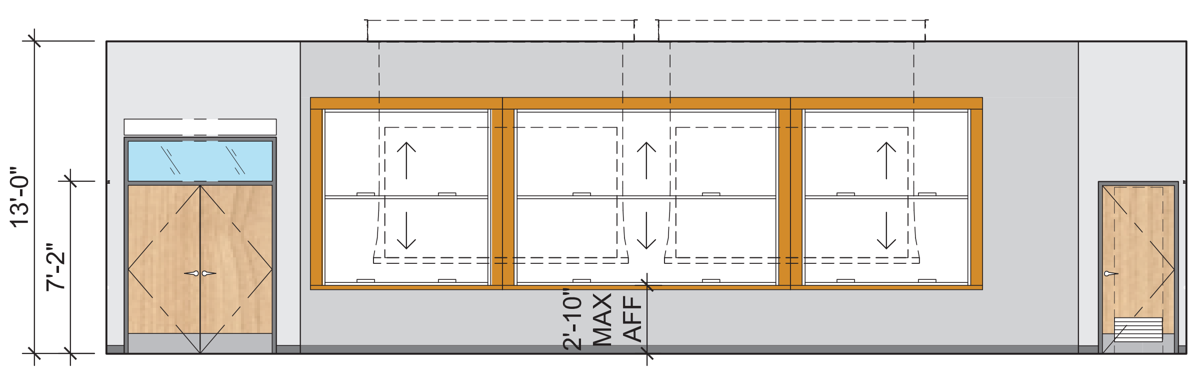
- 1,606 ASF
- 25.1 SF/SEAT



ALTERNATE LAYOUT



ALTERNATE LAYOUT VIEWING ANGLE



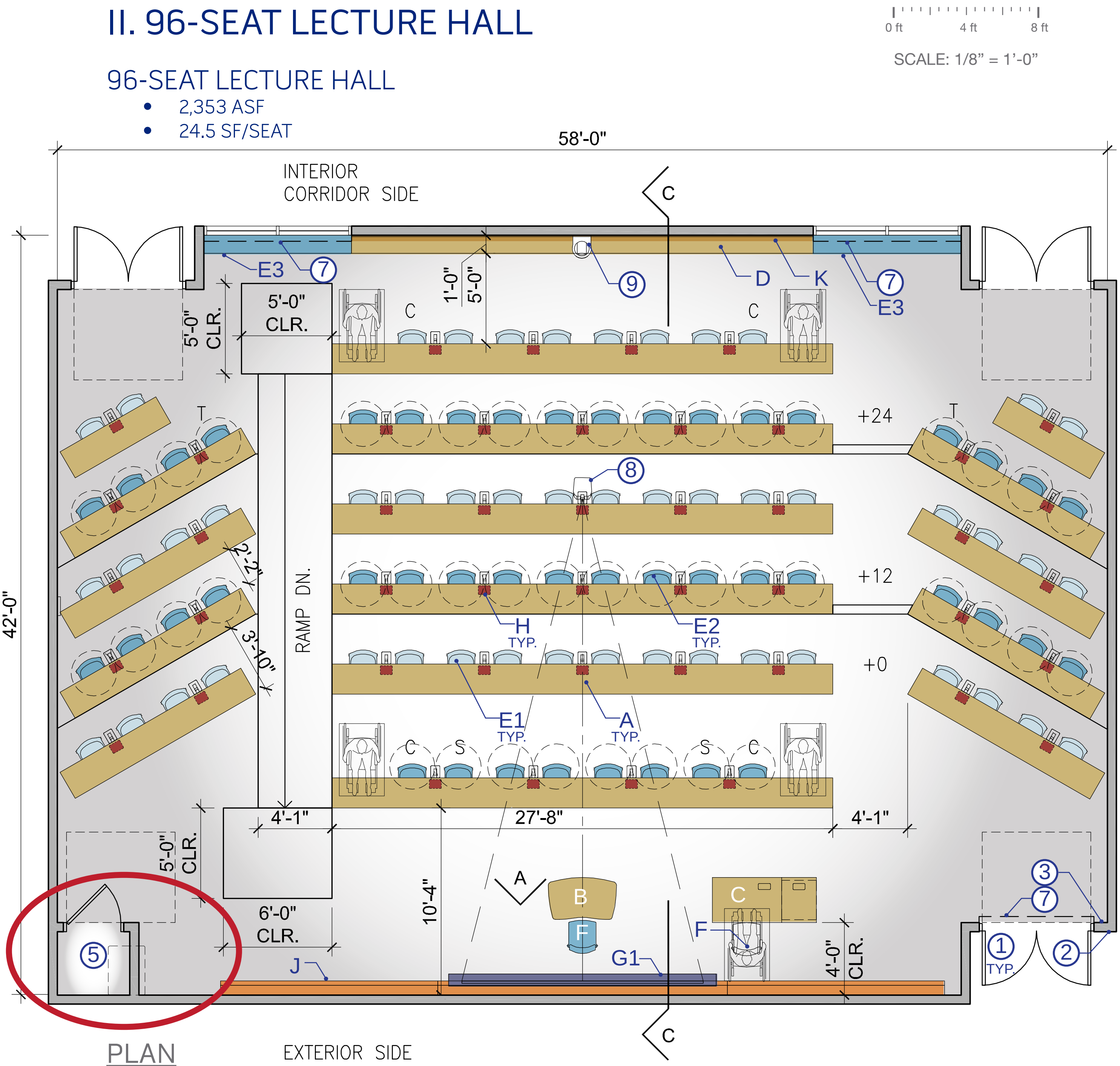
(B) FRONT ELEVATION

II. 96-SEAT LECTURE HALL

SCALE: 1/8" = 1'-0"

96-SEAT LECTURE HALL

- 2,353 ASF
- 24.5 SF/SEAT



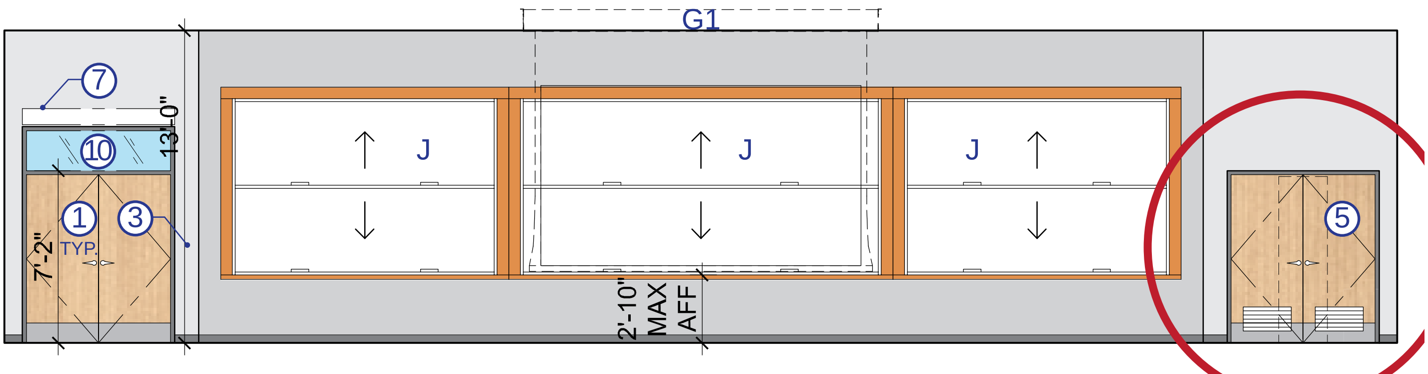
PLAN

SEATING CHART

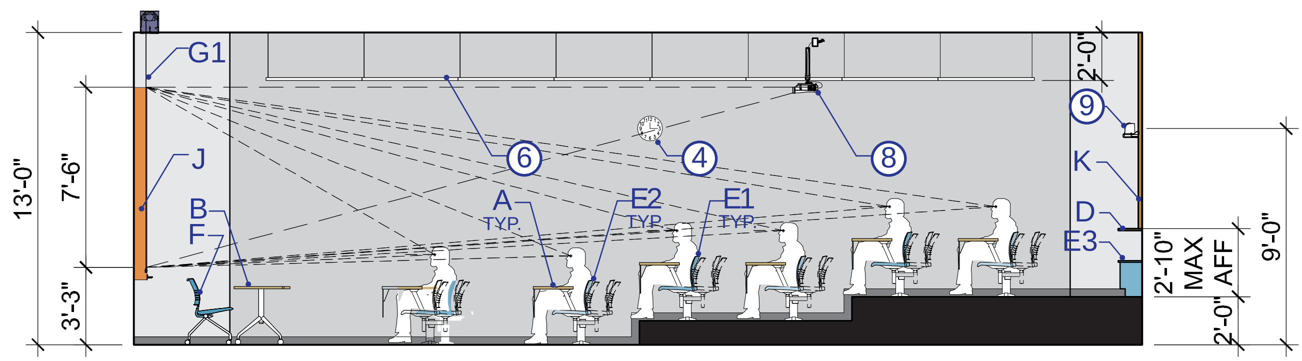
	W	C	T	S	ALS
64	4	4	2	2	4%

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



(A) FRONT ELEVATION



(C) SECTION

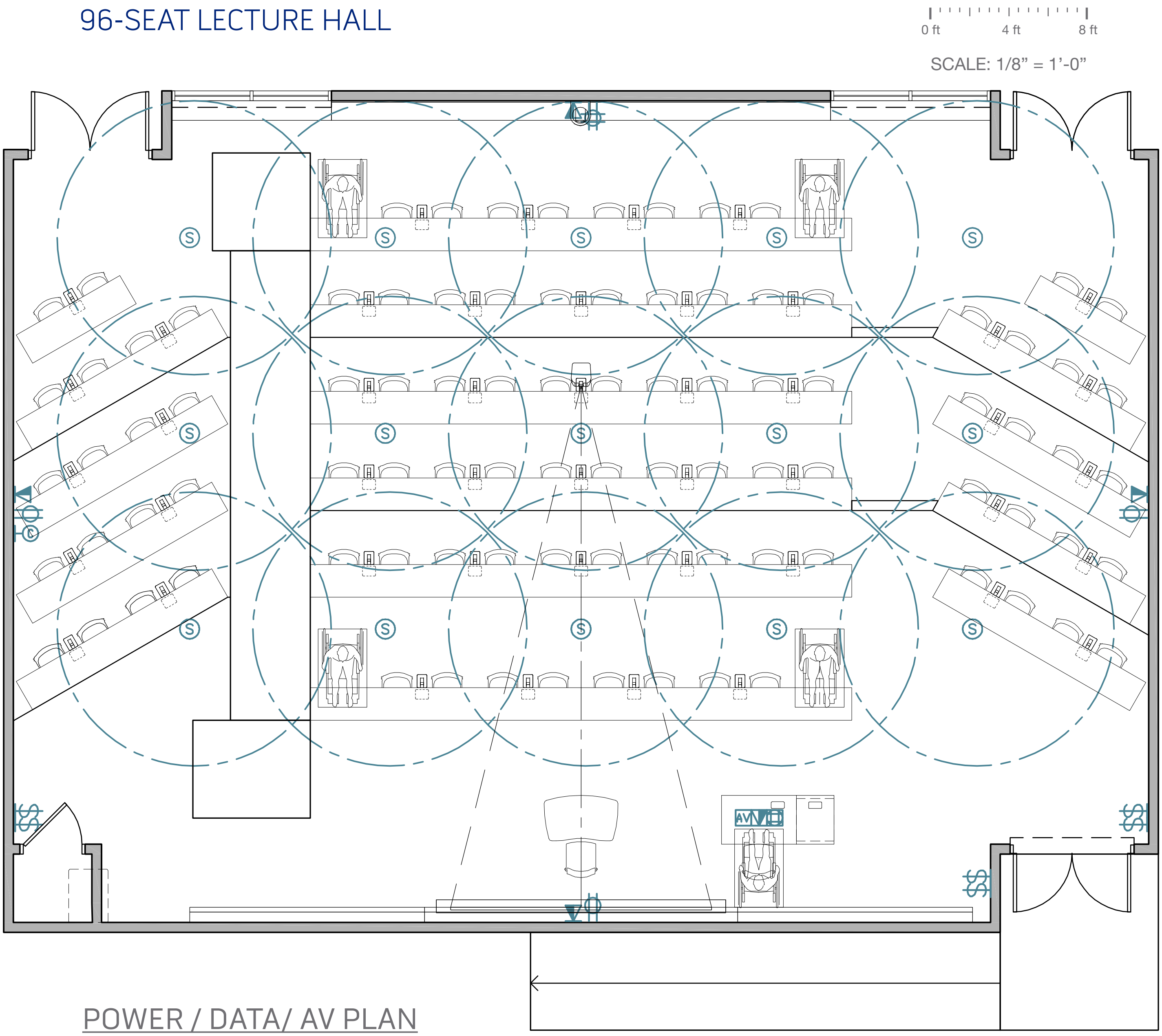
LEGEND

- (A) 20" deep fixed continuous student tables with continuous modesty panels
- (B) Mobile instructor station
- (C) Fixed accessible lectern
- (D) Information area
- (E1) Fixed collaborative student seating
- (E2) Fixed collaborative student seating with 360º swivel
- (E3) Bench seating
- (F) Mobile instructor seating
- (G1) 90"x160" projection screen, recessed ceiling mounted
- (H) Undersurface power and data module
- (J) Writable surface area
- (K) Tackable surface area
- (1) Solid wood door
- (2) Room signage
- (3) ALS signage
- (4) Battery operated atomic clock
- (5) Media closet (42"clear depth)
- (6) Direct / indirect pendant lighting
- (7) Double roller shade (window treatment and room darkening)
- (8) Projector, ceiling mounted
- (9) Pan-tilt-zoom camera
- (10) Transom window

SURFACES

Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	11'-0" to 13'-0"
Ceiling Type:	Acoustical ceiling tile

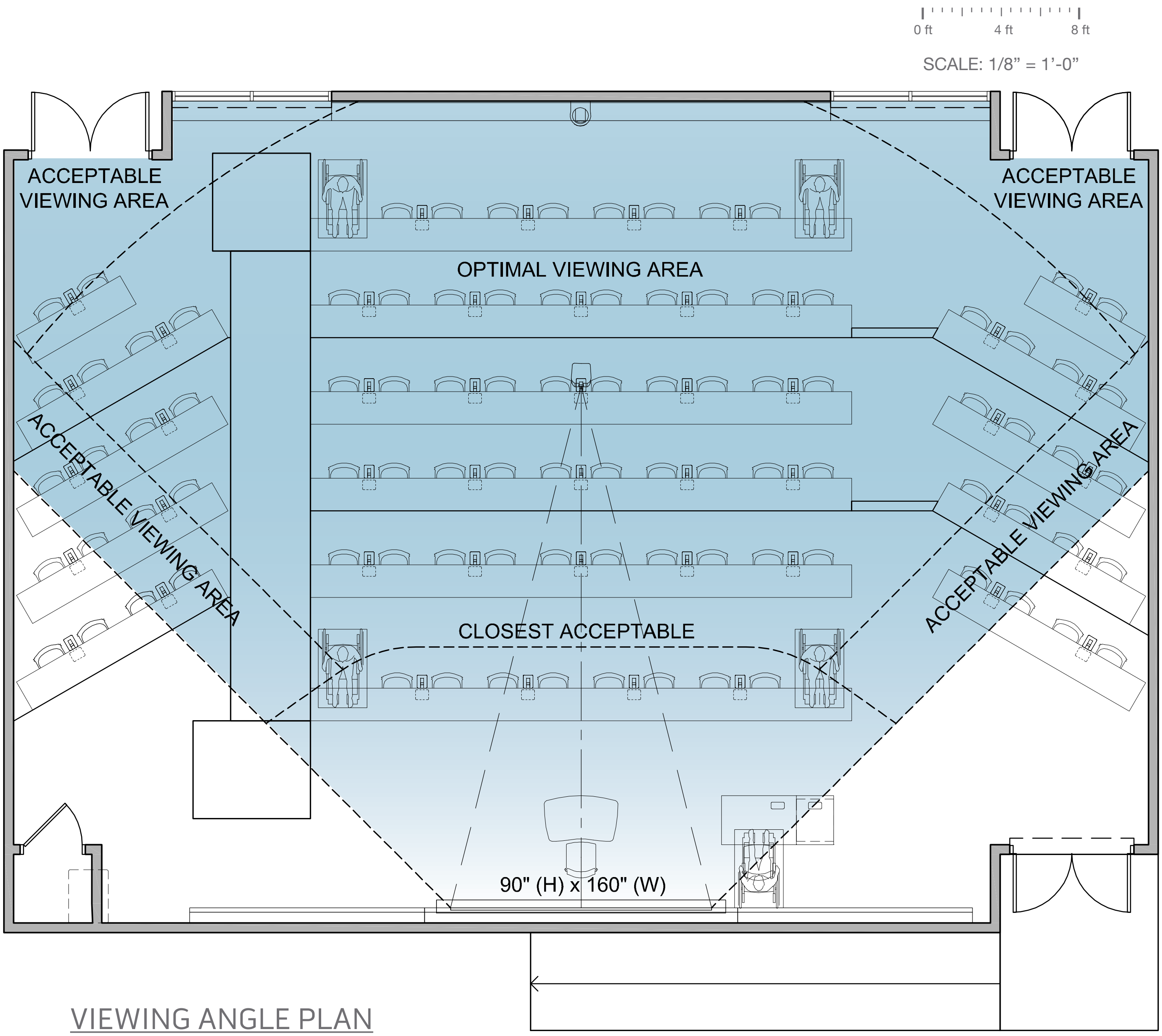
96-SEAT LECTURE HALL



POWER / DATA/ AV PLAN

SYMBOLS

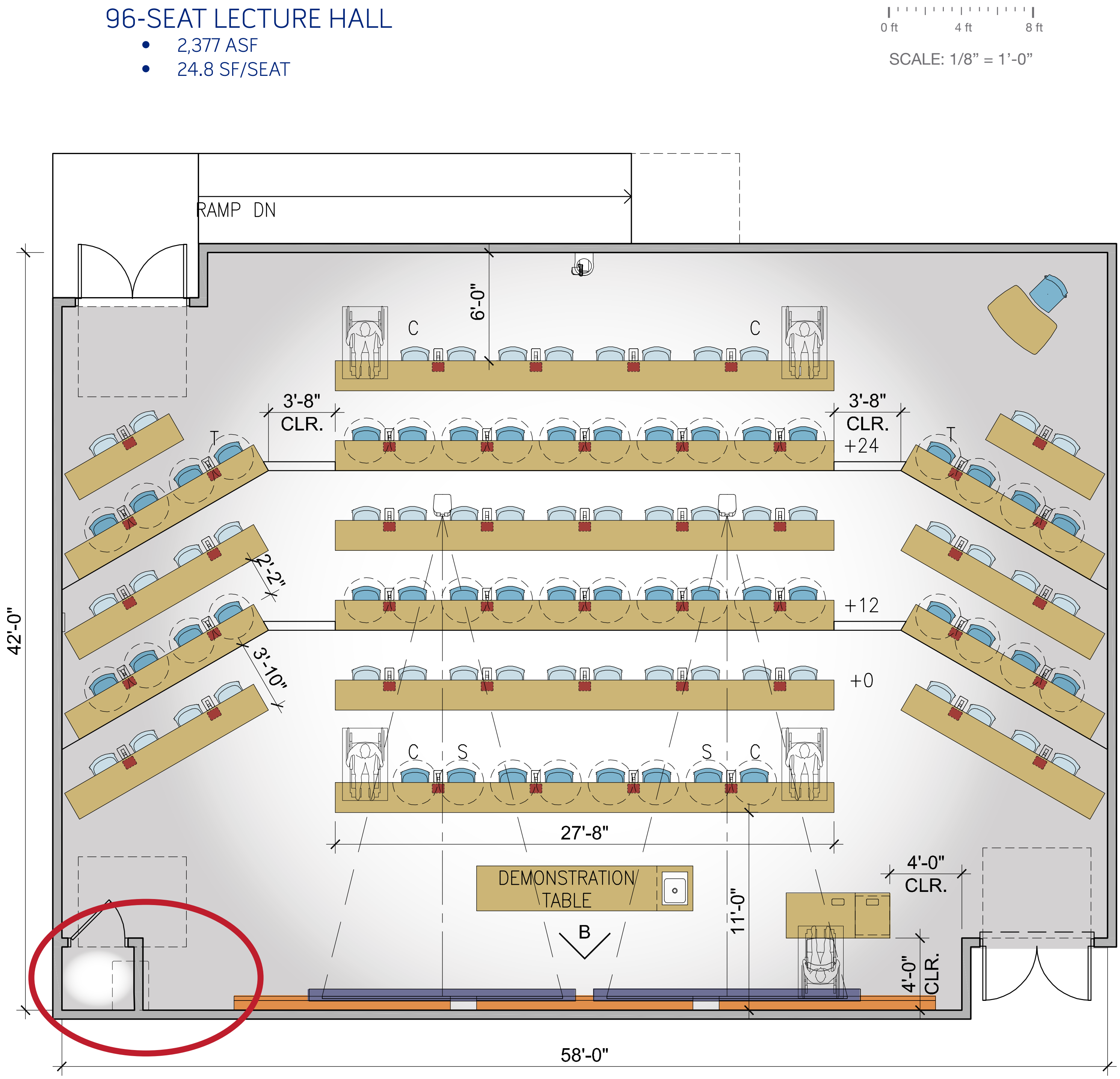
- Duplex
- Quadruplex
- Tel/Data (duplex)
- Flush floor-mounted quadruplex
- Flush floor-mounted data (6 outlets at instructor station)
- A/V connector
- $ Light switch
- Ceiling Data (3 outlets)
- Ceiling Speaker
- Ceiling Duplex



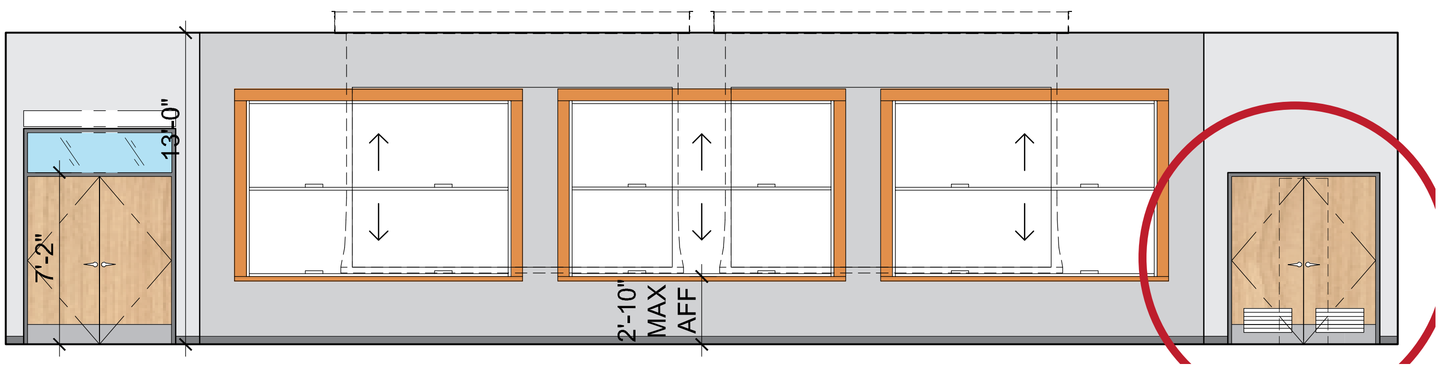
VIEWING ANGLE PLAN

96-SEAT LECTURE HALL

- 2,377 ASF
- 24.8 SF/SEAT



ALTERNATE LAYOUT

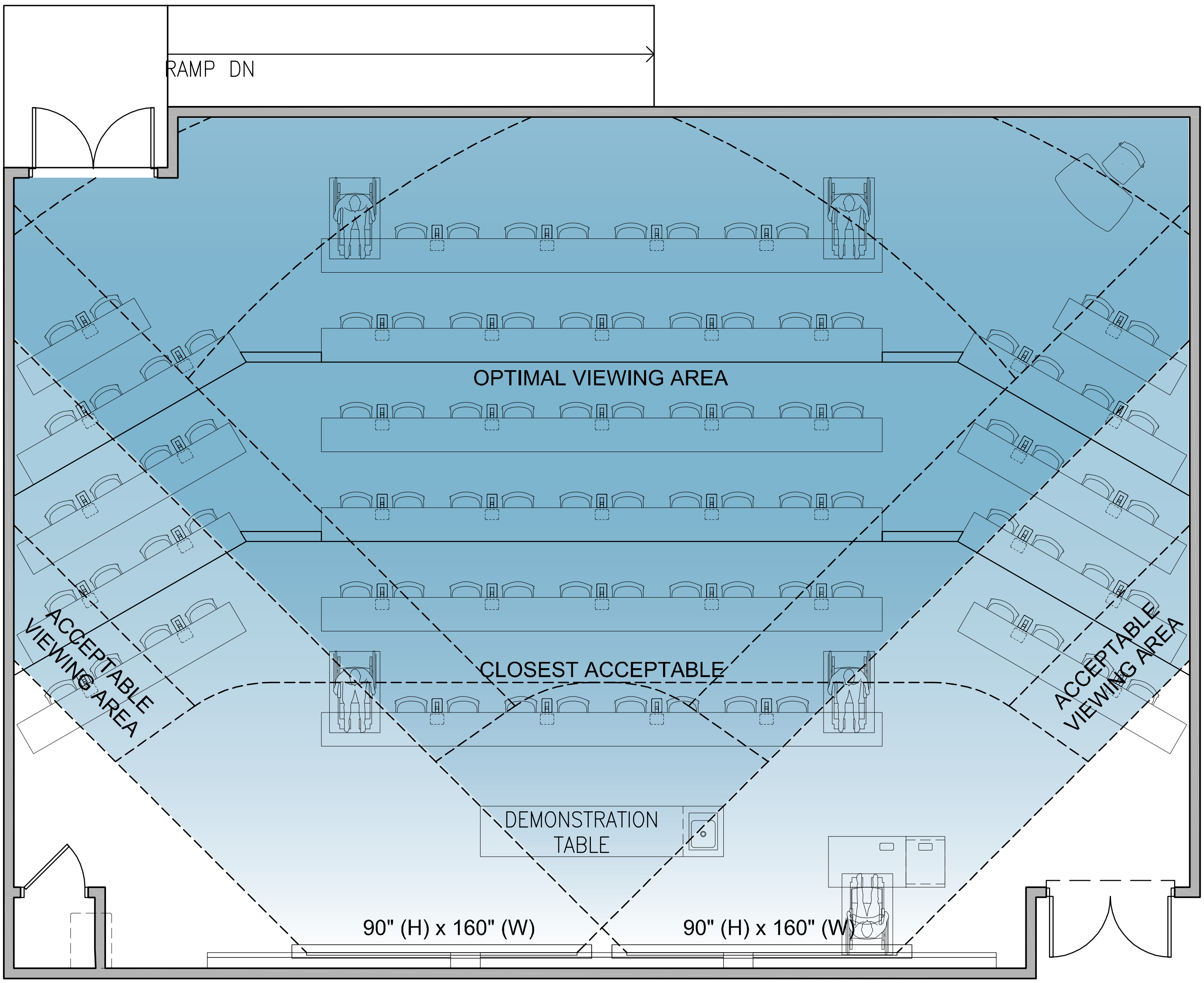


(B) FRONT ELEVATION

96-SEAT LECTURE HALL

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



ALTERNATE LAYOUT VIEWING ANGLE PLAN

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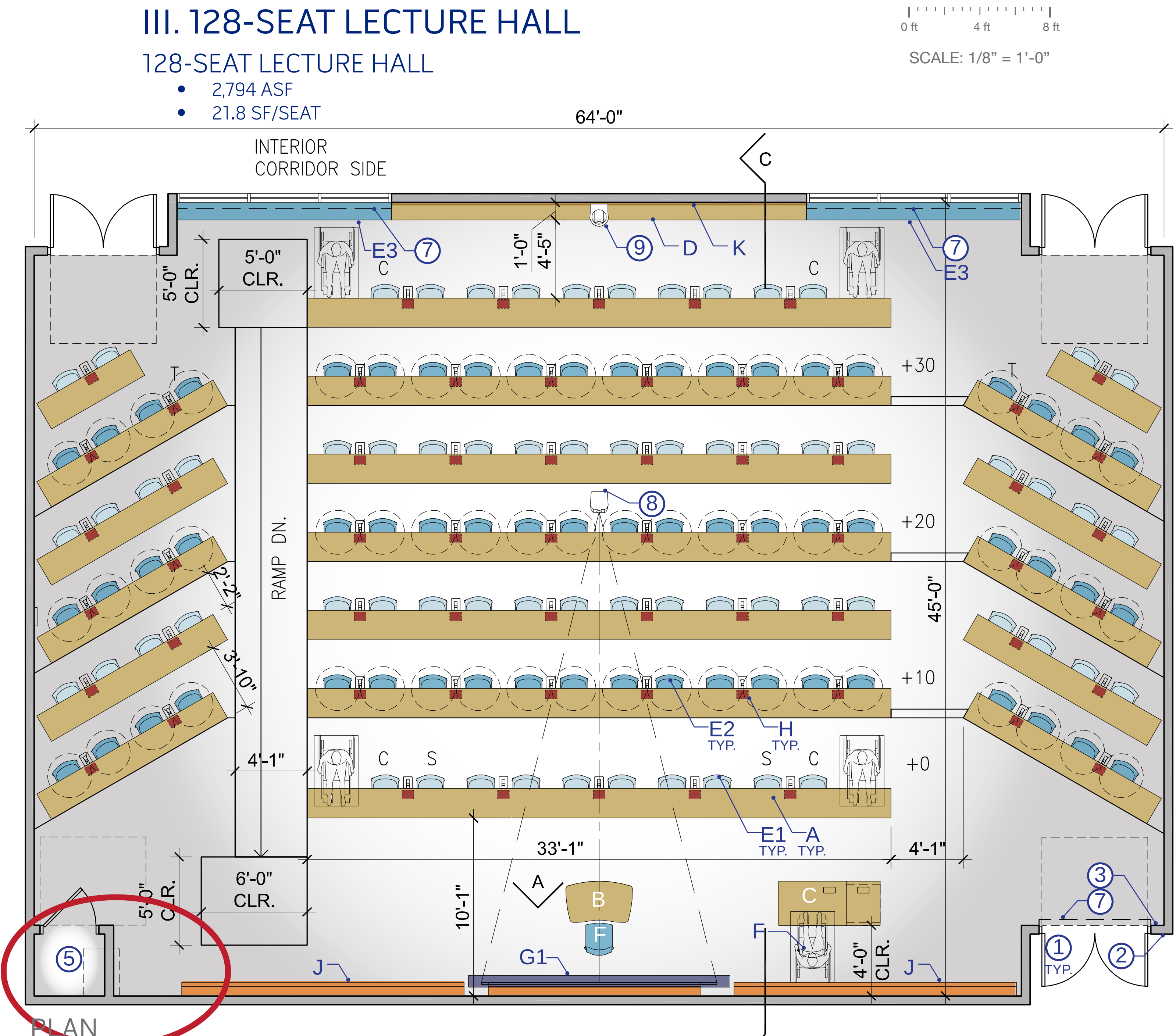
III. 128-SEAT LECTURE HALL

128-SEAT LECTURE HALL

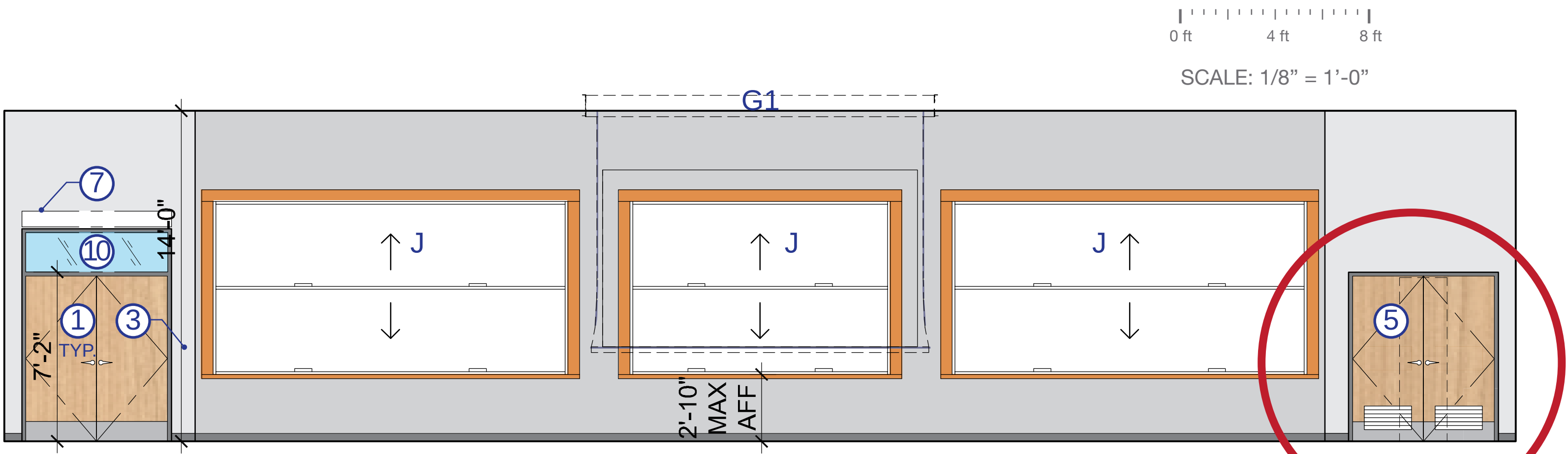
- 2,794 ASF
- 21.8 SF/SEAT



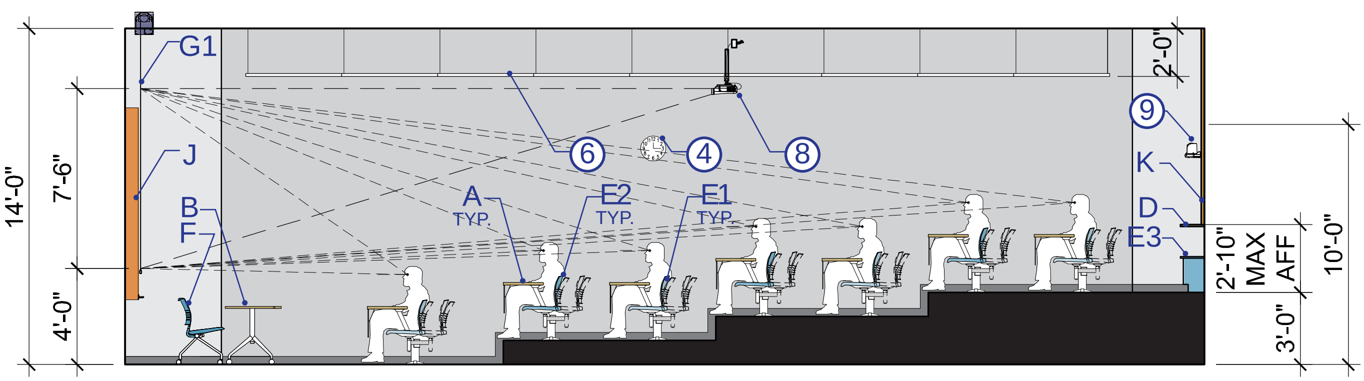
PLAN

SEATING CHART

	W	C	T	S	ALS
128	4	4	2	2	4%



(A) FRONT ELEVATION



(C) SECTION

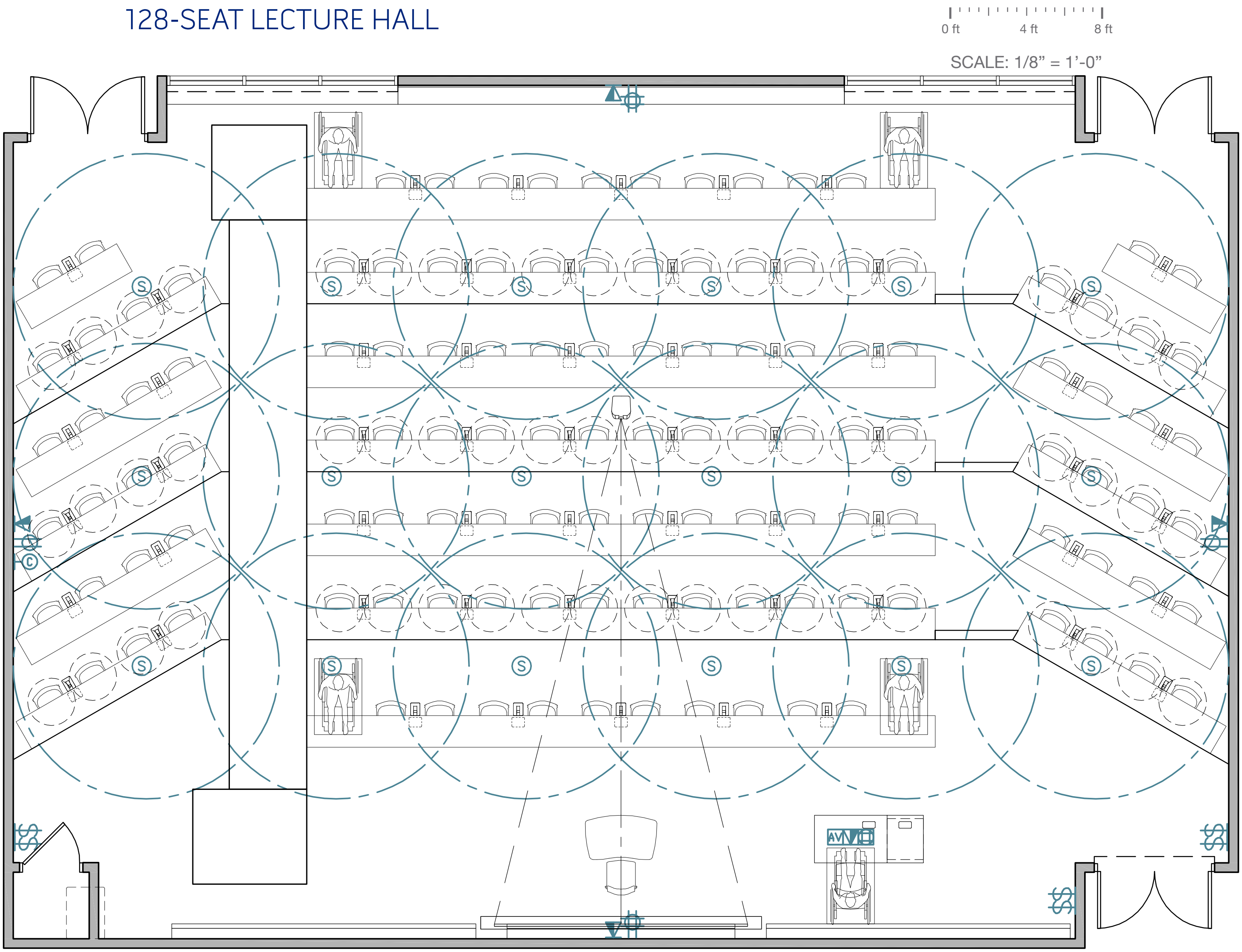
LEGEND

- (A) 20" deep fixed continuous student tables with continuous modesty panels
- (B) Mobile instructor station
- (C) Fixed accessible lectern
- (D) Information area
- (E1) Fixed collaborative student seating
- (E2) Fixed collaborative student seating with 360º swivel
- (E3) Bench seating
- (F) Mobile instructor seating
- (G1) 90"x160" projection screen, recessed ceiling mounted
- (H) Undersurface power and data module
- (J) Writable surface area
- (K) Tackable surface area
- (1) Solid wood door
- (2) Room signage
- (3) ALS signage
- (4) Battery operated atomic clock
- (5) Media closet (42"clear depth)
- (6) Direct / indirect pendant lighting
- (7) Double roller shade (window treatment and room darkening)
- (8) Projector, ceiling mounted
- (9) Pan-tilt-zoom camera
- (10) Transom window

SURFACES

Floor:	Resilient flooring
Wall:	Painted drywall
Ceiling Ht:	11'-0" to 13'-0"
Ceiling Type:	Acoustical ceiling tile

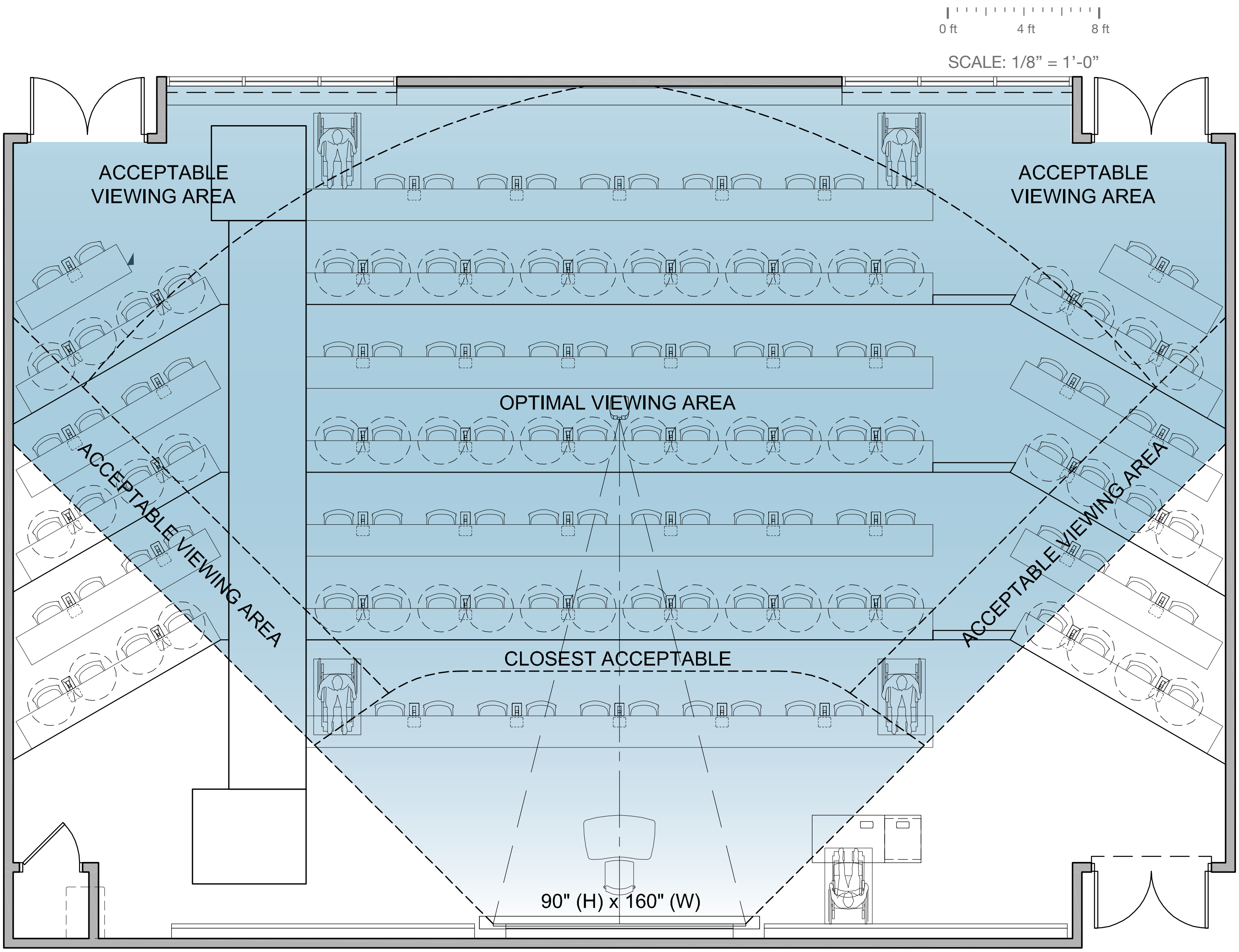
128-SEAT LECTURE HALL



POWER / DATA / AV PLAN

SYMBOLS

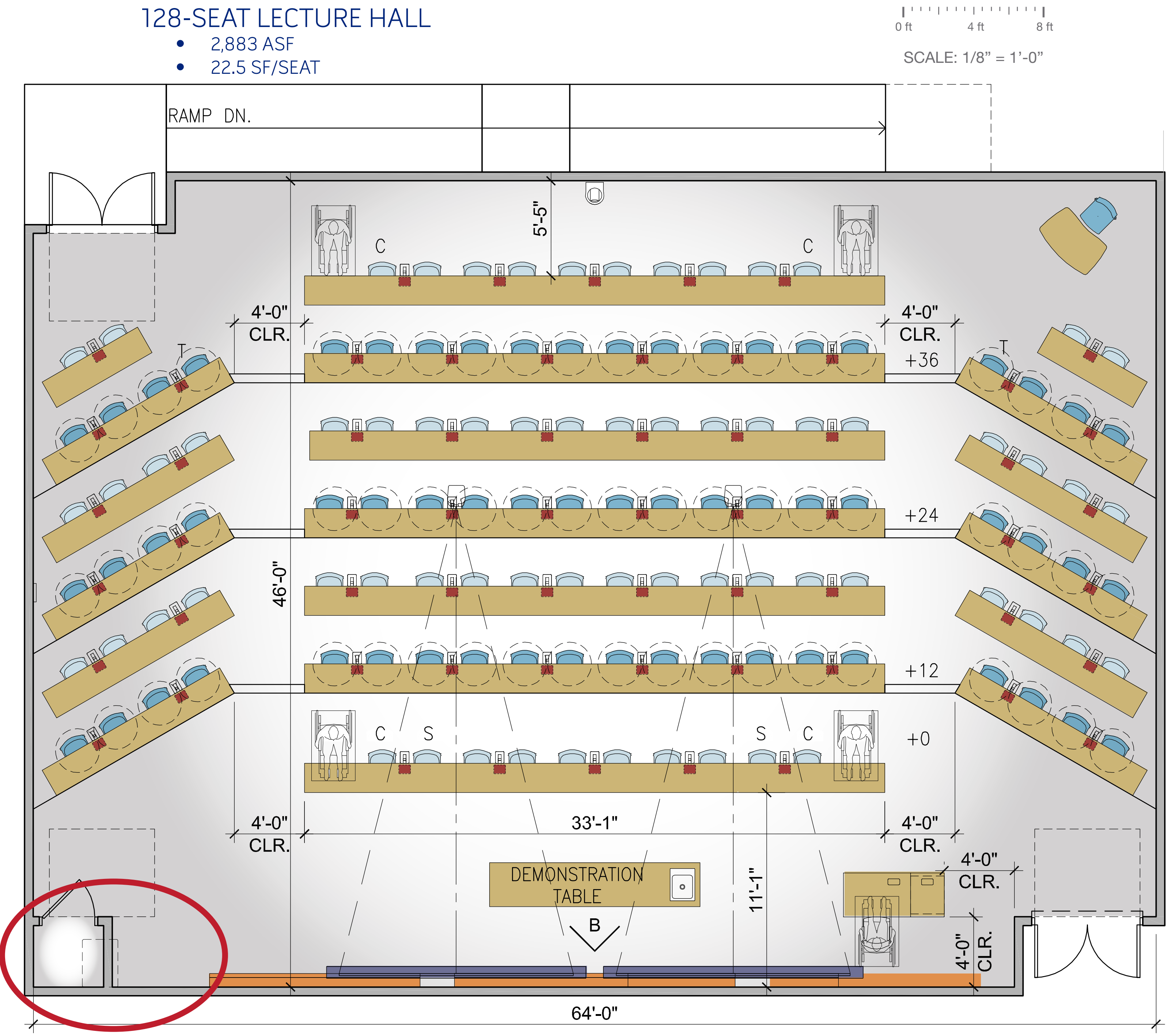
- Duplex
- Quadruplex
- Tel/Data (duplex)
- Flush floor-mounted quadruplex
- Flush floor-mounted data (6 outlets at instructor station)
- A/V connector
- $ Light switch
- Ceiling Data (3 outlets)
- Ceiling Speaker
- Ceiling Duplex



VIEWING ANGLE PLAN

128-SEAT LECTURE HALL

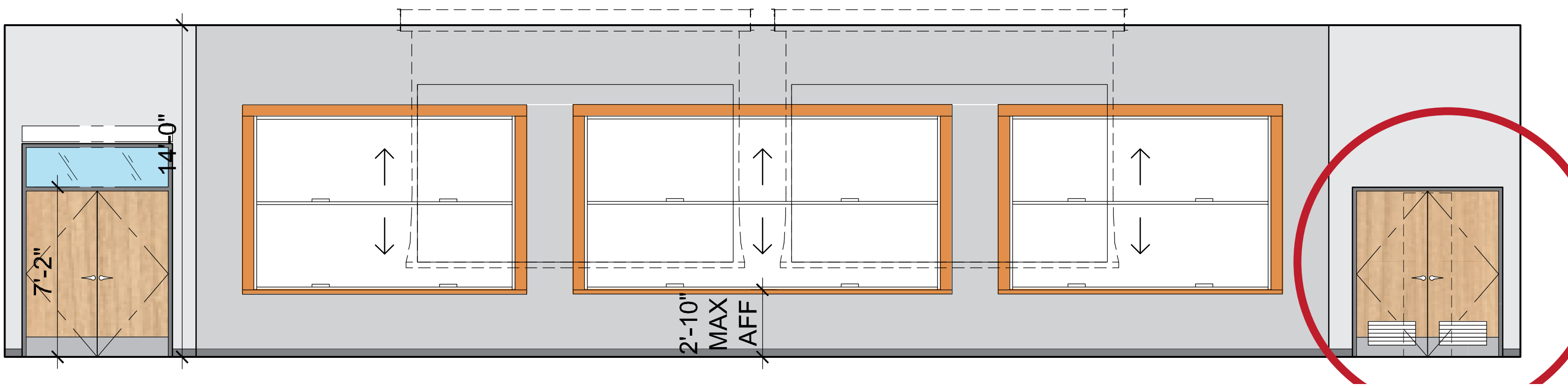
- 2,883 ASF
- 22.5 SF/SEAT



ALTERNATE LAYOUT

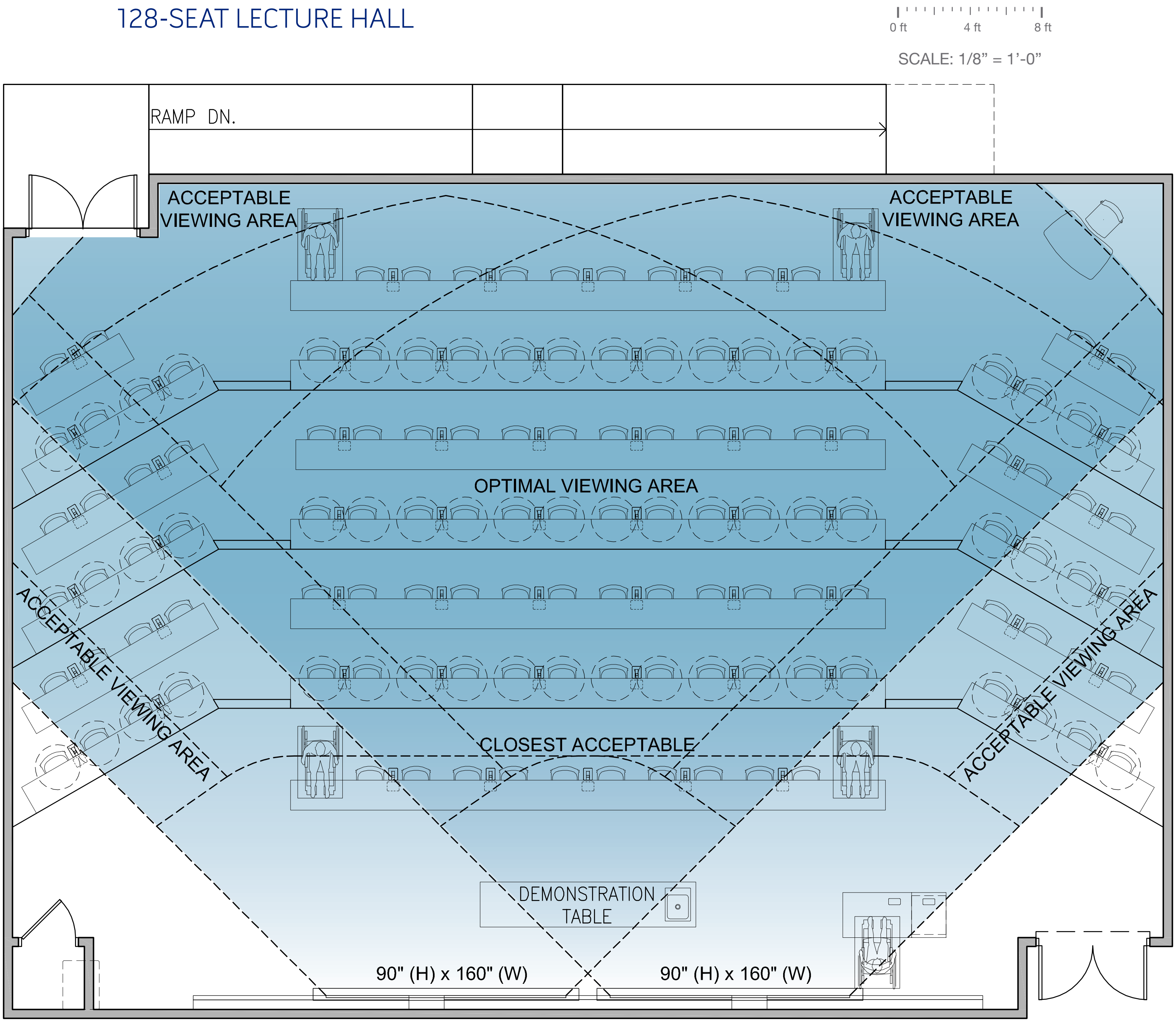
0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”



(B) FRONT ELEVATION

128-SEAT LECTURE HALL



ALTERNATE LAYOUT VIEWING ANGLE PLAN

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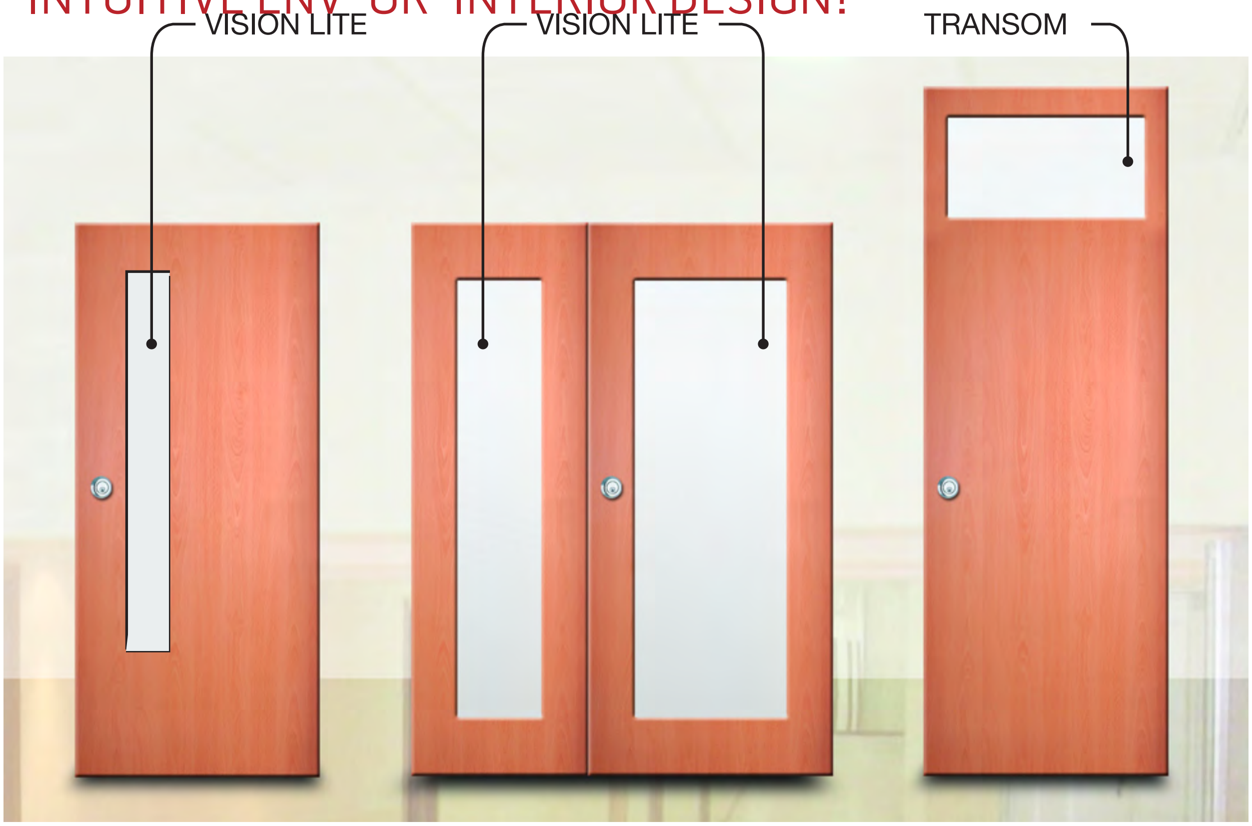
PART G
OFFICES

CONTENTS:

Private office environments should incorporate systems that maximize daylighting and ergonomics to aid user's productivity and overall sense of well-being. Office spaces should combine user focus with freedom of design, while workstations will create flexible work environments perfectly suited to individual tasks, social interaction and collaboration.

Although offices vary in size and capacity, there should be consistency in their furnishing systems, guest seating support, and maximized storage. Work surfaces and collaborative surfaces should be considered, sometimes one surface supporting both in the smaller offices. Mobile elements can make seating reconfigurations or screen sharing more accessible for collaboration. Conference technology and bathroom facilities should be provided in the president and vice chancellor's offices, see Section K for more information.

SHOULD THIS DOOR DIAGRAM MOVE TO "INTUITIVE ENV" OR "INTERIOR DESIGN?



BEST PRACTICES

DOORS
- Vision panels are regularly installed to allow first responders to quickly ascertain the condition of room occupants.
- At a minimum, a solid door with a vision lite is required.

CEILING HEIGHTS
- 8 to 10 feet minimum.

ACOUSTICS / SOUND ISOLATION
- Full height partition construction is recommended.
- See Part B.

ACCESSIBILITY
- See Part A.

CLOCKS
- See Part B.

STORAGE
- Provide furnishings to maximize storage needs without obstructing windows or accessibility.

LIGHTING
- See Parts B and P.

FLAT PANEL DISPLAYS
- Only in designated offices.
- See Part B.

MEDIA RACKS
- To be housed in a prefabricated media console.
- See Part B.

SWITCH CONTROLS
- See Part B.

CLEANOUTS / ACCESS PATHS
- See Part B.

POWER / DATA
- See Part B.

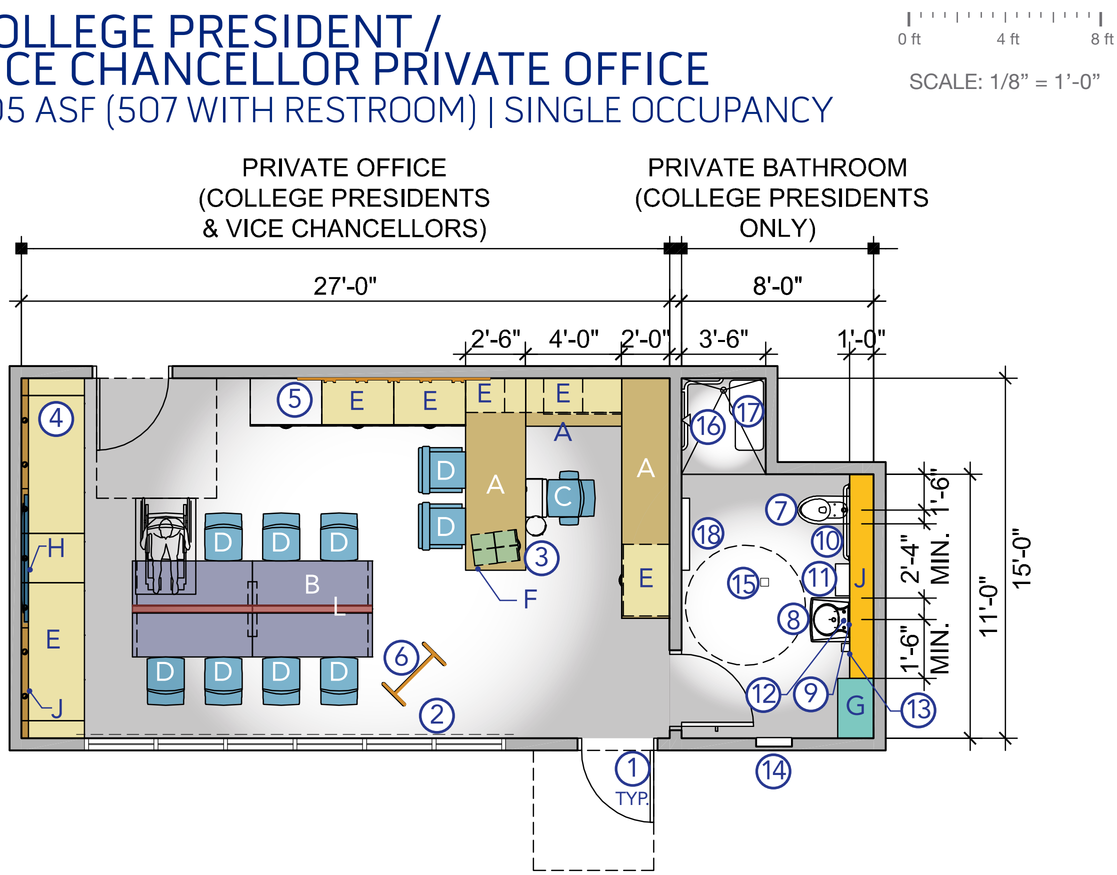
WI-FI
- See Part B.

HVAC
- Manually operated is acceptable.
- See Part B.

LIFE SAFETY
- See Part B.

I. COLLEGE PRESIDENT / VICE CHANCELLOR PRIVATE OFFICE

405 ASF (507 WITH RESTROOM) | SINGLE OCCUPANCY



PLAN

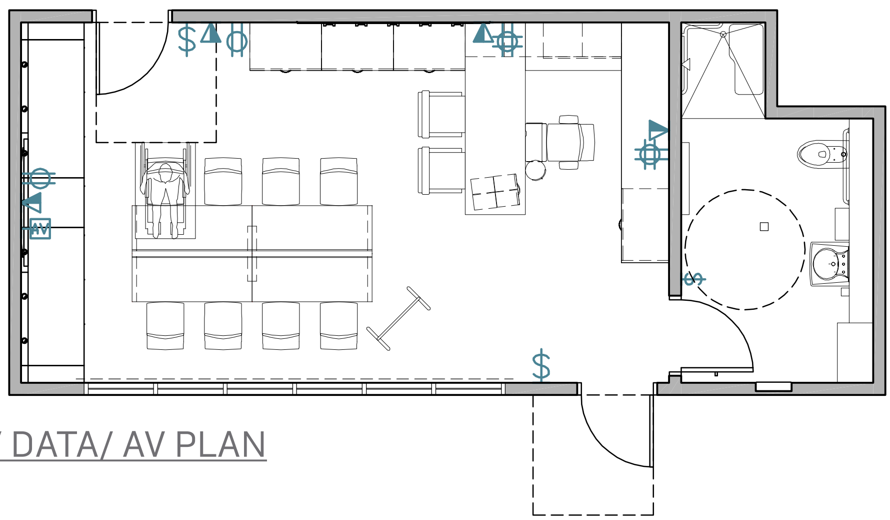
LEGEND

- (A) Worksurface
- (B) Conference table
- (C) Task seating
- (D) Guest seating
- (E) Storage
- (F) Mobile, lockable pedestal file with seat cushion
- (G) Closet
- (H) 70" flat panel display, wall mounted
- (J) Shelf
- (K) Tackable surface area
- (L) Power/data access

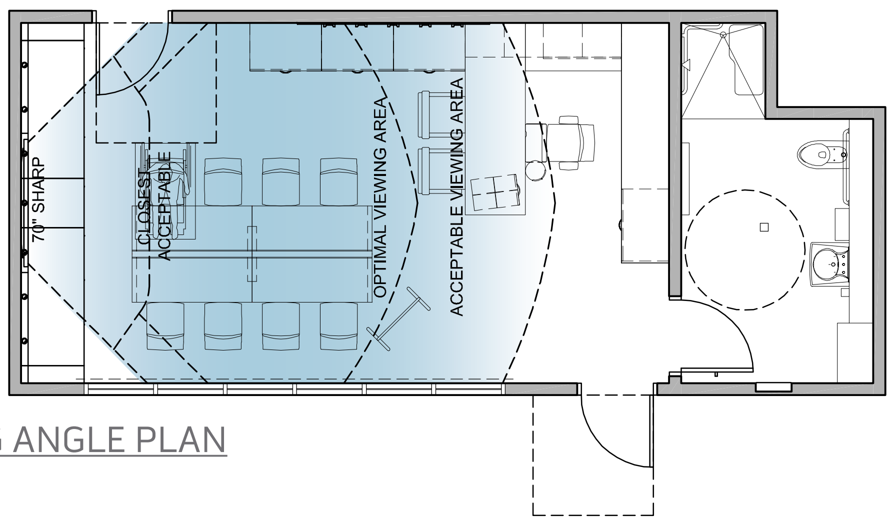
1. Solid wood door with vision panel
2. Single roller shade
3. Keyboard/mouse tray
4. Media console
5. Markerboard rail
6. Whiteboard easel
7. Water closet
8. Lavatory - wall hung
9. Mirror
10. Horizontal grab bar (2 walls)
11. Combination toilet seat cover, sanitary napkin disposal, and toilet tissue dispenser - recessed preferred
12. Faucet
13. Soap dispenser - surface mounted
14. Combination paper towel dispenser and waste receptacle - recessed
15. Floor drain with trap prime connection
16. ADA shower
17. ADA shower seat
18. Diaper changing station

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



POWER / DATA/ AV PLAN



VIEWING ANGLE PLAN

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (coordinate with furniture location)
- $ Light switch with occupancy sensor

SURFACES

Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

NOTE

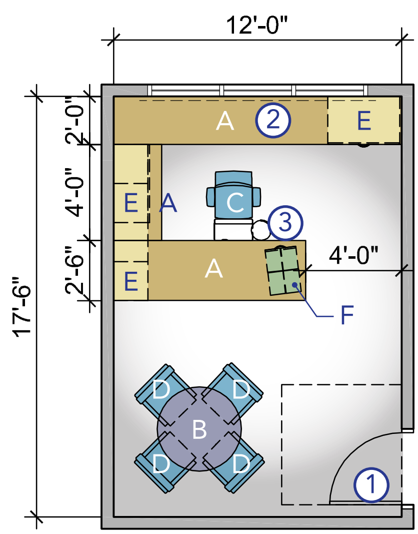
Provide adjacent restroom at college president office only.

II. VICE PRESIDENT / ASSOCIATE VICE CHANCELLOR PRIVATE OFFICE

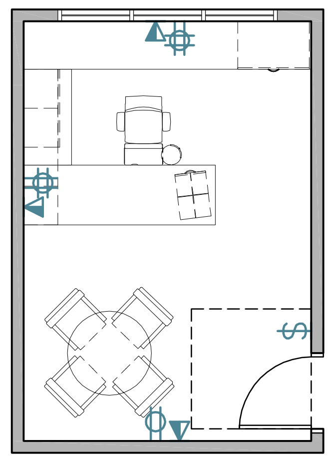
210 ASF | SINGLE OCCUPANCY

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



PLAN



LEGEND

- A Worksurface
- B Collaboration table
- C Task seating
- D Guest seating
- E Storage
- F Mobile, lockable pedestal file with seat cushion
- 1 Solid wood door with vision panel
- 2 Single roller shade
- 3 Keyboard/mouse tray

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (coordinate with furniture location)
- $ Light switch with occupancy sensor

SURFACES

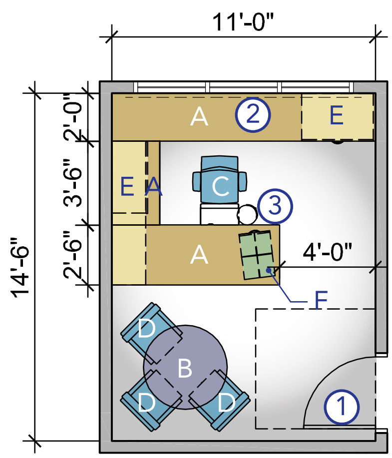
Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

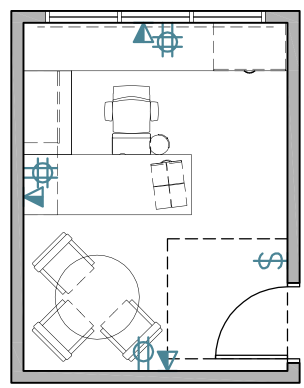
III. DEAN/DIRECTOR PRIVATE OFFICE

160 ASF | SINGLE OCCUPANCY

SCALE: 1/8" = 1'-0"

PLAN





LEGEND

- (A) Worksurface
- (B) Collaboration table
- (C) Task seating
- (D) Guest seating
- (E) Storage
- (F) Mobile, lockable pedestal file with seat cushion
- (1) Solid wood door with vision panel
- (2) Single roller shade
- (3) Keyboard/mouse tray

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (coordinate with furniture location)
- $ Light switch with occupancy sensor

SURFACES

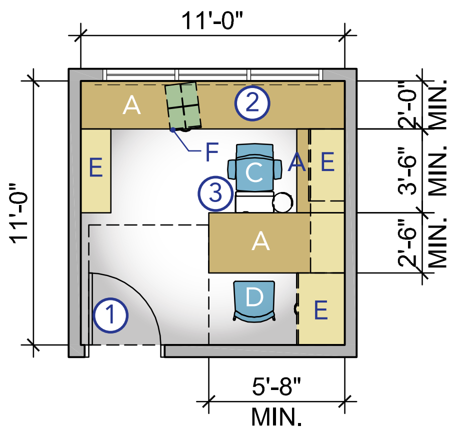
Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

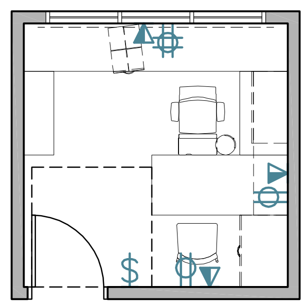
IV. MANAGER/DEPARTMENT CHAIR / SUPERVISOR PRIVATE OFFICE

121 ASF | SINGLE OCCUPANCY

0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”





PLAN

LEGEND

- (A) Worksurface
- (C) Task seating
- (D) Guest seating
- (E) Storage
- (F) Mobile, lockable pedestal file with seat cushion
- (1) Solid wood door with vision panel
- (2) Single roller shade
- (3) Keyboard/mouse tray

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (coordinate with furniture location)
- $ Light switch with occupancy sensor

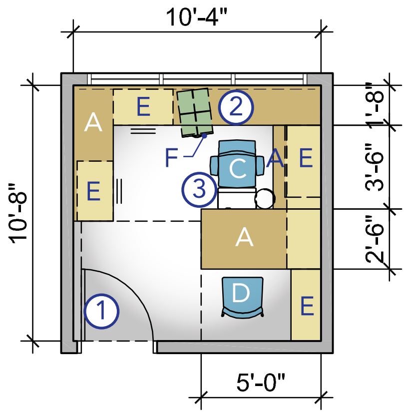
SURFACES

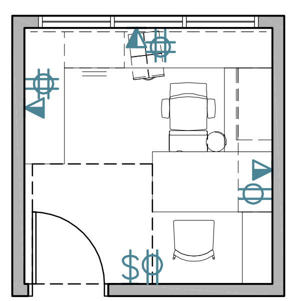
Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9’-0” to 11’-0”
Ceiling Type:	Acoustical ceiling tile

V. FACULTY PRIVATE OFFICE

110 ASF | SINGLE OCCUPANCY

SCALE: 1/8" = 1'-0"





PLAN

LEGEND

- (A) Worksurface
- (C) Task seating
- (D) Guest seating
- (E) Storage
- (F) Mobile, lockable pedestal file with seat cushion
- (1) Solid wood door with vision panel
- (2) Single roller shade
- (3) Keyboard/mouse tray

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (coordinate with furniture location)
- $ Light switch with occupancy sensor

SURFACES

Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

PART H
WORKSTATIONS

CONTENTS:

Open office workstation environments should be designed in consistency with a campus's approach in color, materiality, and furnishings. Systems to maximize daylighting and ergonomics aid user's productivity and overall sense of well-being. Today's office workers are more mobile, flexible, and social, while spending a majority of their day in their work environments. In turn, spaces should be designed to support a variety of productive styles; through "heads-down" focused work, to in-person and virtual social interactions and knowledge collaboration.

Studies show that the "huddle around the water cooler" social interactions support attitudes that lead to trust, collaboration, and productivity. When individuals are given the opportunities to share knowledge and experiences, as well as receive instant feedback, projects move faster toward successful completion (7). Therefore, an open office workstation environment should balance workstation modules with formal an informal gathering areas to encourage camaraderie.

It's good practice to assess a campus's work culture to determine if the work environments created are working effectively as intended, and making any adjustments to improve the staff's productivity.

PART H WORKSTATIONS

BEST PRACTICES

CEILING HEIGHTS
- 10 feet minimum.

ACCESSIBILITY
- See Part A.

STORAGE
- Provide furnishing systems that maximize storage needs without obstructing windows or accessibility.

COLLABORATIVE SURFACES
- Allocated spaces for surfaces between workstations or within a groups of workstations.
- Fixed and mobile white boards as well as tack panels are encouraged.
- Storage unit tops can double as seating for collaborative zone.

LIGHTING
- See Parts B and P.

POWER / DATA
- Coordinate location for floor stub-ups with FF&E consultant.
- See Part B.

HVAC
- See Part B.

LIFE SAFETY
- See Part B.

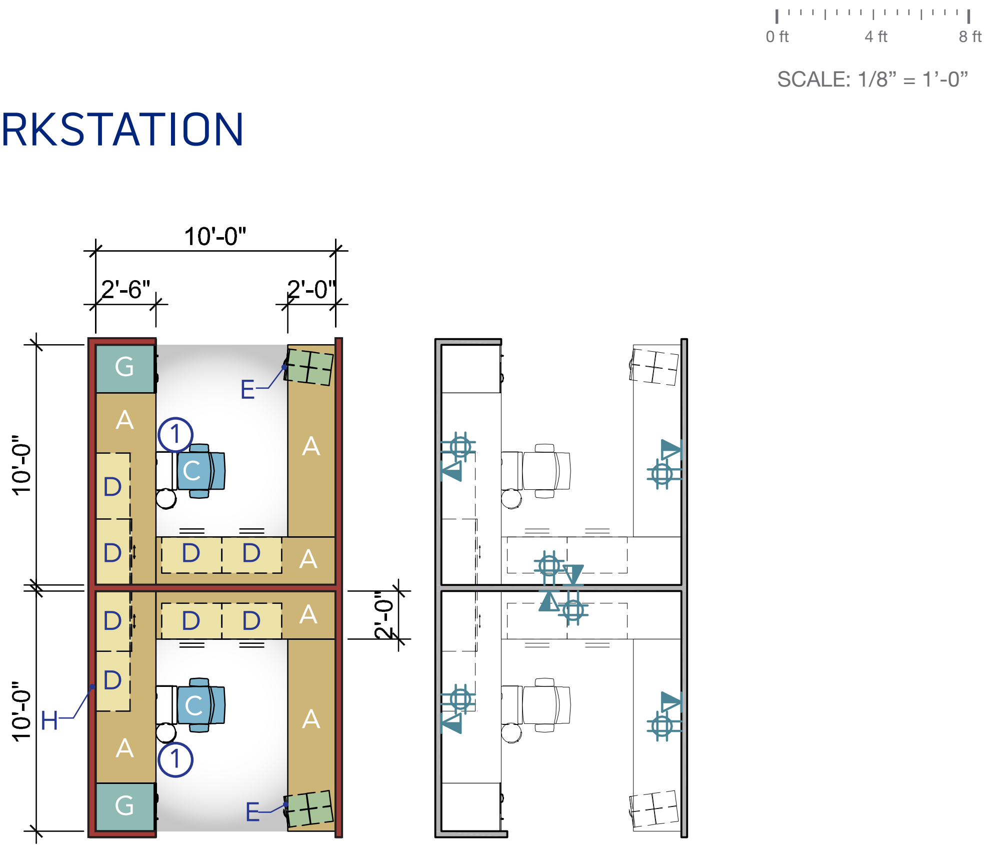
Furnishings should create a variety of opportunities. Elements to consider include:

- Division panel heights low enough to create a line of sight.
- Screens that can be viewed by all parties collaborating.
- Space between two workstations can function as storage, small group collaboration, and a guest seat if a cushion is provided.
- Spaces amid a group of workstations can host a medium group of individuals meeting.
- Formal and informal space types are encouraged to foster to the variety of ways in which people interact.
- A variety of furnishings to support a variety of poses; formal, informal, sitting, standing, leaning, writing, etc.
- Mobile furnishings allow users to reconfigure a space for their needs.

SCALE: 1/8” = 1’-0”

I. LARGE WORKSTATION
100 ASF

PLAN



LEGEND

- (A) Worksurface
- (C) Task seating
- (D) Storage
- (E) Mobile, lockable pedestal file with seat cushion
- (G) Small wardrobe
- (H) Power/data access
- (1) Keyboard/mouse tray

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (coordinate with furniture location)
- $ Light switch with occupancy sensor

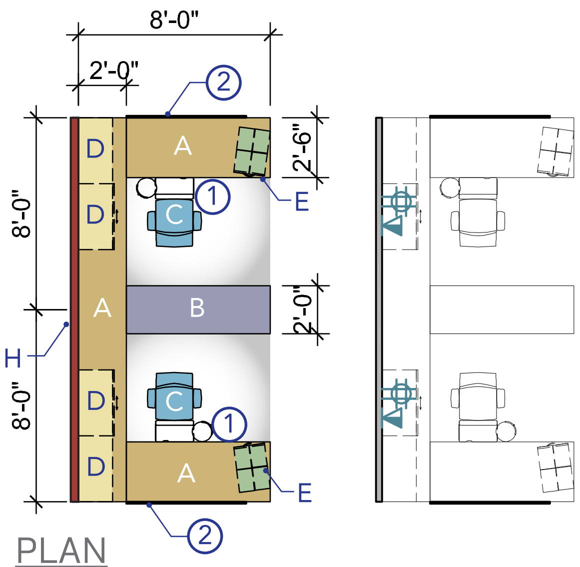
SURFACES

Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9’-0” to 11’-0”
Ceiling Type:	Acoustical ceiling tile

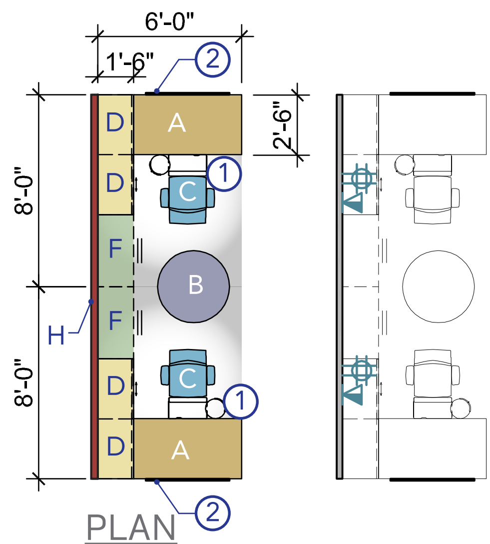
0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”

II. MEDIUM WORKSTATION
64 ASF



III. SMALL WORKSTATION
48 ASF



LEGEND

- A Worksurface
- B Collaboration Table
- C Task seating
- D Storage
- E Mobile, lockable pedestal file with seat cushion
- F Lateral file with seat cushion
- H Power/data access
- 1 Keyboard/mouse tray
- 2 Privacy panel

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data (coordinate with furniture location)
- $ Light switch with occupancy sensor

SURFACES

Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9’-0” to 11’-0”
Ceiling Type:	Acoustical ceiling tile

PART J

MEETING (CONFERENCE) ROOMS

CONTENTS:

A well designed conference room helps in an effective, clear and dramatic communication of ideas and dialogue. Meeting room design demands not only the appropriate furniture and equipment, but also the right space, atmosphere, and lighting arrangement of the room.

These spaces can be a component of public access, located in centralized areas within a facility. Their interiors should be designed seeking the comfort audio level of the users, and should not allow for external sound to interfere with internal interaction. When selecting furnishings, it is good practice to plan for a sufficient amount of space for the users to circulate and roam around comfortably. Cluttering should be completely avoided by not crowding too many chairs around the table. Furthermore, tables with power and data connectivity are ideal for today's high-tech mobile users.

Due to the nature of their use frequency, daylighting and daylight harvesting strategies should be incorporated. Techniques such as motion sensors to turn the lights off when the space is not in use will generate much energy savings.

SMALL MEETING ROOM

MEDIUM MEETING ROOM

LARGE MEETING ROOM

BEST PRACTICES

ROOM GEOMETRY
- Rectangular is ideal with short wall as the media wall.

CEILING HEIGHTS
- 11 feet minimum to accommodate suspended light fixtures and sight lines.

ACCESSIBILITY
- See Part A.

CLOCKS
- See Part B.

STORAGE
- Replicate media console module without electrical fittings.

COLLABORATIVE SURFACES
- Maximize white boards and tack panels.

LIGHTING
- See Parts B and P.

FLAT PANEL DISPLAYS
- One FPD mounted on designated wall.
- 16:9 aspect ratio.
- 4 foot mounting height.

VIEWING ANGLES / SIGHT LINES
- Maximize viewing angles for FPD screens.

MEDIA RACKS
- To be housed in a prefabricated media console.
- See Part B.

SWITCH CONTROLS
- See Part B.

CLEANOUTS / ACCESS PANELS
- See Part B.

MICROPHONES
- Furniture fixed.
- Coordinate with FF&E consultant.

SPEAKERS
- See Part B.

CAMERAS
- On front wall, to be mounted above FPD.
- See Part B.

WINDOW SHADES
- See Part B.

POWER / DATA
- Coordinate location for floor stub-ups with FF&E consultant.
- See Part B.

WI-FI
- See Part B.

HVAC
- See Part B.

LIFE SAFETY
- See Part B.

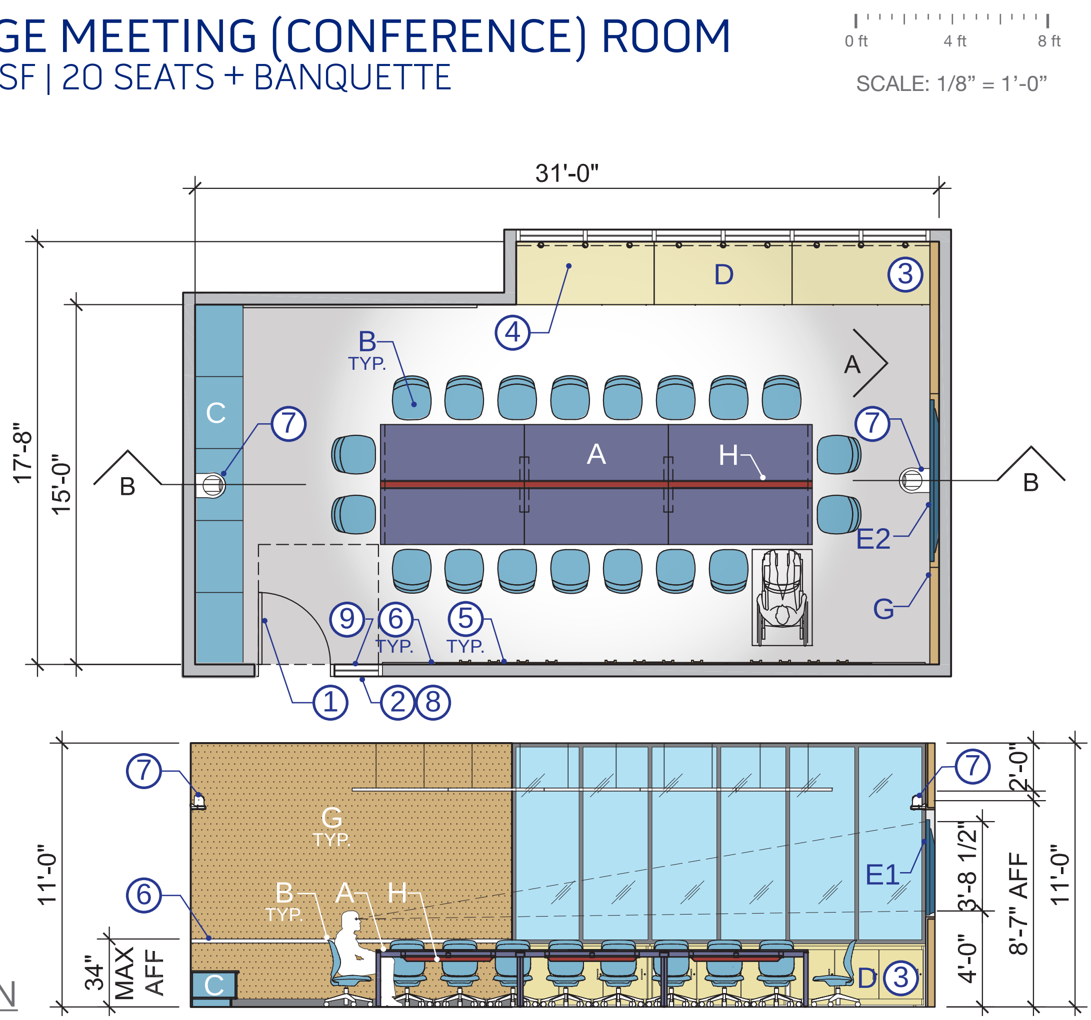
I. LARGE MEETING (CONFERENCE) ROOM

510 ASF | 20 SEATS + BANQUETTE

SCALE: 1/8" = 1'-0"

PLAN

(B) SECTION



LEGEND

- A Fixed table
- B Stackable, mobile chairs
- C Built-in bench seating
- D Freestanding storage
- E2 90" flat panel display, wall mounted
- F Writable surface area
- G Tackable surface area
- H Power/data access

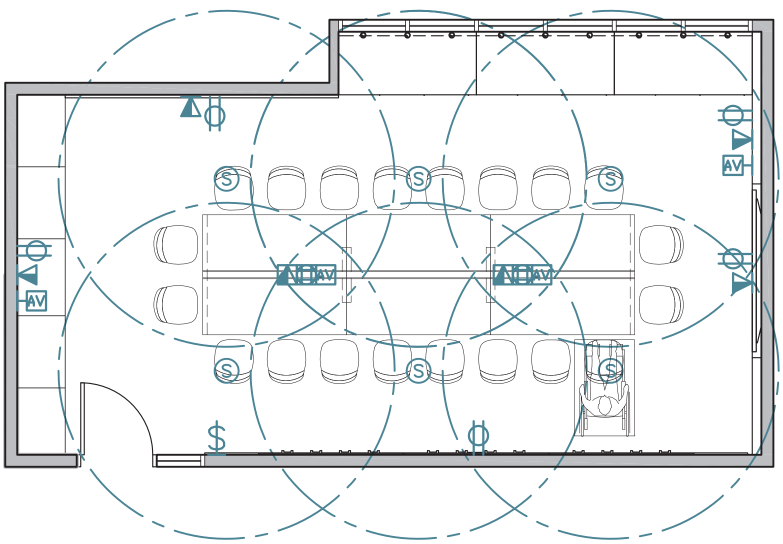
1. Solid wood or glass storefront door
2. Sidelight
3. Media console
4. Double roller shade (window treatment and room darkening)
5. Markerboard rail
6. Chair rail
7. Pan-tilt-zoom camera
8. Room signage
9. ALS Signage

SURFACES

Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Acoustical ceiling tile

0 ft 4 ft 8 ft

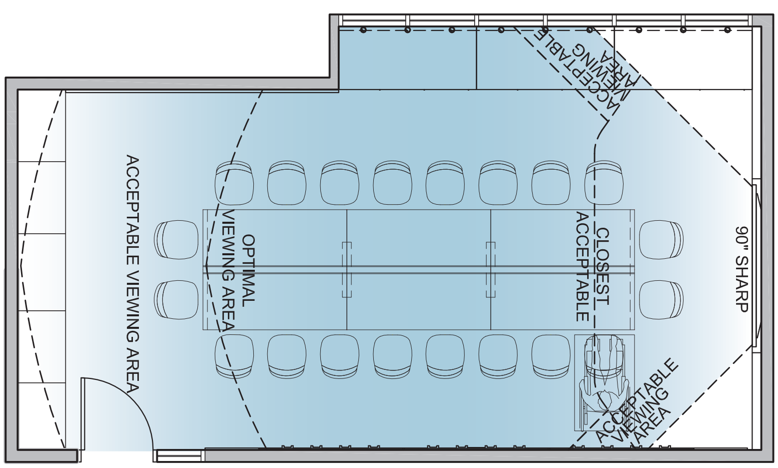
SCALE: 1/8" = 1'-0"



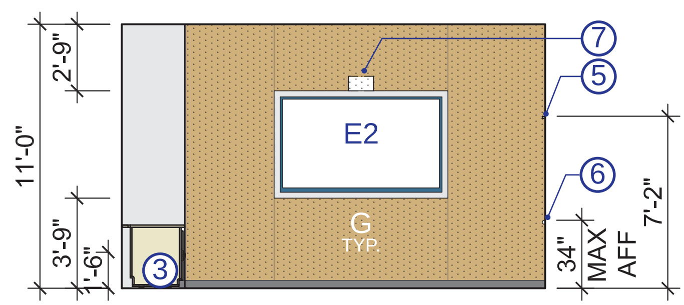
SYMBOLS

- Duplex
- Tel/Data
- Flush floor-mounted duplex
- Flush floor-mounted data
- A/V connector
- Light switch with occupancy sensor
- Ceiling Data
- Ceiling Speaker
- Ceiling Quadruplex

POWER / DATA / AV PLAN



VIEWING ANGLE PLAN



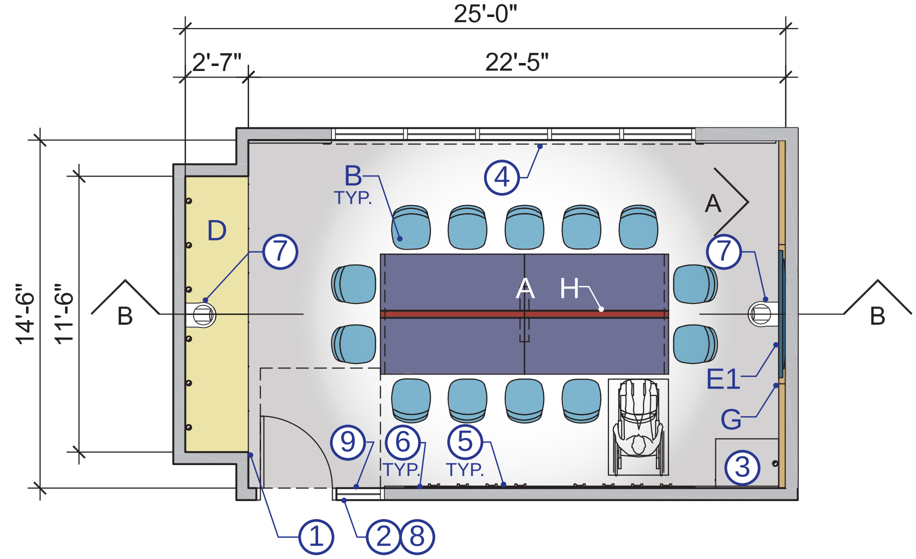
(A) FRONT ELEVATION

II. MEDIUM MEETING (CONFERENCE) ROOM

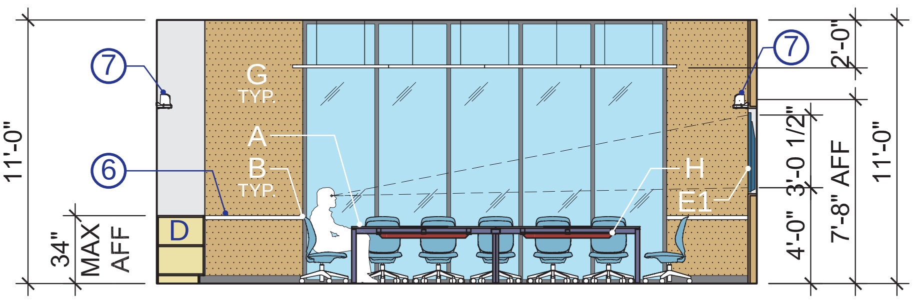
354 ASF | 14 SEATS

0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”



PLAN



(B) SECTION

LEGEND

- A Fixed table
- B Stackable, mobile chairs
- D Freestanding storage
- E1 70” flat panel display, wall mounted
- F Writable surface area
- G Tackable surface area
- H Power/data access

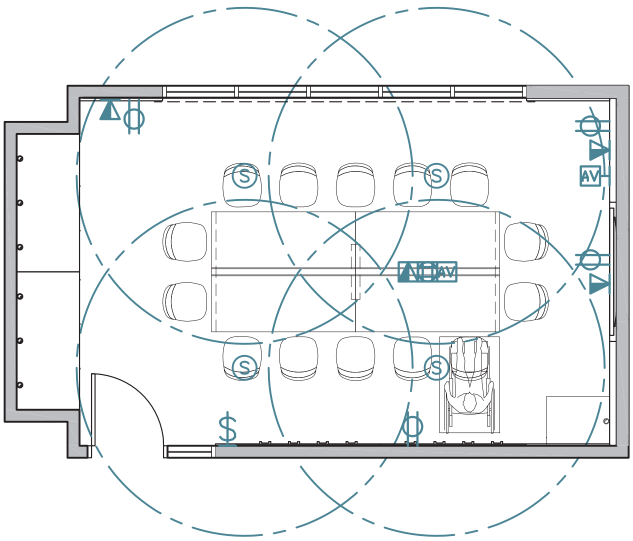
1. Solid wood or glass storefront door
2. Sidelight
3. Media console
4. Double roller shade (window treatment and room darkening)
5. Markerboard rail
6. Chair rail
7. Pan-tilt-zoom camera
8. Room signage
9. ALS Signage

SURFACES

Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9’-0” to 11’-0”
Ceiling Type:	Acoustical ceiling tile

0 ft 4 ft 8 ft

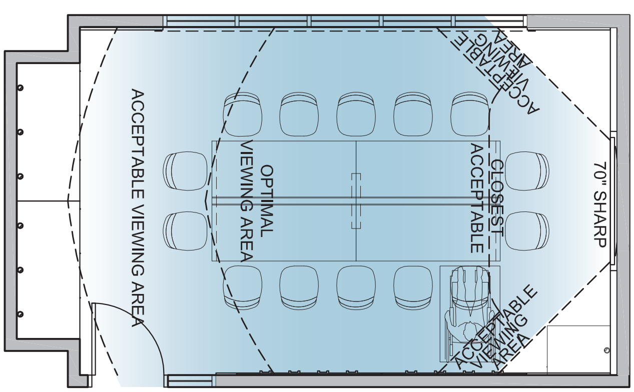
SCALE: 1/8” = 1’-0”



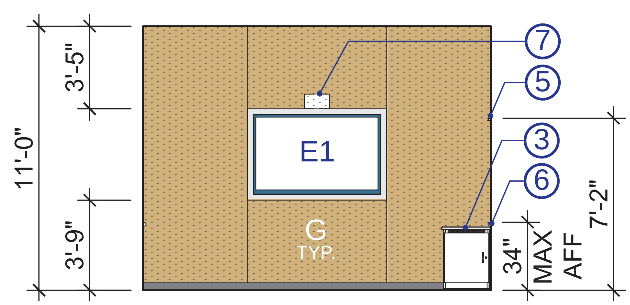
POWER / DATA / AV PLAN

SYMBOLS

- Duplex
- Tel/Data
- Flush floor-mounted duplex
- Flush floor-mounted data
- A/V connector
- $ Light switch with occupancy sensor
- Ceiling Data
- Ceiling Speaker
- Ceiling Quadruplex



VIEWING ANGLE PLAN



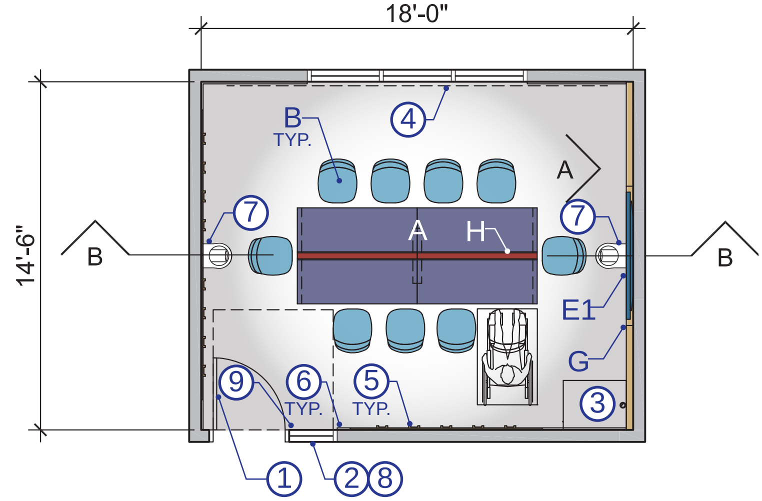
(A) FRONT ELEVATION

III. SMALL MEETING (CONFERENCE) ROOM

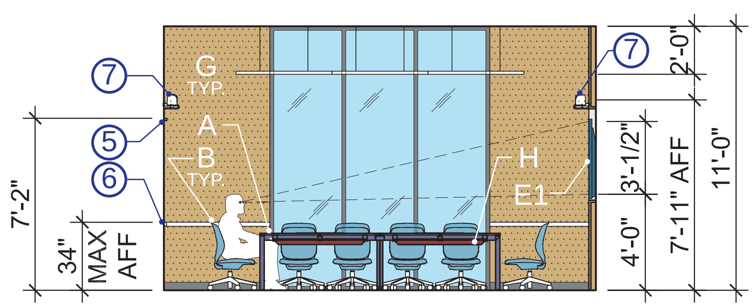
261 ASF | 10 SEATS

0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”



PLAN



(B) SECTION

LEGEND

- A Fixed table
- B Stackable, mobile chairs
- E1 70” flat panel display, wall mounted
- F Writable surface area
- G Tackable surface area
- H Power/data access

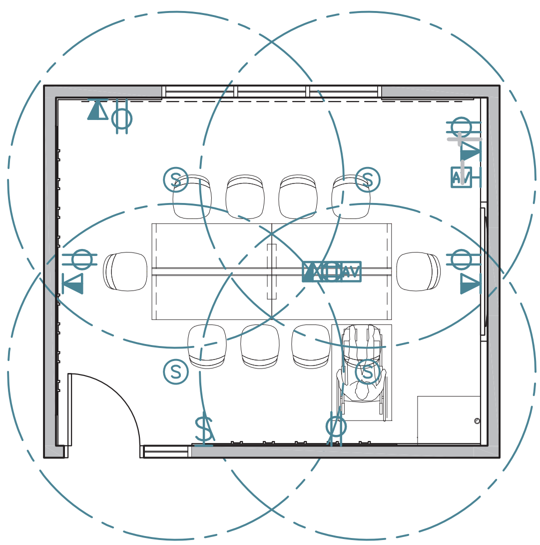
1. Solid wood or glass storefront door
2. Sidelight
3. Media console
4. Double roller shade (window treatment and room darkening)
5. Markerboard rail
6. Chair rail
7. Pan-tilt-zoom camera
8. Room signage
9. ALS Signage

SURFACES

Floor:	Carpet tile
Wall:	Painted drywall
Ceiling Ht:	9’-0” to 11’-0”
Ceiling Type:	Acoustical ceiling tile

0 ft 4 ft 8 ft

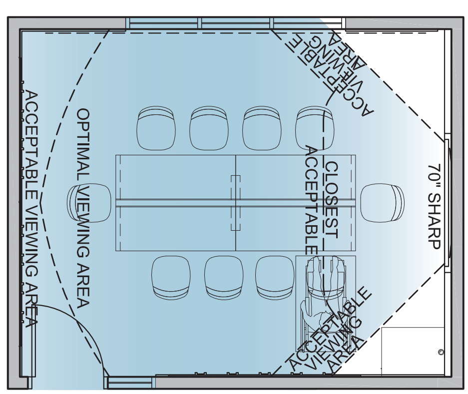
SCALE: 1/8" = 1'-0"



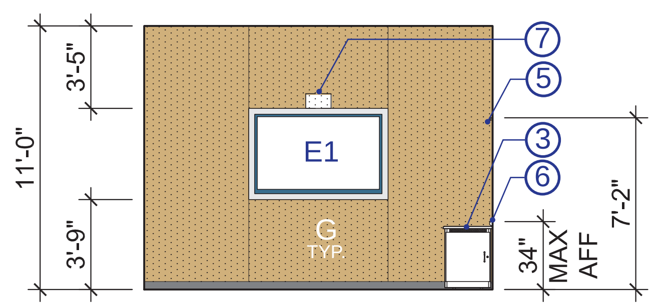
POWER / DATA / AV PLAN

SYMBOLS

- Duplex
- Tel/Data
- Flush floor-mounted duplex
- Flush floor-mounted data
- A/V connector
- $ Light switch with occupancy sensor
- Ceiling Data
- Ceiling Speaker
- Ceiling Quadruplex



VIEWING ANGLE PLAN



(A) FRONT ELEVATION

PART K
TOILET ROOMS

CONTENTS:

Toilet rooms should be designed with equal care and attention to detail as other spaces on campus. Colors, materials, fixtures, and other elements should be appropriate to the design concepts of the each campus so users.

A design feature for convenient use includes providing a continuous ledge, 12 inches deep and spanning the area behind lavatories and toilets. This design element provides a convenient dry surface for occupants to set their personal belongings.

The number of student, faculty and staff toilet rooms included in a building project will be determined by the needs of the specific programs that will occupy the building.

BEST PRACTICES

CEILING HEIGHTS
- 8 feet minimum.

ACCESSIBILITY
- All stall counts, clearances, reach heights, and reach depths should comply with ADA standards.

BATHROOM FIXTURES
- All wall-mounted water closets, urinals, and lavatories to be supported by floor mounted chair carriers or concealed arm uprights.
- Top of lavatory support is approximately 40” high.

WATER FOUNTAINS
- Backing plates for drinking fountains to be provided by the manufacturer.

PARTITIONS
- Floor to ceiling.

LIGHTING
- See Part P.

CLEANOUTS / ACCESS PANELS
- Types and locations to be coordinated with the architect.

DRAINS
- To be provided with an automatic trap primer behind an access panel.

WATER SUPPLY
- Hot and cold water supply should be provided with accessible shut off valves.

HVAC
- See Part B.

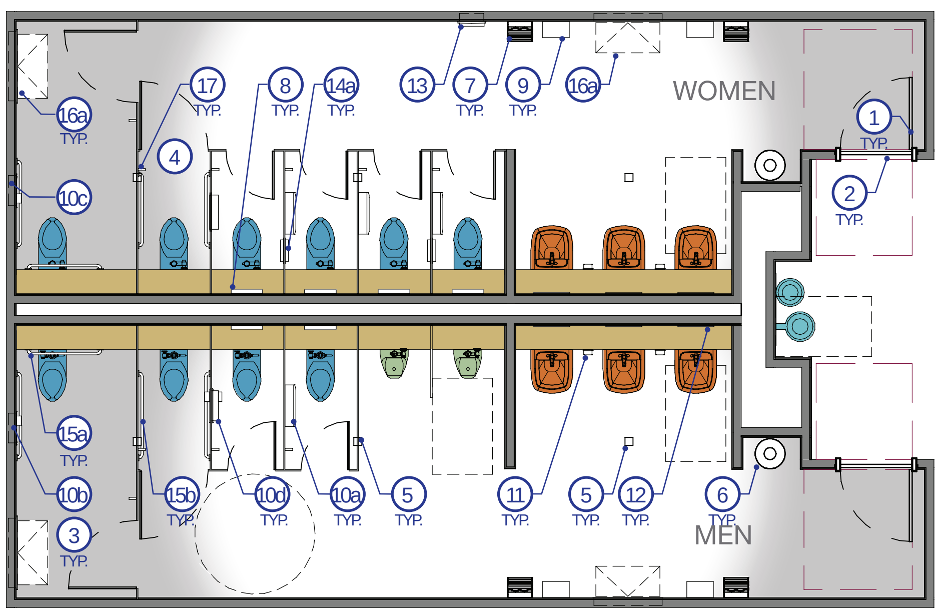
LIFE SAFETY
- See Part B.

I. MULTIPLE ACCOMODATION STUDENT TOILET ROOM

846 SF | TOTAL OCCUPANCY

0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”



PLAN

LEGEND

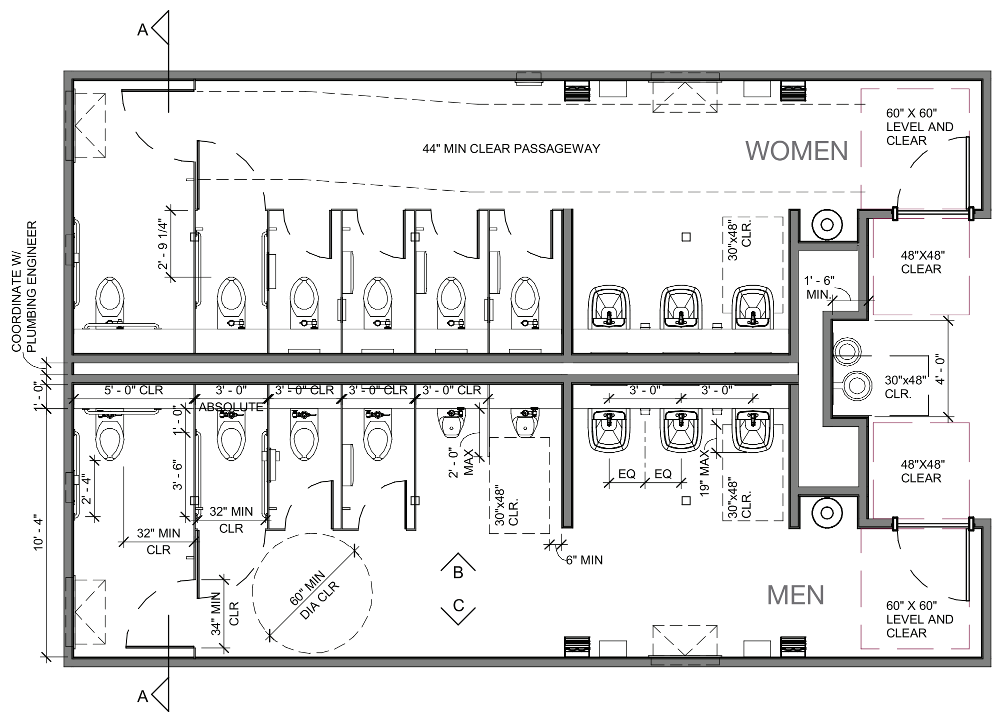
- A Ledge
- B Lavatory - wall hung
- C Water closet - wall hung
- D Urinal
- E Electric water cooler (EWC)

1. Solid wood door
2. Threshold
3. Wheelchair accessible stall
4. Semi-ambulatory accessible stall (where required)
5. Floor drain with trap primer connection
6. Freestanding waste receptacle
7. Hand dryer - recessed preferred
8. Toilet seat cover dispenser - surface mounted
9. Paper towel dispenser - surface mounted

- 10a Jumbo roll toilet tissue dispenser - surface mounted
- 10b Combination toilet seat cover and toilet tissue dispenser - recessed preferred

0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”



DIMENSION PLAN

10c Combination toilet seat cover, sanitary napkin disposal, and toilet tissue dispenser
- recessed preferred

10d Combination toilet seat cover and toilet tissue dispenser
- partition mounted

10e Combination toilet seat cover, sanitary napkin disposal, and toilet tissue dispenser
- partition mounted

11 Soap dispenser
- surface mounted

12 Mirror

13 Napkin/tampon vendor
- recessed

14a Sanitary napkin disposal
- surface mounted

14b Sanitary napkin disposal
- recessed

15a Horizontal grab bar
(2 perpendicular walls)

15b Horizontal grab bar
(2 parallel walls)

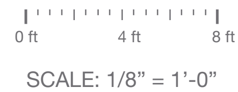
16a Diaper changing station
- recessed

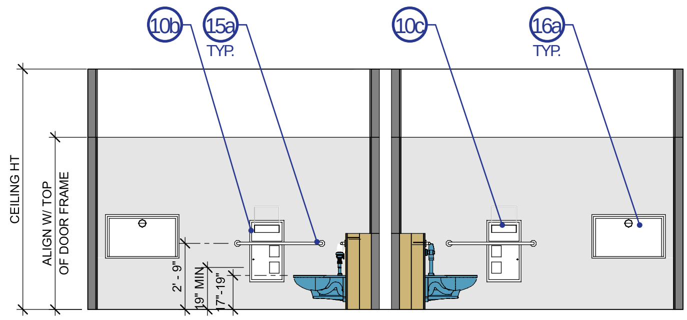
16b Diaper changing station
- surface mounted

17 Coat hook with bumper
(2 per stall)

I. MULTIPLE ACCOMODATION STUDENT TOILET ROOM

846 SF | TOTAL OCCUPANCY

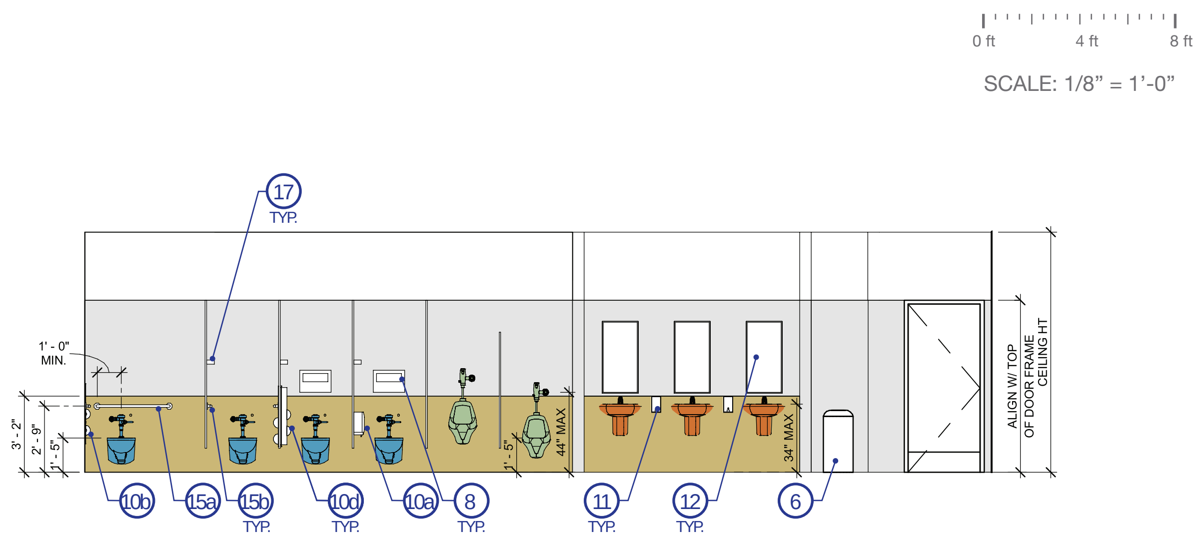




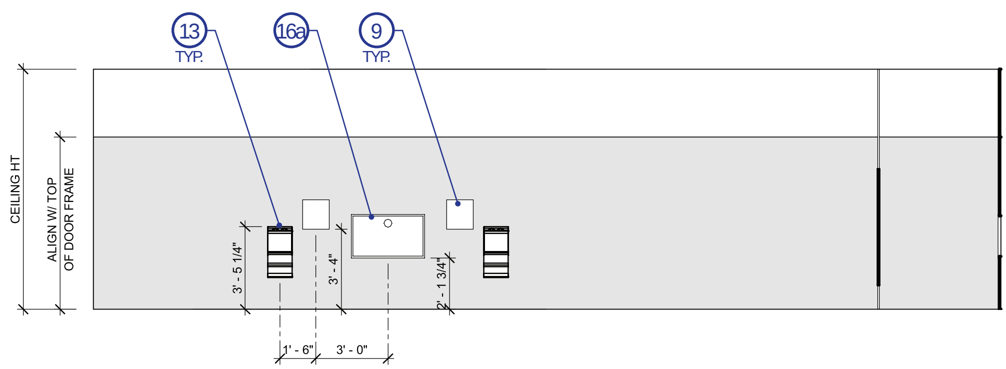
(A) SECTION

SURFACES

Floor:	Sealed concrete, fluid-applied flooring, or porcelain tile
Base:	Porcelain tile
Wall:	Ceramic tile and painted drywall
Ceiling Ht:	9’-0” to 11’-0”
Ceiling Type:	Painted drywall



(B) ELEVATION



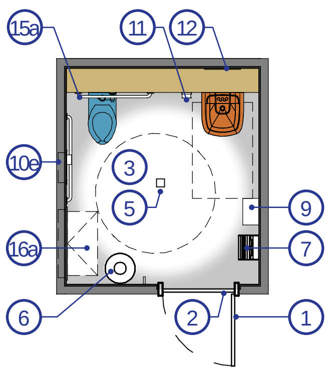
(C) ELEVATION

II. SINGLE OCCUPANCY TOILET ROOM

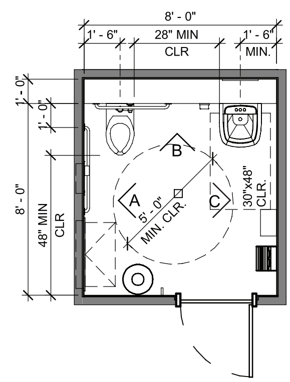
MINIMUM 60 SF

0 ft 4 ft 8 ft

SCALE: 1/8” = 1’-0”



PLAN



DIMENSION PLAN

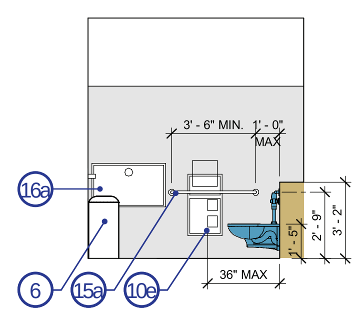
LEGEND

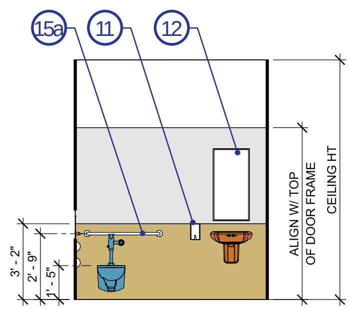
- A Ledge
- B Lavatory - wall hung
- C Water closet - wall hung
- D Urinal
- E Electric water cooler (EWC)

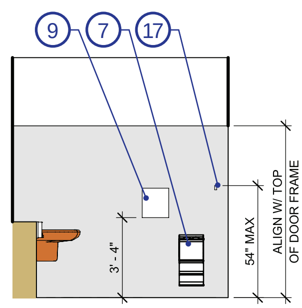
1. Solid wood door
2. Threshold
3. Wheelchair accessible stall
4. Semi-ambulatory accessible stall (where required)
5. Floor drain with trap primer connection
6. Freestanding waste receptacle
7. Hand dryer
   - recessed preferred
8. Toilet seat cover dispenser
   - surface mounted
9. Paper towel dispenser
   - surface mounted

- 10a Jumbo roll toilet tissue dispenser
  - surface mounted
- 10b Combination toilet seat cover and toilet tissue dispenser
  - recessed preferred
- 10c Combination toilet seat cover, sanitary napkin disposal, and toilet tissue dispenser
  - recessed preferred
- 10d Combination toilet seat cover and toilet tissue dispenser
  - partition mounted
- 10e Combination toilet seat cover, sanitary napkin disposal, and toilet tissue dispenser
  - partition mounted

SCALE: 1/8" = 1'-0"







(A) ELEVATION

(B) ELEVATION

(C) ELEVATION

11 Soap dispenser
- surface mounted

12 Mirror

13 Napkin/tampon vendor
- recessed

14a Sanitary napkin disposal
- surface mounted

14b Sanitary napkin disposal
- recessed

15a Horizontal grab bar
(2 perpendicular walls)

15b Horizontal grab bar
(2 parallel walls)

16a Diaper changing station
- recessed

16b Diaper changing station
- surface mounted

17 Coat hook with bumper
(2 per stall)

SURFACES

Floor:	Sealed concrete, fluid-applied flooring, or porcelain tile
Base:	Porcelain tile
Wall:	Ceramic tile
Ceiling Ht:	9'-0" to 11'-0"
Ceiling Type:	Painted drywall

PART L
VERTICAL CIRCULATION

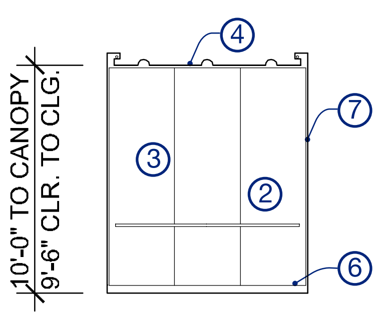
CONTENTS:

Passenger elevators should be designed with equal care and attention to detail as other spaces on campus. Colors, materials, fixtures, and other elements should be appropriate to the design concepts of the each campus so users. Quantity and location should be determined on a project by project basis based on occupancy loads, and they should be large enough to accommodate ADA requirements.

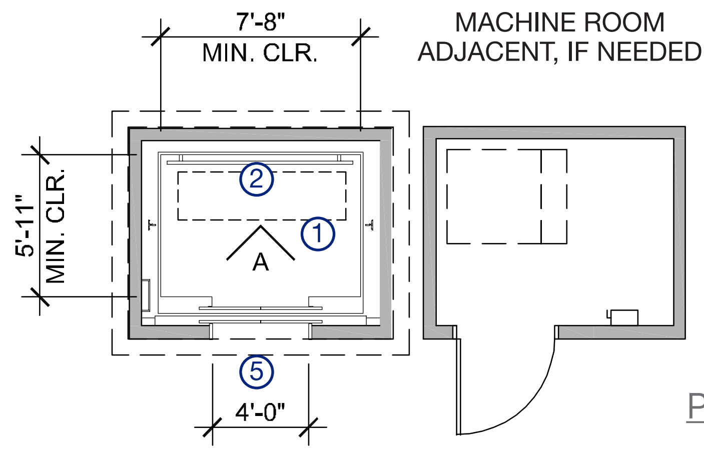
All equipment rooms shall be designed and located to facilitate the removal, transport, and replacement of the largest equipment component housed within the room.
Machine room surfaces similar to Electrical Room. Refer to Part N.

I. PASSENGER ELEVATOR - CENTER OPENING

SCALE: 1/8" = 1'-0"



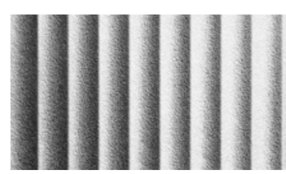
(A) ELEVATION



PLAN

LEGEND

	Manufacturer:	Forms + Surfaces
	Model:	Cabforms Series 1000-A
1	Floor:	Rubber tile (or porcelain tile or stone tile as applicable)
2	Handrail:	Satin stainless steel tubular handrail at rear wall.
3	Walls:	Stainless steel wall panels - Finish: Sandstone; Pattern: Dallas
4	Ceiling:	Six panel suspended island design, satin stainless steel with six recessed LED downlights and perimeter lighting
5	Doors and front returns:	Satin stainless steel (vertical)
6	Base:	Satin stainless steel (vertical) 4" high
7	Corner reveals:	Satin stainless steel (vertical)

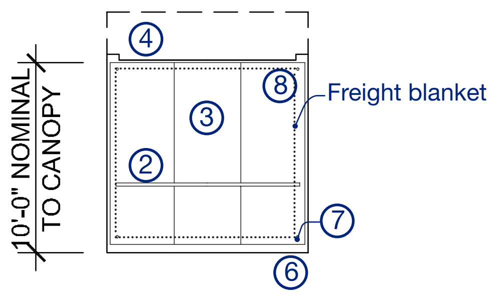


DALLAS PATTERN
SANDSTONE FINISH

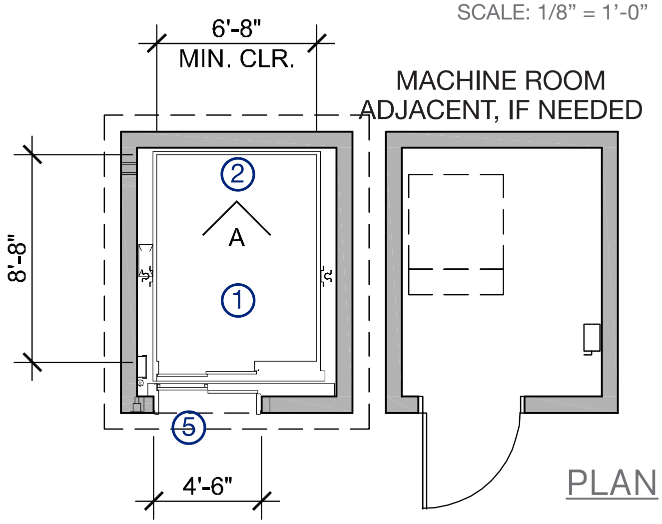
II. SERVICE ELEVATOR - SIDE OPENING

0 ft 4 ft 8 ft

SCALE: 1/8" = 1'-0"



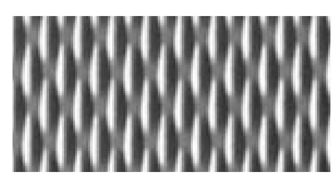
(A) ELEVATION



PLAN

LEGEND

	Manufacturer:	Rigidized Metals or Rimex
1	Floor:	1/4" checker plate stainless steel
2	Handrail/Bumper Rail:	Satin stainless steel tubular handrail at rear and side walls. Return ends.
3	Walls:	5.WL patterned stainless steel wall panels
4	Ceiling:	Omit. Provide fluorescent lighting flush with canopy. Clad or construct canopy of textured stainless steel.
5	Doors, front returns, base and reveals:	Satin stainless steel (vertical)
6	Base:	Satin stainless steel (vertical) 4" high
7	Corner reveals:	None
8	Freight blanket hook:	Satin stainless steel (vertical)



RIMEX 5.WL

PART M
SUPPORT ROOMS

CONTENTS:

Support rooms have unique characteristics due to the nature of the contents they house. Proper materials and acoustic treatment to walls and floors are requires so as to not interrupt any of the building occupants during their daily activities. They should be adequately lit, refer to Part P for more detail.

All equipment rooms shall be designed and located to facilitate the removal, transport, and replacement of the largest equipment component housed within the room, without removing permanent walls, large items of equipment, or equipment essential to the principal on-going, day-to-day building use. Ensure adequate safe access and manufacturer's recommended working clearances for all equipment.

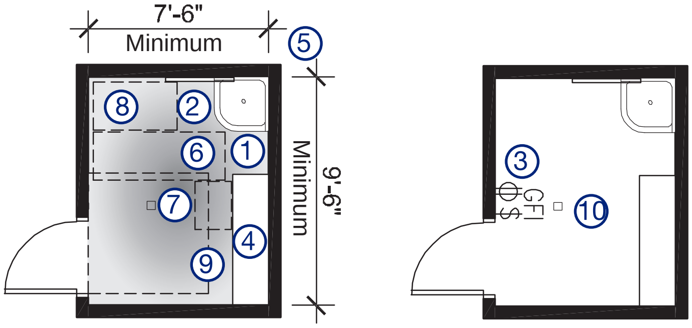
Air equipment, piping, ductwork, etc., shall be located to provide unobstructed access to filters, bearings, valves, control devices, and anything requiring access for maintenance. Piping shall be coordinated such that it does not interfere with equipment and connections to and from equipment.

0 ft 4 ft 8 ft

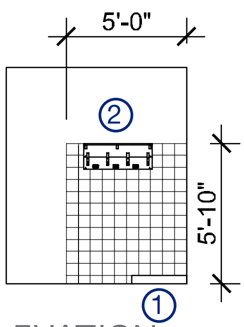
SCALE: 1/8” = 1’-0”

I. CUSTODIAL WET/ EQUIPMENT CLOSET

MINIMUM 71 SF



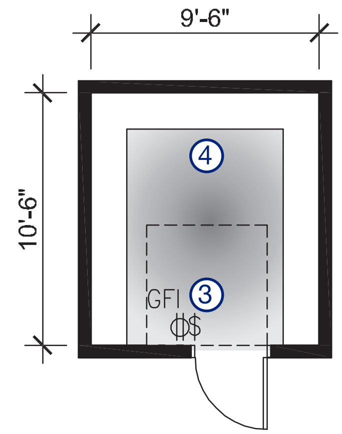
PLAN



(A) ELEVATION

II. CUSTODIAL SUPPLY STORAGE ROOM

MINIMUM 100 SF



LEGEND

1. Floor basin (mop sink) with 4” curb
2. Mop rack/shelf with hooks
3. Ground fault interrupter (GFI) receptacle located approximately 2’-0” above finish floor (AFF) near door
4. Adjustable shelving -18” deep by at least 15 lineal feet; 5’-0” tall shelf units
5. Hot and cold water faucet with vacuum breaker and hook for filling buckets and attached hose
6. Mop cart - 2’-0” x 6’-0”
7. Vacuum - 18” x 18”
8. Floor machine (buffer) - 2’-0” x 4’-0”
9. Step ladder
10. Floor drain with trap primer connection

SYMBOLS

Duplex

Quadruplex

$ Light switch with occupancy sensor

SURFACES

Floor:	Hardened smooth concrete
Wall:	• Washable, hard, smooth finish on concrete block • Glazed tile wainscot at floor basin
Ceiling Ht:	Slab to slab
Ceiling Type:	Exposed concrete or painted drywall
Door:	• 3'-0" wide • Hollow metal frame

BEST PRACTICES

- Backflow preventers, pressure regulators etc. are not allowed in custodial rooms.
- Provide exhaust at a minimum of 10AC/HR.
- Provide adequate ventilation.

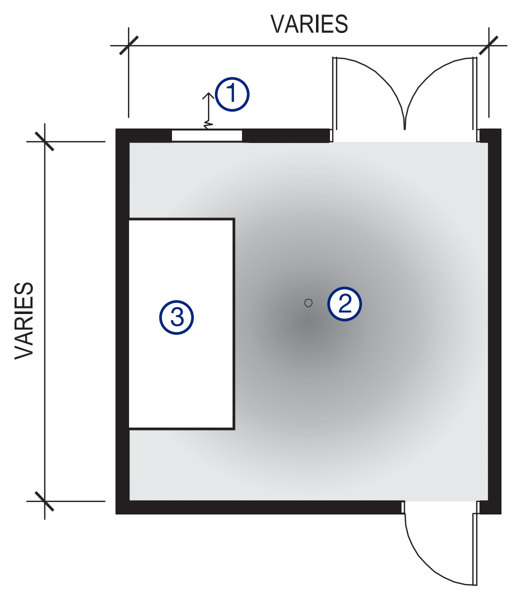
CUSTODIAL WET EQUIPMENT CLOSET

- Strategically located on all floors throughout a building.
- Locate to avoid moving equipment long distances.
- Doors shall swing out and shall be large enough to permit free movement of boxes and equipment (3'-0" min).

CUSTODIAL SUPPLY STORAGE ROOM

- One room per building for bulk storage of custodial supplies.
- Locate on ground floor near elevator or loading dock to avoid moving equipment long distances.
- Doors shall swing out and shall be large enough to permit free movement of boxes and equipment.

III. MECHANICAL ROOMS - SF VARIES



PLAN

LEGEND

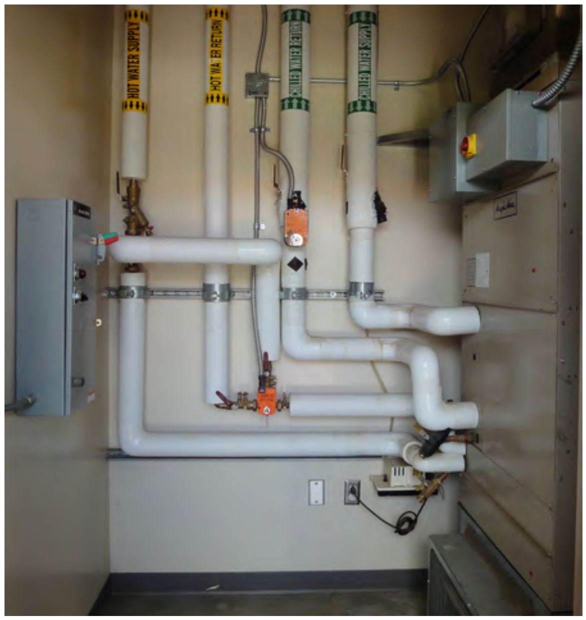
1. Exterior wall louver
2. Floor Drain
3. Provide 4” high concrete curbs (housekeeping pads) for equipment

SYMBOLS

⌖ Quadruplex
GFI Ground Fault Interrupter (GFI)

SURFACES

Floor:	Sealed concrete with floor drain
Wall:	• Exposed concrete • Painted drywall • Hard smooth finish on concrete block wall
Ceiling Ht:	Slab to slab
Ceiling Type:	Underside of structure
Doors:	• 3’-0” wide door to swing out (louvered if required for ventilation and not fire rated) • Hollow metal frames • Double, exterior doors where applicable • Fire rated and sound transmittance class (STC) rated interior doors where applicable
Drains:	Minimum of one floor drain is required. Provide floor sink to support equipment as needed.



BEST PRACTICES

ACCESS

- Provide direct access from the exterior for major mechanical rooms exceeding 100 net square feet.

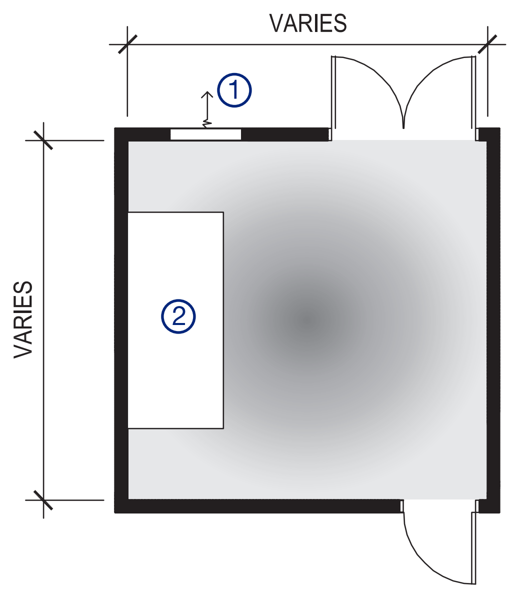
PHASING

- In phased projects, mechanical rooms shall be sized to include equipment for all the phases.

HVAC

- Shall be ventilated by a thermostatically controlled fan unless room is used as plenum for air handling equipment.

IV. ELECTRICAL ROOMS - SF VARIES



PLAN

LEGEND

1. Exterior wall louver (depending on room type)
2. Provide 3" high concrete curbs (housekeeping pads) for equipment.
   Pad size to be determined by equipment size.

SURFACES

Floor:	Sealed concrete
Wall:	• Exposed concrete • Painted drywall • Hard smooth finish on concrete block wall
Ceiling Ht:	Slab to slab
Ceiling Type:	Underside of structure
Doors:	• 3'-0" wide door to swing out (louvered if required for ventilation and not fire rated) • Hollow metal frames • Hollow metal, double, exterior doors where applicable

BEST PRACTICES

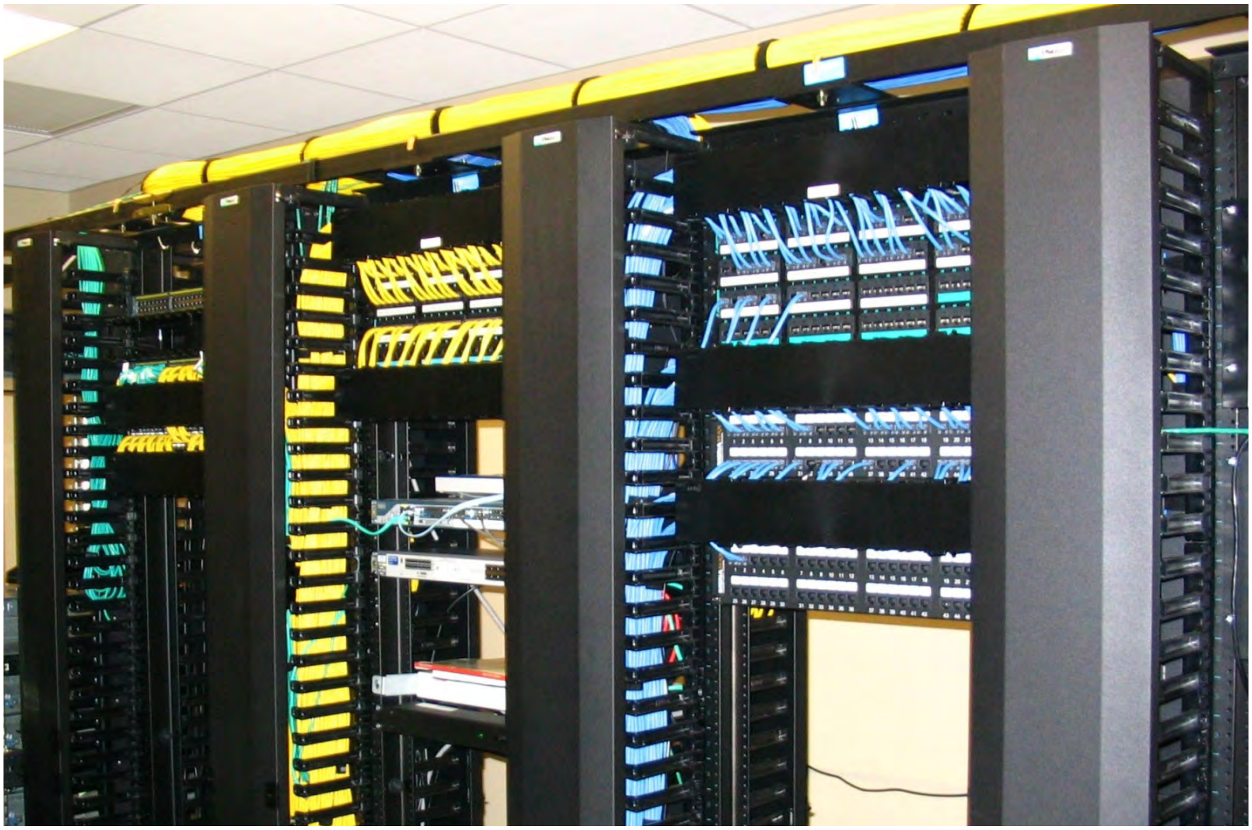
HVAC

- Rooms shall be properly ventilated.
- If room contains transformers, the use of split system air conditioners should be considered.
- Maintain 80 degree F.
- With the exception of fire sprinklers servicing the room, no other piping is allowed in the space (no floor drains).

PART N
TECHNOLOGY ROOMS

CONTENTS:

NEW IMAGE



All technology rooms shall be designed and located to facilitate the removal, transport, and replacement of the largest equipment component housed within the room, without removing permanent walls, large items of equipment, or equipment essential to the principal on-going, day-to-day building use. Ensure adequate safe access and manufacturer's recommended working clearances for all equipment.

BEST PRACTICES

POWER

- Connect to emergency power.

CEILING HEIGHT

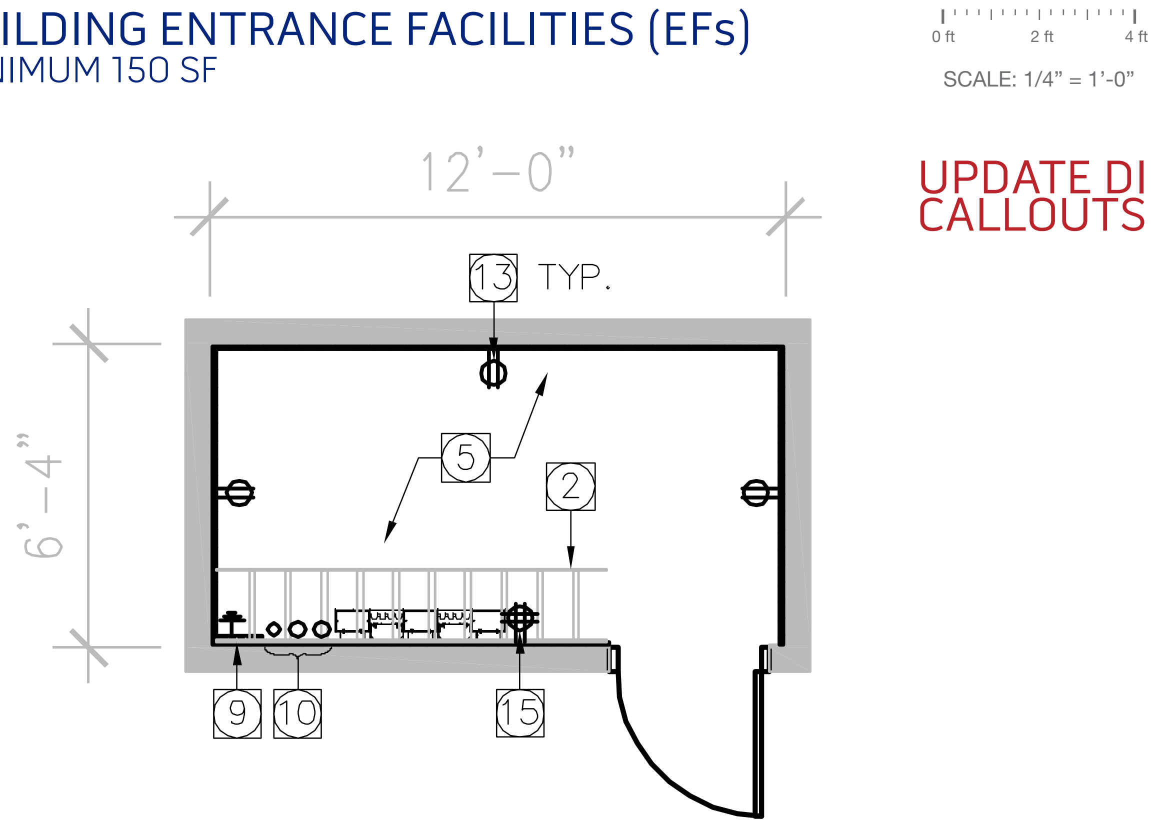
- 8 foot minimum clear of obstructions.
- No windows required, full height walls.

HVAC

- Provide stand-alone HVAC unit with independent controls.

I. BUILDING ENTRANCE FACILITIES (EFs)

MINIMUM 150 SF



UPDATE DIMS/
CALLOUTS ETC

PLAN

LEGEND

1. Telecom main grounding busbar at 18" AFF
2. 120V/30A and 208/30A outlet on dedicated circuit mounted on side of ladder rack (NEMA L5-30R)
3. 120V/20A quadplex outlet on dedicated circuit mounted on side of ladder rack (typ.)
4. Wall mounted equipment
5. Wall mounted telephone
6. 19" equipment rack w/ 6" vertical cable management (typ.)
7. Convenience duplex outlet
8. 12" ladder rack @ 7'-6" above finish floor (AFF)
9. 8'x4'x 3/4" sheets of A-C grade fire retardant treated plywood by General Contractor at all walls, plywood 2'-0"AFF to 10'-0"AFF
10. Security card access

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data
- $ Light switch
- Wall Phone
- Twist Lock

SURFACES

Floor:	Sealed concrete
Wall:	• Exposed concrete • Painted drywall • Hard, smooth finish on concrete block wall
Ceiling Ht:	Slab to slab (8'-6" minimum)
Ceiling Type:	Underside of structure
Doors:	• 3'-6"wide, solid, lockable, no louvers • Hollow metal frames • Hollow metal door for exterior doors

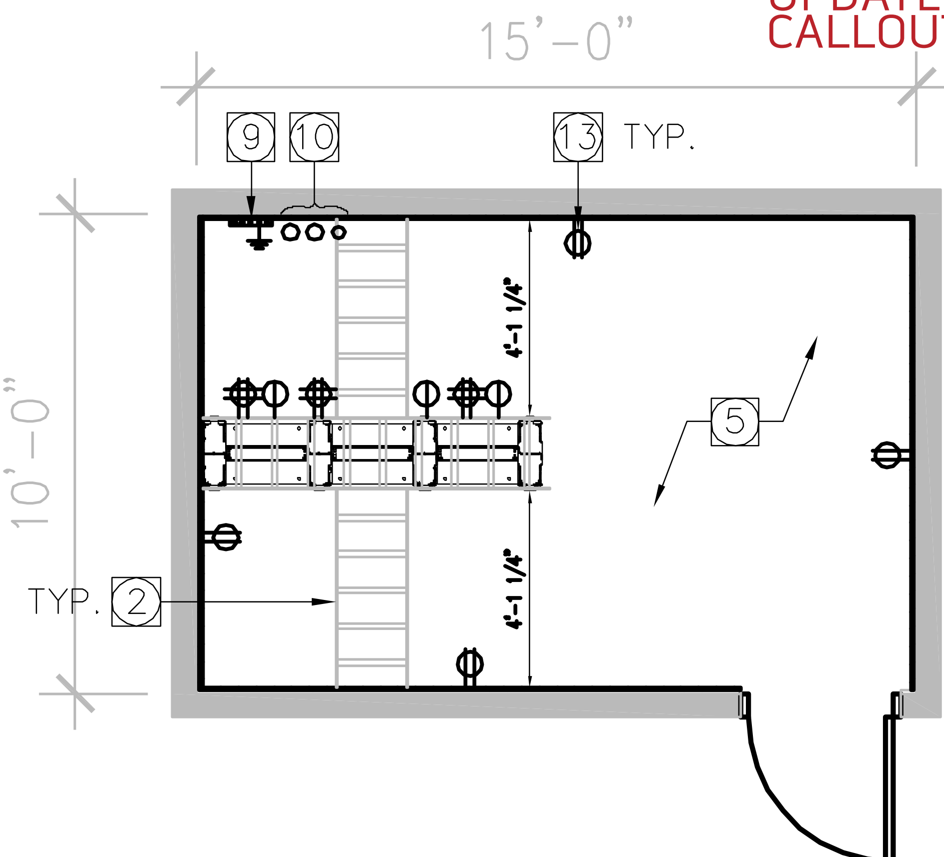
II. BUILDING EQUIPMENT ROOMS (ERs)

MINIMUM 100 SF

0 ft 2 ft 4 ft

SCALE: 1/4" = 1'-0"

UPDATE DIMS/
CALLOUTS ETC



PLAN

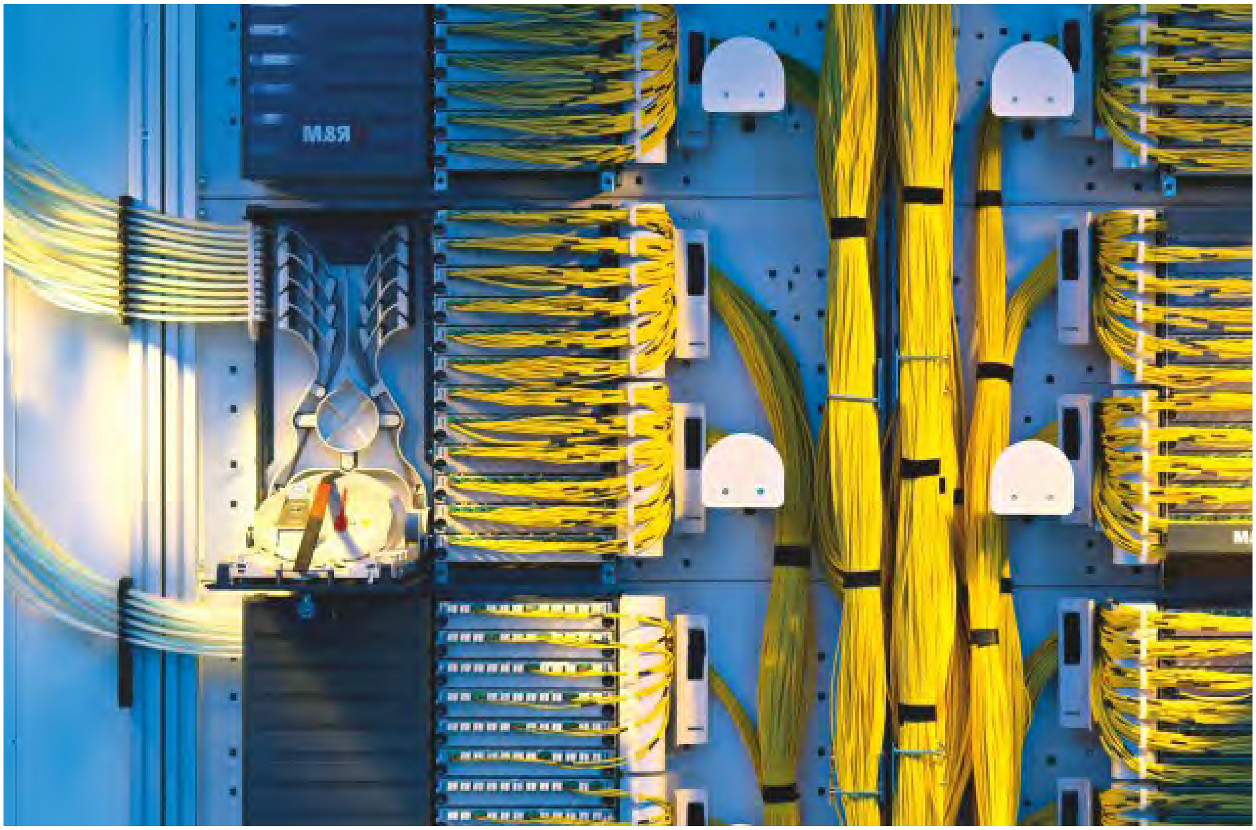
LEGEND

1. Telecom grounding busbar
2. 120V/30A and 208/30A outlet on dedicated circuit mounted on side of ladder rack (NEMA L5-30R)
3. Wall mounted equipment
4. Quadplex outlet on dedicated circuit
5. 19" equipment rack w/ 6" vertical cable management
6. Convenience duplex outlet
7. 18" ladder rack @ 7'-6" above finish floor (AFF)
8. Wall mounted telephone
9. 8'x4'x 3/4" sheets of A-C grade fire retardant treated plywood by

   General Contractor at all walls, plywood 2'-0"AFF to
10. 10'-0" AFF
   Security card access

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data
- $ Light switch
- Wall Phone
- Twist Lock



<u>SURFACES</u>

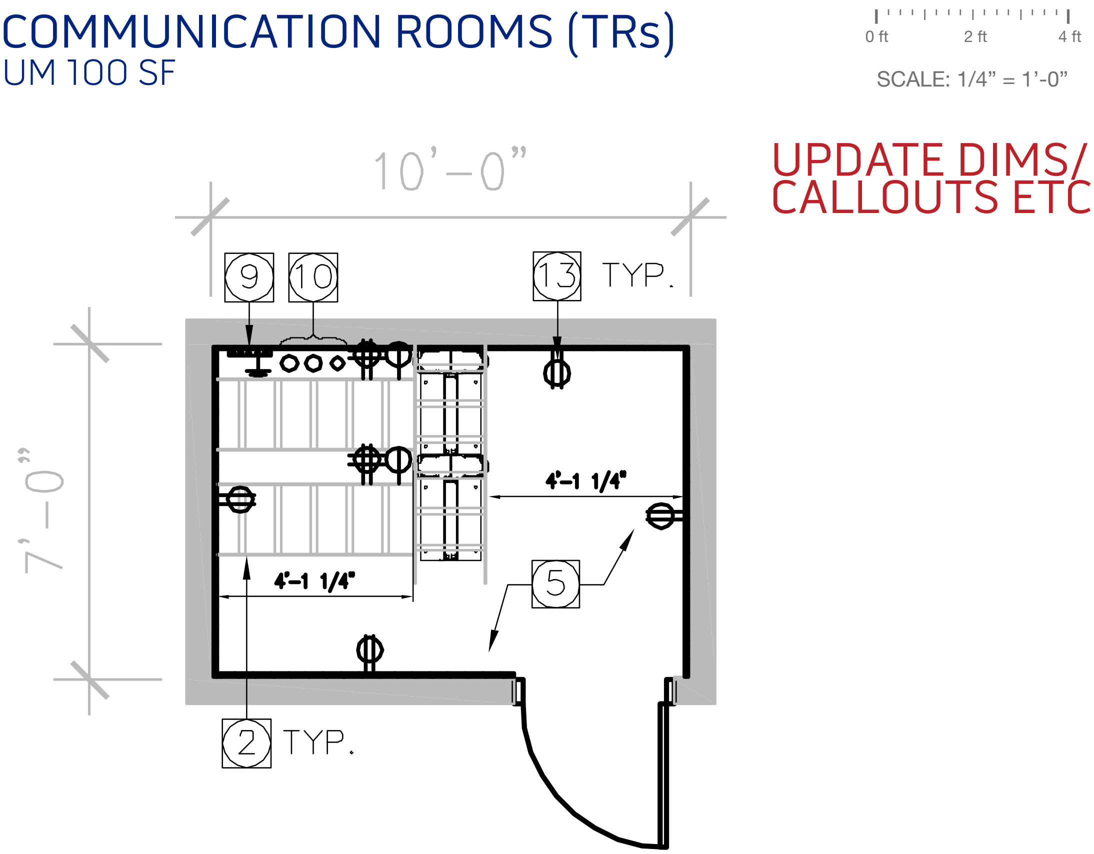
Floor:	Sealed concrete
Wall:	• Exposed concrete • Painted drywall • Hard, smooth finish on concrete block wall
Ceiling Ht:	Slab to slab (8'-6" minimum)
Ceiling Type:	Underside of structure
Doors:	• 3'-0" wide, solid, lockable, no louvers • Hollow metal frames • Hollow metal door for exterior doors

III. TELECOMMUNICATION ROOMS (TRs)

MINIMUM 100 SF

SCALE: 1/4" = 1'-0"

UPDATE DIMS/ CALLOUTS ETC



PLAN

LEGEND

1. Telecom grounding busbar
2. 120V/30A and 208/30A outlet on dedicated circuit mounted on side of ladder rack (NEMA L5-30R)
3. Wall mounted equipment
4. Quadplex outlet on dedicated circuit
5. 19" equipment rack w/ 6" vertical cable management
6. Convenience duplex outlet
7. 18" ladder rack @ 7'-6" above finish floor (AFF)
8. Wall mounted telephone
9. 8'x4'x 3/4" sheets of A-C grade fire retardant treated plywood by

   General Contractor at all walls, plywood 2'-0"AFF to 10'-0" AFF
10. Security card access

SYMBOLS

- Duplex
- Quadruplex
- Tel/Data
- $ Light switch
- Wall Phone
- Twist Lock

SURFACES

Floor:	Sealed concrete
Wall:	• Exposed concrete • Painted drywall • Hard, smooth finish on concrete block wall
Ceiling Ht:	Slab to slab (8'-6" minimum)
Ceiling Type:	Underside of structure
Doors:	• 3'-0" wide, solid, lockable, no louvers • Hollow metal frames • Hollow metal door for exterior doors

PART P
REFERENCE DOCUMENTS

REFERENCES

1. San Diego Community College District
   2011 District Design Guidelines & Standards Manual. October 2011

2. University of British Columbia
   Learning Space Design Guidelines. March 2012

3. Just Because You Build It Doesn't Mean They Will Come: Planning for Effective Workplace Interaction and Collaboration
   Allsteel Inc.

4. Lutron Energy-Saving Strategies Guides : Daylight Harvesting Basics
   Lutron

5. Designing for All Ages and Abilities
   Center for Universal Design at NC State

6. Principles of Universal Design
   Center for Universal Design at NC State

7. Just Because You Build It Doesn't Mean They Will Come: Planning for Effective Workplace Interaction and Collaboration
   Jan Johnson, Allsteel & Steve Hargis, HOK

8. Design Guidance: Learning Environments.
   University of Cincinnati, Division of the University Architect. January 2003

9. Gather: Where Ideas Meet
   Allsteel Inc.

10. Gather Design Guide: Supporting and inspiring interaction and collaboration.
    Allsteel Inc.

11. Involve
    Allsteel Inc.

12. Active Learning Spaces: Insights, Applications, and Solutions.
    Steecase Education Solutions

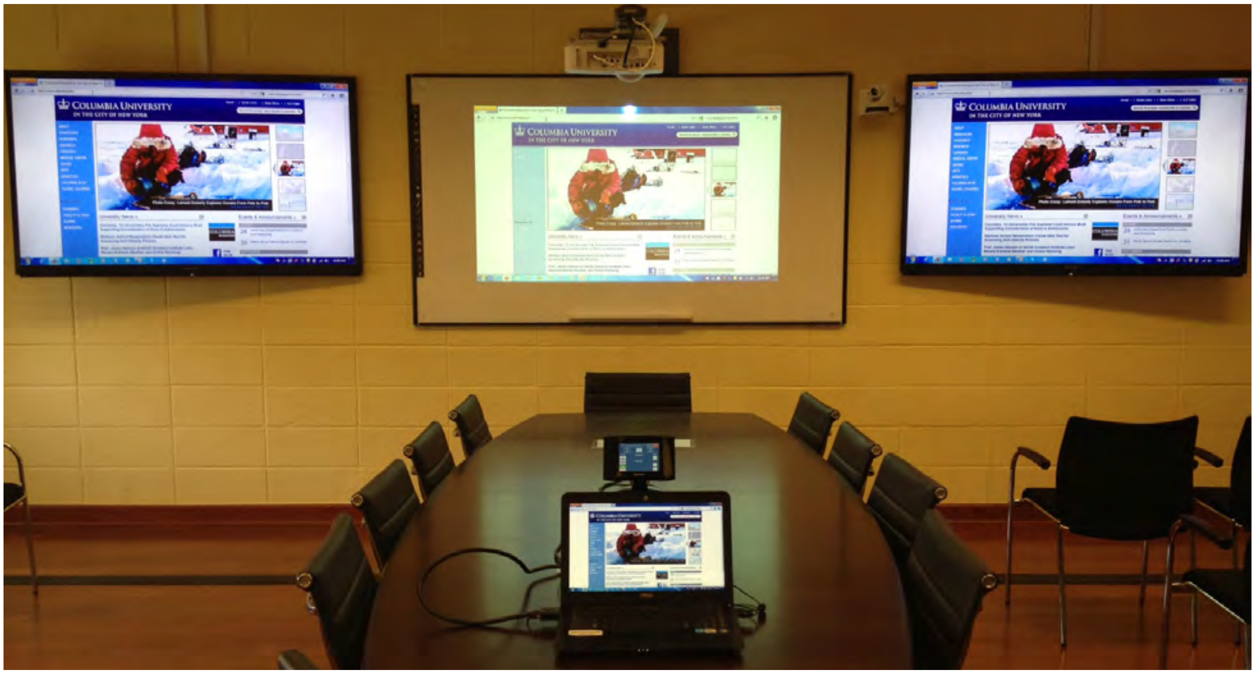
13. Learning Environments Design Guidelines: Version 1.0
    University of New Mexico

LIST OF TERMS

AV	Audio Visual
ADA	American with Disabilities Act
ALS	Assistive Listening System
ASF	Assignable Square Footage
DSA	Division of the State Architect
FF&E	Furniture, Fixtures, & Equipment
FTE	Full Time Equivalent
OFCI	Owner Furnished, Contrator Installed

END OF SECTION 9

10 AUDIO-VIDEO COMMUNICATIONS



INTRODUCTION

The following audio visual standards were provided by the Instructional Media Center (IMC) teams at all three campuses and collectively form a Distinct guideline and standards with a few campus specific variations.

Refer to *Section 9: Space Standards* for diagrams illustrating these guidelines.

PART A
EQUIPMENT STANDARDS

26 05 33.16 BOXES FOR ELECTRICAL SYSTEMS

FLOOR BOX:

Manufacturer:	FSR Metal Products Group
Model:	FL - 500 P
Color/finish:	To be coordinated with project architect
Size:	10” x 12” x depht

- For use in carpet, tile, or wood covered floors over poured concrete applications.

IN WALL BOX (WITH POWER OUTLET CONDITIONER):

Manufacturer:	Chief Manifacturing Inc.
Model:	PAC - 521P
Color/finish:	Black
Size:	11.5” x 7.4” x 3.8”

- For use with Flat Panel Displays (FPDs).

27 41 16 INTEGRATED AUDIO-VIDEO SYSTEM AND EQUIPMENT

INSTRUCTOR STATION:

MORENO VALLEY + RIVERSIDE CITY	
Manufacturer	Spectrum Industries
Model:	Instructor Media Console Series *to be coordinated with Instructional Media
Mounting:	Fixed (mobile is not acceptable)
Finish:	to be coordinated with project architect
Color:	to be coordinated with project architect

NORCO	
Manufacturer	Spectrum Industries
Model:	Freedom Lectern Series and Freedom Lectern XRS Series *to be coordinated with Instructional Media
Mounting:	Fixed (mobile is not acceptable)
Finish:	to be coordinated with project architect
Color:	to be coordinated with project architect

VIDEO/DATA PROJECYOR:

Manifacturer:	To be coordinated with Instructional Media Center (IMC)
Model:	To be coordinated with Instructional Media Center (IMC)

- 4000 lumens (requires 16-21 foot throw distance).

CEILING LOUD SPEAKERS:

Manufacturer:	To be coordinated with Instructional Media Center (IMC)
Model:	To be coordinated with Instructional Media Center (IMC)

PROJECTION SCREENS :

DESCRIPTION			
	Manufacturer:	Da-Lite	
	Model:	Advantage Manual with CSR	
	Size:	/ 60”x96” 16:10 aspect ratio / 69”x110” 16:10 aspect ratio	
	Mounting:	Ceiling recessed	
	Viewing Surface:	Matte White (min 3” top masking)	
	Operation:	Manual	
	Manufacturer:	Da-Lite	
	Model:	Advantage Manual with CSR	
	Size:	60” x 96” 16:10 aspect ratio	
	Mounting:	Ceiling recessed	
	Viewing Surface:	Matte White (min 3” top masking)	
	Operation:	Motorized	

27 41 43 AUDIO-VIDEO TELECONFERENCING

TEXT:

DESCRIPTION			
	Manufacturer:		
	Model:		
	Color:		
	Mounting:		
	Note:		

VTC CAMERA:

- To be coordinated with Instructional Media Center (IMC)

MICROPHONES:

DESCRIPTION			
	Manufacturer:	Beyerdynamic/Taiden	
	Model:	Revoluto/HCS-8328 ACE paparless multimedia congress terminal or HCS-8315C Chairman Unit	
	Color:	To be coordinated with project architect	
	Mounting:	Tabletop	
	Note:	No visible microphone	

27 41 16 FLAT PANEL DISPLAY

The District is well aware that as Brian E. Huff has written, “displays will only become bigger, brighter, cheaper, flatter, and higher resolution. They may even take over the entire front wall and perhaps even other surfaces in the room.”

Therefore choice of display must be coordinated with the Instructor and Media Center (IMC) on a project-by-project basis.

A. Screen Size:
- Minimum Height: 20% of distance to seat farthest away from screen.
- Minimum Width: Determined by aspect ratio of projected images, as follows.
- HDTV Technology: 16:9 Aspect Ratio (Screen width to screen height).
  - o Example: 36 feet to screen, image 7.2 feet high, 12.8 feet wide. Specify screen with nominal dimensions 7.5 feet high, 13 feet wide. This example illustrates that HDTV “wide screen” images may reduce the number of screens that can comfortably fit in the instructor area and still allow enough space for whiteboards.

MEDIA CREDENZA/CONSLE:

	DESCRIPTION		
	Manufacturer:	Middle Atlantic	
	Model:	C5 Series AV Credenza Racks or Deeper C5 Series	
	Color/Finish:	To be coordinated with project architect	
	Size:	1 bay, 2 bay, 3 bay as required	
	Options:	To be coordinated with project architect and IMC	
	Notes:	For use in Meeting (Conference) Rooms	

MOBILE AV CONTROL:

This is a rapidly emerging trend that Riverside Community College District is interested in exploring in the future.

- The main concerns for RCCD are:
  - Security (password protection + administrator rights)
  - Customization
  - Choice of platform
  - Compatibility

27 51 16 PUBLIC ADDRESS SYSTEMS

27 51 26 ASSISTIVE LISTENING SYSTEMS

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PART B
CLASSROOM/ LECTURE HALLS

I. CLASSROOMS

FURNITURE CABINETRY

- Moreno Valley College + Riverside City College:
  - A. Provide secure media closet for media equipment.
  - B. Media closet should be 42” deep x 48” wide in size.
  - C. Secure media closet should be lockable and have a vent on the front toward the bottom.
  - D. Secure media closet should be open to the ceiling space above and not sealed.
  - E. Media closet should contain a 42RU server rack with fans.
  - F. Provide secure instructor station for source media.

- Norco College:
  - A. Allow 10 square feet for placement of instructor station. Media will be placed inside station.
  - B. Instructor station must be at least 48 inches from the front wall and 48 inches from the side wall.
  - C. If space for station is not allotted, a media closet must be added to the design of the room.
    - *Norco College prefers instructor station be placed in classroom to maximize space and access for instructors.*

I. CLASSROOMS (CONT'D)

ELECTRICAL

- Moreno Valley College + Riverside City College:
  - A. Provide duplex on all three walls of classrooms.
  - B. Provide quadruplex at front wall of classrooms.
  - C. Provide flush floor mounted quadruplex at instruction station (location dependent on room layout).
  - D. Provide ceiling duplex for projector unit.
  - E. Provide electrical for projector screen.
  - F. Provide low voltage controller for screen with RS232.
  - G. Provide low voltage wall switch near instructor location for screen control.
  - H. Provide quad outlet in media closet.
  - I. In classrooms with Video Teleconfering (VTC):
    - Provide duplex outlet at 92" AFF at front of room for VTC camera
    - Provide duplex outlet at 92" AFF at rear of room for VTC camera

- Norco College:
  - A. Install a quadruplex in the floorbox at instructor station.
  - B. Install a duplex at ceiling projector location.
  - C. If a media closet is used, install a quadruplex inside media closet.
  - D. If an electric projector screen is being utilized, install a junction box for the low voltage control (LVC) with RS232 capabilities.

LIGHTING

- Moreno Valley College + Riverside City College:
    A. Provide light switch near each entrance.
    B. Lighting at the front of the room near projection screen needs to have an AV preset that shuts the lighting off.
    C. Provide lighting presets that allow the room lighting to be dimmed to 50%.
    D. Label all face plates.
    E. Provide RS232 control of lighting for audio-visual system.
    F. Refer to Section 7: Lighting - Part E Interior Lighting

- Norco College:
    A. RS232 lighting control panels with dimming switches should be located near the entrance of the room and near the instructor station.
    B. Dimmable fluorescent lights should be equipped with a quiet 1% dimming ballast.
    C. Set up lighting separately so that lights can be dimmed in the main classroom area, can be turned off near the white board for projection purposes, and turned on above instructor station.
    D. Refer to Section 9: Space Standards - Part B: Intuitive Eniroments.

I. CLASSROOMS (CONT'D)

AUDIO VIDEO

- Moreno Valley College + Riverside City College
  - A. Provide floor box under instructor station (location dependent on room layout).
  - B. Pokethroughs for the instructor station are not permissible.
  - C. Provide three (3) 1.5" to 2" EMT or RMT conduit from secure media location to floor box.
  - D. Provide three (3) 1.5" to 2" EMT or RMT conduit to space above ceiling tile from secure media location.
  - E. If secure source location is a instructor station provide 1.5" RMT conduit from instructor station to secure media closet.
  - F. Provide unistrut support system for ceiling mountedprojector attached to building support structure.
  - G. All conduit runs are to terminate in a quad box.
  - H. Provide hangers in ceiling for AV cable runs.
  - I. In classrooms with video teleconferencing (VTC):
    - Provide one (1) 1" to 1.5" conduit at 92" AFF at front of room to secure instructor station location.
    - Provide one (1) 1" to 1.5" conduit at 92" AFF at rear of room to secure media cabinet location.
  - J. Speakers – Ceiling or Powered:
    - Provide stub outs above the ceiling line in the media closet to run speaker wire to ceiling speakers.
    - Provide duplex outlet at the media equipment location where the amplifier will feed power to the speakers.
    - Should powered speakers be used, appropriate power outlets for these speakers must be provided at their mounting the location.
    - Pathway to feed to the powered speaker must be provided from the source location to the powered speaker location.
- Norco College
  - K. Install three 2" RMT or EMT conduit pipes from floor box to display location (projector or display).
  - L. Install J-hooks above ceiling grid for CAT-6 AV cable.

HVAC

- Moreno Valley College + Riverside City College:
    A. Avoid ductwork or supply/return vents in location of ceiling projector and ceiling mounted microphones.
    B. Provide a quiet HVAC system.

- Norco College
    A. HVAC system should not be located near projection screen, whiteboard, or ceiling mounted projector.
    B. NC ratings shall be NC 25 or less.
    C. Refer to Section 20

DATA

- Moreno Valley College + Riverside City College:
    D. Provide data to each ceiling projector.
    E. Provide (6) flush floor-mounted data at instruction station (location dependent on room layout).
    F. Provide wireless network in each classroom.
    G. Provide one (1) data port at each wall of classroom.
    H. Provide four (4) data ports in front of classroom.
    I. Provide six (6) data ports in media closet.

- Norco College
    A. Each room will be equipped with six network drops grouped together at the instructor station located in the floor box.
    B. Install one network drop for ceiling mounted projector.
    C. If a instructor station is installed, place six network drops in mounted wall box.

PART C

MEETING (CONFERENCE) ROOMS

FUNITURE CABINETRY:

- District:
    - A. Provide secure media credenza for media equipment and source media.
    - B. Credenza should contain 42RU rack with fans.

ELECTRICAL:

- District:
    - A. Provide duplex on all three walls of room.
    - B. Provide quadruplex in floorbox under at Conference table
    - C. Provide ceiling duplex for projector unit.
    - D. Provide ceiling duplex for projector screen and projector screen control modules (or provide duplex at display location).
    - E. Provide electrical for projector screen.
    - F. Provide low voltage controller (LVC) for screen with RS232.
    - G. Provide low voltage wall switch near instructor/presenter location for screen control.
    - H. Provide quadruplex outlet in media credenza.
    - I. Provide duplex outlet at 92” AFF at front of room for VIdeo teleconferencing (VTC) camera.
    - J. Provide duplex outlet at 92” AFF at rear of room for VTC camera.

LIGHTING

- Moreno Valley College + Riverside City College:
  - A. Provide light switch near entrance(s).
  - B. Lighting at the front of the room near projection screen needs on flat Panel Display to have an AV preset that shuts the lighting off.
  - C. Provide lighting presets that allow the room lighting to be dimmed to 50%.
  - D. Label all face plates.
  - E. Provide RS232 control of lighting for audio-visual system.

- Norco College
  - A. RS232 lighting control panels with dimming switches should be located near the entrance of the room and near the display.
  - B. Dimmable fluorescent lights should be equipped with a quiet 1% dimming ballast.
  - C. Set up lighting separately so that lights can be dimmed in the conference area and can be turned off near the display for projection purposes.

AUDIO VIDEO

- District:
    - A. Provide floor box under conference table (location dependent on room layout).
    - B. Pokethroughs for the iconference table are not permissible.
    - C. Provide three (3) 1.5" to 2" EMT or RMT conduit from secure media location to floor box.
    - D. Provide three (3) 1.5" to 2" EMT or RMT conduit to space above ceiling tile from secure media location.
    - E. If secure source location is a media credenza provide 1.5" RMT conduit from media credenza to secure media closet.
    - F. Provide unistrut support system for ceiling mounted projector attached to building support structure.
    - G. All conduit runs are to terminate in a quadruplex box.
    - H. Provide hangers in ceiling for AV cable runs.
    - I. Provide one (1) 1" to 1.5" conduit at 92" AFF at front of room to secure instructor station location.
    - J. Provide one (1) 1" to 1.5" conduit at 92" AFF at rear of room to secure instructor station location.
    - K. Depending on the size of the room, a wall mounted flat panel display (FPD) may be the preferred media. In this case, the appropriate wall where the FPD will be mounted must be built with inner wall backing to handle the load of the FPD.
    - L. Appropriate electrical, network, and data connections/boxes for the FPD must be provided at the wall mount location.
    - M. Each room will be equipped with four network drops grouped together in floor box under the conference table.
    - N. Install six network drops grouped together in the media credenza.
    - O. Room layout/size will determine primary display size and/or if a video wall system is required.
    - P. Install J-hooks above ceiling grid for speaker cable.

HVAC

- District:
    A. Avoid ductwork or supply/return vents in location of ceiling projector and ceiling mounted microphones.
    B. Provide a quite HVAC system.
    C. HVAC system should not be located near projection screen, whiteboard, or ceiling mounted projector.
    D. NC ratings shall be NC 25 or less.
    E. Refer to Section 20.

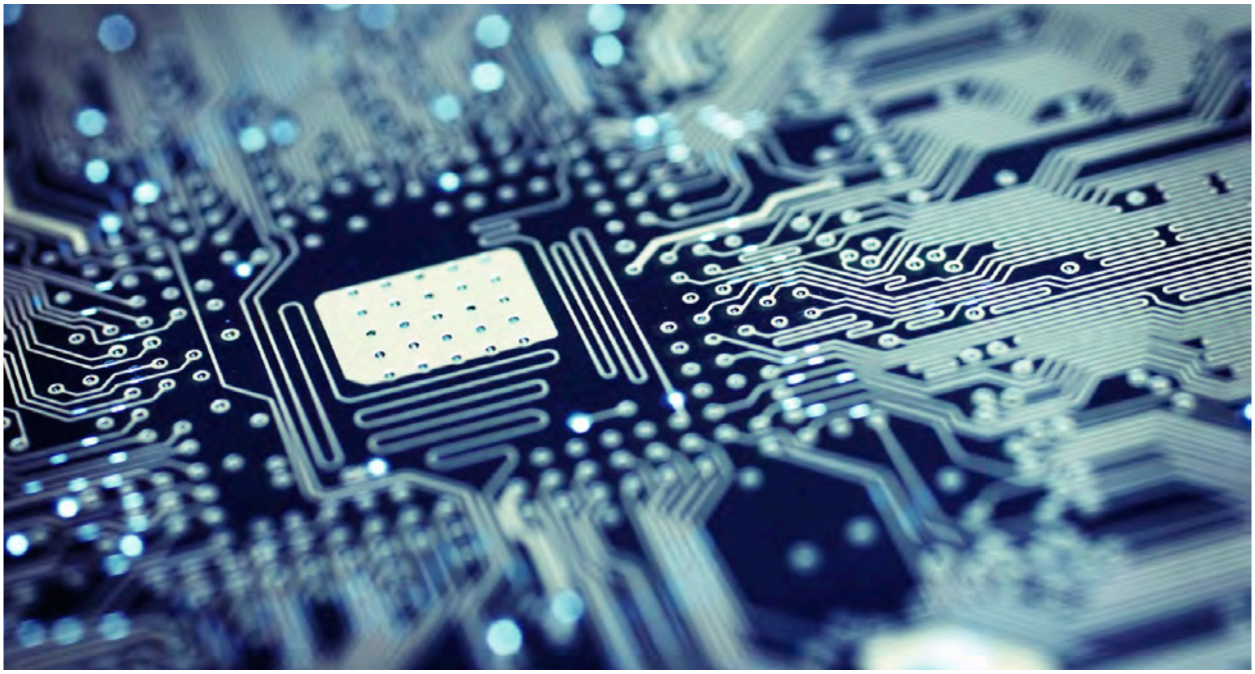
DATA

- Moreno Valley College + Riverside City College:
    F. Provide one (1) data drop to each ceiling mounted projector.
    G. Provide four (4) Flush floor-mounted data at conference table (location dependent on room layout).
    H. Provide wireless network in each room.
    I. Provide one (1) data port at each wall of meeting room.
    J. Provide four (4) data ports in front of meeting room.
    K. Provide six (6) data ports in media credenza.

WALL

- Moreno Valley College + Riverside City College:
    L. Provide double drywall for sound proofing room (especially rooms that will provide Video Conferences).
    M. Refer to Section 20.

11 INFORMATION TECHNOLOGY



INTRODUCTION

Riverside Community College School District has developed an extensive network infrastructure linking all classrooms and work areas throughout the District. This infrastructure is critical to the day to day operations of the District, our staff, faculty, and support staff and in meeting the District's role and obligation to provide educational opportunities to all students.

The network infrastructure consists of high dollar value electronics, copper, coax, and fiber optic cabling, and audio visual systems deployed throughout each building and campus. Applications served by this infrastructure include telephone/VoIP (voice), LAN (data), security, content (audio/visual), intercom, energy management, and broadband video services. As the physical layout and organizational needs at each campus change, it is important that a proper impact assessment is completed as part of the planning and design processes. From this assessment any required funding can be identified, funds attained, and subsequent planning for the network infrastructure can be performed as part of the project/architectural design stages.

INTRODUCTION (CONT'D)

Information Services must be represented early in the programming phase to ensure that the integrity of the District technology assets and capabilities are maintained. Any determination of "no impact" should be recognized in writing by the Associate Vice-Chancellor of Information Services to protect site or department administrators from unexpected costs. Caution should be exercised in making a "no impact" determination without the involvement of the Information Services as even the most minor project can cause thousands of dollars in un-programmed financial requirements, and has the potential to adversely affect the site's ability to properly perform its mission.

1.1 PURPOSE

This Assessment and Planning Guide has four main purposes:

1. Establish required standards for planning and technical design resources
2. Specify the types of technology which must be reviewed for impact
3. Identify the minimum infrastructure support required by each technology, and;
4. Provide assessment and mitigation procedures.

1.2 SCOPE

The standards and guidelines defined, listed, or referenced in this document are based upon those developed by the American National Standards Institute (ANSI), Telecommunications Industry Association (TIA), Electronics Industry Association (EIA), Institute of Electrical and Electronics Engineers (IEEE), and the Building Industry Consulting Services International (BICSI).

1.3 APPLICABILITY

This document has been prepared to assist the project development team/architect in the budgeting, planning and design of network facilities for all new and renovation construction projects. It specifies the minimum requirements that must be adhered to by the planning team in order to ensure the interests of the District are protected. This document should be consulted for all new construction and retrofits of existing buildings, including work in outdoor areas that may impact pathways or support structures on District sites. Deviations from the requirements outlined in this document for any specific construction or retrofit project must be reviewed and approved in writing by the Associate Vice-Chancellor of Information Services. All designs submitted by the architect must be approved and certified by a BICSI Registered Communication Distribution Designer (RCDD) prior to presentation to the District for review and again before final approval. All references to “Architect” are intended to include any and all consultants and/or sub-consultants involved in the project development team, whether under the architect’s direction or individually.

PART A

DRAWINGS, SPECIFICATIONS, + CONSTRUCTION ESTIMATES

INTRODUCTION

All projects affecting network systems or components will require the appropriate documentation, design and planning. The need may range from simple mitigation language in a specification to a complete set of construction documents that include Information Technology (IT) based (Division 27) specification and drawings.

1.4.1 DRAWINGS

Drawings constitute the first of the three elements to a design. The role of the drawings is to show the location of the work required in relation to other required elements with sufficient detail that a contractor performing the work can accurately quantify the scope of the project.

Drawings should be prepared to scale whenever possible. Drawings are generally grouped together by discipline with the T-series drawings specifying telecommunications. The following is a list of T-series drawings to properly organize the telecommunications requirements in a project:

- T0 – Campus or site plans—exterior pathways and inter-building backbones
- T1 – Layout of complete building per floor—serving-zone boundaries, backbone systems, and horizontal pathways
- T2 – Serving zones drawings—drop locations and cable identifiers (IDs)
- T3 – Communications equipment rooms—plan views, telecommunications, architectural, mechanical, electrical, and plumbing (AMEP)/elevations—racks and walls
- T4 – Typical detail drawings—faceplate labeling, fire-stopping, Americans with Disabilities Act (ADA), safety, Department of Transportation (DOT), etc.
- T5 – Schedules (cabling and equipment spreadsheets)

**Please refer to the Construction Specifications Institute MasterFormat™ Division 27nnnn, for required IT layer controls and identities

1.4.2 SPECIFICATIONS

Four main types of specifications can be used to define the requirements of a given project. Most projects will utilize a combination of the four types:

- Performance—focus is on results. Contractors can choose the materials and installation methods to provide the desired results.
- Proprietary—specifications call out brand names and models.
- Descriptive—focus is on exact properties and installation methods.
- Reference—requirements are based on an established standard.

The specifications for IT will be provided in a written document that accompanies the drawing set. In very small projects, the specifications may be incorporated as a part of the actual drawing set. The specifications will follow the most current Construction Specification Institute (CSI) MasterFormat™. The MasterFormat™ Division for Technology is Division 27nnnn. Within this Division, there are several sections designed to specifically address the technology requirements. IT specification sections necessary in a new or renovated building construction package may include the sections listed below.

Section	Description
270000	General Requirements
271000	Cable Plant
272000	Local Area Network
273000	Voice
274000	Audio/Video
275000	Wide Area Network
276000	Architectural, Electrical, and Mechanical Requirements
277000	Intra-building Communications Systems
278000	Building Automation and Control
279000	Security, Access, and Surveillance

1.4.3. ENGINEERS COST ESTIMATES

Accurate cost estimating for all technology projects is vital. Too often a small project grows into the unsuccessful technology project. Materials and labor cost estimates should include all costs associated with furnishing and installing the specified material. Cost estimates should recognize:

- Labor and subcontract costs.
- Material and material waste.
- Shipping, storage, and staging.
- Equipment and tools required for installations.
- General conditions
  - Insurance costs.
  - Legal costs associated with agreements.
  - Advertising for bidding.
  - Bonding costs.
  - Contingency costs.
- Design and project management costs
  - Architectural fees.
  - Engineer and consultant fees.
  - Construction management fees.
  - Owner's internal costs.
  - Cutover and first-use charges.
- Market or regional conditions that can dramatically affect actual construction costs:
  - Seasonal effects on the available labor pool or construction costs.
  - Strong or weak general economy.
  - Surrounding market conditions.
  - Other large project(s) in a region.
  - Construction time frame.
- Existing conditions that must be considered in the cost of the project include:
  - Soil conditions.
  - Asbestos.
  - Displacement and relocation.
  - Hazardous materials
  - Environmental impact studies

1.5. THE ARCHITECT AND/OR PROJECT DESIGN TEAM

Once the initial design drawings, specifications, and estimated costs have been developed, the project design team or architect can evaluate any needed changes to the scope of work or the impact area of the project in the context of budget requirements. This impact review should include Information Services staff to determine funding requirements.

During the design phase, the Architect serves as the lead design professional and organizes design team activities and schedules. The design team may include subject matter experts hired as sub consultants by the Architect, as well as specialists engaged directly by the owner.

The Architect must ensure synergy in the resulting construction documents from all design disciplines to ensure the pathways, cabling systems, and A/M/E/P efforts all inter-relate properly to accomplish the District's objectives. All design efforts must conform to the listed references and requirements found in this guide.

The Architect will provide Information Services with the usable electronic version of their construction documents in AutoCAD (ACAD) 2004 or later version (non bound or exploded) at the conclusion of the design process, and again at the conclusion of the project construction in the form of "As Built" drawings. The Architect shall also render the drawing files into Adobe Acrobat PDF files, retaining the original sheet size, and removing any file security parameters. The Architect will require all project contractors to provide Information Services with the As Built drawings within 30 days of project completion in electronic ACAD format. This and other required documentation should also be rendered into Adobe Acrobat PDF files, retaining the original sheet size, and removing any file security parameters.

The Architect's scope as it relates to Information Technology design support may include the following;

1. Inter- and intra-building pathway development
2. Telecommunication spaces in each building and throughout the campus
3. Build-out and provisioning for IT systems in each IT space
4. Electrical provisioning to properly support all existing, planned and future IT electronics and systems
5. Independent HVAC systems for all IT Spaces operating 7 x 24 x 365
6. IT Grounding and Bonding sub-systems
7. Inter- and Intra-building cabling systems to support voice, data, video, audio visual, intercom, energy management, and security systems.
8. Special build out requirements such as Computer labs, Audio Visual rendering labs, radio stations, etc.

1.6 REVIEW + APPROVAL PROCESS

Refer to Section 1.

PART B

HIERARCHICAL DESCRIPTION + SERVICES

INTRODUCTION

The District's network infrastructure is based on a structured cabling plant utilizing a conduit distribution system model capable of supporting data, voice, video and audio/visual systems. Based on this model, the network system is adaptable to a variety of configurations, platforms, media and uses through simple cable management actions. The systems described in this document include pathways, spaces, cabling, and services. The designer must consider all components of these systems during the design process.

2. TOPOLOGY

Generally, the campus models include a hierarchical star configuration, and a super meshed-ring configuration. All future projects should follow the super meshed-ring configuration allowing for two or more separate ways in and out of every building. Each functional component of the star and ring topology is listed below and in greater detail in its appropriate section. The services provided by these functional components are listed in section 2.2.

2.1.1 MAIN DISTRIBUTION FRAMES (MDF)

MDFs are centralized backbone switching and routing locations, through which the telecommunications cable plant at each site originates. Section 3 provides information for the planning of MDFs and lists the physical locations at district sites.

2.1.2 BACKBONE SYSTEM

An extensive underground conduit system known as the inter-building pathway, links cabling service to all campus buildings. New construction will connect with the existing conduit plant when applicable, or providing a complete new conduit pathway back to the servicing node. Additional information about inter-building conduit and cabling systems are provided in section 6.

2.1.3 INTER-BUILDING CONDUIT

Inter-building conduit is terminated in a Building Entrance Facility (EF). Section 3.1 provides design requirements for building EFs.

2.1.4 INTER-BUILDING CABLING

Inter-building cabling is the media used to carry the signals and services from the Main Distribution point, (MDF or MCC) to the Intermediate distribution points (IDFs or ICCs). Inter-building cabling systems are covered more in depth under section 7 of this document.

2.1.5 TELECOMMUNICATION ROOMS

Each campus building should be provided with one or more Telecommunications Rooms (TRs) dependant on the size of the area served. In multi-floored buildings the TRs should be stacked in the same area per floor. In the case of individual classroom portables, one portable may be designated as the serving location for adjacent units and equipped with an appropriately sized and configured IDF Enclosure. The TR/IDF enclosure will receive the backbone cabling systems and house electronics for defined serving area applications and cross-connects. Section 3.3 provides planning information for TRs.

2.1.6 INTRA-BUILDING CABLING PATHWAY

Intra-building cabling pathways typically consist of conduit, pull boxes, sleeves, cable tray, cable runway, trapeze, or hanger systems and carry the necessary cabling from the TR throughout the serving area. Details governing intra-building pathways are presented in Section 4.

2.1.7 WORKSTATION OUTLETS

Each office, workstation, classroom, or other cabled location should feature individual multifunctional wall faceplates for device connection to the network infrastructure. Wall faceplates are also referred to as Workstation Outlets (WSOs). Information about the planning of faceplates is provided in Section 5.1. All Instructor lecterns will be accessed using a FSRFL-500p with a quad-plex module.

These primary components are essential to a complete network system connecting: voice switches, handsets, and supporting components; streaming, stored, and broadcast video equipment and cabling; data switches; routers; electronic security and safety devices; fire alarm panels; intercom speakers; wireless devices; and other project specific requirements or applications. The architectural firm and design team selected for any new or renovation project must become familiar with the requirements for a complete system listed in this document, and all standards documents referenced herein.

In coordination with Information Services staff, the Architect will be required to provide a comprehensive design plan for inter-building pathways in support of the telecommunications backbone, intra-building pathways supporting the horizontal and vertical riser cabling systems, the building entrance facility, the building equipment room, and the telecommunication rooms. The scope of work must be approved by the Associate Vice-Chancellor of Information Services prior to soliciting bids.

2.1.7 WORKSTATION OUTLETS

Cable Type	Color	Description
Category 6	Yellow	Ethernet
Category 6	Green	UPS NICS
Category 6	Light Blue	Wireless Access Points
Category 6	Red	Cross Over
Category 6	Orange	Security/Remote Mgmt.
Category 6	Black	VoIP
Category 6	Blue	AudioVisual
Category 6	Gray	Air Conditioning
Category 6	White	Lighting
Multimode Fiber (SX) 50 Micron	Teal	IntraBuilding
Singlemode Fiber (SX)	Yellow	BackBone

2.2 SERVICES PROVIDED

The pathways, rooms and spaces represented above are used to support the core communications system carrying voice, video and data. However, all communication systems detailed below must be accounted for when designing pathways and spaces. Additional systems may be required for specific projects.

2.2.1 VOICE

Voice services include plain old telephone service, Voice over Internet Protocol (VoIP), digital key system units, private branch exchange services, and dedicated commercial voice lines. Voice services will be provided at all workstation locations, office spaces, classrooms, and conference or meeting rooms. The Architect must factor the total estimated quantity of voice outlets required to determine all horizontal, riser, and backbone pathway sizing.

2.2.2 DATA

Data services will be provided at all workstation locations, office spaces, conference rooms, classrooms, kitchens, auditoriums, and in certain campus-specific outdoor locations. Data services will normally have a much higher density than voice services. The quantity of data outlets per location will be derived early in design as pathway sizing is based upon the number voice and data cables required to the work space or geographic location

2.2.3 WIRELESS ACCESS TO NETWORK

Data services shall also include wireless access to indoor and outdoor locations. Wireless requirements must be identified by Information Services. Proper coverage is to be calculated by the design team based on the District's choice of equipment. The Architect must again factor conduit and pathways to support the wireless application.

2.2.4 ANCILLARY SYSTEM AND SERVICES SUPPORT

Recent models of utility control panels incorporate network connectivity and management. The configuration and connection locations for these systems must be accounted for under the design of each new or remodeled building.

2.2.4.1 FIRE ALLARM ENUNCIATION

Every building master fire alarm panel should be outfitted with at least two dry contacts reporting “trouble” and “fire” alarms. Conduit from these dry contacts should be run back to the building Equipment Room (ER). For budgeting purposes, the District assumes every building will require one zone with two alarms (trouble/fire), and will quote the equipment necessary to annunciate the alarm back to Primary FACP at each site.

2.2.4.2 ELECTRONIC SAFETY AND SECURITY

Electronic Safety and Security systems require network connectivity, connectivity to each sensor, door, and alarm. The conduit must be provisioned to support this system. The Architect should have a ESS consultant as a part of the design team to ensure the District’s needs have been met.

2.2.4.3 HVAC CONTROL SYSTEM

The HVAC controllers should have a network connection allowing for a centralized management of the system. Location and capacity of the connection should be specifically identified on the plan set.

2.2.5 EMERGENCY PHONES

Large internal public areas should be provided with an emergency phones. All emergency phones should be installed ensuring requirements of ADA are met. A conduit should be provided from the emergency phone to the nearest building’s Equipment Room or TR. A blue strobe light and power will also be needed at each location. All emergency phones shall have signage displaying location, ability to perform daily testing and mass notification.

PART C

INTRA-BUILDING TELECOMMUNICATION SPACES

Telecommunication spaces must be designed and provided according to requirements specified in TIA/EIA 569 – Commercial Building Standards for Telecommunications Pathways and Spaces and the BICSI Telecommunication Distribution Methods Manual (TDMM) (and generally addressed in this section). Provisions for adequate space and environmental conditions within a building are vital to the trouble-free operation of a communications system. In many cases, an Entrance Facility may share the same space as a Equipment room or Telecommunications room. The provisioning requirements may be more stringent in a shared space than might be needed for either room separately. Design plans must be completed in coordination with District Operations and the Information Services staff.

3.1 BUILDING ENTRANCE FACILITIES (EFs)

Building Entrance Facilities (EFs) provide an entrance point for inter-building conduit systems into a building. From three to nine four-inch conduits are commonly required to feed a building. The building entrance facility provides a location in which to terminate cables entering the building and to interconnect them with internal building cables. The EF will also be the origination point of the telecommunications grounding system, the Telecommunications Bonding Backbone (TBB). Pathways from the EF to building equipment rooms will be provided to support the intra building cabling and the TBB. The number and size of conduits into the EF is critical to the success of the telecommunications backbone. The EF must provide sufficient room and structural integrity to support the installation of a variety of cables, locations for splice cases, electrical protectors, and network interface devices. The area must be dry, not subject to flooding, and free of overhead water, steam, or drain pipes. For buildings over 10,000 gross square feet, the entrance facility must be a dedicated, enclosed room. Refer to Table 3.1.1 and 3.1.2 for sizing requirements and the summary of requirements for entrance facilities.

Table 3.1.1 Building Entrance Facility Space Requirements

Building Gross Square Footage	Entrance Room Floor Dimensions
Up to 100,000	12’ x 6.3’
100,001 to 200,000	12’ x 9’
200,001 to 400,000	12’ x 13’
400,001 to 500,000	12’ x 15.6’
500,001 to 600,000	12’ x 18.3’
600,001 to 800,000	12’ x 22.3’
800,001 to 1,000,000	12’ x 27.7’

3.1 BUILDING ENTRANCE FACILITIES (EFs) (CONT'D)

Table 3.1.2 Building Entrance Facility Environmental Requirements

Environment	Required Condition
Lighting	50 ft. candles, 3' AFF
Drop Ceiling	No
Access Door	36" x 80", Swing Out
Floors & Walls	Conductile
Power, Equipment	2 - 20 Amp dedicated, quad outlets (minimum)
Power, Convenience	20 Amp duplex at 6' intervals
Grounding	3/4" conduit to TMGB #6 AWG min., from TGB to TMGB
Backboards	3/4" plywood, painted w/ light colored, fire retardant paint covering all walls
Floor Loading	1000 lbs per sq. ft.
HVAC	64 - 75 degrees constant, 30 to 55% relative humidity

3.2 BUILDING EQUIPMENT ROOMS (ER)

Building Equipment Rooms (ERs) provide housing for the necessary electronics to provide services to building occupants. The equipment room is a centralized space for telecommunications equipment (PBX, computing equipment, video head-end or components, etc.) that serves the occupants of the building. The room should house only equipment directly related to telecommunications systems and its environmental support systems. The room should be secure, not of a joint use nature, and void of any EMI/RFI producing agents. The equipment room is the point of origination in a building for telecommunications signals and services. To guarantee the quality and security of these services, strict adherence to the standards outlined in ANSI/EIA/TIA 569 must be adhered to. Refer to Tables 3.2.1 & 3.2.2 for additional requirements.

Table 3.2.1 ER Space Requirements

# of workstations	sq. ft. requires
Up to 100	150 Sq. Ft.
101 to 400	400 Sq. Ft.
401 to 800	800 Sq. Ft.
801 to 1200	1200 Sq. Ft.

Power and A/C considerations should be made in the design and construction of building ERs. ERs will require adequate fire suppression, power, UPS, and air conditioning systems to maintain equipment operations 24 hours a day, 365 days a year. Security requirements should also be considered when designing the campus ER. If the building is outfitted with a UPS and or power generator, the ER will be included in the power grid for these services. Table 3.2.1 indicates the square footage required in the ER for a given number of user workstations forecasted in the area served. Note, if doors are swing-in, space for door swing should be considered dead space, and not included in the above space provisions.

Table 3.2.2 Equipment Room Environmental Requirements

Environment	Required Condition
Lighting	50 ft. candles, 3' AFF
Drop Ceiling	No
Access Door	36" x 80"
Floors & Walls	Conductile
Power, Equipment	4 - 20 Amp dedicated, quad outlets*
Power, Convenience	20 Amp duplex at 6' intervals
Grounding	¾" conduit to TMGB
#6 AWG min., from TGB to TMGB	
Backboards	3/4" plywood, painted w/ light colored, fire retardant paint covering all walls
Floor Loading	1000 lbs per sq. ft.
HVAC	64 - 75 degrees constant, 30 to 55% relative humidity
Fire Protection	Pre-action fire suppression and detection system. Emergency cut off in case of fire.

* May require additional electrical service, based on required active components.

3.3 TELECOMMUNICATION ROOMS (TR)

Telecommunications Rooms (TRs) provide an area to receive backbone and horizontal cabling systems from the ER or other TRs. This room will house floor-level cabling cross-connects and electronics. The telecommunications room on each floor is a transition point between the backbone and horizontal distribution pathways. The telecommunications room will contain network equipment, cable terminations, and associated cross-connect wiring. The TR should be located as close as practical to the center of the area served and preferably in the core area. TRs must be placed within 90 meters (measured by the conduit run) from the furthest end user workstation area. Multiple TRs will be required on large floors where the 90 meter (295 feet) limitation cannot be serviced by a single TR. The space must be dedicated to telecommunications and related support facilities. Note: if doors are swing-in, space for door swing should be considered dead space, and not included in the space provisions.

All communication racks are to be Chatsworth 19"/42 Unit or equal quad post with vertical and 6" horizontal wire management. All racks shall be configured with a minimum 36" clearance on a least three sides of the rack row installation.

In accordance with ANSI/EIA/TIA 569, TRs on multiple floors should be vertically stacked, and tied together by dedicated conduit pathways, slots or sleeves. When a TR cannot be vertically stacked, a pathway must be provided to link them. Refer to Table 3.3.1 and Table 3.3.2 for additional requirements. The Architect must ensure that design considerations include the horizontal and vertical backbone pathways for of all TRs. These pathways are required to provide connectivity back to the serving ER. The pathways could include dedicated conduit, sleeves between floors, cable runways or tray systems. The pathways will be used for horizontal and vertical cabling of voice, video and data cabling. The Architect must also ensure that a pathway for the TBB (grounding backbone) is present at all TRs (See grounding, section 9 of this manual).

Table 3.3.1 Space Requirements of a TR

Floor Area Served	Room Dimensions
Up to 5,000 Sq. Ft.	10' x 7'
5,001 to 8,000 Sq. Ft.	10' x 9'
8,001 to 10,000 Sq. Ft.	10' x 11'

Table 3.3.3 Telecommunications Room Locations

Environment	Required Condition
Lighting	50 ft. candles, 3' AFF
Drop Ceiling	No
Access Door	36" x 80"
Floors & Walls	Treated to eliminate dust
Power, Equipment	2 – 20 Amp dedicated, duplex outlets
Power, Convenience	20 Amp duplex at 6' intervals
Grounding	3/4" conduit to TMGB #6 AWG min., from TGB to TMGB
Backboards	3/4" plywood, painted w/ light colored, fire retardant paint covering all walls
Ladder rack	12" wide ladder rack necessary to support cabling between all conduits. Vertical sections may also be required.
Floor Loading	50 lbs per sq. ft.
HVAC	64 - 75 degrees constant, 30 to 55% relative humidity
Location	Centrally located and vertically stacked. Longest horizontal cabling run cannot exceed 90 meters (295')

Inside relocatable classrooms, a relay rack enclosure may contain the inter-building and intra-building cabling terminations, active electronics, and supporting infrastructure. It is imperative that the Architect provide a sufficiently sized enclosure. The District standard for Wall mounted enclosures is the Chatsworth Cube-it enclosure, equipped with fans and filters, light kit, and proper cabling management. Approval of enclosure and its contents by Information Services prior to finalization of construction documents is required.

3.3.2 FIRE SUPPRESSION AND DETECTION SYSTEM WITH PRE-ACTION

Fire Suppression and Detection should be provided for all Telecommunications Rooms. MDFs and NOCs shall be evaluated in conjunction with Information Services to evaluate the need of a pre-action dry pipe system, or advanced chemical system for suppression.

PART D

INTRA-BUILDING DISTRIBUTION PATHWAY SYSTEM

The intra-building distribution system allows for connectivity and pathway between multiple intra-building spaces and between work areas and their serving spaces. This includes backbone cabling pathway between telecommunications rooms (TRs) in the same building, riser pathway between a distribution TR and an edge TR, and horizontal cabling pathway connecting the work area to the serving TR.

The backbone or riser pathway between multiple TRs in the same building may be simple such as vertical conduit sleeves between floors or as complex as multiple conduits and pullboxes necessary to route the cabling in accordance with TIA-569, and conditions surrounding the design. Depending on the total served area of a building, serving multiple TRs from the Entrance Facility typically only occurs in a multistoried or large building.

The horizontal pathway is the portion of the telecommunications system that extends from the work area telecommunications outlet/connector to the horizontal cross-connect in the telecommunications room. The horizontal pathway contains the greatest quantity of individual cables in the building.

After construction or building renovation, the horizontal pathway is often much less accessible than the backbone or riser pathway. The time, effort, and skills required to effectively manage changes can be extremely high. Plans must recognize the evolving diversity of user applications with the goal of reducing the likelihood of forcing major future changes to the horizontal cabling.

4.1 INTRA-BUILDING CONSIDERATIONS

A typical configuration will allow for all workstation outlets (WSOs) in a campus building/floor to be serviced by a TR on that floor. WSOs must be within 90 meters of the TR, as measured electronically after the cable has been laid. Suitable methods for supporting cables, including J-hooks and conduit stub-ups, must be provided. The Architect must plan for appropriate TIA-compliant paths between open J-hook areas with the proper type and quantity of sleeves. Proper clearances must be maintained from other services and structures, such as electrical pathways and unbalanced motors.

4.2 HORIZONTAL PATHWAYS

When designing intra-building cable distribution systems, the following guidelines, as well as the ANSI/EIA/TIA 568-A and 569, should be followed.

- Intra building pathways for horizontal distribution on a floor consists of ladder tray, sub-floor channeling, raised-floor, conduit, cable tray, open ceiling with hangers or J-hooks, and raceway. Any of these distribution methods or a combination of all, is accepted practice. Conduit pathways from the WSO to the ceiling are also considered as a component of the horizontal distribution system, and are mandatory for all new facilities or renovations with new or furred out walls. In designing horizontal distribution paths, generally the most direct path is preferred. Appropriate bonding and grounding of horizontal pathways is required.
- Beyond satisfying today's telecommunications requirements, the horizontal pathway should facilitate ongoing maintenance, anticipated equipment upgrades, and reasonable changes in staff work areas. Modifications to the horizontal pathway frequently cause disruption to occupants and their work.
- The preferred method for the horizontal cabling system is a 1" conduit from the WSO to the ceiling, and a J-hook or saddle based hanger pathway from the ceiling area to the TR. This system should support all expected types of structured cabling system to include UTP, fiber optic, and coaxial cabling. The design team should consult with District Information Services to ensure that all network services are accounted for in the plan set.

4.2.1 CONDUIT SYSTEM

In the District's infrastructure environment, multiple conduit systems exist. This section covers the different installations to understand in an existing environment, and lists options available for use to the design team. A backbone or riser conduit system consists of conduits interconnecting the entrance facility (EF), equipment room (ER), and telecommunication rooms (TRs) within a building. Suitable types of conduit include rigid metal conduit, intermediate metal conduit, and fiberglass. Flexible metal tubing is not allowed.

A horizontal riser conduit system is generally used to interconnect a workstation outlet (WSO) to the main horizontal distribution system leading to the zone's telecommunication room. For this application, a minimum 1" conduit should be provided from the WSO to the horizontal distribution system. If the horizontal distribution system is a ladder tray, for example, the WSO's conduit run should terminate at the ladder. Common terminology when discussing conduits or pathways include:

Conduit Stubbed to J-hooks: Conduit is run from the WSO and terminated above a T-bar grid ceiling, providing a small service loop around a J-hook directly above the conduit end. This method is preferred when the ceiling area is highly accessible

Conduit Stubbed to Cable Tray: Conduit is run from the WSO and terminated at a cable tray. This method is preferred when the ceiling area is mostly accessible, and the construction project is providing new cable tray and conduit stub ups at the WSO.

Home-run conduit: Each WSO will be served by a dedicated minimum 1" conduit to its serving TR This method is mandatory where ceiling access is restricted or prohibited. It can also be preferred in new slab construction.

Zoned conduit system: Recommended if the space above a ceiling is not accessible and wall penetrations must be kept to a minimum. It is required in a no ceiling environment. Provide a minimum of one 2" conduit to a pull box for each 500 square feet of usable space (the actual conduit size should be determined by the number of WSOs being served). A minimum 1" conduit should be run from the feeder conduit to each WSO.

4.2.1 CONDUIT SYSTEM (CONT'D)

When installing horizontal or work station conduit runs, the following guidelines and the ANSI/EIA/TIA-569 should be followed. At a minimum, the following guidelines must be adhered to when planning or placing conduit:

- No more than two 90º bends in any one section.
- No 90º condulets (also known as an LB).
- All bends must have a sweeping bend radius of 10 times the diameter of the conduit
- No continuous section of conduit should be longer than 100 feet. Pull boxes should be provided as needed to break up longer runs.
- All ends of metallic conduit must be reamed and bushed
- All metallic conduits must be bonded to building structural steel or other approved ground per National Electrical Code (NEC).
- All unused conduits will have a pull-rope or tape installed with a minimum tensile rating of 200 lbs.
- Conduit runs must be routed in the most direct route possible.
- All conduit runs must maintain proper clearance from EMI/RFI producing agents and other obstructions according to the NEC and applicable sections of this document.
- Conduit feeding WSOs should not be "Daisy Chained" unless properly sized to provide for present and future needs. This should only be done with the prior approval of the Associate Vice-Chancellor of Information Services.
- A minimum of 12" clearance will be maintained above T-Bar drop ceilings.

4.2.2 LADDER TRAY

A ladder tray system customarily consists of a ceiling mounted or hung “ladder” with rungs used to support cabling in an open space area. A ladder tray system is much like a cable tray system, except that it is designed as an open, not closed, system. Designed to carry a large number of cables, this system is the preferred distribution system for most horizontal cabling runs within open ceiling areas outside of classroom areas. It is not preferred inside classroom areas.

- Ladder trays should be a minimum of 12” wide (actual lay-in capacity) and 6” deep, with a maximum of 9” rung spacing.
- Ladder trays must not pass directly through firewalls, without proper fire stopping in accordance with the NEC and other National Fire Protection Association (NFPA) requirements. Design team may choose to have the tray should stop at either end of firewall and multiple 4” conduit sleeves be installed through the wall.
- Ladder tray should be mounted along publicly accessible areas only.
- Ladder trays should only be used in areas that provide access, such as drop ceilings.
- Ladder tray must maintain proper clearance from EMI/RFI producing agents and other obstructions according to the NEC and applicable sections of this document.
- Every ladder tray must be supported at no more than 10’ intervals.
- Ladder trays should be dedicated to network applications only. That is, a single tray should not be designed to carry both network and electrical cabling components.

4.2.3 CABLE TRAY

A cable tray features a metal tray or trough for the transportation of large quantities of network cables typically along a common pathway. This method is not recommended for use in District facilities and should only be used when other methods are not viable, and with the approval of the Associate Vice-Chancellor of Information Services. The following guidelines should be adhered to when planning or placing cable trays:

- Size cable tray to provide a minimum of one square inch of cross sectional area for every 100 usable square feet served. Minimum width should be 6".
- Cable tray must be installed as a continuous system and grounded on each end in compliance with NEC 318.
- Cable tray must not pass directly through firewalls. Instead, the tray should stop at either end of firewall and multiple 4" conduit sleeves should be installed through the wall.
- Cable tray should be mounted along public hallways only.
- Cable trays should only be used in areas that provide access, such as drop ceilings.
- Cable tray must maintain proper clearance from EMI/RFI producing agents and other obstructions according to the NEC and applicable sections of this document.
- Every cable tray must be supported at 5' intervals.

4.2.4 SURFACE RACEWAY SYSTEMS

A surface raceway system may be used for perimeter distribution of cables when routing of cables through a ceiling or wall cavity is not practical. A typical raceway system that is used is the Wiremold™ 5400 series. The following guidelines should be adhered to in using raceway systems:

- The aesthetics of a raceway system is crucial. Submit a plan detailing how you would propose to run the raceway system.
- Generally speaking, all major horizontal runs should run near the ceiling (sloped ceilings would be a potential exception), convert to smaller vertical runs in room corners, and come up to a wall mounted Information Outlet (IO) box positioned 9" off the floor.
- Raceway should be securely mounted and anchored by approved method every 4'. Adhesive alone will not be used to fasten raceway and/or surface mount boxes.
- Channel integrity will be maintained throughout.

The Architect and design team must ensure that the channels provide sufficient pathway for all cabling and services expected to be installed. Selections and locations for raceway should be verified with Information services as sufficient prior to construction document release.

3.3.1 EMERGENCY POWER OFF CONNECTIVITY

All UPS systems located in an area equipped with Emergency Power Off activation should be capable of and connected into the actuator for equipment shutdown.

4.2.5 OPEN CEILING

Under some circumstances cable may be routed through the ceiling space from the TR to the individual faceplates. When this is the case, outlet locations will require a conduit stub into the ceiling. Though no horizontal conduit or ladders are required, designers must ensure that cable distribution in the open ceiling is able to reach its designated TR without the cable contractor having to install sleeves or exposed raceway. A true clear path from the stubbed conduit to the TR must be available. Furthermore, conduit stubs will be reamed and bushed on both ends.

4.2.6 SUB-FLOOR CHANNELING

Sub-floor channeling is often used where flexibility is required for the cabling of a classroom or lab, and most frequently is used for both data and electrical cabling. When used, appropriate provisions must be made to separate data and electrical components so as to avoid signal interference. Appropriate planning must be made for the extension of cabling from the sub-floor channeling to the area's TR.

4.2.7 RAISED-FLOOR

An open floor system, such as is used in computer room environments, is sometimes used when maximum cabling flexibility is required in a classroom, lab or studio. When used, appropriate provisions must be made for the extension of cabling from the open floor area to the appropriate TR. Generally this can be accomplished by providing conduit down a wall into the open floor area from the ceiling.

4.3 VERTICAL PATHWAYS

Intra-building vertical pathways consist of slots or sleeves between vertically aligned TRs. If TRs are not vertically aligned, a conduit system must provide connectivity between TRs. These pathways provide the means for the telecommunications riser cable distribution between floors. When designing vertical pathways, the following guidelines should be followed:

- TRs should be vertically aligned when possible.
- Vertical pathways need to be designed for future growth and accommodation of multiple communications methods.
- All pathways must be properly firestopped.
- Slots: Rectangular floor openings between vertically aligned closets providing a pathway for the vertical distribution of telecommunications cables. A 1” curb is required. The general guidelines below can be used to determine the size of slots required. Greater space may be needed for additional services.

Table 4.3.1 Slot Size

Total Usable Square Feet Served by Slot	Size of Slot in Inches
Up to 250,000	6” X 9”
250,000 to 500,000	6” X 18”
500,000 to 1,000,000	9” X 20”
1,000,000 to 1,400,000	12” X 20 “
1,400,000 to 2,000,000	15” X 24”

Sleeves: 4” conduit between vertically aligned rooms providing a pathway for the vertical distribution of telecommunications cables. Sleeves should extend a minimum of 1” above the finished floor and below the finished ceiling. The general guidelines below can be used to determine the number of sleeves required. Additional conduits may be needed for additional services, or increased numbers of innerduct.

Table 4.3.2 Sleeve Quantities

Total Square Feet Served by Room	Quantity of 4” Sleeves
Up to 50,000	3
50,000 to 100,000	4
100,000 to 300,000	8
300,000 to 500,000	12

4.4 ANCILLARY PATHWAYS

In the event, that TRs are not vertically stacked or when connecting two TRs horizontally, the following guidelines and the ANSI/EIA/TIA-569 should be followed:

- A minimum of three 4" conduits should be installed to interconnect multiple TRs.
- Suitable types of conduit include rigid metal conduit and intermediate metal conduit.
- No more than two 90° bends are allowed in any one section.
- No 90° condulets (also known as an LB).
- All bends must have a sweeping bend radius of 10 times the diameter of the conduit.
- Provide pull boxes as needed and as required. No continuous section of conduit longer than 100 feet.
- All ends of metallic conduit must be reamed and bushed.
- All metallic conduits must be bonded to building structural steel or other approved ground per NEC codes.
- All conduits will have a pull-rope or tape installed with a minimum tensile rating of 200 lbs.
- Conduit runs must be routed in the most direct route possible.
- All conduit runs must maintain proper clearance from EMI/RFI producing agents and other obstructions according to the NEC and applicable sections of this document.
- See grounding and bonding section for Grounding Equalizer conduit sizing requirements. (formerly TBBIBC).

PART E

CUSTOMER WORK AREA REQUIREMENTS

This section will provide guidelines for the design of network services for office spaces, conference rooms, classrooms, kitchens, Multipurpose Rooms, and open areas.   These guidelines are identified to provide the architect and design team with working knowledge of the minimum horizontal cabling component requirements a given area may require. Special cases will require coordination with the Associate Vice-Chancellor of Information Services to ensure the District's needs are properly met.

Formally, Information Services is responsible for voice, data, and multimedia utilities and cabling. In addition to the telecommunications industry design standards relating to these services and outlined in this document, consideration should be made for other services, such as microphones, amplifiers, video projectors, wall-mounted TVs, etc.

5.1 FACEPLATES

Services within a classroom, conference room, office, or other service area are typically provided by wall-mounted faceplates. Unless otherwise negotiated, in all applications the design team needs to ensure the faceplate and supporting components are compatible with the AMP cabling being installed, or currently installed, if existing cabling is utilized. The construction documents should contain sufficiently detailed information to identify the items needed for the different quantities at locations necessary.

Flush mount new construction requirements:

- Faceplates should not be co-located with electrical outlets. All faceplate configurations are based on a minimum single gang back box, 5" square X 2-1/8" D minimum. All device boxes will be feed with a minimum ¾" conduit homerun or ceiling stub.
- faceplates should be positioned with consideration for customer use and serviceability. Typically CATV outlets should be placed near the expected TV mount location at 84" A.F.F. Structured Cabling outlets should be placed next to or behind desks. In either case, outlets should be located next to electrical outlets. Emergency phone faceplates should be wall mounted per ADA standards.

5.2 TYPICAL REQUIREMENTS

Unless otherwise noted in the detailed sections, the following typical guidelines will be followed for all serviced areas:

- All areas will require at least one quad outlet faceplate on a single gang device box to accommodate four AMP CAT6 cables. This equates to a minimum conduit size of ¾" from an outlet to the serving telecommunications room. Therefore, the smallest conduit size allowed in any communications project is ¾". See TIA-569 and the BICSI TDMM for specific conduit sizing to any workspace area.
- The quad outlet will be positioned in close proximity to an electrical outlet that would power a computing device.
- CATV outlets may be co-joined in a single faceplate with UTP cabling providing space is available on the faceplate and in the conduit system. These joint faceplates are also usually mounted at +84" A.F.F. near the expected TV mount.
- Outlet faceplates should be positioned in easily accessible areas. It is poor form to place a faceplate behind a desk that is not designed to be easily moved, or behind a door. Architect should coordinate with entities responsible for furniture layout to ensure synergy.
- Outlet faceplates should be placed at the same height as electrical outlets.
- Offices, classrooms, conference rooms, and other areas where wireless access is specified will require one wireless access point located in the room for every 20 potential occupants of the room. The placement of the transceiver should be in a secured enclosure near or within the ceiling. In areas where multiple small rooms are joining, a single transceiver may provide services for all rooms. (For example, where two conference rooms abut each other.) A network connection will need to be provided to the transceiver. Architect is to coordinate with Associate Vice-Chancellor for Information Services for updated wireless access point part numbers, and density requirements.
- Wall mounted courtesy phones and wireless data transceivers should be provisioned where large groups of staff will gather, such as in office work area or lounge.
- All telecommunications faceplates must be serviced within 295' (90 meters) of its corresponding Telecommunications Room. (See Figure 1). This distance is electronically measured by the length of the cable run.

5.3 OFFICE SPACES

Every walled office should feature two cabling faceplates, each cabled with three CAT6 jacks. These faceplates should be situated on opposite sides of the office for maximum office reconfiguration. Cubical areas and offices smaller than 100 square feet should feature a single cabling faceplate, cabled with four CAT6 jacks. At all locations in the District, the offices should also have wireless networking available. Some offices will require CATV, at the discretion of the site staff and approval from the Associate Vice-Chancellor for Information Services.

A quad outlet should also be planned for common office suite areas, reception spaces, break areas, copier rooms or locations, and for any other area where a phone or computer may be used.

5.4 CONFERENCE ROOMS

All conference rooms have the capability to be utilized as a teleconference facility and should be connected to the campus network. The increased use of voice and data communications for a variety of meetings means all conference rooms must support all forms of communications from multiple sources. For rooms likely to be designated as teleconferencing locations, particular attention must be paid to adequate room sound design. Each conference room should be categorized by the type of technology requirements it will predominately require. Again, these are minimum requirements for the listed conference rooms.

Type 1 – all Type 1 conference rooms will have two or more faceplates each configured with three CAT6 cables. At least one faceplate should be positioned on a wall opposite of where presentation projections will likely be shown. .

Type 2 – all Type 2 conference rooms will have the attributes of a Type 1 conference room, but will also feature CAT6 jacks (and associated electrical outlets) for each occupant of the conference room. These outlets should be strategically positioned to provide convenient utility to the customer. In some applications, these may be provided in the center of the conference table, while in others, outlets may be fed by raceway or floor-mounted jacks.

Type 3 – all Type 3 conference rooms will have the attributes of Type 2 conference rooms, and will additionally be outfitted with a videoconference component. Videoconferencing connectivity shall be integrated into the structured cabling system. This conference room will be developed with a higher level of acoustical design.

5.5 TELECONFERENCE ROOMS

See Type 3 above.

5.6 CLASSROOMS

All classrooms must be equipped with voice, data, and video services in a wide variety of configurations. Increased use of projector and computer-generated displays, require an updated method of providing support facilities (power and signal) from the instructor's location to room displays and beyond. The minimum type of technology requirements it will have, can be categorized as follows.

Type 1 – all Type 1 classrooms will have a minimum of three faceplates cabled with three CAT6 cables. All classrooms over the size of 250 square feet shall be cabled with minimum 8 CAT6 cables total. At least one faceplate should be positioned on a wall at the front of the classroom or near any instructor position. In addition, all Type 1 classrooms will provide a single faceplate providing a CATV outlet. It is necessary that all Type 1 classrooms also make provision for an electronic projection device, providing local cable feeds from a faceplate at the front of the room to a ceiling mounted projection device, in addition to network connection. Additional multimedia devices, such as document cameras and audio equipment may also be required as dictated by the customer. All lecterns should be fed using an FSR box (FSR FL-500p with quadplexmodule). All Type 1 classrooms will feature wireless connectivity in addition to cabled faceplates. See AV Specifications for AV requirements.

Type 2 – all Type 2 classrooms will have the attributes of a Type 1 classroom, but will also feature CAT6 jacks (and associated electrical outlets) for each expected occupant of the classroom. These outlets should be strategically positioned to provide convenient utility to the student. In some applications, these may be provided in the center of a student cluster table, while in others, outlets may be fed by raceway or floor-mounted jacks. Type 2 classrooms should have furniture provisioned with data and electrical feeds in mind. Generally, designs that feature port feeds built into semi-permanent or permanently affixed furniture is preferable to designs that feature floor-mounted outlets. Provisions for telephone and network printer connectivity are still necessary. All lecterns should be fed using an FSR box (FSR FL-500p with quadplex module). See AV Specifications for AV requirements.

Type 3 – all Type 3 classrooms will have the attributes of Type 2 classrooms, and will additionally be outfitted with a videoconference component. Videoconferencing connectivity shall be integrated into the structured cabling system. All lecterns should be fed using an FSR box (FSR FL-500p with quadplex module). This classroom will be developed with a higher level of acoustical design. See AV Specifications for AV requirements.

5.7 PRESENTATION CLASSROOMS

Presentation Classroom information includes the Audio Visual components required. See AV Specifications for AV requirements.

5.8 OPEN AREAS

In many cases open areas, such as staff lounges and work areas, should be provided with structured cabling jacks positioned for ceiling mounted wireless data services, workstation outlets, courtesy (house) phones, and associated electrical jacks. The cabling density will be determined by the type of space provided and therefore, will identify the sizing required of the horizontal pathway. Work areas would naturally have a higher density of data jacks, while staff lounge areas would have a lower density. All courtesy phone outlets should be wall mounted in convenient areas, and will be ADA compliant.

5.9 CABLING

The Riverside Community College District standard for horizontal copper cabling is AMP Category 6 Plenum rated F/UTP cabling. As all existing horizontal copper cabling is protected under the AMP ND&I warranty for 25 years from the date of installation turnover, there will be no substitutions allowed for UTP cabling in new or renovated buildings. The construction documents must call for contractors performing any installations or modifications to the horizontal copper Structured Cabling System to be AMP ND&I certified, in order to preserve the warranty.
The District standard for horizontal coaxial cabling is Commscope Quad Shielded plenum rated drop cable.

Please see AV Standards for any audio visual requirements.

PART F

INTER-BUILDING PATHWAYS + SPACES

Inter-building pathways interconnect separate buildings in the campus environments. They consist of underground, buried, and aerial pathways. Underground pathways are the preferred type of pathway except in temporary construction cases. Design criteria for inter-building pathways are always subject to media type distance limitations and existing conduit utilization. In all, these pathways make up the telecommunications backbone. All inter-building pathway planning must be coordinated with and approved by the Associate Vice-Chancellor of Information Services. The selected design team engineers must be familiar with the ANSI/TIA/EIA-569 as it applies to inter-building pathways.

6.1 UNDERGROUND PATHWAYS

An underground pathway is a series of conduit, duct, trough, manholes, handholes, and pull boxes providing the means to distribute services to different buildings via the network backbone. Furthermore, the underground pathway is considered a component of the entrance facility. Figure 2 identifies a typical inter building backbone structure.

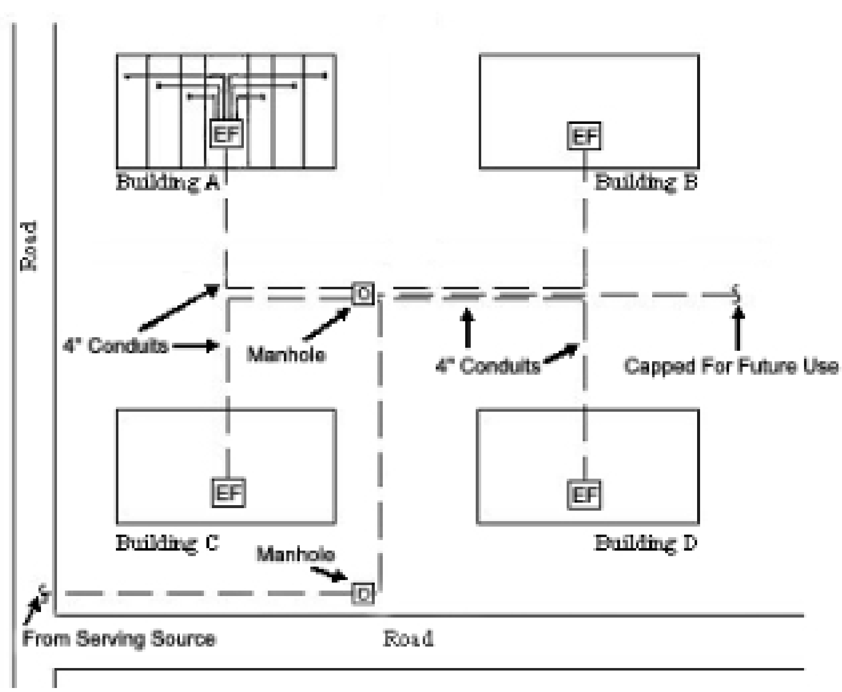


Figure 2 - Typical Underground Entrance Pathway

6.1 UNDERGROUND PATHWAYS (CONT'D)

There are many standards and requirements for the installation of an underground pathway system. These standards are primarily identified in the TIA-569 and BICSI TDMM. The following represents minimum guidelines for underground pathway planning :

- All new underground conduits shall be 4" minimum diameter.
- A minimum of two 4" conduits must be provided when entering a small building with a distribution frame. Additional conduits may be required for large projects or projects with extraordinary telecommunications requirements. Reference the TIA-569 and BICSI manuals for recommended quantities based on building sizing.
- Each conduit (1) of four, designed to carry fiber or coax will be equipped with (4) 1" o.d. innerduct. Innerduct type, style, and rating shall be determined by the design team based on type of cabling used, distance of pull, and environment. All vacant innerduct shall be plugged with Carlon Manufactured (or equivalent) innerduct plug. All innerduct should be placed concurrently using a multiple pulling harness and radial swivel to prevent wrenching.
- All building entry conduits will be plugged or sealed at both ends with a Carlon Manufactured (or equivalent) mechanical plug where manufactured sizes permit. Otherwise, the project shall use a combination of foam plug backing and re-enterable duct seal specifically manufactured for this application.
- Bends in underground conduit and duct are undesirable. However, when required, bends in conduit and duct runs shall be limited to the equivalent of no more than two 90-degree bends.
- For all bends in other than steel conduit or duct, the bend section shall be concrete encased.
- Sections with more than two 90-degree bends will be broken into sub-sections with manholes or handholes.
- All bends should be long sweeping bends with a minimum radius of 10 times the diameter of the conduit (See TIA-569).
- All ends of conduit should be reamed and bushed.
- All buried conduits should have a minimum of 24" of cover.
- Each conduit and innerduct shall have a Carlon Manufactured. (or equivalent) prelubricated, woven polyester tape with sequential footage markings placed within. The tape shall be tied off to the interior plug eyelet.
- Maintain separation from other utilities in accordance with applicable codes and standards.
- Sharing of conduit with other utilities is strictly forbidden.

- When PVC conduit is used, install detectable warning tape at a depth of 18” below grade.
- Consider grading of the underground pathway to allow proper drainage.
- Consider the amount of vehicle traffic to determine the amount of cover over the pathway and whether encasement or slurry capping is required.
- When Telecommunications pathway share a common trench path with electrical service, power boxes and manholes will always be offset from the trench path, allowing the telecommunications conduit a more direct path into the inter-building spaces.

6.2 MANHOLES, HANDHOLES AND PULL BOXES (SPACES)

Manholes are used throughout the District’s main campuses. New manholes will conform to the following specifications:

- Shall be one of the five typical manhole designs, (A; J-3; J-4; L; T) and specifically designed for telecommunications.
- Minimum size should be 5’ x 8’6” x 6’6”.
- Minimum precast concrete strength
- Shall contain galvanized hardware that includes pulling eyes and struts for racking cables.
- Shall have a minimum 8” diameter sump.
- Shall contain bonding inserts.
- Shall have pulling eyes.
- Manholes must have round lids with a diameter of no less than 28”, secured with head screws and pull slots for removal.
- Manhole covers should be traffic rated H20 and marked “Telecommunications”.
- Manholes shall not be used as pathway for power or light conductors, except for support per National Electrical Safety Code.

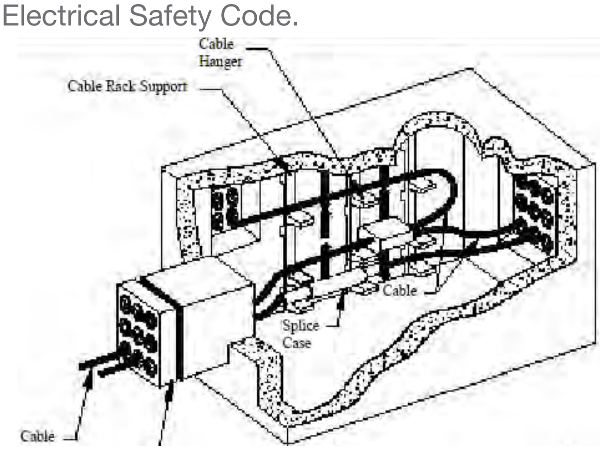


Figure 3 - Typical Manhole

6.2 MANHOLES, HANDHOLES AND PULL BOXES (SPACES) (CONT'D)

Handholes are used sparingly throughout the District's campuses. Unless otherwise approved by the Associate Vice-Chancellor of Information Services, handholes are not to be installed for new construction or renovation projects.
Existing handholes shall be evaluated on a case by case basis for replacement during cabling replacement or installation planning. Handholes will conform to the following specifications:

- Handholes shall be manufactured specifically for use in telecommunications pathway.
- Handhole minimum size is relative to the planned cabling occupancy. This should be evaluated by a RCDD for planning.
- Handholes shall have a minimum 6" gravel bed
- Handholes shall be permanently labeled in conjunction with the TIA-606 and the existing schema on the as builts.

Any handholes not meeting these requirements on existing sites should be corrected or replaced with a pullbox during a renovation project.

Underground pullboxes are the recommended method for providing inter-building spaces to interconnect conduits. New and existing underground pullboxes will conform to the following guidelines:

- Minimum size shall be 3' X 5' X 3'
- Shall be manufactured specifically for telecommunications usage and in compliance with TIA-569.
- Shall be precast concrete with a concrete floor and minimum 6" sump.
- Shall have corrosion resistant pulling irons, cable racks, and earthing attachments.
- Shall have a traffic rated lid
- Shall not be used as pathway for power or light conductors, except for support per NESC safety code.
- Shall be permanently labeled "communications" or "comm." and in conjunction with TIA-606 and the existing schema on the as builts.
- All penetrations shall utilize conduit windows.
- Any underground pullboxes not meeting these requirements on existing sites should be corrected or replaced during a renovation project.

6.3 DIRECT BURIED PATHWAYS

A direct buried pathway is considered to be component of the inter-building pathways. It is achieved by trenching, augering or boring. Consideration of existing landscape, fencing, trees, paved areas and existing utilities must be considered. The direct buried cable provides out of sight service to a building without the use or cost of conduit. Special cabling requirements exist for Direct buried applications. Direct buried cable should not be used except for temporary applications and with the express approval of Associate Vice-Chancellor of Information Services.

Should a direct buried pathway exist at an existing campus, proper permanent inter-building pathway should be provided under a renovation project. The services on the direct buried cabling should be transferred to the new inter-building pathway and cabling, and the direct buried cabling removed, and surfaces restored to original condition.

6.4 AERIAL PATHWAYS

An aerial is considered to be component of the inter-building pathways. Aerial distribution is accomplished through the use of poles, cable support strands, and related support systems. Considerations for installation include: appearance, applicable codes, and separation from electrical, span length, and number of cables between poles. Aerial distribution is generally not allowed and should only be used for temporary applications and with the express approval of the Associate Vice-Chancellor of Information Services.

Should an aerial pathway exist at an existing campus, proper permanent inter-building pathway should be provided under a renovation project. The services on the aerial cabling should be transferred to the new inter-building pathway and cabling, and the aerial pathway and cabling removed.

PART G
INTER-BUILDING CABLING SYSTEMS

An aerial is considered to be component of the inter-building pathways. Aerial distribution is accomplished through the use of poles, cable support strands, and related support systems. Considerations for installation include: appearance, applicable codes, and separation from electrical, span length, and number of cables between poles. Aerial distribution is generally not allowed and should only be used for temporary applications and with the express approval of the Associate Vice-Chancellor of Information Services.

Should an aerial pathway exist at an existing campus, proper permanent inter-building pathway should be provided under a renovation project. The services on the aerial cabling should be transferred to the new inter-building pathway and cabling, and the aerial pathway and cabling removed.

7.2 FIBER-OPTIC CABLING

The District standard for fiber optic backbone cabling is singlemode fiber optic cabling. All new fiber optic backbone cabling added to a site will match the existing cabling and termination types. <u>All SM terminations are ST. All intra-building fiber optic riser cabling is 50 micron multimode using connectors.</u>

Most existing fiber optic backbone cabling is protected under the Corning Extended Warranty Program (EWP) for 25 years from the date of installation turnover. There will be no substitutions allowed for backbone fiber optic cabling in new or renovated buildings. The construction documents must call for contractors performing any installations or modifications to the backbone fiber optic cabling to be Corning EWP certified, in order to preserve the warranty. Verify additional requirements with the Associate Vice-Chancellor for Information Services prior to finalizing the plan set.

7.3 MULTIPAIR COPPER CABLING

The District standard for OSP multi-pair copper cabling is to utilize a RUS/REA PE-39 OSP rated cabling for copper backbone. All new and renovated buildings must have a copper backbone installed. All Termination points should include proper solid state protection. The existing cabling protection is primarily Circa protectors at most buildings. The main cross-connect (MC) shall be comprised of wall mount 110 blocks. The design must ensure sufficient pair counts to each intermediate cross-connect (IC), sufficient protection, and proper labeling in accordance with TIA-606. Typically these wall mount 110 blocks are cross connected to the key system unit at each site. The design team must research the existing environment prior to finalizing design.

The District standard for riser and tie cable multi-pair copper cabling is to utilize a CAT5E riser rated cabling for copper riser. All cables should be terminated on minimum CAT5E rated 110 punchdown blocks or spliced with a properly sized splice case and MS^2 splices.

7.4 BROADBAND COAXIAL CABLING

The District standard for Broadband Coaxial trunk cabling is to utilize a low loss Commscope 1Ghz rated trunk cable. All new and renovated buildings must have a coaxial backbone installed. The installation of additional coaxial locations will require a recalculation of the campus system to ensure proper signal distribution.

When new construction projects are proposed, the architect should work closely with Information Services to plan for the impact on existing Inter-building cabling systems.

PART H
GENERAL ISSUES

8.1 CLEARANCE + SEPARATION

The planning and placement of telecommunications pathways and spaces should give consideration to nearby noise sources, such as electric power wiring, RF sources, large motors and generators, induction heaters, arc welders, and any other potential source of EMI/RFI. Precautions should be taken to protect the integrity of the information carried by the telecommunications cable plant.

All pathways should be placed with sufficient separation from noise sources according to TIA/EIA 569 guidelines and summarized in Table 8.1. This separation is required internally and externally to the building under design.

Table 8.1 Pathway Separations

Condition	Min Separation
Power Lines <2KVA	6”
Power Lines 2-3KVA	12”
Power Lines >5KVA	36”
Fluorescent Lights	5”
All EMI/RFI Sources	5”

8.2 FIRESTOPPING

Sealing of openings through fire rated walls, smoke walls and cement block walls, existing or created by the contractor for the purpose of placing conduit is the responsibility of the contractor. It is the installer’s responsibility to bring the wall or floor back to its proper rating. Approved fire stopping material must be used in accordance with local codes and building authorities having jurisdiction in this area, and must be installed according to manufacturer’s suggested practices. Conduit sleeves will be provided and utilized to penetrate any wall, floor or structural ceiling. All penetrations will conform to NEC 21, NFPA 70 and state and local codes.

8.3 ADA

All guidelines of the American with Disabilities Act will be incorporated into the planning and construction of the premises distribution system. The designer must include provisions for disabled individuals in all designs. The designer should insure all locations are within the Reach Limitations as shown in the ADA Handbook (EEOC-BK-19).

PART J

BONDING + EARTHING (GROUNDING) SYSTEM

A properly bonded, grounded and protected telecommunications system is necessary for the successful operation of telecommunications electronics and safety of personnel. The NFPA 70/NEC, IEEE NESC, ANSI J-STD-607A standards must be followed in every regard with respect to the planning, design and implementation of new or retrofitting an existing telecommunications infrastructure. This section provides an overview of recognized standards that must be adhered to in the design and implementation of telecommunications systems as it relates to bonding and grounding.

9.1 INTRA-BUILDING BONDING + GROUNDING

The telecommunications grounding and bonding infrastructure originates with a connection to the service equipment (power) ground typically via the EF, and extends throughout the building. It comprises five major components:

1. Bonding Conductor for Telecommunications (BCT)
2. Telecommunications Main Grounding Busbar (TMGB)
3. Telecommunications Bonding Backbone (TBB)
4. Telecommunications Grounding Busbar (TGB)
5. Grounding Equalizer (GE) formerly known as the Telecommunications Bonding Backbone Interconnecting Bonding Conductor (TBBIBC)

9.2 COMPONENTS

TMGB. The Telecommunications Main Grounding Bus bar (TMGB) serves as the dedicated extension of the building grounding electrode system for the telecommunications infrastructure. The TMGB also serves as the central attachment point for telecommunications bonding backbones (TBB) and equipment, and is located such that it is accessible to telecommunications personnel. A TMGB is required at all Main Distribution Frames. The District standard for TMGB is Erico Part Number TMGB-A29L41PT.

TGB. The Telecommunications Grounding Bus bar (TGB) is the common central point of connection for telecommunications systems and equipment in the location served by that telecommunications closet or equipment room. The District standard for TGB is Erico Part Number TGB-A18L10PT.

9.2 COMPONENTS (CONT'D)

TBB. Telecommunications Bonding Backbone. The TBB is the conductor that interconnects all TGBs with the TMGB. A TBB's basic function is to reduce or equalize potential differences between telecommunications systems bonded to it. A TBB is not intended to serve as the only conductor providing a ground fault current return path.

GE. The Grounding Equalizer is the conductor that interconnects the TGBs located in separate Telecommunication Rooms on the same floor of a building.

BCT. Bonding Conductor for Telecommunication. The conductor that connects the TMGB to the Service Equipment (power) Ground. See figure 5.3-1 of the ANSI J-STD-607-A shown below for example of BCT. Reference to BCT only.

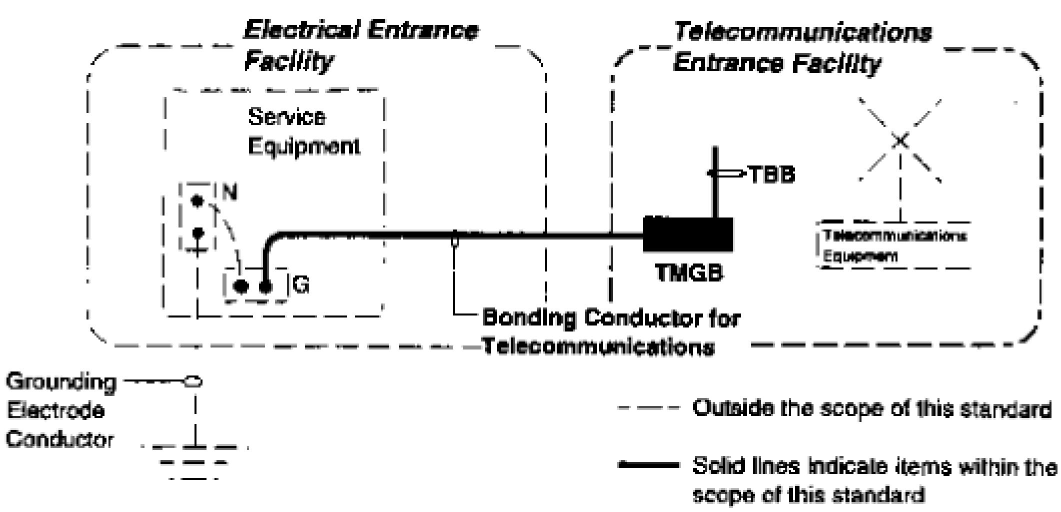


Figure 4 - Entrance Facility Grounding to Electrical

9.3 GROUNDING REQUIREMENTS

The following guidelines and all applicable codes and standards should be met in the design and implementation of intra-building bonding and grounding: Though the selected architect may not provide the actual cable or grounding bars, it is important that the architect understand the requirements of the cabling contractor. The Architect will provide all pathways required to install a complete telecommunications grounding system.

- All bonding conductors must be insulated and copper.
- The minimum bonding conductor size must be # 6 AWG. Ensure appropriate pathways are provided. See chart below.

Table 9.3.2 Conductor Sizing

Conductor Size (AWG)	Area (Circular Mils)	Maximum Length (feet)
6		13
4		20
3		26
2		33
1		41
1/0		52
2/0		66
3/0		>66

- The TBB must be # 6 AWG minimum. Ensure appropriate pathways are provided.
- Bonding conductors and TBB should not be placed in ferrous metallic conduit, unless conductor is bonded to each end of conduit. Ensure appropriate pathways are provided.
- TMGB must be bonded to the service equipment ground at the electrical service entrance point. Ensure appropriate pathways are provided. Locate TMGB in the EF if possible.
- A telecommunications grounding busbar (TGB) should be located in each TR, EF, and ER. Ensure appropriate pathways are provided.
- The TGB should be directly connected to the TMGB by a minimum # 6 AWG TBB. Ensure appropriate pathways are provided. See chart above.
- Interior water pipes and metallic cable shield will not be used as a TBB.
- All metallic raceways for telecommunications shall be bonded to the TMGB.

III. GROUNDING REQUIREMENTS (CONTINUED)

- Each telecommunications bonding conductor shall be labeled at each termination point, and point of exposure using a label with a distinctive green color and in accordance with the ANSI J-STD-607-A.
- Labels shall be nonmetallic and include the information depicted in figure 5.1-1 of the ANSI J-STD-607-A.

Figure 5 - Grounding Label

- The metallic sheath of copper cables should be grounded as close as practicable to the point of entrance as possible.
- All copper cables spliced within a manhole or handhole should be bonded within the manhole to the bonding insert. Ensure proper ground source is available in all holes.
-

Note: Refer to the following diagram for a typical building bonding system.

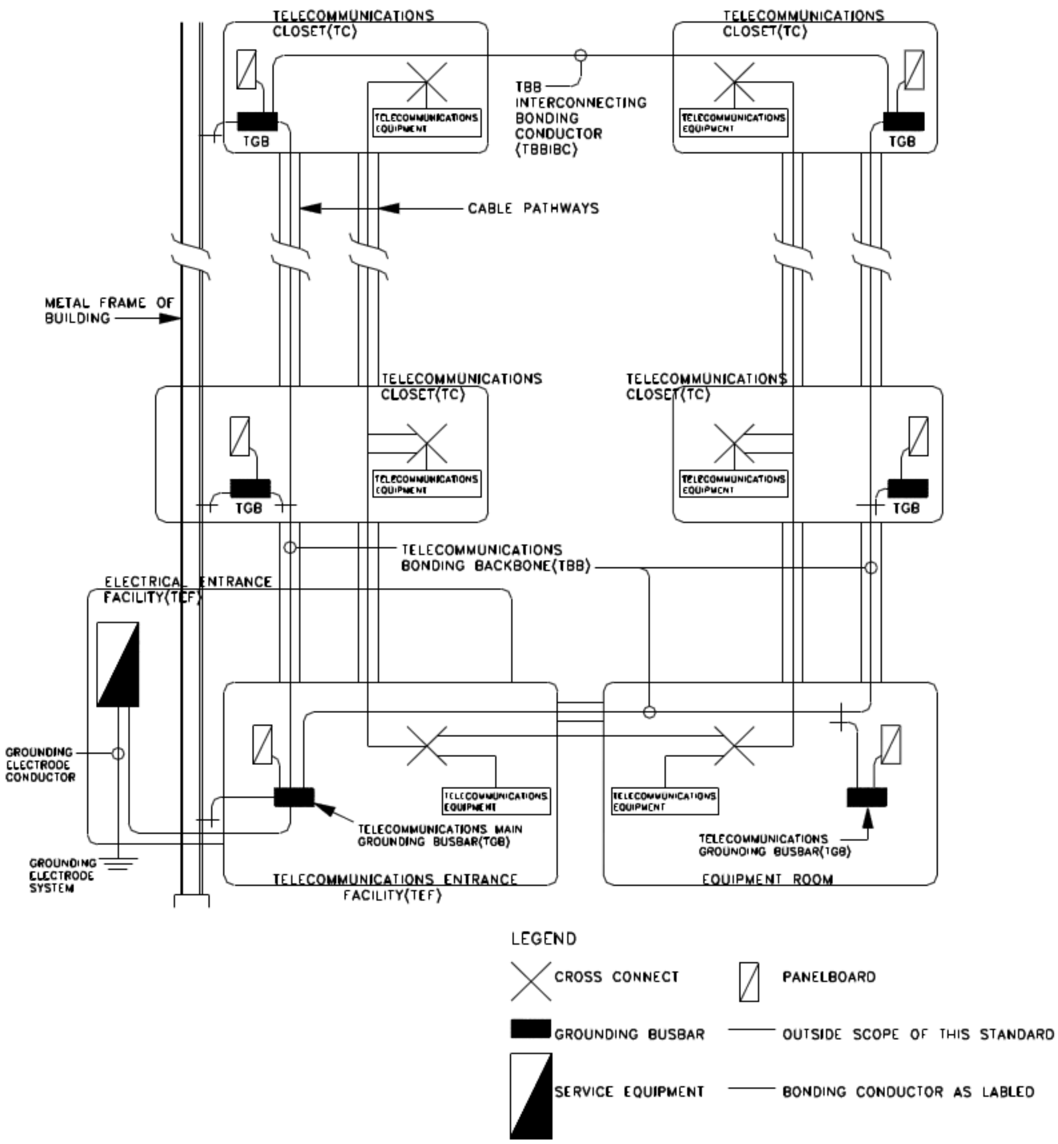


Figure 6 - Typical Building Bonding System

PART K
ACTIVE ELECTRONICS

The active electronics at Riverside Community College District are comprised of all computer network switches and routers, Private Branch Exchanges (PBXs), Wireless Access Points and controllers, Broadband Coaxial distribution amplifiers, Uninterruptable Power Supply (UPS) Systems, Paging amplifiers and intercom controls, and other associated supporting components.

10.1 NETWORK ELECTRONICS

The design team must have knowledge of all existing network switches and routers on a site prior to the addition or replacement of these devices. All campuses currently use a Super Meshed Ring/Star topology with either Cisco 10Gig or Gigabit based switches in the EF of each building. All Distribution and Edge requires Cisco switches with 10Gig edge connectivity, layer three image, and POE in a Star topology. All routers are currently Cisco modular routers. The design team must ensure at the completion of the project all WSO locations intended for data have connectivity and are patched into the equipment. A Certified Cisco Design Associate or Professional should evaluate the existing conditions and verify correctness of the designs prior to the submittal to the District. All network electronic designs must be approved by the Associate Vice-Chancellor of Information Services prior to plan completion. If an integrator is required they must be at a minimum a Cisco Premier partner with staff who holds a current CCIE certification.

10.2 TELEPHONY ELECTRONICS

The active telephony electronics currently consists of a NEC IP-enabled PBX at the Riverside City, Moreno Valley, and Norco Colleges. Each classroom should be equipped with a NEC VoIP handset.. Specific VLAN and Quality of Service configurations are necessary. Some locations will need a digital phone handset with connectivity to the PBX through the structured cabling system utilizing the copper backbone.

10.3 WLAN COMPONENTS

The District utilizes Wireless Access points at all locations. The design team must be aware of any existing wireless access points during the design development phase. All existing and new Access points are to be Cisco or equal. The architect must coordinate with the Associate Vice-Chancellor of Information Services to determine if there will be any Wireless Local Area Network (WLAN) components during a new or renovation project. A Certified Cisco Design Associate or Professional should evaluate the existing conditions and verify correctness of the designs prior to the submittal to the District. Additional Network Access Control components will be required with the introduction of WLAN requirements. These controllers will need to be integrated into the existing system and be designed in a distributed method on a building by building basis.

10.4 ENVIROMENTAL MANAGEMENT

The District currently uses APC NetBot systems inside each new and remodeled Telecommunications Room. These units are to be equipped with temperature, humidity and water sensors. An IP based camera shall be provisioned inside each TR. This camera shall be configured for viewing on the NVR located in the buildings MDF. This camera shall also be able to detect motion and alert via email Information Services Staff. Licensing will need to be addressed as a requirement of each project.

Each TR should have its own dedicated HVAC system. This system shall be configured to accommodate the electronics housed in this area.

10.7 ATS

Automatic Transfer Switch (ATS) Systems are required for all active electronics. The ATS selected should be connected to UPS and utility power sources or a redundant UPS. All ATS systems are to be APC Rackmount or equal equipped with an SNMP management card . Validate selection with Associate Vice-Chancellor for Information Services prior to plan submittal.

PART L

STANDARDS, CODES, + SPECIFICATIONS

Standards have a major role in providing uniformity in telecommunications infrastructure design. These standards then become the foundation on which new technologies are based. They allow a building to grow and change as technology changes, with minimal disruption to existing services, reducing the cost of moves, adds and changes. It is therefore, the position of the District that all telecommunication designs and installations adhere to these standards.

11.1 ANSI/TIA/EIA-568-A

Commercial Building Telecommunications Standard

The purpose of this standard is to provide the minimum requirements for telecommunications cabling within a commercial building or campus environment. The standard addresses the six major components of a structured wiring system: Entrance facility, main cross-connect, backbone distribution, horizontal cross-connect, horizontal distribution, and work area.

11.2 ANSI/TIA/EIA-569

Commercial Building Standards for Telecommunications Pathways and Spaces

The primary focus of this standard is to provide design specifications and guidance for all building facilities relating to telecommunications cabling systems and components, The standard identifies and addresses six prominent components of the building infrastructure: building entrance facility , equipment rooms, backbone pathways, telecommunication rooms, horizontal pathways and work areas.

11.3 ANSI/TIA/EIA-606

Commercial Building Standards for Telecommunications Pathways and Spaces

The primary focus of this standard is to provide design specifications and guidance for all building facilities relating to telecommunications cabling systems and components, The standard identifies and addresses six prominent components of the building infrastructure: building entrance facility , equipment rooms, backbone pathways, telecommunication rooms, horizontal pathways and work areas.

11.4 J-STD-607-A

Commercial Building Grounding (Earthing) and Bounding Requirements for Telecommunications

The primary objective of this standard is to provide guidance around the issue of bonding and grounding as it relates to building telecommunications infrastructure. The TMGB, TGB, TBB, GE, and the techniques to achieve proper grounding are discussed.

11.5 BICSI TDMM

BICSI is a comprehensive not-for-profit professional trade association that promotes the economical and efficient design and implementation of telecommunications distribution systems in commercial and multi-family buildings. BICSI's programs and interests cover a broad spectrum of the voice, data, and video technologies. Serving the telecommunications industry worldwide, BICSI has set the standard for qualifying and registering designers of telecommunications distribution systems.

The Telecommunications Distribution Methods Manual is a compiled document of global best practices for the design of telecommunications distribution systems.

11.6 IEEE STANDARDS

The Institute of Electrical and Electronics Engineers, Inc is a leading authority on areas ranging from computers and telecommunications to electric power and consumer electronics. The IEEE 802.X set of Standards for local and metropolitan networks are the basis for Ethernet connectivity. The design team must have a working knowledge of the standards, and which standards will apply for each project. The standards to follow will dictate which equipment selection of protocol use is appropriate. The selection of the protocol and standards should be based from existing conditions at a site, and should be validated by the Associate Vice-Chancellor of Information Services prior to plan development for updated information and requirements.

11.7 FEDERAL REGULATIONS

It is the Architect's responsibility to follow all state and federal regulations when such regulations conflict with guidance given in this document. At the federal level in the United States, the Federal Communications Commission's (FCC) Part 68 Rule provides regulations for connecting premises cabling and customer-provided equipment to the regulated networks. The FCC also publishes numerous reports and orders which deal with specific issues, some of which apply at the District. At the state level, additional codes, regulations and standards are mandated.

11.8 AMERICANS WITH DISABILITIES ACT (ADA)

The Americans with Disabilities Act of 1990 as it relates to telecommunications is covered in " Title IV: Telecommunications, " specifically, "Appendix B. Section 4.3.1: Telephones, " which covers accessibility to telephones and communications devices by the physically impaired.

11.9 NATIONAL ELECTRICAL CODE HANDBOOK 2008

The NEC Handbook is based on the National Fire Protection Association, NFPA 70. It is the most authoritative and comprehensive document available on electrical safety. The code addresses safety from fire to electrocution. It is intended for inspectors, electricians, engineers, designers, building and fire officials, and safety personnel. The code is applicable to both internal and external portions of a design process.

PART M
GLOSSARY

Access Unit	An opening with a removable cover providing access to either/or header and distribution ducts or cells.
Adapter	A device that can enable different sizes or types of plugs to mate with one another or to fit into a telecommunications outlet, provides for the re-arraignment of leads, allows large cables with numerous wires to fan out into groups of smaller groups of wires, or makes inner-connections between cables.
Alternating Current (AC)	Electrical current commonly used in homes and businesses throughout the world, whose magnitude and direction vary cyclically.
Attenuation	Decrease in magnitude of current, voltage, or power of a signal in transmission between points. Expressed in decibels.
AWG (American Wire Gauge)	A standard method of denoting wire diameter, especially for electrically conductive wire. A 6guage decrease doubles the wire diameter.
Backbone	A facility (pathway, cable or conductors) between TRs, EFs, and ERs within or between buildings.
Bandwidth	A continuous range of frequencies extending between two limiting frequencies.
BICSI	Building Industry Consulting Service International.
Blended Floor System	A combination of cellular floor units with raceway capability and other floor units without such capability, arranged systematically in a modular pattern.
Bonding	A low impedance path obtained by permanently joining all non-current carrying metal parts to ensure electrical continuity to safely conduct any electrical current likely to be imposed on it.
Cable	An assembly of one or more conductors or optical fibers within an enveloping sheath, constructed to permit use of the conductors singly or in groups.
CAD	Computer Aided Design
Cable Tray	A ladder, trough or channel raceway system used to support telecommunications media.

CATV	Community Access Television. Distribution method for Cable TV signals to be distributed through a campus over coaxial cabling.
CCITT	Consultative Committees for International Telegraph and Telephone.
CCTV	Closed Circuit Television. A system allowing for video monitoring and/or recording of an area or campus.
Cellular Floor Raceway	An assembly of cellular metal or concrete floor units forming part of a continuous floor structure.
Central Office	The place where communications common carriers terminate customer lines and locate switching equipment that interconnects those lines.
Centrex	The voice and data switching service provided by the local or serving telephone company.
Circuit	A means of two-way transmission between two or more points.
Circuit Switching	A method of handling traffic through a switching center, either from local users or from other switching centers, either from local users or from other switching centers whereby a connection is established between the calling and called station.
CBC	Coupled Bonding Conductor provides equalization and protection through electromagnetic coupling.
Coaxial Cable	A popular transmission medium usually consisting of one central wire conductor (two for twin axial cable) surrounded by a dielectric insulator and encased in either a wire mesh or an extruded metal sheathing. Coaxial cable comes in may varieties, and typically supports' data or video.
Conduit	Tube or pipe that provides a pathway and protection in which wire and cable are routed.
Connectivity	Physical connection of media to associated hardware or electronic equipment.
Cross Connect	Distribution system equipment used to terminate and administer communication circuits. Jumper wires or patch cords are used to make circuit connections.

Crosstalk	The phenomenon in which a signal transmitted on one circuit or channel of a transmission system creates an undesired effect in another circuit or channel.
Data	Information represented in digital or analog form.
Data Rate	The rate at which data is transferred.
DCE	Abbreviation for data circuit-terminating equipment.
DEMARC	Demarcation Point. A point at which two services interface and identify division of responsibility.
Distribution Duct (Cell)	A raceway of various cross-sectional area, placed within or just below the floor and from which the wires and cables serve a specific floor area.
Distribution Frame	Structure with termination's for connecting the permanent wiring of a facility in such a manner that cross connections may be made readily.
DNA	Digital Network Architecture.
EF	See Entrance Facility.
EIA	Electronic Industries Association.
EMI	Electromagnetic Interference: A device's radiation leakage that couples onto a transmission medium, resulting (mainly) from the use of high frequency wave energy and signal modulation.
EMT	Electrical Metallic Tubing: Conduit made of high grade steel electrically welded with an exterior coating of hot galvanized zinc. Used for interior pathway.
Entrance Facility	The area inside a building where telecommunications cables enter and leave the building.
Equipment Room	A room in which telecommunications is housed .
ER	See Equipment Room.
Ethernet	A high speed local area network of 10 Mbps transmitter over a shielded coaxial cable of Unshielded Twisted Pair (UTP).
Exchange	An area in which a communication common carrier furnishes service to its customers.
Facilities	Equipment, hardware and space provided to house communications systems to operate tenant services.
FCC	Federal Communication Commission.

Fiber Optic	Transmission technology in which modulated light wave signals, generated by a laser or LED, are propagated along a glass or plastic medium.
Firestop	A material, device or assembly installed in a cable system in a fire related wall or floor to prevent passage of flame, smoke, or gases through the rated barrier.
Ground	A conducting connection between a circuit and the earth.
GE	Grounding Equalizer: Conductor that interconnects the TGBs located in separate TRs on the same floor of a building. (formerly TBBIBC)
Handhole	A buried box whose lid is even with the surface of the ground. It provides a space for splicing and terminating cables.
IC	See Intermediate cross-connect.
Inside Wiring	In telephone deregulation the customer's premises wiring. The wiring inside the building.
Intermediate Cross-Connect	A cross-connect between the Main Cross-connect and the Horizontal cross-connect in backbone cable.
IO	See Information Outlet.
Information Outlet	Wall, ceiling or floor mounted device used for the termination of the horizontal distribution cabling at a user work station.
Innerduct	Additional conduit placed inside a larger diameter conduit.
Intra-building	All station wires, cables and permanent building cable Wiring from the point of entering a building (where it connects with the service connection facility) expending to and between equipment or connection arrangement. Intra-building wiring includes protectors, terminals, frames, and connecting blocks.
Inter-building	Cables (copper and/or optical) that run between buildings to form a backbone for distribution of signal to campus locations.
ISDN	Integrated Services Digital Network. A digital telecommunications network offering user's voice, data and certain image services on end to end digital circuits.
Jumper	A patch of cable or wire used to establish a circuit.
Key Telephone System	Telephones capable of handling several lines.

Kbps	Abbreviation of Kilobits per second. It is equal to 1 thousand bits per second.
KSU	Key System Unit. A telephone system providing phone service typically to fewer than 100 users. A KSU can also provide voicemail and other advanced features not available with ordinary phones.
LAN	Local Area Network. A type of high-speed data communications arrangement where all segments of the tans-mission medium (coaxial cable, twisted-pair wire, or optical fiber) are linked together for the purpose of sharing data and resources.
LASER	Light Amplification by Stimulated Emission of Radiation. Device that produces coherent light within a narrow range of wavelengths.
LCD	Liquid Crystal Display.
LED	Light Emitting Diode.
Main Cross-Connect	The cross-connect in the main equipment room for connecting entrance cables, backbone cables, and equipment cables.
Manhole	Large, reinforced, covered hole interconnecting conduit runs between buildings.
Mbps	Abbreviation of Megabits per second. It is equal to 1 million bits per second.
MC	See Main Cross-Connect
MDF	Main Distribution Frame: Point where the backbone campus cables terminate and cross-connect for inter-building distribution.
Media	Physical carriers of electrical or optical energy. Various types of wire and optical cable used for transmitting voice, data or video.
MHz	See Megahertz
Megahertz	A unit of frequency equal to one million hertz.
Modulation	The process by which certain characteristics of a wave are varied or selected in accordance with a modulation function.
NEC	National Electrical Code.
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association.

Network	An interconnected group of nodes.
OSP	Outside Plant, refers to a cable type that can be installed in underground or aerial installations.
PBX	Private Branch Exchange: A manual, user owned telephone exchange.
Pathways	Conduits, raceways, cable trays, and other devices that provide routing and protection for all types of media.
Plenum	An air duct or space inside buildings through which cable can be pulled or housed.
Plenum Jacket	A cable jacket (sheath) that is listed as being suitable for use in ducts, plenums, and other space used for environmental air
Poke Thru	A term used to describe an unlimited or random penetration through the fire resistive floor or wall structure. Used to facilitate the installation of distribution wires for power and communications.
Port	A point of access into a computer, a network, or other electronic device.
Pull Box	A box with a cover inserted in a long conduit run, particularly at a corner. It makes it easier to pull wire or cable into the conduits.
Raceway	Any channel designed for holding wires, cables.
Riser	The conduit or path between floors of a building.
Riser Cable	Inter-floor distribution media.
RFI	Radio Frequency Interference.
SAA	Systems Application Architecture. A proprietary IBM Operating System.
Shielding	Protective enclosure surrounding a transmission medium designed to minimize electromagnetic leakage and interference.
Sleeve	Circular opening through wall, ceiling or floor to allow passage of cables and wires.
Slot	Rectangular opening through wall, ceiling or floor to allow passage of cable and wires.
SNMP	Simple Network Management Protocol. A networking protocol used to send information gathered by network devices to a management station.

TBB	Telecommunications Bonding Backbone. A copper conductor extending from the TMGB to the TGB.
TGB	Telecommunications Grounding Busbar. A busbar located in each ER and TR connected to TMGB through the TBB.
TMGB	Main Telecommunications Grounding Busbar. A busbar located in the EF and connected to the electrical service equipment ground.
T Carrier	A time-division-multiplexed, digital transmission facility.
TAP	Baseband: The component or connector than attaches a transceiver to cable.
Broadband: Also called a directional tap or multitap, a passive device used to remove a portion of a signal power from the distribution line and deliver it onto the drop line.	
TR	See Telecommunications Room.
TELCO	Telephone central office, in most usage's but also, a generic abbreviation for "telephone company."
Telecommunications	A term encompassing voice, video and data.
Telecommunications Room	Floor serving space set aside in a building to provide safe, secure, and environmentally suitable area for the installation of cables, wires, telecom equipment, termination and administration systems.
TIA	Telecommunications Industry Association
Topology	Physical or logical configuration of a network.
Transmission	The dispatching of a signal by wire, radio, telegraphy, telephony, facsimile, or other means.
Trunk	A dedicated aggregate telephone circuit connecting two switching centers, central offices, or data-concentration devices.
Twisted Pair	Two insulated copper conductors that are wound around each other, mainly to cancel the effects of electrical noise.
Underfloor Raceway	Any facility provided for the express purpose of holding wires and cables and located within or immediately below the floor structure.

Utility column	A utility column is a post placed between the ceiling and the floor in conjunction with the ceiling distribution system.
UPS	Uninteruptable Power Supply. A power supply supported by battery power ensuring continuous power to a device in the event of power interruption. UPS systems typically refer to the entire unit to include any additional batteries, consoles, modems, or management devices.
UTP	Unshielded twisted pair, refers to 100 ohm 4-pair cable without external shielding. Available in Cat 3, Cat 4 & Cat 5. Also called horizontal wiring
Vaults	Underground access points used for splicing and routing of media. Usually precast concrete with traffic bearing lids.
Wire	Assembly of conductors within a common protective sheath.
Wiring Closet	Central location for termination and routing of “on premises” wiring systems.
WLAN	Wireless Local Area Network: A type of LAN which utilized high-frequency radio waves as the media to transfer data.

END OF SECTION 11

12 ROOFING + WATERPROOFING

INTRODUCTION

A weather-tight roof is basic in the preservation of a structure, regardless of its age, size, or design. The intent of this section is to establish District level roofing and waterproofing design guidelines for both new construction, renovations, and roofing replacement projects with the goal of providing a long-term roofing system. Listed are the minimum requirements that must be adhered to by the planning team in order to ensure the interests of the District are protected.

The standards and guidelines defined, listed, or referenced in this document are based upon those developed by the National Roofing Contractors Association (NRCA), Single-Ply Roofing Institute, (SPRI), American Society Testing Materials (ASTM), Underwriter Laboratories (UL), Factory Mutual (FM) and manufacturers published criteria.

PART A
BEST PRACTICES

Intro text

A. Low-Sloped Membrane Roof color:
   - A tan color blends better than white in the RCCD environment (aesthetics), shows less dirtiness, and weathers better.
B. Future installation of Solar Photovoltaic (PV) panels:
   - Single-ply roofing is the most accommodating.
C. Key components to proper design include wind uplift calculations, drainage design, thermal factors, perimeter edge design, and existing building conditions.
D. Provide access to <u>all</u> roof areas.
E. Provide stairs <u>between</u> roof levels.
F. Elevator/Interior Stair:
   - An elevator to a mechanical penthouse is the preferred means of roof access. Where an elevator to a mechanical penthouse cannot be provided, an interior stair to a roof penthouse is the next preferred means of roof access.
   - Stair doors opening onto roofs or into mechanical penthouses shall be equipped with a self-locking lockset having free lever on the roof or mechanical area side with access by key only.
G. Roof Hatch:
   - If an elevator or stair cannot be provided for roof access, a roof hatch with a stair or ladder is the third preferred means of roof access. Where a ladder is provided for roof access, a handrail or ladder extension shall be provided as required by the applicable codes or regulations (including OSHA).
   - Provide padlocks to all roof hatches.
   - Ship's ladders shall not be used for roof access.
   - Roof hatch should not be located against an exterior wall.
H. Parapets:
   - For buildings with flat or low slope roofs, parapets shall be provided to guardrail height (42 inches above roof level) wherever possible. Where it is not possible for parapets to be provided, fall protection measures shall be provided.
   - When possible, cover parapet interior walls with single-ply roof membrane when used as roofing material. This provides a parapet-to-parapet coverage and guarantee.
I. Fall Protection:
   - Fall protection anchorages shall be provided on all roofs per OSHA
   - requirements, to remain a permanent fixture of the building.

J. Window Washing:
- Where windows cannot be accessed with a man-lift around the building to be cleaned, a window washing system shall be provided with safety tie-off anchors.

K. Roof Penetrations:
- The number of roof penetrations shall be minimized.
- Where penetrations occur, they must be a minimum of 10” above finished roof system including roof hatch.

L. Flashing:
- Design for high wind conditions.
- Provide sheet metal coping along parapet walls, including transitions, terminations, and saddle flashings. The sheet metal coping shall provide an ANSI/SPRI ES-1 wind rating. For parapet walls 32 inches or less in width, provide a kynar-coated, pre-fabricated assembly meeting the above-referenced wind-rating criteria. Design Professional shall review requirements for gauge of materials to meet the above-referenced standard.

M. Gutters:
- Gutters shall be lined.
- Screens shall be installed at all locations.

N. Roof-top Equipment:
- Avoid roof-mounted equipment where possible.
- Where unavoidable, fume hood fans, motor starters and other roof-mounted equipment shall be installed on fully flashed raised curbs. When roof mounted equipment cannot be set on curbs, allow 18 inches clearance minimum to facilitate repairs and reroofing.
- Rooftop HVAC units shall be located away from the edges of roofs to minimize visibility of the units from below, and to avoid the need for fall protection while performing maintenance.
- Special consideration shall be given to the height of HVAC equipment above the roof deck and clearances for maintenance and operation.
- Specify manufactured equipment curbs for all roof mounted equipment.
- Fill in any other info?

O. Insulation:
- A minimum of R-12 is recommended.

P. Overlayment Board:
- Recommended at plywood decks to provide a proper fire-rated roof system
- Recommended at insulated decks to protect the roof membrane and insulation from compressive failure due to excessive traffic or hail.

Q. Overflow Drainage:
- No roof draiins exiting near entrance doors
- Recommend overflow drains be incorporated at all existing roof sections as needed.

R. Walkpads:
- A walkpad layout from roof access to and around all serviceable equipment is required.

S. Waterproofing:
- Recommend utilizing a 215 mil polyester reinforced hot rubberized asphalt waterproofing system including protection board and drainage boards. System should provide a twenty year manufacturer's warranty.

T. Warranty:
- A 25+5-year manufacturer's warranty is recommended for the low sloped roofing systmes. The manufacturer's warranty should include for an 80 miles per hour wind condition.

PART B
ROOF SYSTEMS

Riverside Community College District requires a Sika Sarnafil roof system for both new construction and roof replacement for low-sloped roofing projects (membrane shall be recyclable). For steep-sloped roofing projects, either flat, two-piece clay, concrete tile, or standing seam metal roofing can be used.

The following provides guidelines for both types of roofing projects:

I. NEW CONSTRUCTION

Low-Sloped Roof Membrane System:

A. Adhered Systems:
   1. Sika Sarnafil® G410, 80-mil thick fiberglass reinforced membrane with a lacquer coating manufactured using an extrusion coating process. Membrane shall conform to ASTM D4434-96 (or latest revision), “Standard for Polyvinyl Chloride Sheet Roofing.” Classification: Type II, Grade I

B. Color of all membrane shall be “Energy Star White or Tan.” (Tan is preferred) The membrane shall have an initial solar reflectance of 83% and a corresponding emissivity of 92%. In combination, the total solar reflectance index value (SRI) of the membrane shall be 104 and meet standards of the State of California Title 24 latest requirements.

C. VOC compliant adhesive for membrane attachment.

D. Sika Sarnafil G410, 60-mil thick fiberglass reinforced membrane with a lacquer coating for base and wall flashings.

E. Polyisocyanurate rigid roof insulation board shall be used for pre-tapered systems and for meeting project R-value criteria. Insulation board shall receive a cover board minimum 1/4” thick, with a DensDeck Prime Roof Board or equal. Insulation and cover board may be mechanically attached or adhered using a Factory Mutual approved low-rise foam adhesive.

F. Penetrations shall receive either pre-fabricated boots or field-fabricated boots, including stainless steel cinch bands and sealant. The top edge of the boots shall receive a storm collar fabricated from the single-ply roof membrane and attached using a secondary cinch band and sealant.

G. Two-piece reglet and counterflashing systems including wind clips and corner pieces shall be used at wall cladding that abut roof areas, for both new and exisitng roofs.

H. The roof membrane system shall be installed in accordance with ASTM D5036.

I. Three acceptable manufacturer for underlayment: Suprema, Polyguard, Henry’s

I. NEW CONSTRUCTION (CONT'D)

Steep-Sloped Roof Systems:

A. Tile manufacturer, color, shape, style and blend of tile shall be approved on a project-by-project basis.
   1. All tile systems shall utilize a two-layer, high-temperature, self-adhering underlayment designed for use beneath tile.
   2. All tile systems shall be attached in a continuous twisted wire-tie system with accessory components.
   3. Tile clay and concrete tile roofs are acceptable for new construction at Riverside City College only (match existing for aesthetics)
   4. Gutters shall receive domed screens at downspouts and a screen system over the gutter.

B. Metal manufacturere, color, panel width, and style of standing-seam metal roof shall beapproved on a project-by-project basis.
   1. Underlayment for the standing-seam roofs shall consist of a two-layer, high-temperature, self-adhering underlayment designed specifically for beneath a standing-seam metal roof.
   2. A rosin sheet may be recommended to divorce the self-adhering membrane and the bottom side of the panels.
   3. Gutters shall receive domed screens at downspouts and a screen system over the gutter.
   4. Warranty for tile shall be 50 years.

II. ROOF REPLACEMENT

Low-Sloped Roof Membrane System:

A. Adhered Systems:
   1. Sika Sarnafil® G410, 80-mil thick fiberglass reinforced membrane with a lacquer coating manufactured using an extrusion coating process. Membrane shall conform to ASTM D4434-96 (or latest revision), “Standard for Polyvinyl Chloride Sheet Roofing.” Classification: Type II, Grade I

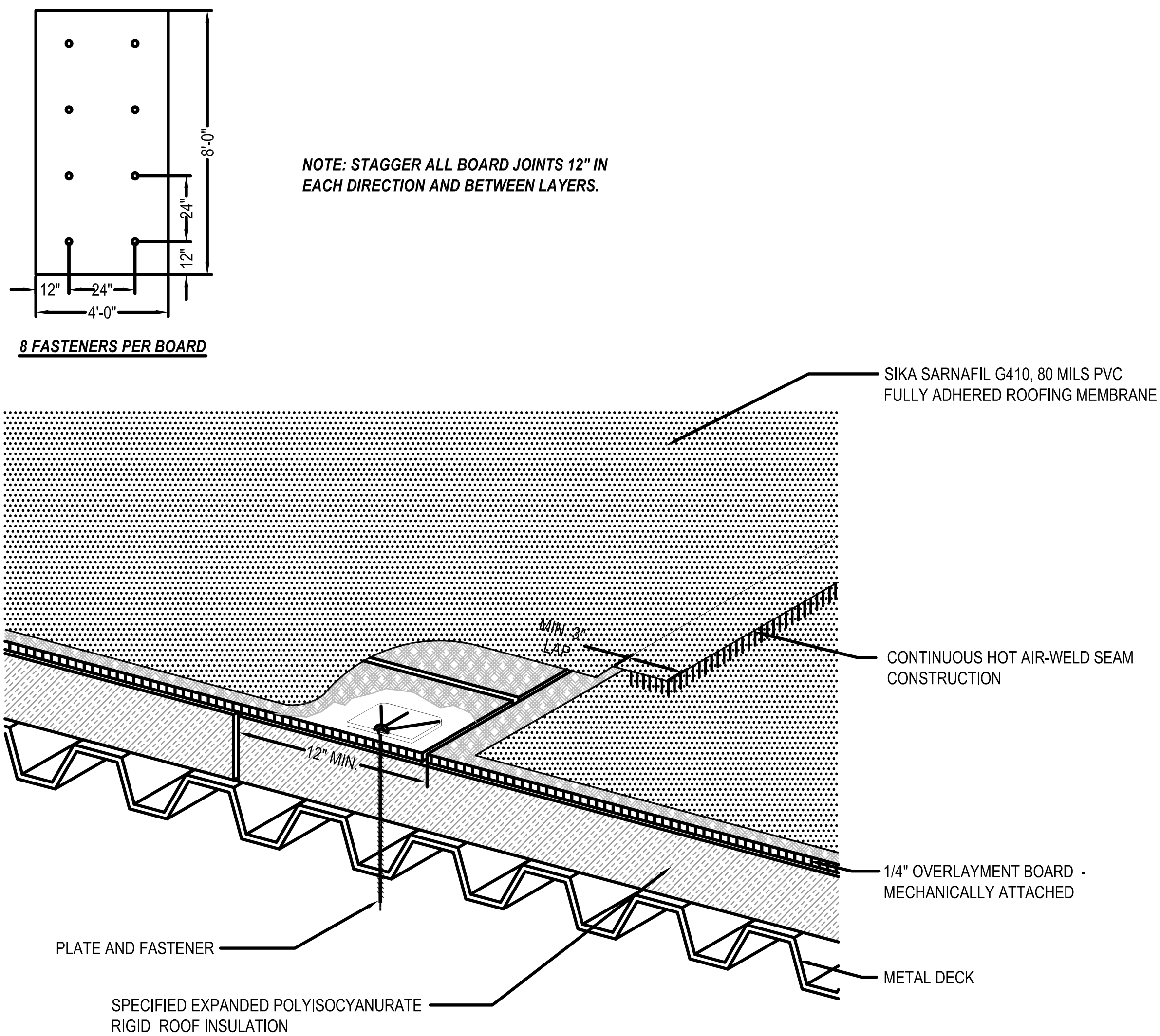
B. Color of all membrane shall be “Energy Star White or Tan.” (Tan is preferred) The membrane shall have an initial solar reflectance of 83% and a corresponding emissivity of 92%. In combination the total solar reflectance index value (SRI) of the membrane shall be 104 and meet standards of the State of California Title 24 latest requirements.

Low-Sloped Roof Membrane System (cont'd):

C. VOC compliant adhesive for membrane attachment.
D. Sika Sarnafil G410, 60-mil thick fiberglass reinforced membrane with a lacquer coating for base and wall flashings.
E. All gravel roof shall be replaced when they are in failure mode
F. A feasibilty study is required to evaluate the viability of renovation or replacement of roofs.
G. Design Professional shall perform a visual inspection of the existing roof and document the following as part of the feasibility study:
    1. Existing slope and overall drainage of the roof. Roof replacements require a minimum 1/4" per foot positive slope throughout the roof. Elevations of existing walls and units need to be reviewed in conjunction with adding the new required slope.
    2. Existing roof drain bowls. Identify overflow drains and/or scuppers.
    3. Environmental related materials located on the roof.
    4. Existing elevations of curbs, pipes, etc. that may need to be modified to achieve a minimum 10" elevation above the roof membrane elevation.
    5. Review existing mechanical units and their current condition and efficiency.
    6. Review interior of building to identify prior leak areas and potential damage to the existing substrates.
    7. Field test cuts should be taken down to the deck to identify the number of roof systems, etc.
    8. Identify existing R-value of insulation either above the roof or below the roof; additional insulation may be required. Consideration should be given at decks with no insulation to incorporate in the design a new minimum R-12 insulation and cover board.
    9. Pre-painted sheet metal copings should be utilized at all parapet walls, including termination saddle flashings.
    10. Access ACM and abatement requirements.
    11. Existing cast iron roof drawins attached to drain pipe wtih solder shall incorporate Sika Sarnafil retrofit roof drain, RAC.
    12. Roof system shall provide for A 25+5 year manufacturers warranty.

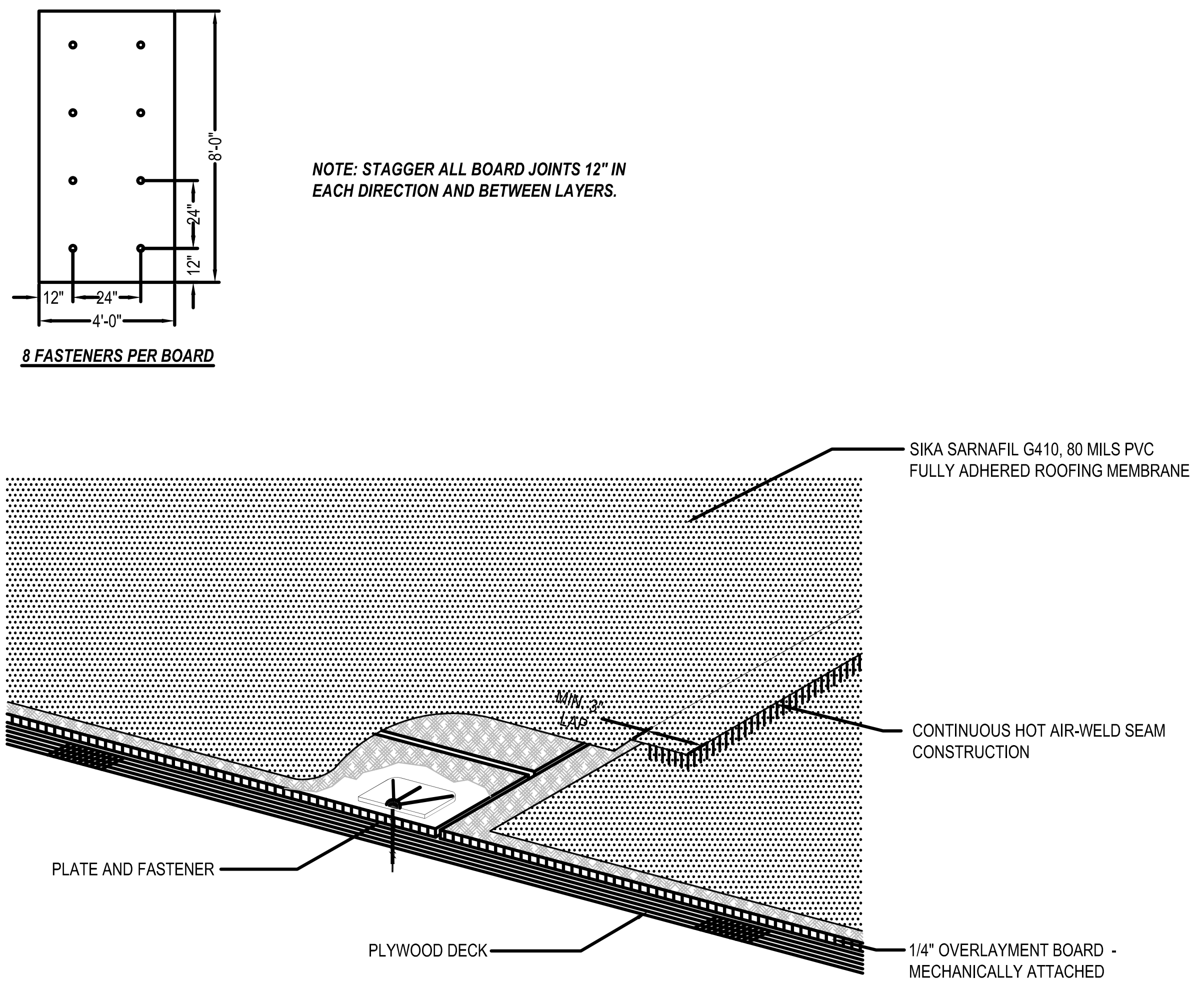
PART B
TYPICAL DETAILS

SCALE: N.T.S.



Typical Single-Ply Cross Section at Metal Substrate

SCALE: N.T.S.



Typical Single-Ply Cross Section at Plywood Substrate

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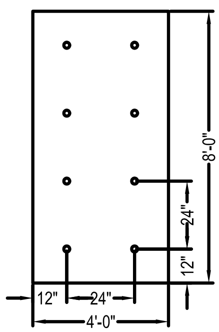
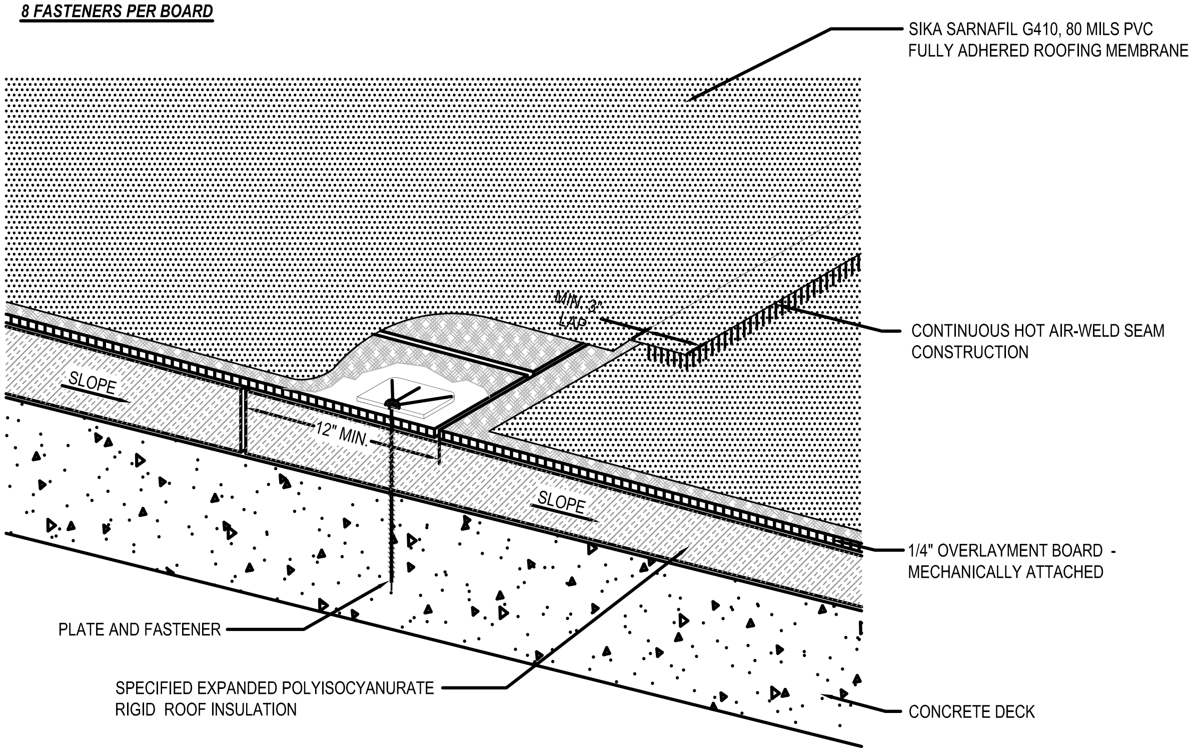


8 FASTENERS PER BOARD

NOTE: STAGGER ALL BOARD JOINTS 12" IN EACH DIRECTION AND BETWEEN LAYERS.



Typical Single-Ply Cross Section at Concrete Substrate

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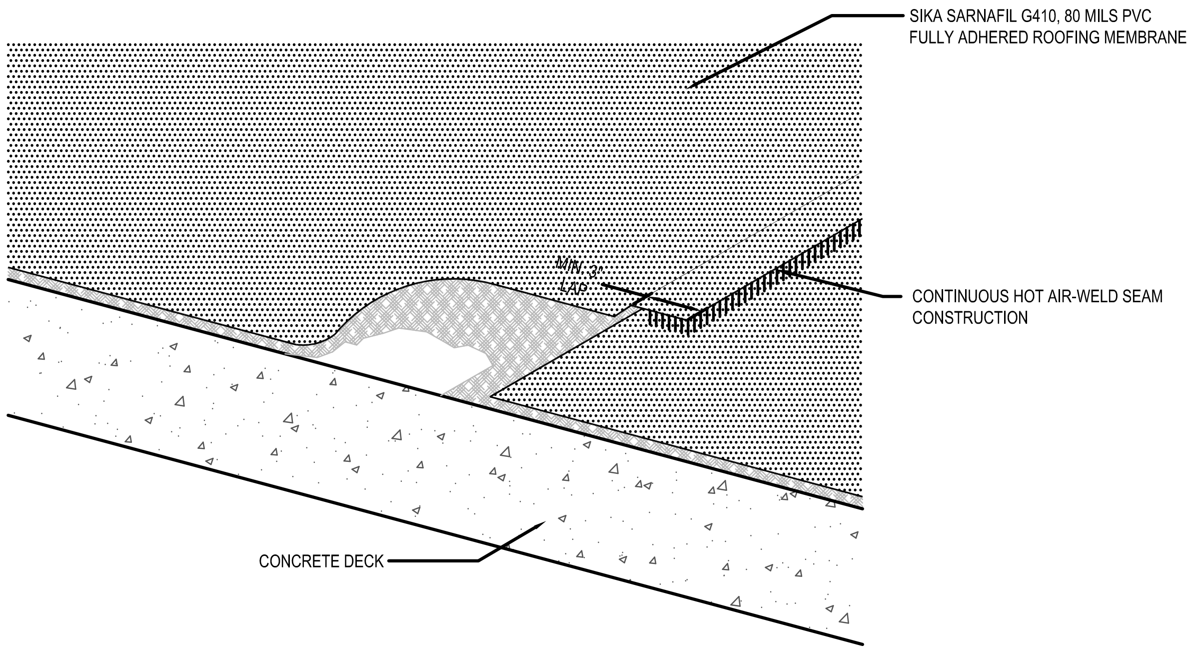

Typical Single-Ply Cross Section at Concrete Substrate

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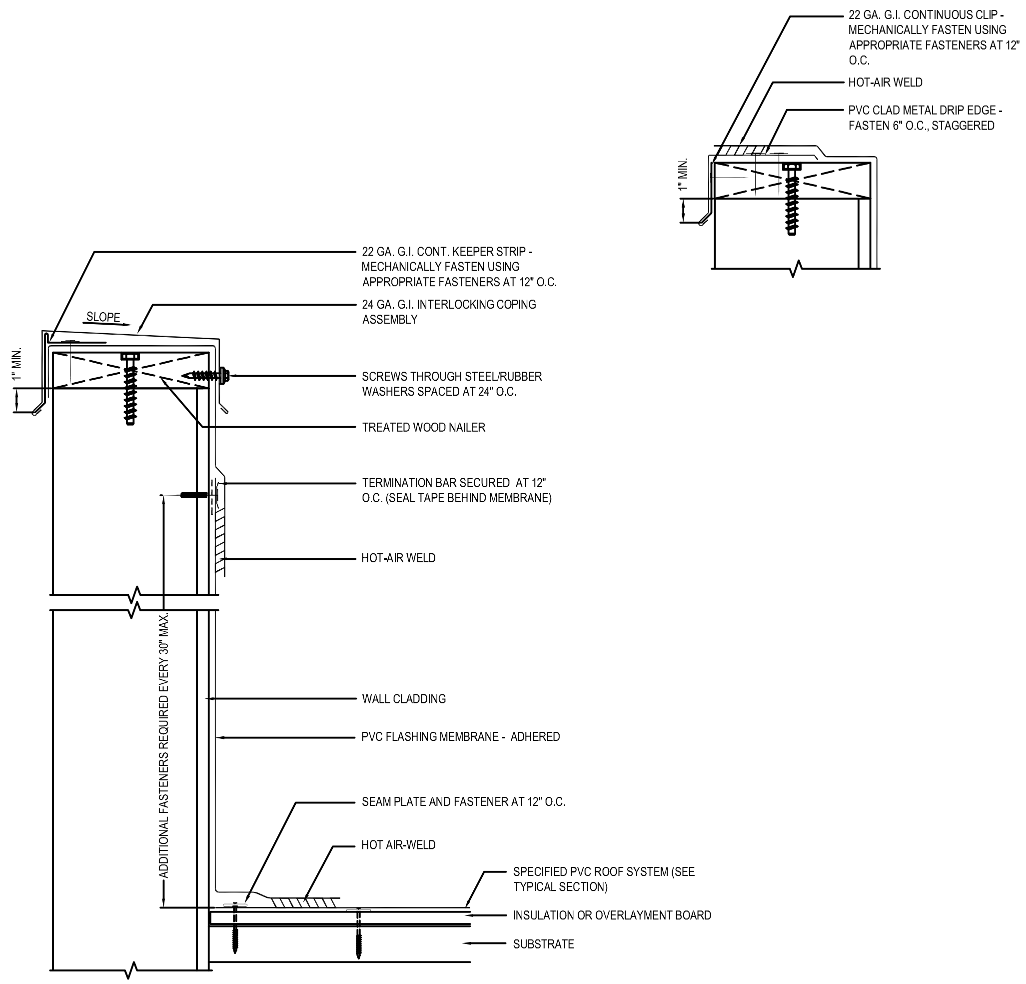

Base flashing at Parapet Wall

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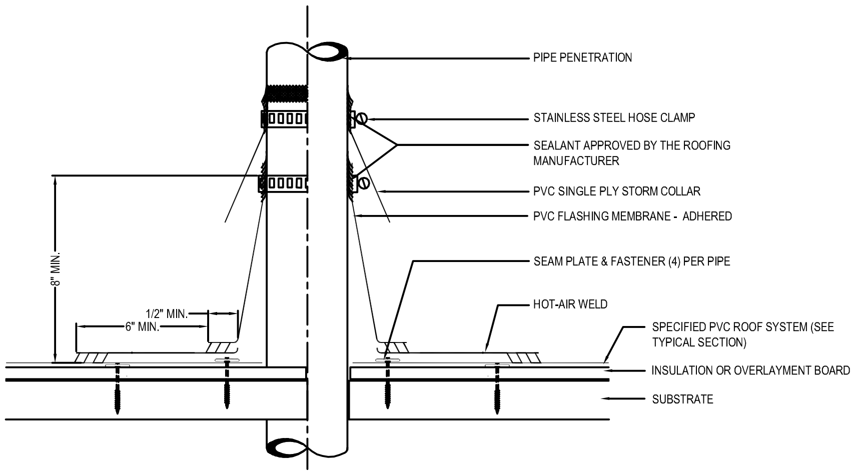
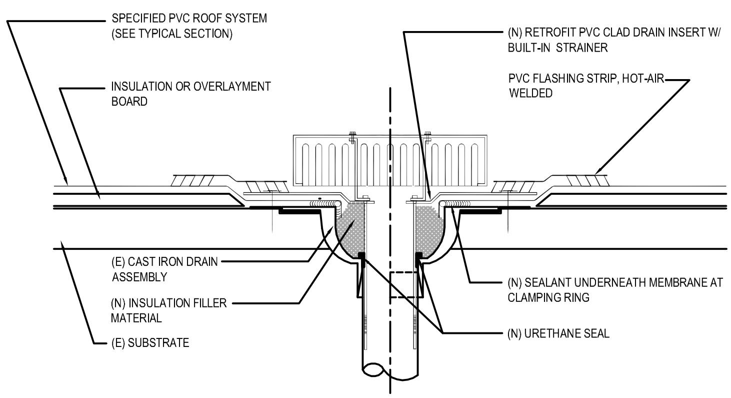


Cone (Pre-fabricated) Curb

NOTE:
1. ***AT LOCATIONS WHERE EXISTING BOWL DOES NOT HAVE NECK.***
2. ***AFTER COMPLETE INSTALLATION OF THE ROOFING SYSTEM, CONTRACTOR SHALL INSPECT AND TEST ALL ROOF DRAINS TO ASSURE THAT NO CLOGGING OF THE DRAINAGE SYSTEM IS PRESENT. THE ROOF DRAIN LEADER SHOULD BE IN SUCH CONDITION THAT THE FULL DIAMETER OF THE DRAIN LEADER IS CLEAR.***



Flashing at Retrofit Roof Drain

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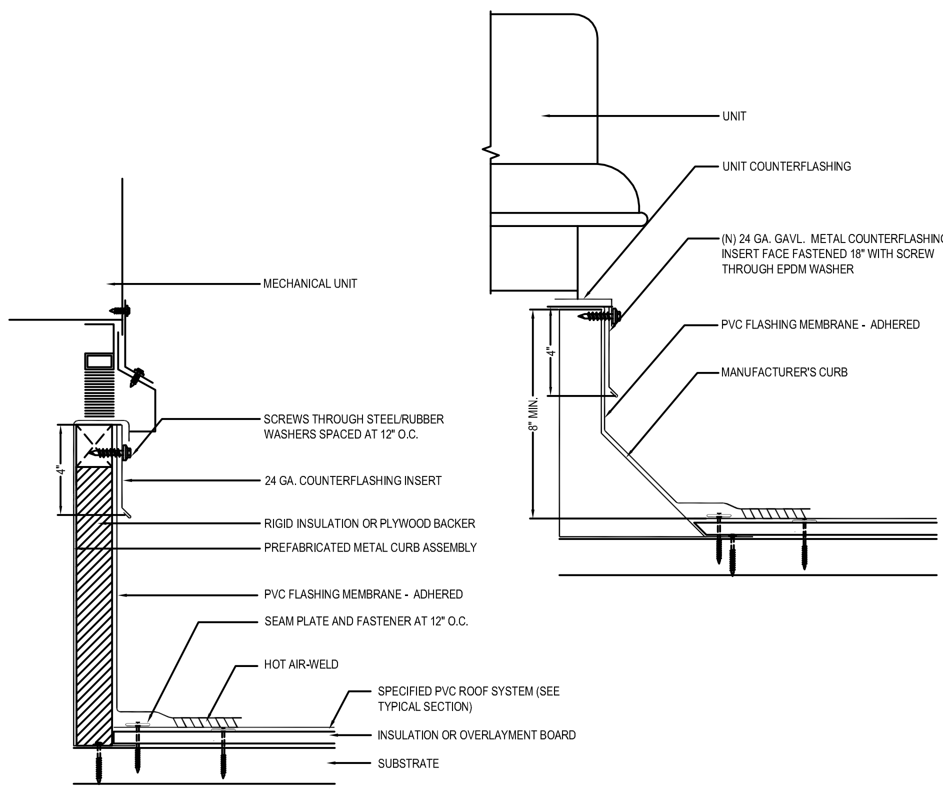

Base flashing at Pre-fabricated Curb

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SECTION 12

MORENO VALLEY COLLEGE

PART A
EXISTING CONDITIONS

DATE OF SITE INVESTIGATION:

December 16, 2011

SITE REPRESENTATIVES:

Dale Barajas, Facilities Director

- Mr. Barajas has been using Sika Sarnafil roof systems for the past several roof replacements and has been satisfied with the single-ply roof membrane. He did suggest that walkpad materials be properly placed at roof systems, as the membrane is slippery when wet. (Photographs #1 + #2)
- Prior to using the Sika Sarnafil roof systems, the Science and Technology Building used a Tremco white rock, cold-processed roof system for the roof replacement. (Photograph #3)
- All of the low-sloped roofs at the campus consist of a gravel-surfaced built-up roof system. Some of the buildings consist of a low-sloped roof system and a steep-sloped roof system with concrete flat tile. (Photographs #4 + #5)
- At one location on campus, a split-slab waterproofing membrane was found to be located beneath a concrete topping slab. (Photograph #6)

The photographs on the following pages document observations:

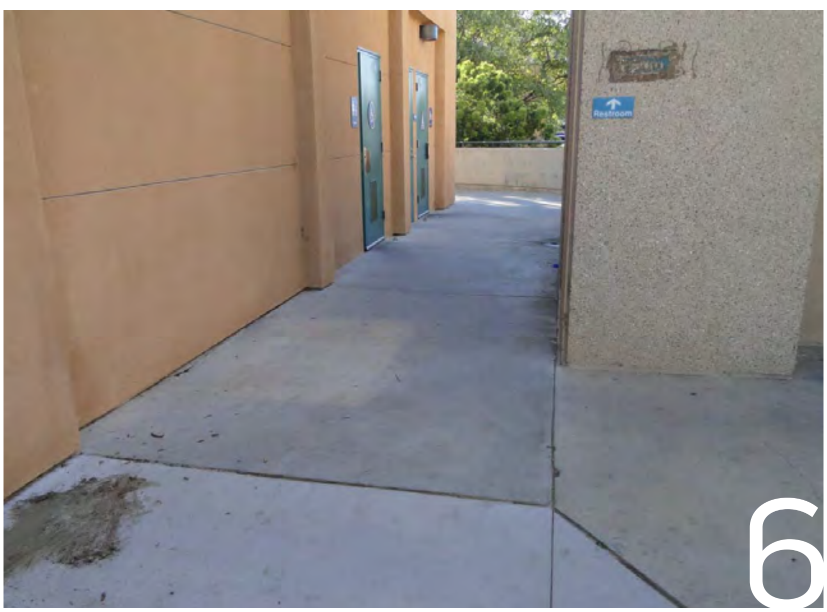
- Walkpads were recommended on existing roof areas, as membrane is slippery when wet.

- General overview of roofing system.

- Example of Tremco white rock cold-processed roof system.

- Gravel-surfaced roof system at low-sloped roof area.

- Example of steep-sloped roof system with concrete flat tile.



- Split-slab waterproofing was found beneath concrete topping slab.

- Pre-cast panel joint sealant was found open or extremely weathered.

- Pre-cast panel joint sealant was found open or extremely weathered.

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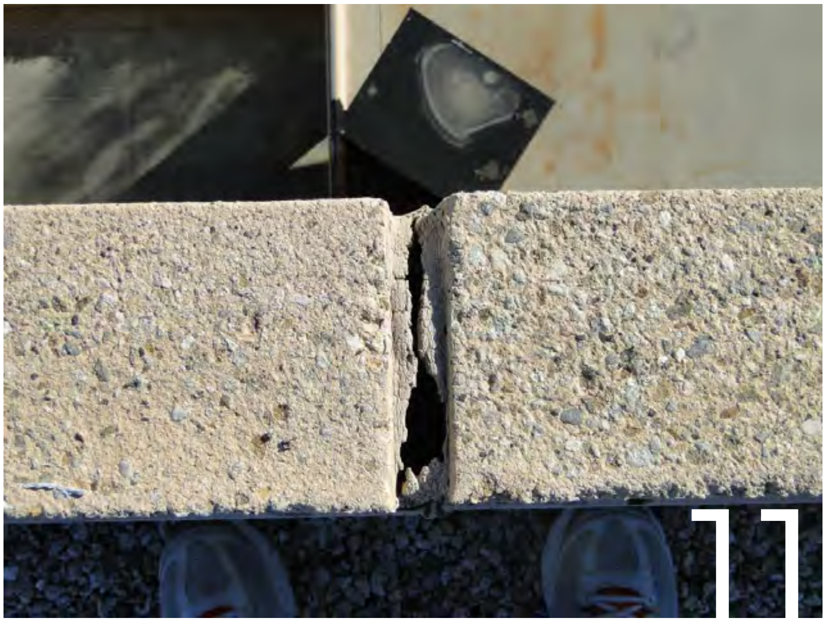
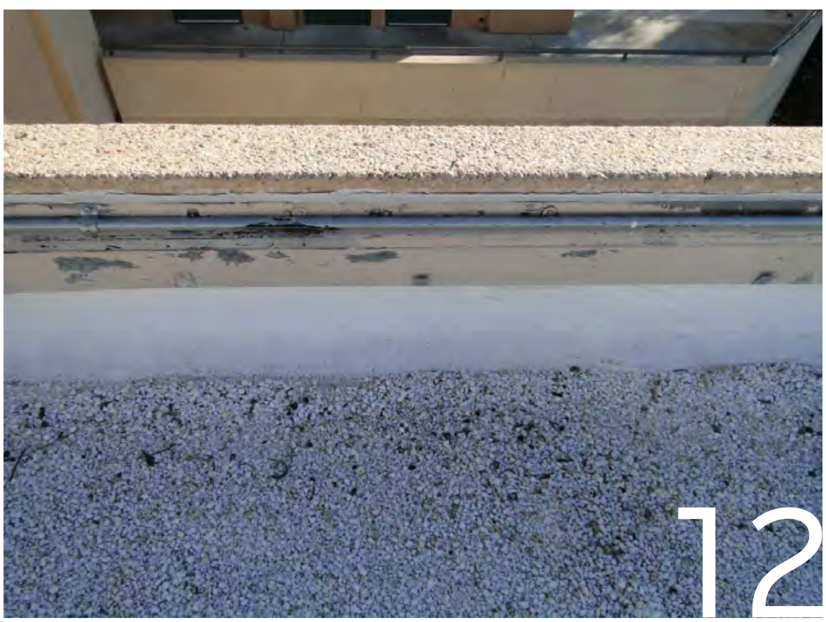
- Pre-cast panel joint sealant was found open or extremely weathered.

10

- Pre-cast panel joint sealant was found open or extremely weathered.



- Pre-cast panel joint sealant was found open or extremely weathered.



- Surface-mounted reglet and counterflashing found at most low parapet walls.

13

- Cast iron ring-and-bowl main and secondary roof drain assemblies were noted at each roof.

14

- Leaf debris from adjacent trees was noted on most roof areas.

- Fallen base flashing at roof hatch at Student Services Building - due to lack of fastening.

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END OF SECTION 12 - MORENO VALLEY COLLEGE

SECTION 12
NORCO COLLEGE

PART A
EXISTING CONDITIONS

DATE OF SITE INVESTIGATION:

December 14, 2011

SITE REPRESENTATIVES:

Steve Monsanto, Facilities Director

- Mr. Monsanto prefers to utilize a Sika Sarnafil roof system as they have been using the system on recent roof replacement over the last several years. Mr. Monsanto stated that all roofs should provide positive slope and that additional insulation R-value should be considered.

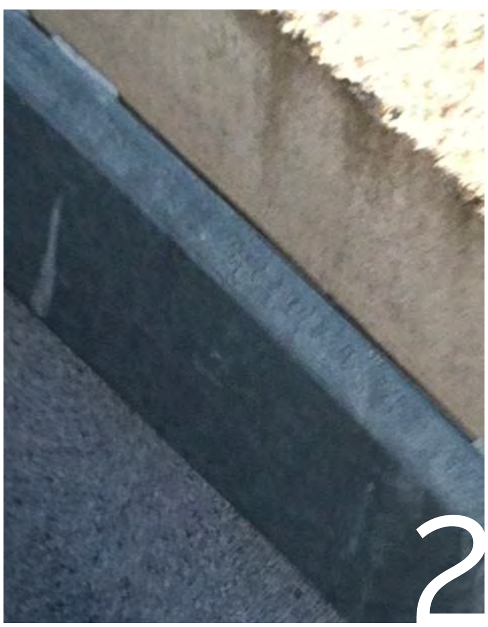
- The roof system on the Bookstore (BK), Industrial Technology Building (IT), and Center for Student Success Building (CSS) have been replaced with a Sika Sarnafil roof system. At each building, the roof membrane extends up the parapet walls and across the top of the wall, with a sheet metal coping has been installed along the top of the parapet walls.

- All of the low-sloped roofs at the campus consist of a gravel-surfaced built-up roof system. Many of the buildings combine a low-sloped roof with a steep-slope concrete flat tile system. At the steep-slope roofs, an internal gutter is used to evacuate water.

The Humanities (HUM), Little Theater (THR), and Science +Technology Building (ST) were reviewed. The Science +Technology Building (ST) and Humanities Building (HUM) are currently being re-roofed using cold applied bitumen roofing and standing seam metal roof panels at canopies.

The photographs on the following pages document onservations.

- Pitch pans are in need of immediate maintenance.



- Sheet metal system at parapet wall is pulling out of the wall, and sealant is extremely weathered.

- Pre-cast concrete panel sealant joints are open from movement, or have failed due to weathering.

- Pre-cast concrete panel sealant joints are open from movement, or havefailed due to weathering.

- Pre-fabricated mechanical unit curb has not been properly tied into the existing roof system.

- Lead flashing around overflow pipe is open at top edge.

- A pre-fabricated bellow expansion joint system between the two roof sections was found with openings from the bellows to the wall. A sheet metal counterflashing should have been incorporated.

- Multiple pipe penetrations through a single pipe flashing. This is improper.

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END OF SECTION 12 - NORCO COLLEGE

SECTION 12

RIVERSIDE CITY COLLEGE

PART A
EXISTING CONDITIONS

DATE OF INVESTIGATION:

January 11, 2012

SITE REPRESENTATIVES:

Scott Zwart, Facilities Maintenance Manager

Mr. Zwart has been using a 72-mil Sika Sarnafil roof system for the past 10 roof replacements and has been satisfied with the single-ply roof membrane. At the Huntley Facility and the Martin Luther King Facility, a gravel-surfaced Tremco roof system was used prior to the Sika Sarnafil roof history. There are approximately nine (9) roof replacements remaining at the campus. Each of these roofs' currently have a gravel-surfaced built-up roof system.

Mr. Zwart recommended the following for consideration during roof replacements:

1. Provide a minimum 1/4" per foot slope by using pre-tapered insulation. Each roof would need to be evaluated for the overall impact of the increase in slope versus cost.
2. Increase R-value during roof replacement to an R-12.
3. The existing cast iron ring-and-bowl roof drains should be evaluated for possible replacement of the drain or use of retrofit type drains.
4. Overflow drainage should always be considered if not already existing.
5. A 20-year Manufacturer's Warranty could be provided.
6. Flashings should be designed to accommodate high-wind conditions.

The roof system on the Eleanor H. Crabtree Pilates Studio and on the Cosmetology Building was reviewed. Photographs on the following pages document observations.

I. ELEANOR H. CRABTREE PILATES STUDIO

- General view of field membrane and parapet walls on the Eleanor H. Crabtree Building.

3

4


5

II. COSMETOLOGY BUILDING

- General view of field membrane and details.


9

- Roof-mounted HVAC equipment


10

- Parapet

- Roof drain

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END OF SECTION 12 - RIVERSIDE CITY COLLEGE

13 DOORS + HARDWARE

RIVERSIDE COMMUNITY COLLEGE DISTRICT - DISTRICT STANDARDS + CAMPUS GUIDELINES HANDBOOK

INTRODUCTION

The information provided in this section comprises guidelines and standards for doors and door hardware. Green text in this section denotes information that relates to sustainability or contributes to LEED points.

PART A
BEST PRACTICES

Below are general best practices items that should be reviewed or verified when specifying doors and hardware:

A. Design professionals should comply with current applicable codes.
   - UBC, CBC, and NFPA Sections that apply to new construction or alterations.

B. Coordinate with a professional hardware consultant.
   - Refer to door hardware recommendations in the following pages. Or contact an ASSA ABBLOY representative.

C. Refer to Section 2 for Universal Design Strategies that relate to ADA access.

D. Coordinate with fire life safety drawings
   - Coordinate with design professional to determine egress path of travel to specify panic hardware

E. Coordinate with security drawings
   - Door hardware selection should be selected with consideration with security drawings.

F. Door ratings
   - Refer to construction drawings and coordinate door ratings with wall ratings as required by applicable codes.

G. Verify that all door hardware is ADA compliant
   - Avoid using any hardware component that requires that users apply tight pinching or grasping.
   - Use accessible door handles that are lever-type and push-pull handles.
   - Install automatic openers where applicable
   - Door pressures to be adjusted to 8.5 pounds for exterior pressure and no more than 5 pounds for interior restroom doors.

H. Door widths
   - Minimum door widths is 32 inches.

I. Door threshold
   - Maximum allowable change in elevation at a door threshold is 1/4” vertical rise or a beveled 1/2”.

J. Door swing
   - Door swing should not encroach into a clear floor space unless applicable codes allow such movement.

Div 8

OPENINGS

08 10 00 DOORS AND FRAMES

- Contact ASSA ABLOY Door Security Solutions of Southern California for assistance in preparing specifications for Doors and Frames on all District projects.

- Sustainability: Basis of design to conform with of the California Green Building Standards Code, "CALGreen", California Code of Regulations Title 24, Part II, published by the California Building Standards Commision, 2010 Edition, or current verision.
  - Doors and Hardware, where applicable, shall comply with the following:
    - CBC Section 01350 – Special Environmental Requirements.
    - GREENGuard certification for Children and Schools.
    - ASHRAE 189.1 – 8.4.7.6 Ceilings and Walls
  - Include applicable openings into Energy Modeling requirements.

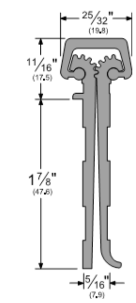
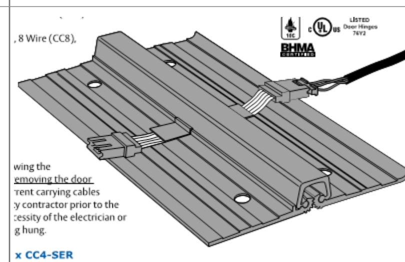
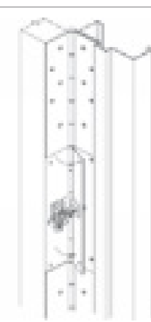
- Exterior Swinging Doors with Builders Hardware:
  - Storefront/Curtainwall:
    - Manufacturer and style will be selected on a project-by-project basis.
    - Storefront doors to have wide stiles to accommodate standard mortise locks and rim style exit devices.
  - Hollow metal frames:
    - Ceco, Curries, or Security Metal Products
    - Minimum 14-Gauge A60 galvanized steel, continuous weld
  - Hollow metal doors:
    - Ceco Trio-E or Curries 777 Trio-E Series
    - Minimum 1-3/4" thick 16-gauge A60 galvanized steel, closed top, welded

- Interior Swinging Doors with Builders Hardware:
  - Aluminum door frames/sidelights:
    - Frameworks Type 2, knock down frame system
  - Hollow metal frames:
    - Ceco, Curries or Security Metal Products
    - Minimum 16-Gauge cold rolled steel, continuous weld
  - Hollow metal doors:
    - Ceco Medallion or Curries 747 Series
    - Minimum 1-3/4" thick 18-gauge cold rolled steel
  - Solid core wood doors:
    - Maiman Thermal Fused
    - Minimum 1-3/4" thick

maybe create a matrix?

08 71 00 DOOR HARDWARE

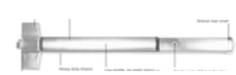
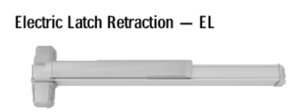
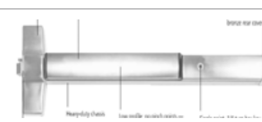
- Contact ASSA ABLOY Door Security Solutions of Southern California for assistance in preparing specifications for Door Hardware on all District projects.

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
HINGES	Exterior	Continuous Geared Aluminum Hinges Pemko CFM_HD1 Series or McKinney MCK25HD1 Series	Aluminum Storefront, Curtainwall and/or High Frequency/ High Use Doors	
	Exterior Electrified Hardware	Pemko CFM_ HD1_CC_ SER Continuous Geared Aluminum Power Transfer Hinge	Aluminum Storefront, Curtainwall and/or High Frequency/ High Use Doors	
	Exterior	Continuous Stainless Steel Pin & Barrel Hinges Markar 300 Series or McKinney MCK_300 Series	Hollow Metal and/or High frequency/ High Use Doors	
	Exterior Electrified Hardware	Continuous Stainless Steel Pin & Barrel Hinges Markar 300 Series x EL x MP-ETAP or McKinney MCK_300 Series x EL x MP-ETAP	Hollow Metal and/or High frequency/ High Use Doors	

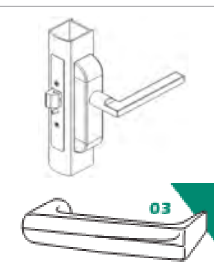
08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
HINGES	Interior	McKinney TA714/ TA786, Size as required	Concealed Bearings (for windy/sandy environment)	
	Interior Electrified Hardware	McKinney TA714-QC-CCS/ TA786-QC-CCS	Wood doors where ElectoLynx cable not used	
POWER TRANSFERS	Electrified Hardware	McKinney "QC" ElectroLynx Power Transfer Cables Securitron CEPT	Access Control and/or Automatic Operators	
POWER SUPPLIES	Electrified Hardware	Securitron AccuPower Series	Where power not supplied by Access Control panel	
KEY SYSTEM CYLINDERS	General	Corbin 59A1 Keyway <u>No Substitutions Allowed</u>	No IC Cores	
KEY CABINETS	General	HPC, Lund or Telkee, as required	Only required on larger projects	

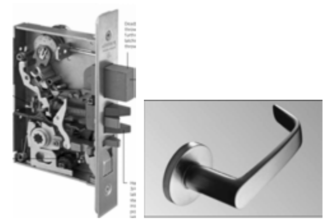
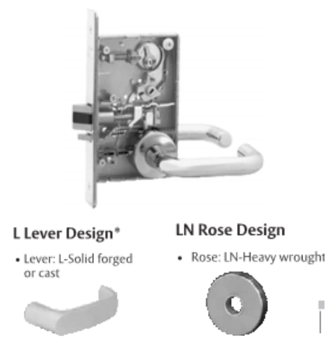
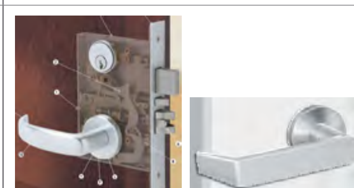
08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
what about exterior trim - RCC mentioned 994 L-R+V-US26D? EXIT DEVICES	Exterior + Interior	Von Duprin XP98/XP99 Series x AM (Anti-Microbial finish) Design Standard	Cylinder Dogging required (confirm handing prior to ordering)	
		Sargent 43-80 Series x SG (Anti-Microbial finish)	Cylinder Dogging required (confirm handing prior to ordering)	
		Corbin ED5200 Series x M110 x AM (Anti-Microbial Finish)	Cylinder Dogging required (confirm handing prior to ordering)	
ELECTRIFIED LATCH RETRACTION EXIT DEVICES	Exterior + Interior	Von Duprin XP98/XP99 QEL Series x AM (Anti-Microbial finish) Design Standard	Electrified Dogging where required	
		Sargent 43-56-80 Series x SG (Anti-Microbial finish)	Electrified Dogging where required	
		Corbin ED5200 Series x M110 x M94 x AM (Anti-Microbial Finish)	Electrified Dogging where required	 Electric Latch Pullback - M94

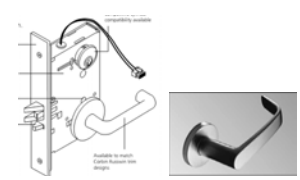
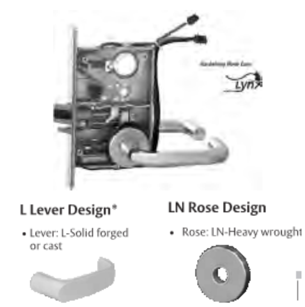
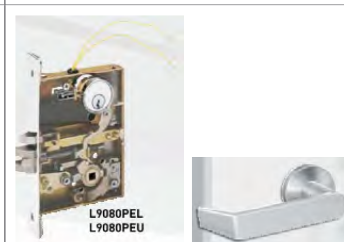
08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
REMOVABLE MULLIONS	Exterior + Interior Pairs	Von Duprin KR4954/KR9954 Series Design Standard	Keyed Cylinder required to remove	
		Sargent L980S/12-L980S Series	Keyed Cylinder required to remove	
		Corbin 900/900A Series	Keyed Cylinder required to remove	
NARROW STILE LOCKSETS	Exterior Aluminum Narrow Stile Doors	Adams Rite "MS" or 2190 Series Locksets	Aluminum Storefronts	
	Interior Aluminum Narrow Stile Doors	Adams Rite 4600 Series Locksets	Aluminum Storefronts	

08 71 00 DOOR HARDWARE (CONTINUED)

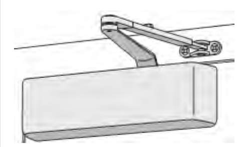
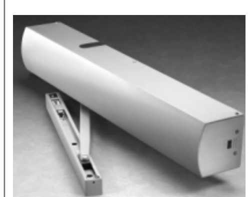
HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
MORTISE LOCKSETS	Interior + Exterior	Corbin ML2000 Series Newport NSA Lever Design Standard	Curved Lipped Strikes required	
		Sargent 8200 Series LNL Lever	Curved Lipped Strikes required	
		Schlage LV9000 Series 06A Lever	Curved Lipped Strikes required	
ELECTRIFIED NARROW STILE LOCKSETS	Exterior Aluminum Narrow Stile Doors	Adams Rite e-Force Series Proximity Reader	Exterior Aluminum Storefronts	
	Interior Aluminum Narrow Stile Doors	Adams Rite 4200 eLatch Series	Interior Aluminum Storefronts	

08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
ELECTRIFIED MORTISE LOCKSETS	Interior + Exterior	Corbin ML20900 ECL Series Newport NSA Lever Design Standard	Curved Lipped Strikes required	
		Sargent 8271/8272 LNL Lever	Curved Lipped Strikes required	
		Schlage L9080PEL L9080PEU 06A Lever	Curved Lipped Strikes required	
FLOOR CLOSERS AND PIVOTS	Option for Storefront/ Curtainwall	Rixson PH27 Series M19 Intermediate Pivot or PH28 Series, as required	Heavy Doors	

picture shows 6200 regular arm mounting

08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
RCC has been using DC6210-689 parallel arm mounting heavy duty, should we be more specific? SURFACE CLOSERS	Interior Doors	Corbin DC6200 Series Design Standard	Cast Iron Body	
		Sargent 281 Series	Cast Iron Body	
		LCN XP4040 Series	Cast Iron Body	
LOW ENERGY POWER OPERATORS	ADA Openings	Norton 5900 Series Besam SW200i Series	Accessible openings or where 5-lbs. opening force cannot be achieved with mechanical closer	
COORDINATORS	Interior Fire-Rated Pair	Rockwood 2600 Series	Pairs of Doors with Astragal	
MANUAL FLUSHBOLTS	Interior Non-Rated Pair	Rockwood 550	Pairs of doors	

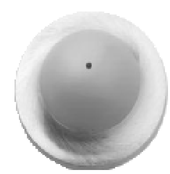
08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
AUTOMATIC FLUSH BOLTS	Interior Fire-Rated Wood Pair	Rockwood 1960 (20-minute) Rockwood 1962 (Up to 90-Minutes)	Pairs of Doors	
	Interior Fire-Rated Hollow Metal Pair	Rockwood 1848/2842 (Up to 3-Hours)	Pairs of Doors	
DUST PROOF STRIKE	Interior Non-Rated Pair	Rockwood 570	Where bottom bolts used	
ENTRANCE PULLS	Exterior Storefront or Curtainwall	Rockwood MegaCurve RM200 series, or approved equal	Selected on a Project-by-Project basis	

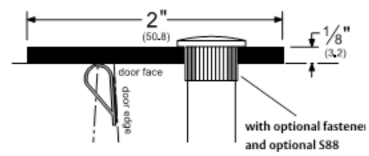
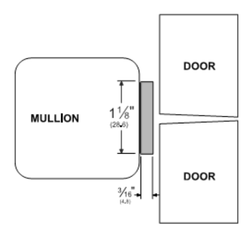
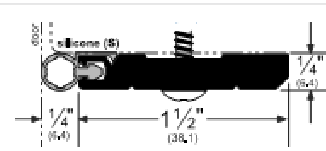
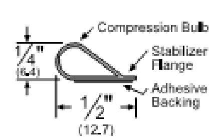
08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
ANTI-VANDAL PULLS	Exterior Hollow Metal Doors with Exit Devices or Mortise Locks	Rockwood VRT24/ VRT26 with MicroShield antimicrobial coating	VRT24 @ outswing doors with mortise latchbolt VRT26 @ Rim Panics or inswing doors	 No. VRT24  No. VRT26
LATCH GUARDS	Exterior Doors with mortise latchbolt	Rockwood 325	Outswing doors where Vandal Pull not applicable	
PUSH & PULL PLATES	Exterior & Interior Multi-Occupant Restrooms	Rockwood 111 x 73 Series with MicroShield antimicrobial coating	Auxillary classroom deadlock required	
KICKPLATES	Doors with Closers	Rockwood K1050/K1050F	Installed on push side minimum of 10-inches high	 Kick Plate 6" to 12"h x 48"w

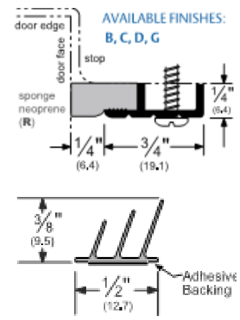
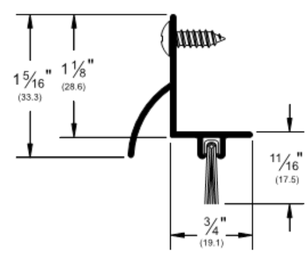
08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
FLOOR STOPS	Exterior	Rockwood 466	Mount no greater than 4-inches from wall	
	Interior	Rockwood 481	Mount no greater than 4-inches from wall	
WALL STOPS	General	Rockwood 400	Where floor stop not applicable	
OVERHEAD STOP AND HOLDERS	Exterior Concealed	Rockwood 400 Rockwood 11000	Where floor or wall stop not applicable	
	Interior Surface	Rockwood 19000 Rixson 9 Series	Where floor or wall stop not applicable	
ELECTRO-MAGNETIC HOLDERS	Hold-Open Fire-Rated Doors	Rixson 990 Series	Doors requiring automatic closing	
COAT HOOKS	General	Rockwood 796	Single Occupant Restrooms and Offices	

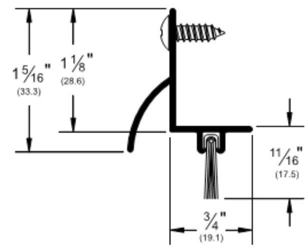
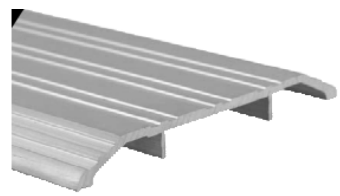
08 71 00 DOOR HARDWARE (CONTINUED)

<table>
<tr><th>HARDWARE TYPE</th><th>USE</th><th>DESCRIPTION</th><th>NOTES</th><th>CATALOG CUTS</th></tr>
<tr><td>SILENCERS</td><td>Interior Non-Rated Door Frames</td><td>Rockwood 608</td><td>At all Hollow Metal frames with no seals</td><td></td></tr>
<tr><td>FLAT ASTRAGAL</td><td>Exterior Pairs</td><td>Pemko 357SP</td><td>Requires coordinator</td><td>
</td></tr>
<tr><td>MEETING STILE SPLIT ASTRAGALS</td><td>Interior Pairs</td><td>Pemko 29310_S, 29324_NB, as required</td><td>Both leaves active</td><td>
</td></tr>
<tr><td>MULLION SEAL</td><td>Exterior Pairs</td><td>Pemko 5110BL</td><td>At removable mullion with panic devices</td><td>
</td></tr>
<tr><td rowspan="2">HEAD AND JAMB SEALS</td><td>Exterior</td><td>Pemko 2891_S, as required per detail by architect</td><td>Do not cut for closer bracket or panic strike</td><td>
</td></tr>
<tr><td>Interior</td><td>Pemko S88</td><td>Color selected by Architect</td><td>
</td></tr>
</table>

08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
SOUND SEALS	Interior Sound Doors	Pemko 312_R, S773, or as required per by acoustical door manufacturer	Sound Insulated or STC Rated openings	
AUTOMATIC DOOR BOTTOMS	Interior Sound Doors	Pemko 434_RL, as required or per acoustical door manufacturer	Sound Insulated or STC Rated openings	
DOOR SWEEPS	Exterior	Pemko 2230_NB, or as required per detail by architect	Exterior envelope protection	

08 71 00 DOOR HARDWARE (CONTINUED)

HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
DOOR BOTTOMS	Exterior	Pemko 216_FG, as required per detail by architect	Exterior envelope protection	
SADDLE THRESHOLD OR ASSEMBLIES	Exterior	Pemko, as required per detail by architect	Exterior envelope protection	

END OF SECTION 13

14 ELECTRONIC SAFETY, SECURITY + ACCESS CONTROL

INTRODUCTION

The information provided in this section are reference guidelines for project's architects, engineers and other consultants that address District Standards security concerns and the District fire alarm system for new and renovation projects on each campus. The information contained in this section also describes functional requirements for each of the sub-systems that forms the District-wide communication system that integrates the analog and IP devices using a shared platform so safety or security events are tracked instantaneously.

27 32 26 RING-DOWN EMERGENCY TELEPHONES
28 10 00 ACCESS CONTROL LOCKS
28 20 00 ELECTRONIC SURVEILLANCE
28 31 00 FIRE DETECTION AND ALARM

Refer to Section 2 Part C1

ELECTRONIC SAFETY,SECURITY + ACCESS CONTROL

BEST PRACTICES

All exterior doors and doors that lead to sensitive areas shall have card readers.

A. Access Control - C-Cure System requirements/standards (Software house)
B. CCTV:
   - Perimeter doors (location specific exterior and interior cameras)
   - Perimeter doors open 24/7 to the public – provide interior camera
   - Stairwells (interior and exterior)
   - Lowlit pedestrian areas – IR daylight camera
   - Designated security areas
C. Streaming video (live viewing) versus viewing of data recorded on DVRs:
   - It is clear there are bandwidth issues with streaming video.
D. Partitioning of campus servers
E. Partitioning of district server to link in all three campuses
F. Code Blue emergency phone specs and when to use the version with integrated camera.
G. Card reader specifications:
   - “armored” version for high security areas
   - Built-in change key

*Note: The current scope of this *Handbook* does not include comprehensive development of the design guidelines and Standards. In the future, it is highly recommended that this section be completed.

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Div 27

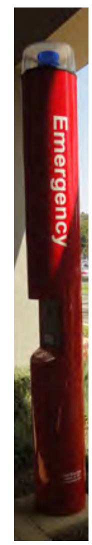
COMMUNICATIONS

27 32 26 RING-DOWN EMERGENCY TELEPHONES

DESCRIPTION

Pedestal - interactive public address communication unit

Manufacturer/ Model:	Code Blue 1-standard (PAS 1-d) 24v LED combo beacon/strobe pedestal mount
Faceplate:	IP5000 VOIP with FP1: standard faceplate assembly with single red push for help.
Finish:	Standard painted finish
Color:	Cardinal Red
Graphics text:	“Emergency”
Graphics color:	Reflective White
Main Bezel:	“Emergency” (raised letters with Braille)
Power:	**Standard method:** Provide PoE for connectivity to College VOIP network switch and factory extractor to power built-in LED lights and strobe. *Where excessive run length requires fiber in lieu of Cat 6 PoE:* Provide factory NightCharge uninterruptable power supply (UPS) system and factory fiber-to-copper converter modules. Provide 120v power source.



Wall-mounted - interactive voice communication unit

Manufacturer/ Model:	Code Blue 6-standard (CB 6) 24v AC wall mount
Faceplate:	IP5000 VOIP with FP1: standard faceplate assembly with single red push for help.
Finish:	High-density polyethylene
Color:	Safety Yellow
Graphics text:	“Emergency”
Graphics color:	Black
Power:	24v AC @ 5.5w max

LED combination strobe kit

Manufacturer/ Model:	Code Blue Remote mount combination LED beacon/strobe kit
Finish:	Heavy duty stainless steel
Mount:	Wall mount, pole mount placement if necessary
Power:	Low voltage LED

Communication manager

Manufacturer/ Model:	Code Blue Toolvox
Mount:	4U rack mount chassis
Capacity:	2GB RAM w/DVD-ROM, onboard LAN, and video

Div 28

ELECTRONIC SAFETY + SECURITY

28 13 00 ACCESS CONTROL

- The future goal is to eliminate keys; however, card access is expensive and requires battery back-ups.
- For the access control installed in the newer buildings, there are high costs for maintenance and licensing for software.
- IP-Enabled WiFi and PoE are recommended

LOCKS				
HARDWARE TYPE	USE	DESCRIPTION	NOTES	CATALOG CUTS
ACCESS CONTROL MORTISE OR CYLINDRICAL LOCKSETS AND PANIC DEVICES	Exterior or Interior	Corbin Access 800 WI1	WiFi Stand Alone Battery Powered	
		Corbin Access 800 IP1	PoE IP Enabled Hard Wired	
		Corbin Access 800 AC2	Software Based Stand Alone Battery Powered	
ACCESS CONTROL NARROW STILE LOCKSETS	Exterior or Interior	Adams Rite A100 Series	Aperio Wireless Technology	
ACCESS CONTROL CYLINDERS	Exterior or Interior	Medeco eCylinder M100 Series	Aperio Wireless Technology	
ACCESS CONTROL CABINET LOCKS	Interior	HES K100 Series	Aperio Wireless Technology	

28 13 19 ACCESS CONTROL SYSTEMS INFRASTRUCTURE

Manufacturer:	Software House
Model:	C-CURE 9000

28 13 26 ACCESS CONTROL REMOTE DEVICES

CARD READERS:

Manufacturer:	HID
Series:	i CLASS Transit Readers
Model:	RP40
Color:	To be coordinated with Project Architect

28 13 26.11 WIRELESS ACCESS CONTROL DEVICES

ACCESS CARD:

Manufacturer:	HID
Series:	i CLASS
Model:	RCCD Corporate 1000

- Purchased through CI Solutions.
- There should be no cards purchased by the contractor for a project, although an allowance for additional cards could be included within a capital project if a new group of faculty and staff will be provided with access cards. The cards are made up using special software through CI Solutions, which accesses the District directory. There is no badging station associated with the Software House C-CURE 9000 access control system. Once the badges are made, the campus administrator associates the badge with the record for the individual and assigns access privileges within the system. The objective with the special format is to reduce the likelihood of badge cloning or the potential for duplicates.

28 13 00 VIDEO SURVELLIANCE

NETWORK VIDEO RECORDER (NVR):

Manufacturer:	American Dynamics
Model:	to be selected on a project-by-project basis

- Set to record at maximum allowable resolution by camera.

CLOSED-CIRCUITTELEVISION (CCTV):

Manufacturer:	Sony
Model:	to be selected on a project-by-project basis

- Set to record with high definition (HD)

28 31 11 DIGITAL ADDRESSABLE FIRE ALARM SYSTEM

- Campus standard fire alarm system is Notifier.
- Provide a fully automatic and manual, analog addressable fire alarm system.
- The system shall be monitored by the “California State University of San Bernardino’s “Dispatch Office”.
- Standard notification devices should be white in color.
- All fire alarm wiring shall be installed in conduit, factory pre-painted red.
- All work shall be in strict accordance with Division of the State Architect requirements.

- A new manual/automatic, addressable fire alarm system conforming to current California Building, Fire and NFPA 72 Codes will be installed in buildings. Initiating devices comprising of manual pull stations, smoke detectors, and duct detectors will be installed per current codes. Indicating devices will consist of horns and strobes and will be distributed and installed throughout the proposed buildings per current CBC and CFC codes. The new fire alarm system which will be of Notifier make consistent with campus standards and with the use of a dialer will notify the “California State University of San Bernardino’s “Dispatch Office” who will in turn notify the Local Campus Police facility and/or the Fire Department.

28 31 00 FIRE DETECTION AND ALARM

FIRE ALARM MASTER PLAN

The following document has been excerpted from:

Riverside Community College District Campus Fire Alarm System Master Plan

September 17, 2007

Riverside Community College District
Riverside, California

Campus Fire Alarm System Master Plan

Final Submittal

Prepared For:
Riverside Community College
4800 Magnolia Avenue
Riverside, CA 92506

Prepared By:
P2S Engineering, Inc.
5000 East Spring Street
8th Floor
Long Beach, CA 90815

Project No. 4981
September 17, 2007

Riverside Community College District
Riverside, California

Campus Fire Alarm System Master Plan

Final Submittal

Prepared For:
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September 17, 2007

1.0 INTRODUCTION

P2S Engineering was contracted by Riverside Community College District to develop a Fire Alarm Master Plan for all three campuses. The three campuses included the Moreno Valley Campus, Norco Campus and Riverside College Campus.

P2S had already been retained by the District to do an extensive survey and prepare a detailed report of the existing fire alarm systems at each of the 3 campuses. In addition P2S Engineering had also been retained to do an extensive survey and report on the existing telecommunication infrastructure for each of the campus locations.

The objective of this study is to evaluate the existing fire alarm systems currently serving each of the facilities existing at the three campuses and recommend a fully code and regulatory compliant fire alarm system on all three Riverside Community College campuses that not only meets the short term needs of each the campuses but also supports the future master plan at each of the campuses. Our study also addresses an integrated network to support an updated Central Monitoring Station to be located at the Riverside College Campus police facility.

An evaluation of the existing fire alarm systems at each of the three campuses revealed that the three campuses have a mix of past generation and newer fully addressable fire alarm systems. The system at each campus is monitored via the utility telephone system back to the Campus Police on the Riverside Campus location.

Each campus has a different fire alarm methodology.

The Riverside Campus comprises of (27) buildings, each of which is equipped with a stand alone system. Prior to 1997 there were a variety of fire alarm systems including Simplex and Edwards. In 1997, the entire campus' fire alarm system was upgraded with individual Faraday MCP 2000 Fire Alarm panels connected via a dialer to the Campus Police Central Station. The Faraday system met the current codes applicable at the time of upgrades.

The Moreno Valley Campus has multiple fire alarm systems. Several buildings have stand alone systems that report via a telephone dialer directly to the Riverside Campus. The remainders of the buildings connect to a Notifier AFP 400 control panel located in the Mechanical Building, which in turn reports via a telephone dialer to the Riverside Campus.

The Norco Campus has multiple fire alarm systems. Several buildings have stand alone systems that report via a telephone dialer directly to the Riverside Campus. Approximately five years ago, a new Notifier S5000 control panel was installed in the Mechanical Building. This system controls majority of the campus buildings. There are two other Notifier S500 control panels located in the Applied Technology Building and the Library Building.

These various systems are hard wired back to a graphic annunciator which in turn ties back into the various S500 panels. The system then transmits through a telephone dialer and reports to the Riverside Campus.

In summary there are a wide variety of fire alarm systems and equipment existing at each of the campuses. Majority of the systems are zoned, hard wired, non-addressable systems and with no capability of expansion. Many of these systems do not meet present fire alarm codes or standards and are thus obsolete.

The entire fire alarm system at all three campuses need to be replaced with a “state of the art” fully addressable system. The new fire alarm system will utilize the existing onsite copper distribution network to report to the central annunciation system until the new telecommunication fiber optic network is installed on all three campuses.

A new master control station shall be installed in the Riverside Campus Police Dispatch building to accommodate all campuses.

Due to available funding constraints and the proposed size of the project, the system should be installed in phases. Until the new fiber optic infrastructure is in place, we recommend that the proposed fire alarm system that will e installed in each of the facilities utilize the existing telecommunication infrastructure’s’ copper network. Once the new fiber infrastructure is in place, the same will be utilized to connect the fire alarm panels together and report to the centralized annunciator system.

New control panels and network annuciators shall be installed adjacent to the existing panels in each building and a phased cut over will take place as new buildings come on line or existing buildings are remodeled.

The hard wire and obsolete addressable devices shall be replaced and connected to the new panels and network.

Attachment “A” is a summary of each of the campuses’ existing fire alarm system.

The fire alarm site plans as well as Riser Diagrams for each campus are attached to this report.

2.0 FINDINGS

The findings for the various campus locations is as follows:

Riverside Campus

Fire Alarm System Description

The existing fire alarm systems that serve each of the facilities at the campus are all in good working condition. However, the systems are obsolete and no longer manufactured. They will require replacing and integration to meet the needs of the new proposed buildings and the modernization of any existing buildings.

The installed system in the majority of the buildings is a Faraday MPC 2000 system with an automatic telephone dialer that connects to the campus police dispatch building via the telephone line. The campus dispatch office has a Radionics D6500 receiver with monitor and automatic printer that logs and records all incoming signals.

The system is fully addressable and each MPC-2000 has self contained batteries and an adjacent smoke detector above it, to protect the unit.

The individual buildings have the MPC-2000 fire alarm panels which monitor the following functions:

Quadrangle Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes and water flow valves. The control panel is located in the basement electrical room. There is a remote building annunciator located at the southeast first floor breezeway.

Stadium Building System monitors smoke detectors manual pull station, fire alarm horns and strobes. The control panel is located in the east wing entryway inside the building.

Wheelock Gymnasium Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes and water flow valves. The control panel is located at the entrance to the main level.

Facilities Building System monitors smoke detectors manual pull station, fire alarm horns and strobes. The control panel is located in the rear entrance to the building. This system also monitors devices in the Paintshop and Warehouse.

Technology ‘A’ Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located at the main level corridor.

Technology ‘B’ Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located at the entrance to the lower level.

Campus Police Dispatch Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes in the building. The control panel is located in the storage room of the dispatch office. The dispatch area houses the Radionics Receiver, monitor and printer which logs in and records all alarm signals. This building system also subfeeds the fire alarm devices in the Portable Buildings 1,2 & 3., Athletics Center, Carters and Safety & Security.

Arts Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located at the first floor entrance.

Huntley Gym Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located at the entrance hallway.

Administration Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located in the mail room. There is a remote building annunciator located at the rear entrance corridor.

Cosmetology Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located in the rear storage room. There is a remote building annunciator located in the main entrance.

Admissions Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located at the back entrance hallway.

Data Processing Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located in the data storage room. There is a Halon System in the Data Room that is not monitored or annunciated through the fire alarm panel. The system has been disconnected and only alarms in the Data Room.

Landis Auditorium Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located at the back of the stage. There is a remote building annunciator located in the Promenade front lobby.

Music Hall Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located at the entrance lobby.

Music Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located in the entrance lobby. There is a remote building annunciator located exterior to the building adjacent to the Landis Auditorium.

Cutter Pool Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located in the electrical room.

Life Science Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes and water flow valves. The control panel is located in the electrical room on the upper level. There is a remote building annunciator located exterior to the building opposite the Student Center.

Martin Luther King Library Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel has been replaced with a Faraday MPC-1500 which is a smaller unit. There is a remote building annunciator located in the second floor lobby.

Student Center Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located in the electrical room accessed through the men's restroom on the upper level. There is a remote building annunciator located at the lower level exit corridor.

Physical Science Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located at the lower level work room. There is a remote building annunciator located in the lower level lobby.

Automotive Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located in the janitor's closet. There is a remote building annunciator located at the entrance to the Mechanics Workshop.

Child Development Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located in the electrical room. There is a remote building annunciator located at the front desk.

Business Education Building System monitors smoke detectors, manual pull station, fire alarm horns and strobes. The control panel is located in the electrical room. There is a remote building annunciator located on the exterior of the building facing Riverside Avenue.

The Digital Library Building, which was built in 2003 has an Edwards State of the Art EVS fully addressable system. This system monitors smoke detectors, heat detectors, duct detectors, smoke fire dampers, sprinkler flow valves, post indicator valves, strobes, horns as well as activating magnet door hold open devices and elevator recall function. The main control panel and printer are located in the Electrical Room on the first floor. The system also has an automatic dialer that ties in via the telephone system to the Campus Police Dispatch Office. There is a remote annunciator located in the security office located in the building.

The Temporary Quad Remodel portable trailer swing space has a fire alarm panel located in the communications room. The system monitors strobes, horns and manual pull stations. There is a remote annunciator located in the front of the portable.

The New Parking Structure has a fire alarm panel that only monitors the sprinkler system. The panel is located in the Pump Room on level 3.

Moreno Valley Campus

Fire Alarm System Description

The various existing fire alarm systems that currently serve each facility ion campus are in working condition. However, they will require replacing and integration to meet the needs of the new proposed buildings and the modernization of any existing buildings.

There are multiple fire alarm systems throughout the campus. The original campus system was an Edwards central fire alarm panel. The peripheral devices such as break glass stations, strobes, horns, etc. were hard wired back to this panel. The old system was not an addressable system and was replaced by a newer Notifier AFP400 control panel located in Mechanical Building No.1 approximately five years ago. The original hard wired field devices were reconnected to this panel and new addressable devices have been added to the new panel as needed.

The Notifier FP400 panel (which is a two-loop addressable panel with networking capabilities) is no longer being manufactured. It has been replaced by the new Notifier NFS640 panel. It should be noted that Notifier still maintains parts and service for the old AFP400 system. As new devices were required, they were added to the addressable loop of the AFP400. However, it appears that both loops are either nearing or at their maximum capacity.

The existing system has two remote annunciators. One is located in the lobby of the Student Services Building. The other is in the hallway of the Facilities Warehouse Building. The system is being monitored directly by the Riverside College Police Department at the Riverside campus station. In the even of an alarm, they notify the police located on campus. Note that although the Riverside campus station is occupied on a 24-hour basis, the police office on campus is not.

The central fire alarm panel and system covers the Humanities, Library, Student Services, Science and Technology, Tiger's Den, Bookstore, and Mechanical Buildings No. 1 & 2. This system consists of manual station strobes, strobe and horn combination units, smoke detectors, duct detectors, and the connection to a won door. The small quantity of sprinklers in the stage area of the Humanities Building does not appear to be tied into the fire alarm system. There are a combination of old hand wired and addressable strobes.

The system has several problems. The primary problems are that the strobe light coverage does not meet ADA requirements. If additional strobe lights are added in areas where the campus has the old hard wired strobes (these can be identified by the milk-white lens), they will not be able to be synchronized and thus not comply with current NFPA 72 code. The buildings where this condition occurs are Student Services, Library, Science and Tech Building, and the Tiger's Den. The other item of concern is that there are not adequate manual break glass stations on the path of egress in many buildings. The smoke detector and duct detector coverage appears to be adequate.

The buildings that have a "stand alone" system are the multipurpose building, Early Child Care Education Center, and the President's office. The multipurpose building has a Notifier AFP100 control panel. The Notifier AFT100 control panel is a single loop addressable panel. The system appears to have addressable devices interfaced to it - namely a manual break-glass statio.. The system has a telephone dialer that ties into the college police department. The system in the Early Child Care Center is similar. The system in the President's office building is a Fire Lite panel FCPS-24SC, which is installed and operated in the same manner as the Notifier AFP100.

In summary, the existing fire alarm systems met the current codes at the time they were installed. The same applies to remodeled areas and new buildings. They can be left in place "as is" and will still be acceptable as an operational fire alarm system and will not require an enforced replacement or upgrade.

Norco Campus

Fire Alarm System Description

The various existing fire alarm systems that serve each of the facilities on campus are in working condition. However, they will require replacing and integration to meet the needs of the new proposed buildings and the modernization of any existing buildings.

There are multiple fire alarm systems throughout the campus. The original main campus system was an Edwards central fire alarm system panel. The peripheral devices such as break glass stations, strobes, horns, etc. were hard wired back to this panel. The old system was not an addressable system and was replaced by a newer Notifier S5000 control panel located in Mechanical Building No.1 approximately five years ago. The original hard wired field devices were reconnected to this panel and new devices have been added to the new panel as needed.

Unfortunately, the replacement Notifier S5000 is also a hard wired non-addressable system that cannot be networked. This sytem controls the Student Services Building, Sceience and Technology, Multipurpose Auditorium, Humanities, Tigers Den, Central Plant, Maintenance Buildings No. 1 and 2, and the Bookstore. There are also inputs that connect to additional separate fire alarm control panels in the Library and Applied Technology buildings. These inputs appear to be connected in order to provide outputs on the main graphic annunciator in the Student Services Building. The control of these systems from the main control panel is not possible.

The graphic annunciator has indicator lights for the Student Services, Science and Technology, Multi-purpose, Humanities, Tigers Den, central plants, Library, Facilities M1 and M2, and Applied Technology buildings. The only buildings not indicated on the annunciator are the Activities Center complex and Head Start/Early Child Care which have stand alone systems. The buildings directly connected to this control panel have manual fire alarm pull stations and strobe lights that do not comply with ADA requirements.

There is a secondary Notifier S5000 fire alarm control panel located in the Applied Technology Building which monitors this building as well as the CACT and the central plant (F2). This system is also a hard wired non-addressable system that can not be networked with the other panels. This control panel has manual fire alarm pull stations and ADA compliant strobe lights. As previously indicated, this panel is interconnected to the main fire alarm panel for annunciation purposes only.

There is a third Notifier S5000 fire alarm control panel located in the Library Building that controls the Library only. This system is also a hard wired, non-addressable system that cannot be networked. It has outputs that connect to the main fire alarm panel for purposes of graphic annunciation only. This system has manual fire alarm pull stations and ADA compliant strobes. However, it does not appear that the strobes are capable of being synchronized.

There is a "stand alone" Notifier AFP100 control panel located in the Activities Building. This system monitors the Activities building as well as the portable buildings adjacent to it. This system has a telephone dialer that connects directly to the college campus police department. This panel is an addressable panel that is not capable of networking. It controls the manual fire alarm system as well as the ADA compliant strobes.

There is a “stand alone” Fire Control Instruments FC17100 panel located in the Head Start Building. This panel only monitors this building with a telephone dialer. The panel is an addressable panel that cannot be networked. The panel controls the manual fire alarm system as well as ADA compliant strobes.

There is a “stand alone” Notifier AFP100 control panel located in the Early Child Care Center. This system monitors the Early Child Care Center and is an addressable, single-loop system that is not capable of networking. It has a Radionic automatic dialer system tied into the campus police department. It controls the manual fire alarm system as well as the ADA compliant strobes.

In summary, the core campus area is controlled by hard wired, non-addressable systems. These systems would be difficult (if not impossible) to expand due to the extensive modifications required to the system. In addition, the system is very difficult to reset in the event of an alarm or trouble signal initiated in the Library or Applied Technology Building. In order to reset the system, it is required to go to the building initiating the signal, reset the panel in alarm, then go to the main fire alarm panel and clear the alarm – a two-step minimum process.

Majority of the existing strobe lights do not meet current ADA requirements. However, because of the S5000 hardwired non-addressable panel, it is not possible to synchronize the strobe lights even though they are connected to the same panel. This would result in the “second blink” between strobes which could trigger an epileptic seizure and thus not meet NFPA 72 code. However, the existing fire alarm systems met the current fire marshal and NFPA requirements at the time they were installed. The same applies to remodeled areas and new buildings. They can be left in place “as is” and will still be acceptable as an operational fire alarm system and will not require an enforced replacement or upgrade.

3.0 CODE ANALYSIS

The new fire alarm system, equipment, installation and wiring materials and methods used shall comply with the following codes and standards:

1. System components proposed in this specification shall be UL listed for its intended use.
2. California State Fire Marshall Listed Components.
3. California Building Code – Title 24.
4. California Fire Code – Title 24.
5. California Mechanical Code – Title 24.
6. California Electrical Code – Title 24.
7. NFPA 72 National Fire Alarm Code

4.0 OPTIONS

Description of Building Fire Alarm Systems

Today's microproccesor-based fire alarm systems offer excellent versatility and a multitude of options. Examples of the new technologies available include.

1. Addressable Technology – The exact location and status (alarm or trouble) of any field device (initiating or indicating) will be monitored at the fire alarm panel and displayed by means of a digital alphanumeric display.

2. Analog Technology – Detailed device information (such as sensitivity), in addition to alarm and trouble status will be monitored and tracked by the fire alarm panel. This is a particularly useful tool for identifying detectors that have become dirty over time and may need to be cleaned. This is effective in reducing false alarms of the life of the system.

3. True Peer to Peer Communication Technology – All remote fire alarm panels are the stand-alone type and will be in constant communication with other panels on the network. The alarm or trouble status of any panel can be identified at all panels on the network. Since each panel is a stand-alone panel, it can maintain full functionality even if the main fire alarm (or any other panel on the network) becomes inoperable or separated from the network.

Description of Fire Alarm System Networks

There are three network types which were considered for connecting all buildings' fire alarm control panels (FACPs):

1. An Arc Net communication system using dedicated twisted shielded pair cables.

2. An Arc Net network using the fiber-optic campus telecommunication infrastructure.

3. A dedicated copper-pair network using the campus copper telecommunication infrastructure.

The Arc Net network is a common type of fire alarm network, and is similar to the type of network commonly used for connecting personal computers. The remote fire alarm panels communicate peer to peer (two way) with a main fire alarm panel (commonly referred to as the head-end) via a single twisted and shielded pair of wires.

The downside of using an RS-485 system is that dedicated pathways (conduit) need to be installed from building to building. This system already exists in Moreno Valley and Norco Campuses. This method is not practical given the extent and topology of the Riverside Campus.

However, with the installation of the new telecommunication conduit and manhole/pullbox system, this path will become available for fire alarm usage.

It should be noted this is not the recommended system for the campus except purely as an interim measure.

A fiber optic network using the existing or new telecommunication infrastructure is the preferred system.

As part of the planned telecommunication upgrade new fiber optic cable are being installed. Additional fibers can be added to accommodate the new fire alarm system.

The Moreno Valley and Norco Campuses have a fairly extensive existing conduit, pullbox/manhole system that already accommodates the existing fire alarm system.

5.0 RECOMMENDATIONS

Recommended Fire Alarm System Design

The key issue for the new fire alarm system is the large size of the three projects. The new campus fire alarm system must be cost effective and allow for a phased installation. It is recommended that all existing fire alarm systems be Notifier (with one exception) and that they are the supplier and installer of the new master system.

P2S recommends installing a new fire alarm network at each campus with new fiber optic infrastructure using the new telecommunication system network 12 strand multi-mode fiber cable. Four strands of which shall be dedicated for fire alarm.

The new fire alarm shall be a microprocessed based direct wired multi-priority peer to peer network system.

The existing copper network will be used to connect the various fire alarm systems together until such time as the new fiber infrastructure system is completed.

While the fiber system is installed, any new or remodeled building shall be connected to the existing copper network. One copper pair for “in” and one pair for “out” for each fire alarm control panel (FACP) is required. The copper pairs must be zoned in order to keep the existing Notifier S5000 and Faraday MPC 2000 operational during the phased cut over.

A new Fire Alarm control panel Notifier NFS-640 FACP shall be installed in each building as well as a network annunciator “NCA”, which shall have an LCD annunciator.

All FACP and remote data gathering panels shall be connected for a complete Class A fiber network between all areas of the building allowing for one common dialer at each campus.

Each campus shall have a network annunciator with two-way communication and a graphic annunciator.

The network annunciator shall be provided with a microphone and paging switch to provide “all call” or selective paging in the buildings it serves.

Speakers will be provided in public and private spaces.

Provide a new receiver in the Campus Police Dispatch office with CPU display, printer and local paging facilities.

Fire Alarm System Installation Phasing Plan

Phase One is to leave all existing fire alarm systems "as is" and fully operational.

Phase Two is to replace existing "hardwired" non-addressable devices in all building with addressable devices. Cut over shall be accomplished such that the system is never shut down.

Phase Three – Install new Fire Alarm Control Panel in tandem with the existing fire alarm control panels. New Fire Alarm Control Panel shall be stand alone with independent dialer capabilities until Phase Four. Cut over addressable devices to this panel.

Phase Four – Connect new Fire Alarm Control Panel to new fiber optic network. Leave existing copper network in place until fiber optic network is fully operational. Once network is complete, connect all panels to the new fiber optic network.

6.0 CONCLUSIONS

All building fire alarm systems will be integrated into a new fiber network which will not only locally alarm by audible and visual means, but also immediately report events to a central alarm station for logging and notification of Campus Police personnel.

The system can be installed in phases starting with replacement and addition of new initiation and notification devices and fire alarm control panel in existing remodeled and new buildings followed by the telecommunication infrastructure fiber network and connection of fire alarm control panels.

All design should be submitted to the Division of the State Architect (DSA) for jurisdictional review and approval. Coordination with the local fire department is recommended. System installation and testing should be inspected and documented by DSA field inspectors and all close-out procedures should be followed for a complete functional and DSA accepted system

7.0 YEARLY TEST PROGRAM

The testing of the fire alarm system shall be done in accordance with NFPA 72.

Visual inspection of the fire alarm system shall be mandated every three months.

Testing of the sprinkler connection shall be on a quarterly basis.

The fire alarm system shall be completely tested with 100% of all devices tested at least once every 12 months.

The tests shall be logged in a test report, a copy of which shall be sent to the local fire department.

Batteries for the fire alarm panel shall be replaced every three years.

SECURITY MASTER PLAN

The following document has been excerpted from:

Security Master Plan

November 11, 2006

Riverside Community College District Security Master Plan

District and Moreno Valley, Norco, and Riverside City Campuses

Security Master Plan

Executive Summary

Security must be designed to be convenient and responsive for the persons who are using the facilities at Riverside Community College District. The objective is to provide a safe and secure environment that will foster the educational goals of the District. Security awareness is part of the approach, but the tools to manage the process must be in place. Having information that allows the District to know where and when it is being successful from a security standpoint is important. Communication within the District and with the community is important for maintaining the desired environment.

This plan recommends a combination of access control, alarms, video, and voice communication devices to provide the basic infrastructure for a robust security program. Security should be administered, managed, and monitored by the District Police Department. Security equipment installations should be handled through the Facilities Planning, Design, and Construction Department in the same manner as other infrastructure tools.

In order to effectively implement a security systems standards approach for the District, it will be necessary to pre-select the manufacturer and models of most of the equipment. This will ensure compatibility between the various components, allowing the District to achieve it’s goal of having a cohesive security program. The key factors are:

- An access control and alarm system. (The District currently owns one system by SoftwareHouse, which could be used as the basis for expansion.)
- A security video system that is compatible with the selected access control system. (Envisioning the near future, it is recommended that the district strongly consider IP cameras and digital network video recording devices that will provide high definition video capability.)
- Having the District Police Department Monitoring and Dispatch Center UL Certified as a Central Station. This will allow this center to receive both security and fire alarms as a primary monitoring location, eliminating the need for outside monitoring contracts.

Table of Contents

Introduction

In conjunction with a program to create a master plan for the development for each of the campuses relative to educational plans, long range-program, growth, and capital plans, a Security Master Plan has been developed. The organization of this report is based on the outline provided in the RFP for the overall master plan. It is based upon interviews with selected interested stakeholders across all of the campuses to determine current and future needs and observation of the existing security program. This plan was conceived on behalf of and in close coordination with Chief Lee Wagner of the Campus Police Department.

The scope of work was conducted under the guidance of the Office of Facilities Planning, Design and Construction to incorporate the concepts into an overall infrastructure planning effort. RCCD has embraced the concept that shared infrastructure and standards regarding capital project elements will be the most cost effective approach for the future. The Infrastructure Committee has been formed to identify options and define infrastructure for all of the campuses in a cohesive manner across all disciplines, including security. This approach is lead by Aan Tan, Associate Vice Chancellor, Facilities Planning, Design, and Construction, within his Infrastructure Committee headed by Rick Hernandez. The work will provide the vehicle needed to allow inter-operability within RCCD. There has already been some success in standardization of alarm systems in an effort to augment the beginning of a "standards" approach.

Background

Currently, each department at each campus independently identifies the security concerns and solutions for their specific area of responsibility, prepares a requisition for expenditure of funds to address the concerns, creates the Request for Bid once the funds are approved, and manages the implementation by the successful bidder. The result has been several different alarm systems and approaches, spread across each campus. In addition, each of these alarm system comes with a separate contract for monitoring at a private central station, whenever the systems are actually monitored. One of the challenges has been that local municipal police departments are notified by the private central station. The result is that the alarm response is performed by personnel who do not know the campus, rather than the RCCD Campus Police, and RCCD loses the ability to manage the situation. Another challenge is that spaces that are larger than one can easily see from the alarm keypad are difficult to clear prior to arming. If the person leaving is in a hurry, there is a tendency to not want to wander throughout a large, multi-room space to determine if everyone else has left or that all monitored points are secure before arming the alarm. Sometimes, if a specific point is not secure, it is difficult to determine if the condition is caused by an equipment malfunction or other causes. Since many of the systems have not been well maintained, this condition is more likely to occur. However, the system cannot be armed unless that unsecured point is masked out of the secure zone. Most staff personnel are not trained in how to do this, nor is it advisable to do so. If the alarm is not set, then there is no security.

The Campus Police Department has an alarm signal receiver and now monitors a few of these systems from the Riverside College Campus, along with many of the fire alarms. This has been a step in the right direction.

Today, the systems around the campuses are alarm centric, with a little access control. The latter was evidenced at March Education Center at March AFB where a SoftwareHouse access control system has been installed. The standalone biometric locks installed for Information Services and at the new structure at Riverside Campus are additional applications of access control. Most of the primary buildings and office areas on every campus have had alarm systems installed over time. These are monitored at offsite central stations, by Campus Police, or are not monitored at all. Maintenance is a constant problem, because of the mix of installation companies.

Access control is achieved through key and lock control approaches at the present time for most departments. The historic challenge with this approach is the difficulty in controlling the access to the keys, preventing unauthorized duplication, and the cost of re-keying locks and reissuing keys. The utilization of special key blanks and lock systems helps this process, but doesn't solve the underlying difficulty of managing access in a fluid environment.

Electronic access control systems should be used if an area is too large for easy alarming. It can effectively be used to restrict an area to only authorized personnel when persons are working within the space. Specific persons should receive access cards to open a space for business or open the door for entry depending upon how the portal is configured. Once the door has been opened for the day, these persons are responsible for the space. If the control is active, then the Police Department can monitor the doors for held and forced conditions, but persons inside can move around freely. This creates a controlled perimeter around the space.

Cameras should be used whenever there is a desire for surveillance for safety of persons in waiting areas, such as pick-up/drop-off areas. Specific cases include childcare exits, bus stops, and car pool waiting areas. Cameras are used for audit trail video, to document transactions or activity in specific areas, and for the Police Department to qualify alarms or monitor event related activities.

In order for any security alarm program to be effective, there must be:

- Monitoring for the qualification of alarms.
- Dispatch of response units.
- Qualified response personnel to investigate the alarm conditions and resolve the condition.

This requires administration of the overall program for function and metrics of performance, programming and editing of the security databases, and education of the staff and community for security training and awareness. Under staffing any of these areas can defeat an otherwise effective program.

Security Plan and Program Development

Approach to data collection

The process used to identify the objectives, needs, and current status included:

- Visiting each campus to observe the dynamics of the operation, the flow of people around the campus, and the current state of implementation of security tools.
- Discussing security objectives with Chief Wagner and his staff at the Campus Police.
- Discussing security and infrastructure objectives and conditions with the Infrastructure Committee members.
- Interviewing various interested parties regarding security concerns for various departments, such as Early Childhood Development, the Digital Library, Performing Arts, and the RCCD Controller.
- Review of plans for the new parking structure at the Riverside Campus from a security perspective.

A list of those who were interviewed or contributed information for this plan is contained in the Appendix of this document. Security By Design wishes to express our sincere appreciation for all of the input received from all sources. Security for any organization is only as effective as those who manage the site wish it to be.

In conjunction with this Security Master Plan preparation, a charter to identify the best approach to migrating the monitoring of the various alarm systems from private central stations to the RCCD Campus Police Monitoring Center was authorized. After reviewing the options for monitoring alarms and evaluating the needs of the various departments who currently have or desire alarm systems, it was determined that the best way to do that is with an access control system. The basis for this result was that the persons who use this campus are diverse and fluid. Classrooms, while scheduled for identified classes, can be dynamically used throughout the day for legitimate, unscheduled, purposes. Offices, which normally close at 4:30 or 5:00 p.m., often have staff working at various hours of the evening or night to meet deadlines and workloads. During one of the initial interviews, the comment was made that the “faculty does not pay attention to building alarms.”

RCCD wants to know that the person(s) who are using the rooms are authorized and that there is a degree of safety knowing that only other authorized persons can enter an area that has been secured. If an alarm system has to be disarmed for the person to enter and work, then the latter objective cannot be achieved. However, if the entry is access controlled, then only another authorized person can enter without causing a forced door alarm condition. The Campus Police can respond to a forced door alarm, with the expectation that it is not a false alarm caused by an authorized person.

Additionally, unless special alarm software is purchased to enhance the processing of the alarm signals within an alarm system, there is no way to prioritize alarms. They simply arrive by time with an alarm code indicating the type of alarm. The central station operator must either memorize all of the valid alarm codes or look it up to determine what the alarm is. However, if an Access Control and Alarm System is used, each type of alarm can be prioritized. This allows certain types of alarms, such as duress alarms, to be presented at the top of the list with information regarding the location. The time lost determining the type of alarm and location through normal alarm processing could be critical in this type of situation.

In both of the cases identified above, the use of an access control and alarm system over just an alarm system meets the operational needs of RCCD more effectively.

Mission for Security at RCCD

Safety is the primary concern for RCCD, followed by the desire to protect District assets from vandalism or theft.

In order for the campuses to look, feel, and be safe, security must become an integral part of the environment. As part of this approach, the goal of the Infrastructure Committee to create a "standards" approach for capital projects across the District and identify interrelationships between infrastructure disciplines will play a key role in achieving that status. For security measures to be effective, they must be easy to use in order for the authorized person to access the information or space to achieve their primary objective.

The vision for security for the administrators and staff includes the ability to:

- Control each campus during periods of unrest.
- Control access to buildings with the ability to separate private from public areas, based on the need for public access and time of day.
- Allow the departmental administrators to control access to departments, based on the departmental needs.
- Have safe travel along paths, in parking lots, and garages.
- Maintain a safe atmosphere for students and staff.
- Lower the frustration caused by persons parking in areas designated for other functions, like loading docks and delivery spaces.
- Have a general feeling of safety, whether from humans or wild animals.
- Understand how and where to make contact, if assistance is needed.
- Have sufficient space in the Police Services Office for victims to feel comfortable when filing reports.
- Have easy and convenient to use security tools.
- Meet the expectations of security by the public, without becoming an invasion of privacy.

There are some Departments and functions with special needs such as Early Childhood Development's responsibility to verify the approval for the person picking up a child and to maintain the well being of the child while they are in the care of the ECCD, the Arts and Theater productions, Physical Education sporting events, Financial Services cashiering functions, laboratories and high value equipment and materials rooms, and traffic and parking management.

Presently, parking enforcement consumes resources. During the interviews with the department staff and administrators, frustration with parking violations was repeatedly mentioned. The RCCD Police Department enforces parking rules, but in a commuter college situation students historically have ignored parking designations in their rush to attend classes on time. This is not a problem unique to RCCD. The tickets that are issued currently are part of program contracted by a third party administrator, which places them within the State's law enforcement legal system. Some approaches to alleviating this challenge include shuttle services, parking lot controls, and adjusted traffic circulation. A big step in the right direction is the new garage on the Riverside

Campus. However, it is currently designed with manual controls to close off the garage after hours. This facility will lower the parking space problem, but will not address the desire for secured parking for those who are working during late hours. Special arrangements can be made with the Campus Police Department for access, but this does not meet the convenience goal. Dealing with parking and traffic issues proactively will lower the cost of doing business for the District.

The vision for security for RCCD includes the ability for the Campus Police to:

- Know what is happening on each of the campuses.
- Receive reliable alarm signals when abnormal activity is occurring, throughout the District.
- Eliminate the cost of having private central station monitor alarm signals.
- Have integrated tools, such as alarm, access control, and video signals to more effectively qualify situations.
- Have confidence, knowing that the tools are in proper working order and are tested regularly.
- Provide response in a timely manner.
- Have the tools to properly investigate incidents that do occur.
- Have sufficient space on each campus to adequately serve the needs of the RCCD community with storage space for emergency equipment and supplies, plus allowing victims to file reports in a non-threatening environment.
- Reduce the cost of parking enforcement.

From an infrastructure standpoint, the goals relating to security include having:

- Reliable power for maintaining equipment in an operable state, in both a normal and in a crisis environment.
- Reliable communication for alarms, video, and voice communication, in both a normal and in a crisis environment.
- Adequate and good ambient lighting along pathways, parking areas, building entry/exit points, and waiting areas to provide good visibility of the surrounding area.
- Well maintained landscaping, terrain and vegetation, to provide good visibility of the surrounding area.
- Signage that is clear to effectively direct persons to their destination, whether coming to or leaving the campus.
- Reliable lock hardware, with the appropriate function for the space being served.
- Security conduit, wiring, and equipment programmed into planned projects to minimize retrofit costs and increase consistence of security application installations.
- Consistent security equipment to minimize special knowledge for end users, system administrators, system maintenance personnel, replacement parts requirements, and response personnel.
- Consistent interoperability approaches between infrastructure disciplines to lower the cost to implement and maintain security.

The security systems envisioned would consist of:

1. An access control and alarm system (ACAMS) deployed with a panel in each major building that is linked over the RCCD LAN to the RCCD Police Department for monitoring and administration. This panel would allow the ability to have spaces alarmed or access controlled, based on the needs of the department(s) located in the buildings.
2. A security video system that is interfaced with the ACAMS, so that live and recorded video can be associated with alarm and access conditions, if appropriate. The video would be recorded on digital recording devices. These digital recording devices would allow access to the video for anyone who is authorized via a password and access information. Both the RCCD Police Department and designated department administrators would be able to view the camera images for that department.
3. Emergency assistance stations deployed at strategic locations to provide direct communication with the RCCD Police Department Monitoring Center.
4. Communication equipment that will allow the RCCD Police Department to communicate between their units on different channels for enforcement versus police activities, have a channel for communicating within the Facilities Department and between Facilities and the Police Department, and have a method for communicating with First Responder units from the community, such as municipal police, fire department, and ambulances.
5. Have the RCCD Police Monitoring Center qualified as a UL listed central station to ensure that all uses meet current code requirements. For instance, this monitoring center could then be the primary monitoring location for fire alarms across the campuses.

An approach to consistency for end-users that has gained popularity over the last few years has been that of a "one-card" implementation. This approach utilizes a "contactless smart-card" that is used as an ID card for the person, an access card for security, a parking access card for pre-paid parking, library card, pre-paid purchases of books, supplies, or food, and events occurring on site. The value of this approach is that a single credential can be issued to each person. Should that credential be lost or stolen, it can be blocked from being used at all of these venues, and a replacement credential issued that restores the value to the rightful recipient. This, of course, does not work with a stored value card, where the pre-payment is stored on the credential itself rather than the card being handled like a debit card.

At a minimum, the security systems should operate using the existing fiber and cable infrastructures for network, telephone, and power. RCCD intends to become the "preeminent provider of long distance learning." The reliability and resilience required to achieve this goal implies a stable data environment. Within this environment, it should not be difficult to implement a security subnet. A security subnet is recommended for two primary reasons: First, it isolates security from the campus network and limits access by creative students; second, it minimizes the impact of future high definition (HD) IP video capacity requirements on the RCCD network.

The security devices located at each building that are intended for use by campus staff or others must be consistent in their appearance and function. The application must be appropriate for the needs of the community. It must be easy for each person to assume the responsibility of the security for the space in which they are operating.

Goals for Physical Development

As a basic vision for RCCD security systems equipment would include:

- A card reader and electrified door hardware installed on at least one after-hours perimeter door on each secure building, where classrooms or offices are entered off of a lobby or hallway.
- Alarm contacts on all perimeter doors of all secure buildings.
- A card reader, door contact, and electrified door hardware with an integrated request to exit function on each room RCCD wishes to individually secure within a building.
- Space protection motion detector(s) for each room where there are special requirements, such as a laboratory with high value equipment or materials, which can be armed for space detection by time or by request. A classroom with accessible windows, where there is concern that the room would be entered by means other than the door, or a large room that has multiple entries might be candidates for this treatment.
- Cameras placed to augment security and foster safety of persons. Cameras are used to allow the Campus Police to surveil areas, qualify a situation, gather information about an incident in conjunction with an investigation, or create an audit trail of activity. Examples of places recommended for the use of camera views include:
    - Areas where people wait for rides (childcare pick-up/drop-off, bus stops, other designated pick-up/drop-off areas around campus).
    - Areas where problems have occurred in the past or dark, lonely areas along or near pathways.
    - Main entry lobbies of buildings.
    - Locations for process audit, such as childcare check-out procedures or other regulated transactions.
    - Rooms where the public uses or views high value items.
    - Areas where there is a concern for safety of staff, such as reception areas, offices where student disciplinary functions occur.
    - Stations where cash or other negotiable material is handled.
    - All emergency assistance stations.
    - Viewing the door or lobby area that enters any space where someone has been issued a duress button.
- Duress buttons should be provided where staff members have been identified as being at risk or upon request because someone feels vulnerable. These can be fixed position or portable with the person, depending upon the situation.
- Emergency Assistance stations should be located at transition points around the campus with the voice signal automatically contacting the Campus Police Monitoring Center.
- Upgraded, multi-channel radio communication equipment.
- After-hours use of parking garages with electrified and automated portals for vehicle entry and exit and pedestrian entry.

- Security Awareness and Training Program to show persons how to effectively use the security infrastructure and to teach persons how to increase their own safety and the safety of others.

The key to success in the near term is to utilize existing or developing infrastructure. A basic campus infrastructure must be in place, which is the intent of the Infrastructure Committee. The elements for this infrastructure include reliable power sources, a robust IP network, proper lighting of all building portals and pathways, well maintained landscaping that allows persons to visually check their surroundings for safe passage, door hardware that is reliable and with the proper functions, and standardized equipment within each building that can interface effectively. It is expected that most of the communication between the campus alarm points and the monitoring station will be processed over a security subnet on the RCCD IP network, with telephone backup through RCCD's voice system. If the security equipment is designed to be part of the overall infrastructure within each of the facilities, then there will be additional opportunities for interoperability between functions, which can lower the District's cost of doing business.

An example of this last thought is that there are other opportunities, should a "one-card" approach be adopted as part of the infrastructure program. The same access card, with interfaces to multiple databases could be used for the user interface for services such as parking fees and/or access for controlled lots, purchases made at the Bookstore or Tiger's Den, and library or class use fees. The potentials will emerge as the District becomes familiar with the options available within the systems.

Appendix

Security By Design wishes to thanks all who contributed information toward this Security Master Plan. Should there be any omissions or errors in the list provided below, it was inadvertent and all who contributed are greatly appreciated.

Infrastructure Committee Members

Aan Tan, Associate Vice Chancellor, Facilities Planning, Design, and Construction
Rick Hernandez, Facilities Manager, Facilities Planning and Environmental Health/Safety
Steve Gilson, Associate Vice Chancellor, Information Services
Kathryn R. Paschke, Network Specialist, Voice
Mike Webster
Robert Gurrola
Bill Vincent
Keith Francis, Project Facilitator, Infrastructure Committee

District

Dr. Buysee, Vice President Administration and Finance
Bill Bogel, District Controller and Manager of Auxillary College Services
Bob Bramucci, Dean of Open Campus
Aaron S. Brown, Director, Accounting Services
Ralph Perez, Director of Facilities, Operations & Maintenance
Debbie Whittaker, Early Childhood Development
Chief Lee Wagner, Chief of Police
Mary Varela, College Police Secretary III
Sgt. Henry, College Police Officer
Eleanor, Police Monitoring and Dispatch
Dave Keese, College Police Officer

Moreno Valley Campus,

Dale Barajas, Facilities
Bill Orr, Chief Business Officer, Moreno Valley Campus

Norco Campus

Steve Monsanto, Plant Director, Operations and Maintenance
Normand P. Godin, Chief Business Officer, Norco Campus

Riverside Campus

Dr Daniel Castro, President of Riverside Community College
Ed Godwin, Director of Administrative Services for College House
Dr. Lacy, Vice Chancellor, Student Services
Dr. Quinn, Dean of Riverside School for the Arts
Terry Walker, Assistant to Associate Vice Chancellor of Digital Library
Ralph Perez, Director of Facilities, Operations and Maintenance

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SECTION 14

MORENO VALLEY COLLEGE

Div 28

ELECTRONIC SAFETY + SECURITY

28 31 00 FIRE DETECTION AND ALARM

FIRE ALARM SURVEY

The following document has been excerpted from:

2007 Moreno Valley Fire Alarm Survey

Riverside Community College District

Moreno Valley
Fire Alarm Survey

February 7, 2007

P2S Engineering, Inc.

Riverside Community College District

Moreno Valley
Fire Alarm Survey

February 7, 2007

P2S Engineering, Inc.


Fire Alarm Main Panel (Mech Bldg 1)

Executive Summary

Background and Scope

Moreno Valley College, one of three colleges within the Riverside Community College District, is a two-year public community college situated in the suburban community of Moreno Valley, California. The campus was built in two phases with the majority of the buildings being built in phase one. The Moreno Valley Campus is fast becoming the health education center of choice in the Inland Empire with strong programs in health sciences, human and public services. Each semester more than 7,000 students pursue associate's degrees, transfer to a four-year college or university or receive career certificates that qualify them to enter their chosen field.


Fire Alarm Remote Annunciator "FAA"

There are multiple fire alarm systems installed throughout the campus. This includes several buildings which have "stand alone" systems that are not connected to the central system. The main fire alarm system appears to have been an old Edwards system which has been replaced with a Notifier system. However, many of the old Edwards hard-wired devices have been left in place and connected to the newer Notifier addressable system. The present Notifier system is no longer manufactured and appears to be at its maximum capability.

To meet the growing needs of the campus, the existing campus fire alarm system has been evaluated and will require upgrading as necessary to accommodate the plan expansion. P2S evaluated the existing fire alarm system currently serving the Moreno Valley College campus.

Objective

The objective of this report is to evaluate the existing fire alarm system currently serving the Moreno Valley College campus. We will consider alternatives for improvements, make cost-effective and specific recommendations as necessary to alter/upgrade/modify the existing fire alarm system to support new buildings, major renovations, and building retrofits that form part of the proposed Facilities Master Plan.

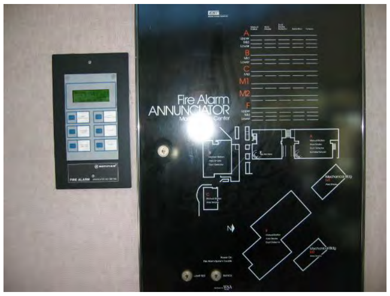

Fire Alarm Terminal Cabinet

Methodology

The following methodology was adopted in formulating our power distribution master plan:

-A critical aspect in the evaluation of the existing fire alarm systems serving a facility is a detailed and accurate field investigation of the current systems. A detailed survey of the existing fire alarm system that currently serves the facilities at Moreno Valley College campus and existing conditions, together with potential problems, are being identified. The surveyed information has been verified through available field investigations and meetings with the campus facilities staff as well as discussion with a Notifier service representative. No record drawings were available.

-Alterations/upgrades/modifications necessary to support new buildings, major renovations and building retrofits that will form part of the proposed campus facilities were identified.



Fire Alarm Remote Annunciator “FAA2”

Report Overview

Our following report provides an analysis of the present fire alarm system currently serving the campus. It identifies potential problems associated with the system, defines future requirements and outlines recommended solutions.

The following are included in this survey submittal:

-Executive Summary

-Fire alarm system description and photographs of the existing equipment.

-Existing manhole conditions and photos.

-Existing pull box conditions and photos.

-Existing handhole conditions and photos.

-AutoCAD drawings of the existing fire alarm system site plan and riser diagram.


Fire Alarm Subpanel “FAD”


Stand-Alone Fire Alarm System


Fire Alarm Splice Box


Humanities Building Fire Alarm Module


Typical Building Fire Alarm Module

Summary of our Findings and Recommendations

Fire Alarm System

Findings

-The various existing fire alarm systems that serve the campus are in working condition. However, they will require replacing and combining to meet the needs of the new proposed buildings and the modernization of any existing buildings.

-There are multiple fire alarm systems throughout the campus. The original campus system was an Edwards central fire alarm panel. The peripheral devices such as break glass stations, strobes, horns, etc. were hard wired back to this panel. The old system was not an addressable system and was replaced by a newer Notifier AFP400 control panel located in Mechanical Building No.1 approximately five years ago. The original hard wired field devices were reconnected to this panel and new addressable devices have been added to the new panel as needed.

The Notifier FP400 panel (which is a two-loop addressable panel with networking capabilities) is no longer being manufactured. It has been replaced by the new Notifier NFS640 panel. It should be noted that Notifier still maintains parts and service for the old AFP400 system. As new devices were required, they were added to the addressable loop of the AFP400. However, it appears that both loops are either nearing or at their maximum capacity.

The existing system has two remote annunciators. One is located in the lobby of the Student Services Building. The other is in the hallway of the Facilities Warehouse Building. The system is being monitored directly by the Riverside College Police Department at the Riverside campus station. In the even of an alarm, they notify the police located on campus. Note that although the Riverside campus station is occupied on a 24-hour basis, the police office on campus is not.

The central fire alarm panel and system covers the Humanities, Library, Student Services, Science and Technology, Tiger's Den, Bookstore, and Mechanical Buildings No. 1 & 2. This system consists of manual station strobes, strobe and horn combination units, smoke detectors, duct detectors, and the connection to a won door. The small quantity of sprinklers in the stage area of the Humanities Building does not appear to be tied into the fire alarm system. There are a combination of old hand wired and addressable strobes.

The system has several problems. The primary problems are that the strobe light coverage does not meet ADA requirements. If additional strobe lights are added in areas where the campus has the old hard wired strobes (these can be identified by the milkey-white lens), they cannot be synchronized. This can cause a one second blink effect which can trigger an epileptic attack in people with epilepsy. The buildings where this condition occurs are Student Services, Library, Science and Tech Building, and the Tiger's Den. The other item of concern is that there are not adequate manual break glass


Fire Alarm Pullbox “PB-1”

stations on the path of egress in many buildings. The smoke detector and duct detector coverage appears to be adequate.

The buildings that have a “stand alone” system are the multipurpose building, Early Child Care Education Center, and the President’s office. The multipurpose building has a Notifier AFP100 control panel. The Notifier AFT100 control panel is a single loop addressable panel with network capabilities. The system appears to have addressable devices interfaced to it - namely a manual break-glass station and ADA strobe coverage. The system has a telephone dialer that ties into the college police department. The system in the Early Child Care Center is similar. The system in the President’s office building is a Fire Lite panel FCPS-24SC, which is installed and operates in the same manner as the Notifier AFP100.

In summary, the existing fire alarm system met the current fire marshal and NFPA requirements at the time they were installed. The same applies to remodeled areas and new buildings. They can be left in place “as is” and will still be acceptable as an operational fire alarm system and will not require an enforced replacement or upgrade.


Fire Alarm Pullbox “PB-1”

Recommendations

-The existing fire alarm system can be left “as is” at the present time.

-Any remodeling will trigger an automatic replacement of the existing fire alarm system.

-The existing AFP400 control panel should be interconnected to a new Notifier network.

-New control panels should be installed in each existing or new building and tied into the new network.

-The new network annunciators should display all activity on all control panels tied to the network.

-The new network will require a separate network circuit connected between all panels in the network.


Fire Alarm Pullbox “PB-1”

-The new circuit should be fiber optic cable.

The main advantage of this new system is if the network wiring is disrupted or a problem occurs in one building the remaining panels will remain operational as opposed to the vulnerability of the present single control panel feeding multiple buildings. The new system should be advanced “state of the art” with large expansion capabilities. It is also recommended that the present “stand alone” systems be phased out and tied into the new central system.


Hand-Hole (HH) AA


HH AA


HH AA Looking North to Tigers Den


Two 4 inch conduits to Tigers Den


Two 4 inch conduit to HH BB

Hand-Hole AA Condition

HH #AA is located at the northwest end of the vacant lot where the new parking structure is scheduled start construction in 2007. The hand-hole is 12 inches wide, 18 inches long and 18 inches deep with about 18 inches of cover over the conduits. This box is marked as "ELECTRICAL".

The north wall end has (2) 4 inch conduits coming from the Tigers Den. One 4 inch conduit has (2) fire alarm cables which transition through the hand hole to the Tiger's Den.

The south wall end has (2) 4 inch conduits to HH #BB. One four-inch conduit has (2) fire alarm cables.

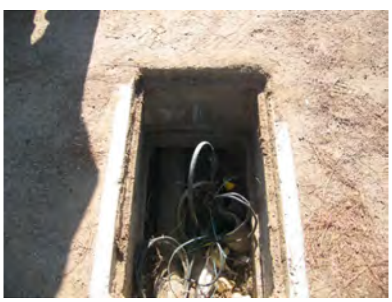
This hand hole is the main campus pathway to all the buildings on the south side of campus including the Early Childcare Services building and the new President Office.

It also should be noted that the (2) 4 inch conduits from Hand Hole #AA to Hand Hole #BB maybe in the construction site of the new parking structure located just north of the Warehouse building. These conduits and hand Hole BB may require relocation prior to the start of construction of the proposed parking structure.


Hand-Hole (HH) BB


HH BB Looking South


HH BB (2) 4” conduits to HH #CC


HH #BB Looking North to HH #AA


Two 4 inch conduit from
HH #BB South side

Hand-Hole #BB Conditions

HH #BB is located at the southwest end of the vacant lot next to the Warehouse Building driveway. The hand-hole is 12 inches wide, 18 inches long and 18 inches deep with about 18 inches of cover over the conduits.

The north wall end has (2) 4 inch conduits coming from the Hand hole #AA. One 4 inch conduit has (2) fire alarm cables which transition trhough this hand hole to hand hole #CC.

The west wall has (2) 4 inch conduits to HH #CC. These two 4 inch conduits are full.

Hand-Hole (HH) #CC

HH #CC Looking Southwest

HH #CC Copper and fiber optic cables

Hand-Hole #CC Conditions

HH #cc is located at the between the Warehouse building #12 and the Multi-Purpose Building #10. The hand-hole is 12 inches wide, 18 inches long and 18 inches deep with about 18 inches of cover over the conduits.

This hand hole has more conduits installed in it than recommended. There are (10) 4 inch including two that have been abandoning in place. HH #CC has the main feed to the Warehouse building and it also serves the Classroom, Multi-Purpose, President Office and Early Childcare Services going through this hand hole.

On the south end of the Hand hole is (1) 2 inch going to the Multi-Purpose building and (2) 4 inch going to hand hole #DD. These conduits are full.

On the east wall there is (1) 4 inch conduit to the Warehouse building. This conduit has a fire alarm cable extending to the pullbox in the warehouse then to the fire alarm annunciator. Also on the east wall there is (1) 4 inch and (1) 2 inch to the portable classrooms. This conduit has a fire alarm cable that extends to the portable buildings. The four inch has the copper and fiber optic cable installed in it. The two inch has the Fire Alarm cables placed in it.


CMH #1 Looking North


CMH #1 Looking South


CMH #1 Looking South


CMH #1 Looking South to CMH #2


CMH #1 Looking North to Mech-1 Bldg

CMH #1 Conditions

CMH #1 is located at the northwest end of the John M. Coudures Jr. Plaza. The manhole is 6 feet wide, 8 feet long and 7 feet high with about two feet of cover. The manhole is in good shape. The manhole was installed as part of the phase one of the campus construction.

The south wall end has (12) 4 inch and (2) 3 inch conduits coming from manhole number two. The three inch has the abandon fire alarm cables in them one is about 60% full and the other is about 40% full. There are fire alarm cables in two of the 4 inch conduits that are about 20% full.

The north wall end has (12) 4 inch and (2) 3 inch conduits going to the Mech-1 building. The conduits have the same fill ratios as the south wall end.

There are nine 4 inch vacant conduits between CMH #2 and CMH #1 and eight 4 inch from CMH #1 to the BDF in the Mech-1 building.

There is no splice case in this manhole. All fire alarm cables are homerun from various buildings to the Mech-1 building main fire alarm panel.

CMH #2 Conditions


CMH #2 Looking West to MDF


CMH #2 Looking North to CMH #1


CMH #2 Looking East to CMH #5


CMH #2 Looking South to CMH #3


CMH #5 Looking West to CMH #2

CMH #2 is located at the west end of the John M. Coudures Jr. Plaza. The manhole is 6 feet wide, 8 feet long and 7 feet high with about two feet of cover. The manhole is in good shape. The manhole was installed as part of the phase one of the campus construction.

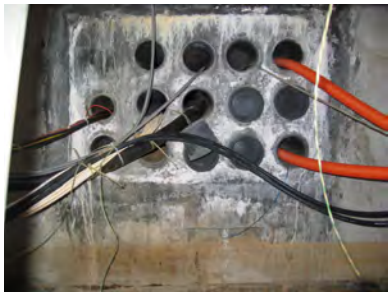
This manhole is the main feed from the main fire alarm panel located in the Mechanical Bldg No.1 to the various campus fire alarm modules. The conduits enter on all four walls of the manhole.

The west side wall has (18) 4 inch and (3) 3 inch conduits, one of which has fire alarm cables in them. There are fire alarm cables in two of the 4 inch conduits that are about 20% full extending to the Library and Student Services Building.

The north end wall has (12) 4 inch and (2) 3 inch conduits going to the CMH #1 with (9) 4 inch conduits between CMH #2 and CMH #1. The east side wall has (3) 3 inch conduits going to a FA pullbox PB1 just northwest of CMH #05.

On the south end wall there are (12) 4 inch and (2) 3 inch conduits going to the north end wall of CMH #03, two of which contain fire alarm cable. There are (8) vacant conduits or with vary small cable place in them. (4) 4 inch and both the 3 inch conduits have cables placed in them and are at least 40% or more full.

As with the other manholes the cables place in the manholes lack the proper cable support systems. This could be an issue in the future.

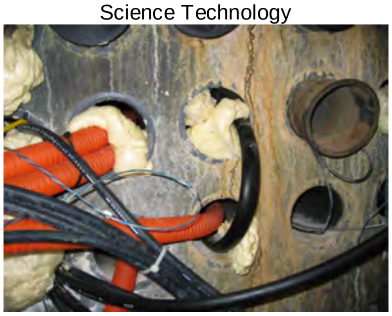


CMH #3 Looking North to CMH #2

CMH #3 Looking North to CMH #2

CMH #3 Looking South

CMH #3 Looking South to Science Technology



CMH #3 Looking south to Tigers Den

CMH #3 Conditions

CMH #3 is located at the southwest end of the John M. Coudures Jr. Plaza. The manhole is 6 feet wide, 8 feet long and 7 feet high with about two feet of cover. The manhole is in good shape. The manhole was installed as part of the phase one of the campus construction.

The north end wall has (12) 4 inch and (2) 3 inch conduits coming from manhole number two. The three inch has the fire alarm cables placed in the Science Technology building.

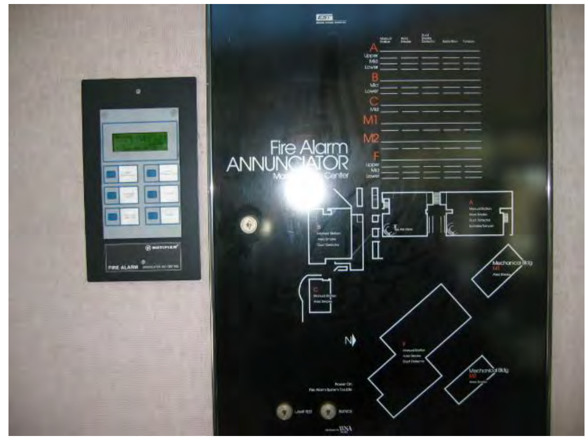
The south end wall has (18) 4 inch and (2) 3 inch conduits feeding the Tigers Den, Science Technology building and manhole #4. The manhole serves as the main distribution point to the buildings on the south end of the campus.

There are (6) four inch conduits to Science technology, (6) four inch to Tigers den and (6) four inch to CMH #04. Fire alarm cables are installed extending to the Tiger's Den and the Science and Technology building.

As with other manholes on campus the cables installed in them lack proper cable support systems. All cables are home run from the termination point to the end termination point.

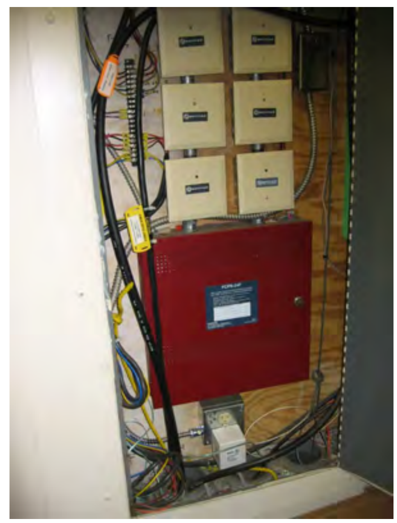
No splice exist in the manholes which allow for poor duct use. The NOC is located in the Science Technology building penthouse and this manhole is the main pathway to the building.

Fire Alarm Main Panel
(Mech Bldg No.1)



Fire Alarm Remote Annunciator “FAA2”
(Student Services Bldg.)

Fire Alarm Remote Annunciator “FAA”
(Warehouse)



Fire Alarm Subpanel “FAD”
(Tigers Den)

Fire Alarm Terminal Cabinet
(Mech. Bldg. No.2)

Stand-Alone Fire Alarm System
(President’s Office)


Fire Alarm Splice Box


Fire Alarm Pullbox "PB-1"


Humanities Building Fire Alarm Module


Fire Alarm Pullbox "PB-1"


Typical Building Fire Alarm Module


Fire Alarm Pullbox "PB-1"

Hand-Hole (HH) AA

Two 4 inch conduits to Tigers Den

HH AA

Two 4 inch conduit to HH BB

HH AA Looking North to Tigers Den

Hand-Hole (HH) BB

HH #BB Looking North to HH #AA

HH BB Looking South

HH BB (2) 4” conduits to HH #CC

Hand-Hole (HH) #CC

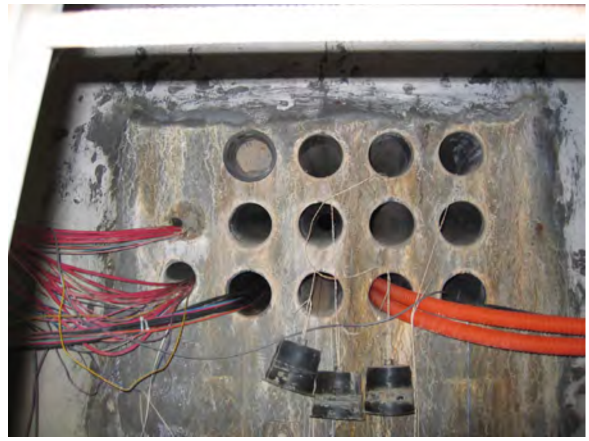
HH #CC Looking Southwest

HH #CC Copper and fiber optic cables

CMH #1 Looking North

CMH #1 Looking South

CMH #1 Looking South



CMH #1 Looking South to CMH #2

CMH #1 Looking North to Mech-1 Bldg

CMH #2 Looking West to MDF

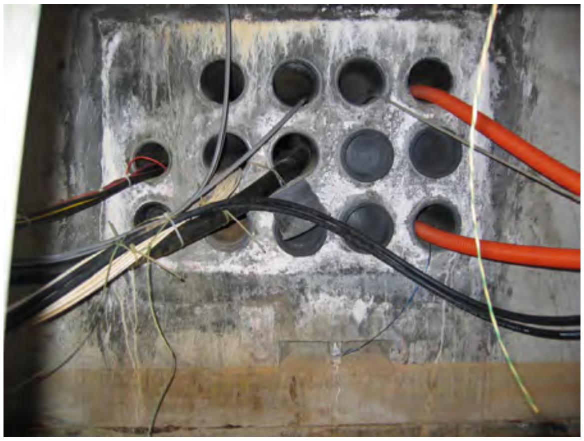
C

MH #2 Looking South to CMH #3

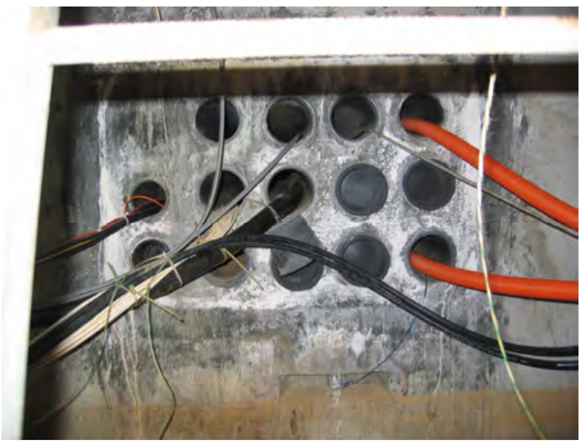
CMH #2 Looking North to CMH #1

CMH #5 Looking West to CMH #2

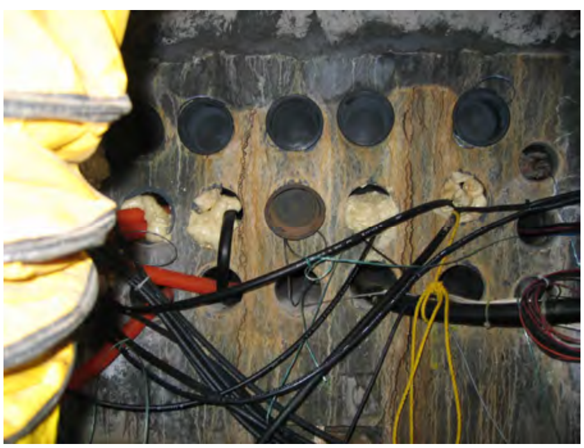
CMH #2 Looking East to CMH #5



CMH #3 Looking North to CMH #2



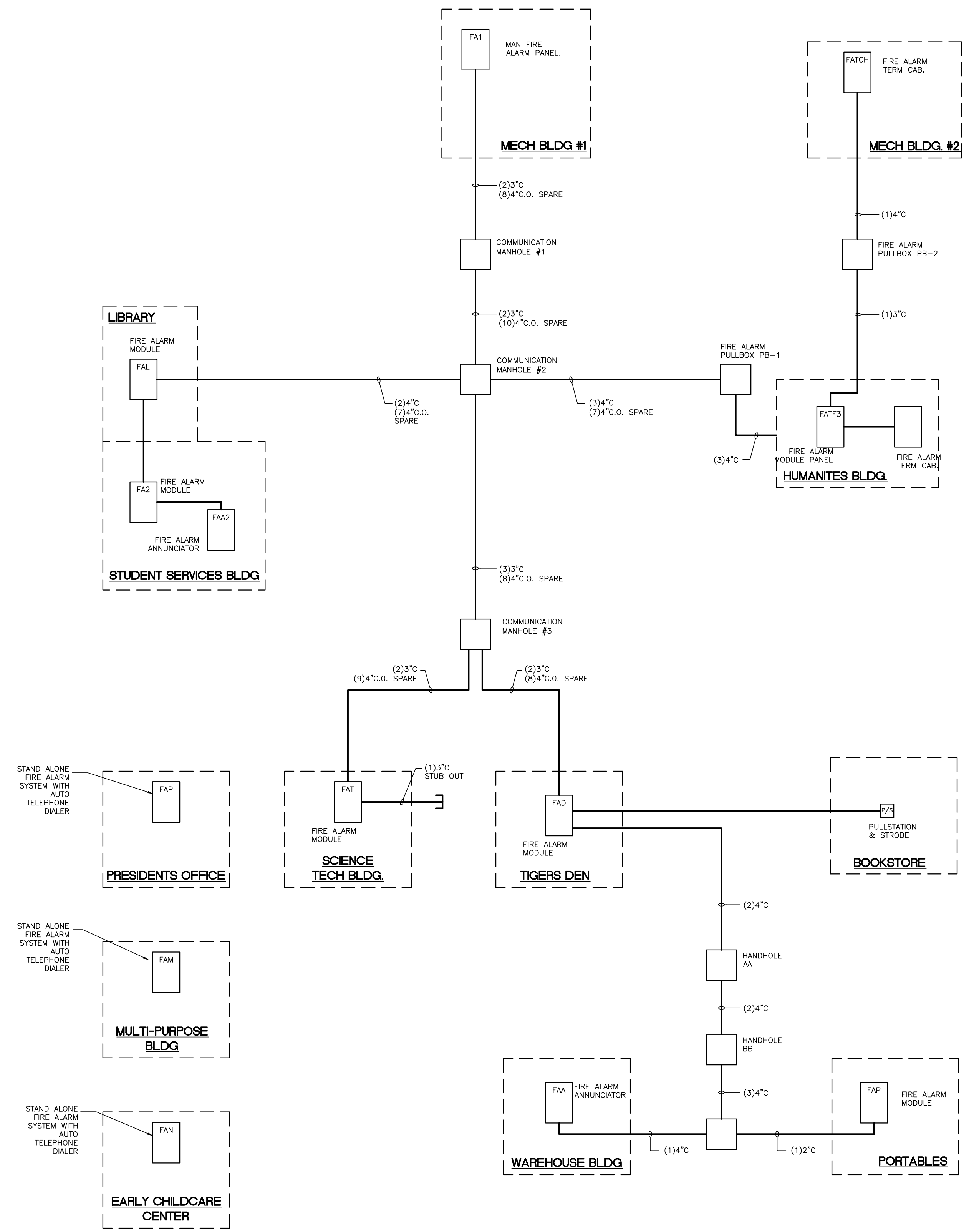
CMH #3 Looking North to CMH #2



CMH #3 Looking South

CMH #3 Looking South to Science Technology

CMH #3 Looking south to Tigers Den



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Consultant

REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

Project Title

ELECTRICAL
CAMPUS SURVEY
MORENO VALLEY

RIVERSIDE COMMUNITY COLLEGE 1916

MORENO VALLEY CAMPUS
16130 Lasselle St.
Moreno Valley, CA 92551

Revisions

Number	Description	Date
	SURVEY	07/30/07

Designed JL
Drawn JP
Checked JL
Approved

Date JULY 30, 2007

Submittal SURVEY

Scale AS NOTED

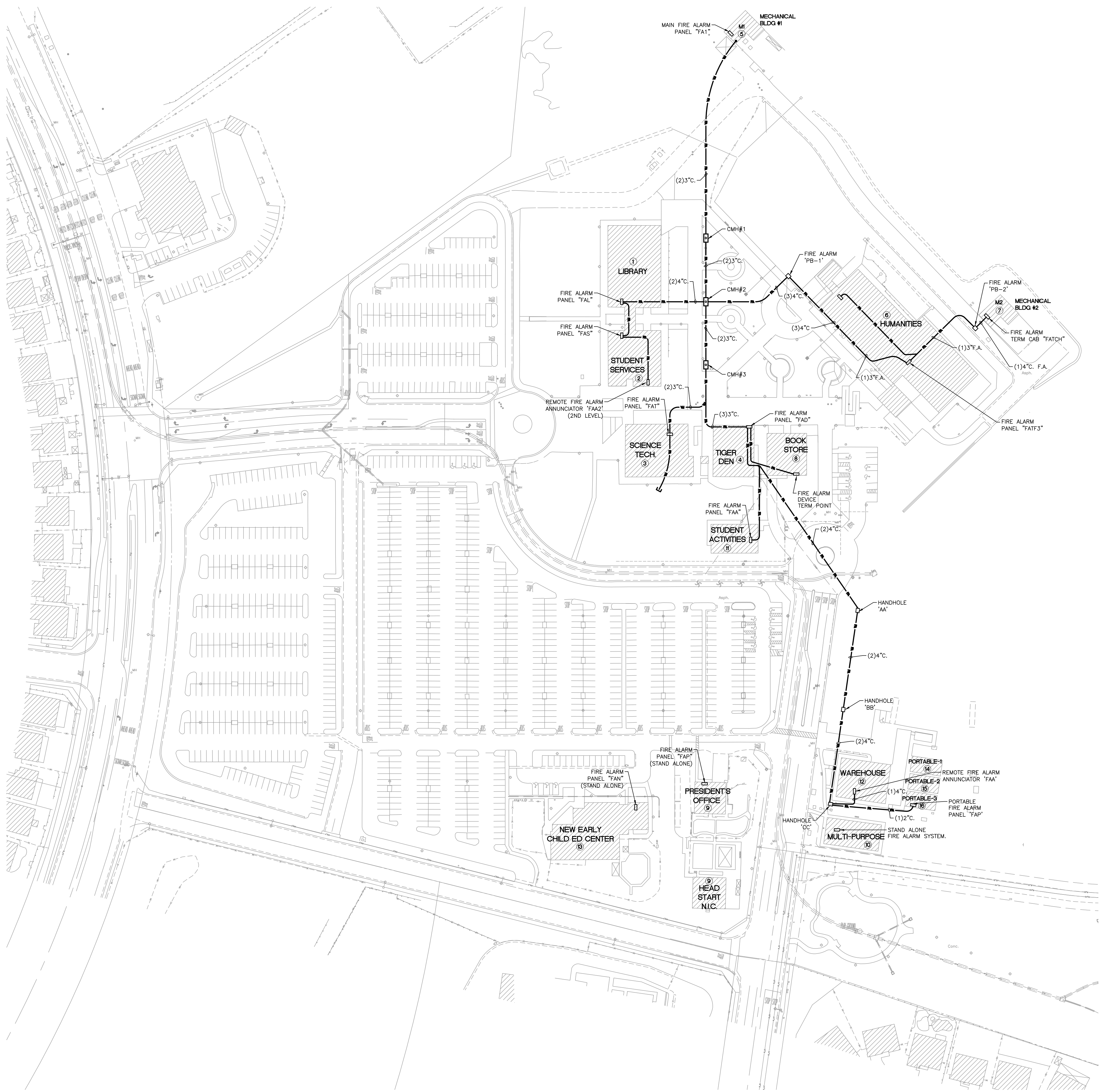
Sheet Title

FIRE ALARM
RISER DIAGRAM

Sheet Number

FA-1.1

of



BUILDING LIST

BLDG. NO.	NAME
1	LIBRARY
2	STUDENT SERVICES
3	SCIENCE AND TECHNOLOGY
4	TIGERS DEN
5	MECH-1
6	HUMANITIES
7	MECH-2
8	BOOKSTORE
9	NEW PRESIDENT'S OFFICE
10	MULTI-PURPOSE
11	STUDENT ACTIVITIES
12	WAREHOUSE
13	NEW EARLY CHILDHOOD ED. CENTER
14	PORTABLE CLASSROOM AND OFFICES
15	PORTABLE CLASSROOM AND OFFICES
16	PORTABLE CLASSROOM AND OFFICES

NOTE

SEE ELECTRICAL CAMPUS SITE PLAN E1.1 FOR EXACT LOCATION OF ALL MANHOLES, PULLBOXES AND HANDHOLES.

NORTH

CAMPUS

SITE PLAN

SCALE: 1"=60'

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Consultant

Project Title

ELECTRICAL CAMPUS SURVEY MORENO VALLEY

MORENO VALLEY CAMPUS
16130 Lasselle St.
Moreno Valley, CA 92551

Revisions

Number	Description	Date
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Designed JL
Drawn JP
Checked JL
Approved

Date JULY 30, 2007

Submittal SURVEY

Scale AS NOTED

Sheet Title

FIRE ALARM SITE PLAN

Sheet Number

FA-2.1

of

4655

SECTION 14
NORCO COLLEGE

Div 28

ELECTRONIC SAFETY + SECURITY

28 31 00 FIRE DETECTION AND ALARM

FIRE ALARM SURVEY

The following document has been excerpted from:

Norco Fire Alarm Survey

March 6, 2007

Riverside Community College District

Norco Fire Alarm Survey

March 6, 2007

P2S Engineering, Inc.

Riverside Community College District

Norco Fire Alarm Survey

March 6, 2007

P2S Engineering, Inc.


Central Plant Fire Alarm Main Panel

Fire Alarm Annunciator


Student Services Weatherproof Horn

Bookstore Pull Station

Executive Summary

Background and Scope

Norco College, one of three colleges within the Riverside Community College District, is a two-year public community college situated in the suburban community of Norco, California. The campus was built in two phases and opened in 1991 with the majority of the buildings being built in phase one. The Norco campus is fast becoming the engineering and technology based education center of choice in the Inland Empire. Each semester more than 8,500 students pursue associate's degrees, transfer to a four-year college or university or receive career certificates that qualify them to enter their chosen field.

There are multiple fire alarm systems installed throughout the campus. This includes buildings which have "stand alone" systems that are not connected to the central systems. There are three separate central fire alarm systems that serve one or more buildings as well as two stand alone systems. A central graphic annunciator displays alarm conditions at most (but not all) of the buildings on campus. The main fire alarm system appears to have been an old Edwards system which has been replaced with a newer Notifier system. However, many of the old Edwards hard-wired devices have been left in place and connected to the newer Notifier addressable system. The present Notifier system is no longer manufactured and appears to be at its maximum capability.

To meet the growing needs of the campus, the existing campus fire alarm system has been evaluated and will require upgrading as necessary to accommodate the planned expansion. P2S evaluated the existing fire alarm system currently serving the Norco College campus.

Objective

The objective of this report is to evaluate the existing fire alarm system currently serving the Norco College campus. We will consider alternatives for improvements, make cost-effective and specific recommendations as necessary to alter/upgrade/modify the existing fire alarm system to support new buildings, major renovations, and building retrofits that form part of the proposed Facilities Master Plan.

Methodology

The following methodology was adopted in formulating our power distribution master plan:

-A critical aspect in the evaluation of the existing fire alarm systems serving a facility is a detailed and accurate field investigation of the current systems. A detailed survey of the existing fire alarm system that currently serves the facilities at Norco College campus and existing conditions, together with potential problems, are being identified. The surveyed information has been verified through available field investigations and meetings with the campus facilities staff as well as discussion with a Notifier service representative. No record drawings were available.

-Alterations/upgrades/modifications necessary to support new buildings, major renovations and building retrofits that will form part of the proposed campus facilities were identified.

Report Overview

Our following report provides an analysis of the present fire alarm system currently serving the campus. It identifies potential problems associated with the system, defines future requirements and outlines recommended solutions.

The following are included in this survey submittal:

-Executive Summary

-Fire alarm system description and photographs of the existing equipment.

-Existing manhole conditions and photos.

-Existing pull box conditions and photos.

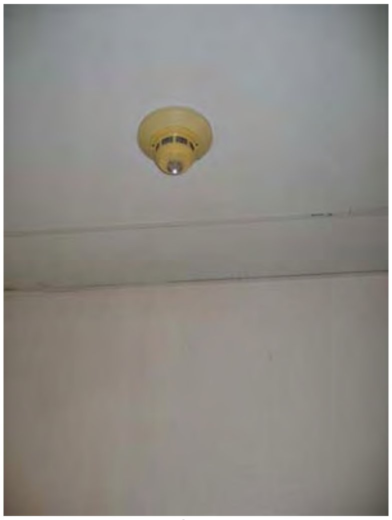
-Existing handhole conditions and photos.

-AutoCAD drawings of the existing fire alarm system site plan and riser diagram.

Student Services Strobe and Pull Station

Library Fire Alarm Control Panel

Bookstore Strobe



Tiger's Den Smoke Detector

Summary of our Findings and Recommendations

Fire Alarm System

Findings

-The various existing fire alarm systems that serve the campus are in working condition. However, they will require replacing and combining to meet the needs of the new proposed buildings and the modernization of any existing buildings.

-There are multiple fire alarm systems throughout the campus. The original main campus system was an Edwards central fire alarm system panel. The peripheral devices such as break glass stations, strobes, horns, etc. were hard wired back to this panel. The old system was not an addressable system and was replaced by a newer Notifier S5000 control panel located in Mechanical Building No.1 approximately five years ago. The original hard wired field devices were reconnected to this panel and new devices have been added to the new panel as needed.

Tiger's Den Strobe

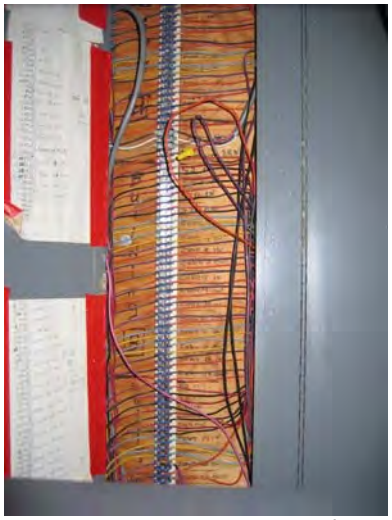
Unfortunately, the replacement Notifier S5000 is also a hard wired non-addressable system that cannot be networked. This sytem controls the Student Services Building, Sceience and Technology, Multipurpose Auditorium, Humanities, Tigers Den, Central Plant, Maintenance Buildings No. 1 and 2, and the Bookstore. There are also inputs that connect to additional separate fire alarm control panels in the Library and Applied Technology buildings. These inputs appear to be connected in order to provide outputs on the main graphic annunciator in the Student Services Building. The do not appear to allow control of those systems from the main control panel.

The graphic annunciator has indicator lights for the Student Services, Science and Technology, Multi-purpose, Humanities, Tigers Den, central plants, Library, Facilities M1 and M2, and Applied Technology buildings. The only buildings not indicated on the annunciator are the Activities Center complex and Head Start/Early Child Care which have stand alone systems. The buildings directly connected to this control panel have manual fire alarm pull stations and strobe lights that do not meet ADA compliance.

Science Tech Fire Alarm Terminal Cabinet

There is a secondary Notifier S5000 fire alarm control panel located in the Applied Technology Building which monitors this building as well as the CACT and the central plant (F2). This system is also a hard wired non-addressable system that can not be networked with the other panels. This control panel has manual fire alarm pull stations and ADA compliant strobe lights. As previously indicated, this panel is interconnected to the main fire alarm panel for annunciation purposes only.

There is a third Notifier S5000 fire alarm control panel located in the Library Building that controls the Library only. This system is also a hard wired, non-addressable system that cannot be networked. It has outputs that connect to the main fire alarm panel for purposes of graphic annunciation only. This system has manual fire alarm pull stations and ADA compliant strobes. However, it does not appear that the strobes are capable of synchronization.


Humanities Fire Alarm Terminal Cab.

There is a “stand alone” Notifier AFP100 control panel located in the Activities Building. This system monitors the Activities building as well as the portable buildings adjacent to it. This system has a telephone dialer that connects directly to the college campus police department. This panel is an addressable panel that is not capable of networking. It controls the manual fire alarm system as well as the ADA compliant strobes.

There is a “stand alone” Fire Control Instruments FC17100 panel located in the Head Start Building. This panel only monitors this building with a telephone dialer. The panel is an addressable panel that cannot be networked. The panel controls the manual fire alarm system as well as ADA compliant strobes.

There is a “stand alone” Notifier AFP100 control panel located in the Early Child Care Center. This system monitors the Early Child Care Center and is an addressable, single-loop system that is not capable of networking. It has a RAdionic automatic dialer system tied into the campus police department. It controls the manual fire alarm system as well as the ADA compliant strobes.

Science Tech. Strobe

In summary, the core campus area is controlled by hard wired, non-addressable systems. These systems would be difficult (if not impossible) to expand due to the large quantities of wiring required. In addition, the system is very difficult to reset in the event of an alarm or trouble signal initiated in the Library or Applied Technology Building. For these cases, you must first go to the building initiating the signal, reset the panel in alarm, then go to the main fire alarm panel and clear the alarm – a two-step minimum process.

The existing strobe lights are a mixture of ADA compliant and noncompliant devices. However, because of the S5000 hardwired non-addressable panel, it is not possible to synchronize the strobe lights even though they are connected to the same panel. This would result in the “second blink” between strobes which could trigger an epileptic seizure. However, the existing fire alarm systems met the current fire marshal and NFPA requirements at the time they were installed. The same applies to remodeled areas and new buildings. They can be left in place “as is” and will still be acceptable as an operational fire alarm system and will not require an enforced replacement or upgrade.


Tech Building Fire Alarm Control Panel

Recommendations

-The existing multiple fire alarm systems can be left “as is” at the present time.

-Any remodeling will trigger an automatic replacement of the existing fire alarm system.

-A new addressable system that is capable of networking should be installed. A new control panel can then be located in each building or groups of buildings and tied into the new system.

-A new networking graphic annunciator should be installed that is capable of displaying all buildings and can be silenced and reset at one location.

-The new network would require separate circuits that interconnect the buildings on campus. These circuits should be composed of copper or


Mech. Bldg No. 2 Fire Alarm Terminal Cabinet

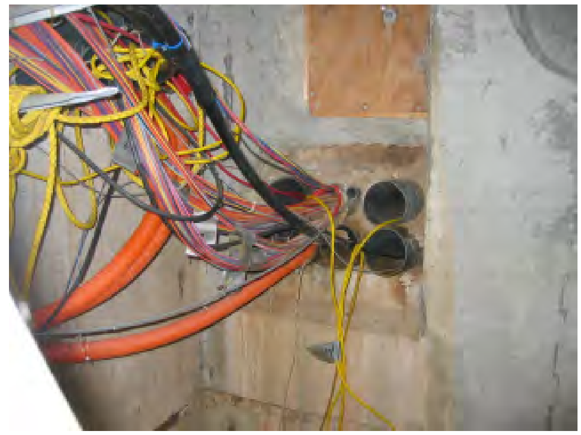
preferably fiber optic cable. With new network wiring, any disruption or problem in one building would not affect the remaining panels. These panels would continue to be operational, which would not be the case with the single main control panel at the present time.

-The main advantage of a new system is if the network is disrupted or a problem occurs in one building, the remaining panels will continue to be operational as opposed to the vulnerability of the present single control panel feeding multiple buildings. The new system should be advanced “state of the art” with large expansion capabilities. It is also recommended that the present “stand alone” systems be phased out and tied into the new central system.

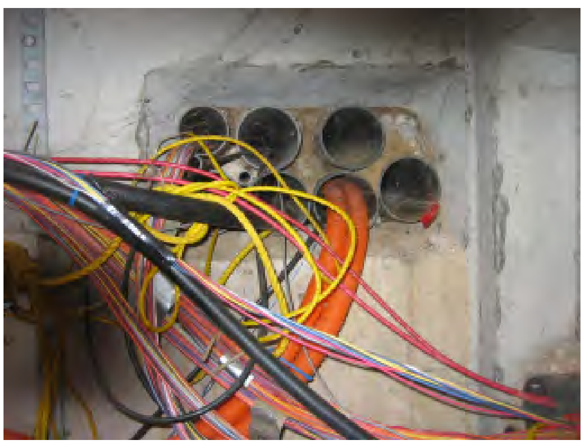
Norco Campus Fire Alarm Manholes & Pullboxes

CMH# 01 EAST OF HUMANITIES BUILDING

CMH#01 SOUTHWEST WALL



CMH# 01 NORTH EAST WALL

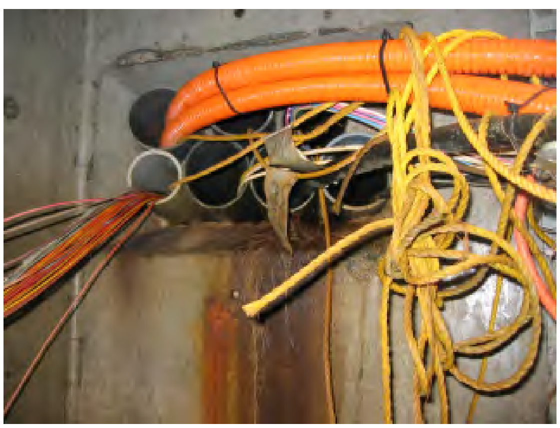


CMH # 01 NORTHEAST WALL

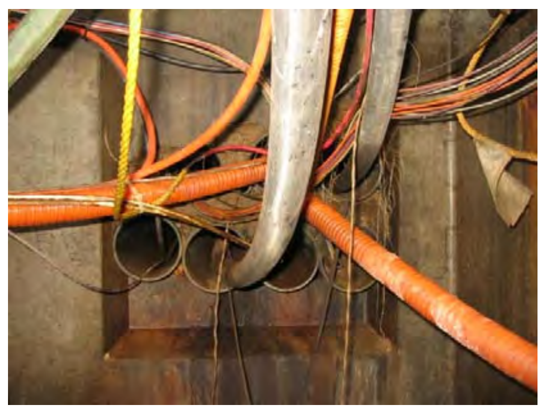
CMH# 02 NORTH OF STUDENT SERVICES BUILDING

CMH# 02 EAST WALL 1 OF 2

CMH# 02 EAST WALL 2 OF 2



CMH # 02 SOUTH WALL



CMH # 02 WEST WALL

CMH # 02 NORTH WALL

CMH # 03 SOUTH OF TECH BUILDING

CMH# 03 SOUTH EAST WALL

CMH # 03 NORTHWEST WALL

CMH# 03 NORTHEAST WALL

CMH# 04

CMH # 04 SOUTHEAST WALL

CMH# 04 NORTHEAST WALL

CMH # 04 NORTHWEST WALL

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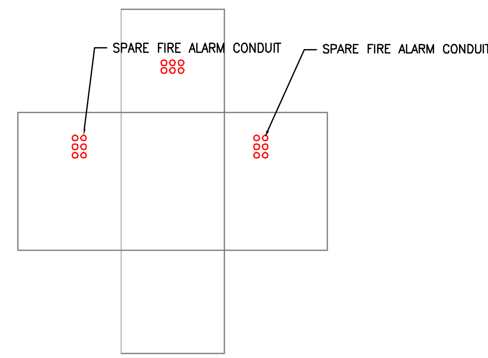
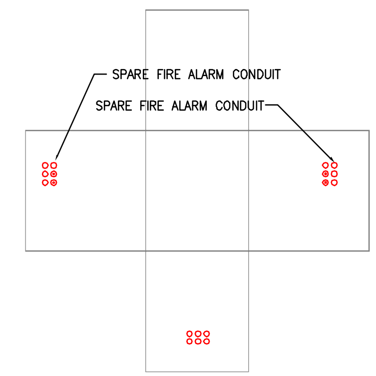
SCALE: NONE
CMH #1



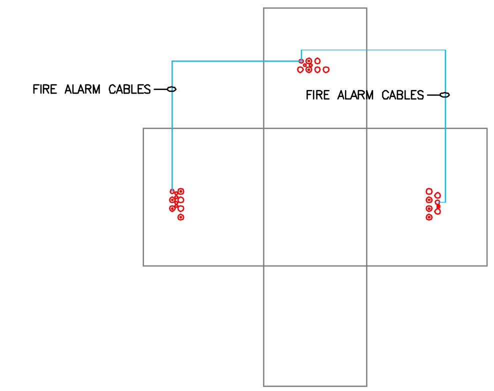
MANHOLE PLAN

CMH #5
SCALE: NONE



MANHOLE PLAN

CMH #3
SCALE: NONE



MANHOLE PLAN

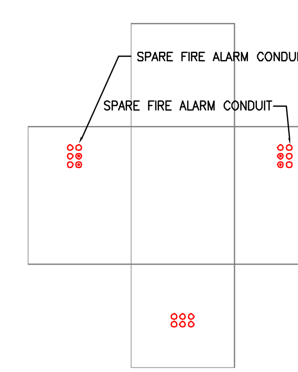
CMH #1
SCALE: NONE

-

SCALE: NONE

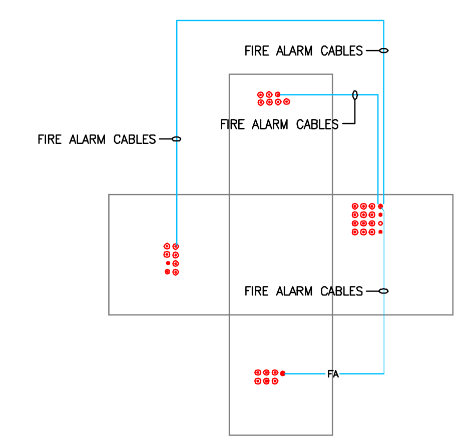
-

SCALE: NONE



MANHOLE PLAN

CMH #4
SCALE: NONE



MANHOLE PLAN

CMH #2
SCALE: NONE

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Consultant

Project Title

**FIRE ALARM
CAMPUS SURVEY
NORCO**

NORCO CAMPUS
2001 Third Street
Norco, CA 92860-2600

Revisions

Number	Description	Date
	CAMPUS SURVEY	03/05/07

Designed JL
Drawn JP
Checked JL
Approved

Date MARCH 06, 2007

Submittal CAMPUS SURVEY

Scale

Sheet Title

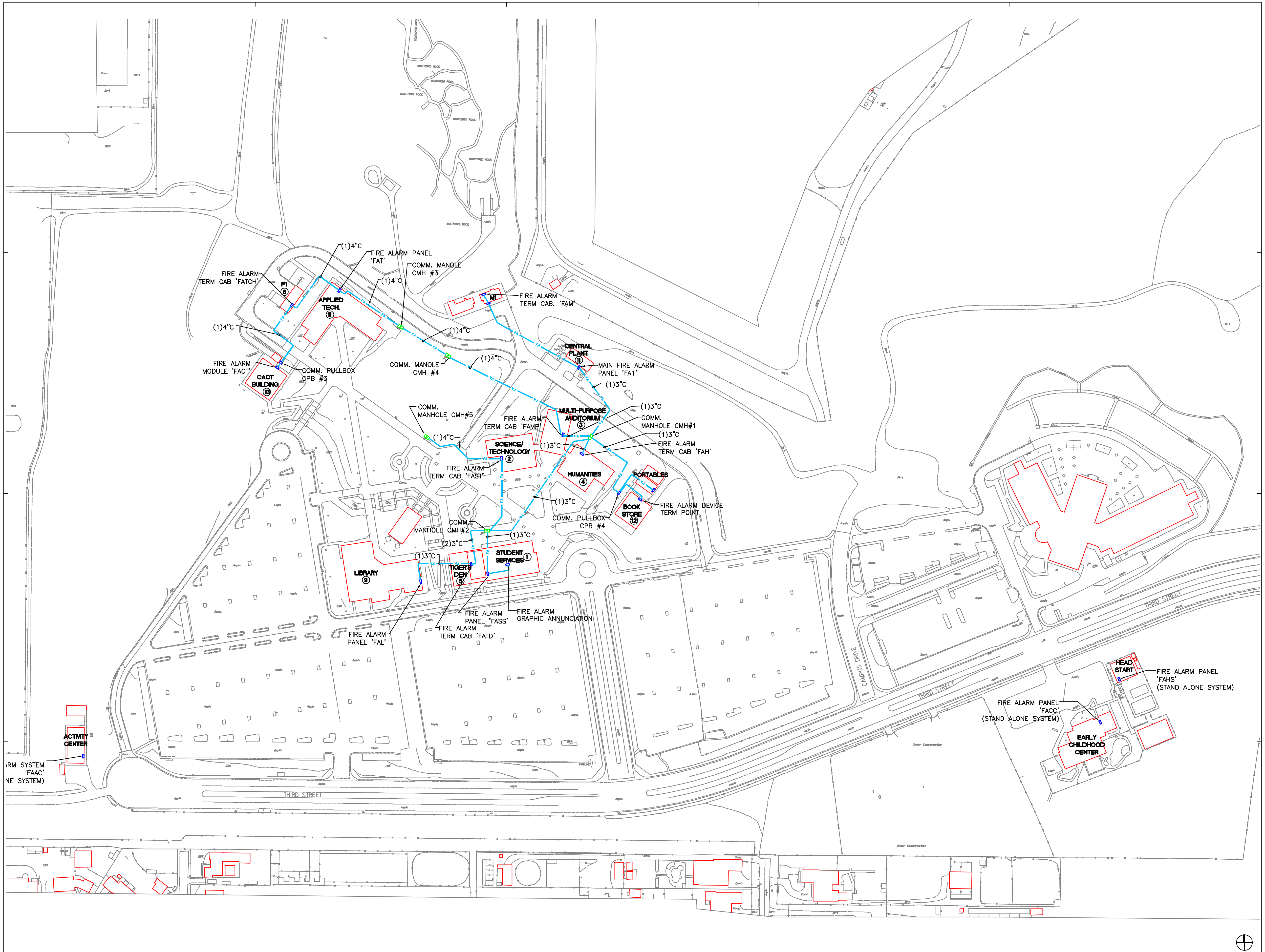
**FIRE ALARM
MANHOLES**

Sheet Number

FA-4.2

of

4817



SITE PLAN

CAMPUS
SCALE: 1"=80'

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CAMPUS SURVEY
NORCO

NORCO CAMPUS
2001 Third Street
Norco, CA 92860-2600

Revisions

Number	Description	Date
	CAMPUS SURVEY	03/05/07

Designed	BL
Drawn	RM
Checked	BL
Approved	
Date	MARCH 05, 2007
Submittal	CAMPUS SURVEY
Scale	

Sheet Title

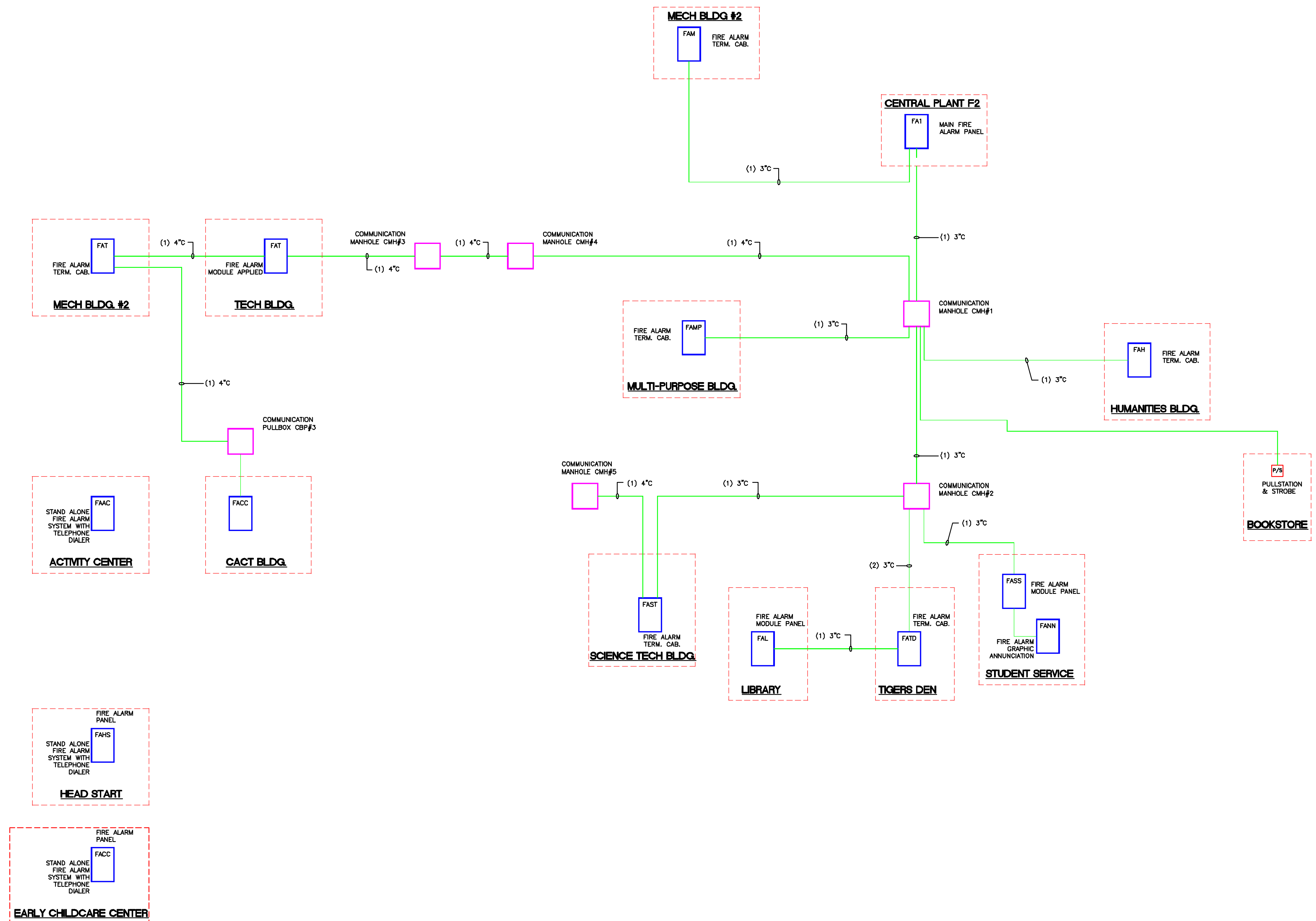
FIRE ALARM
CAMPUS
SITE PLAN

Sheet Number

FA-1.1

of

4817



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Project Title

FIRE ALARM CAMPUS SURVEY NORCO

NORCO CAMPUS
2001 Third Street
Norco, CA 92860-2600

Revisions

Number	Description	Date
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Designed BL
Drawn JAV
Checked BL
Approved

Date MARCH 05, 2007

Submittal CAMPUS SURVEY

Scale

Sheet Title

FIRE ALARM RISER DIAGRAM

Sheet Number

FA-1.2

of

4817

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Norco Campus Fire Alarm Devices

Central Plant Fire Alarm Main Panel

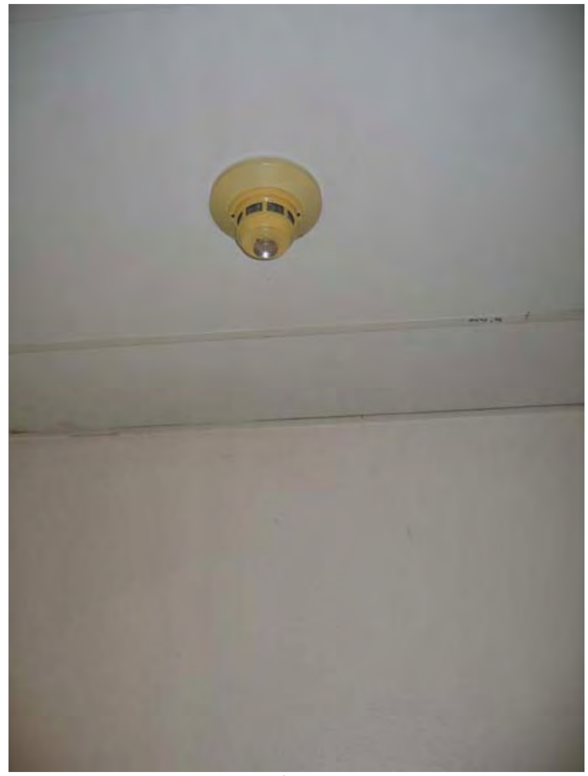
Fire Alarm Annunciator

Student Services Weatherproof Horn

Bookstore Pull Station

Bookstore Strobe

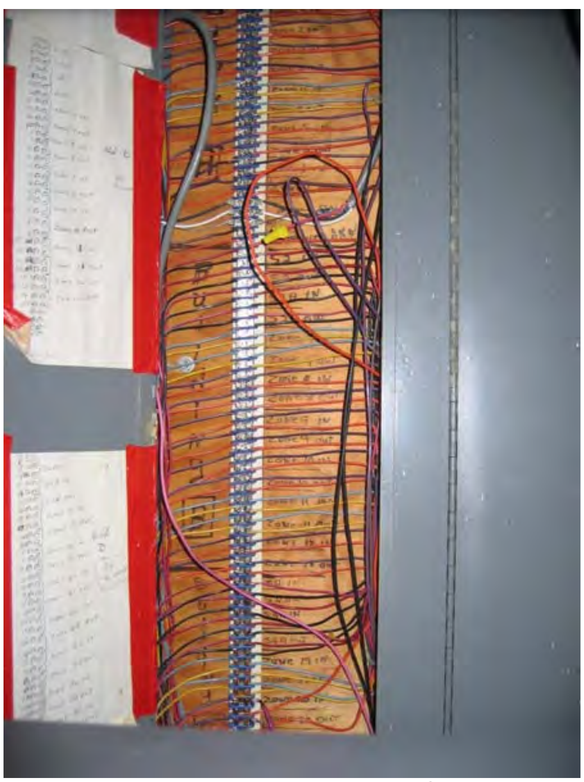

Student Services Strobe and Pull Station


Tiger's Den Smoke Detector

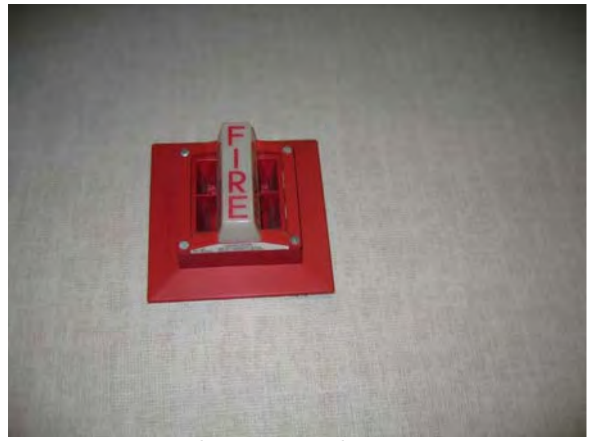

Library Fire Alarm Control Panel


Tiger's Den Strobe

Science Tech Fire Alarm Terminal Cabinet



Humanities Fire Alarm Terminal Cab.



Science Tech. Strobe

Tech Building Fire Alarm Control Panel

Mech. Bldg No. 2 Fire Alarm Terminal Cabinet

Science Tech. New Strobe

SECTION 14

RIVERSIDE CITY COLLEGE

Div 28
ELECTRONIC SAFETY + SECURITY

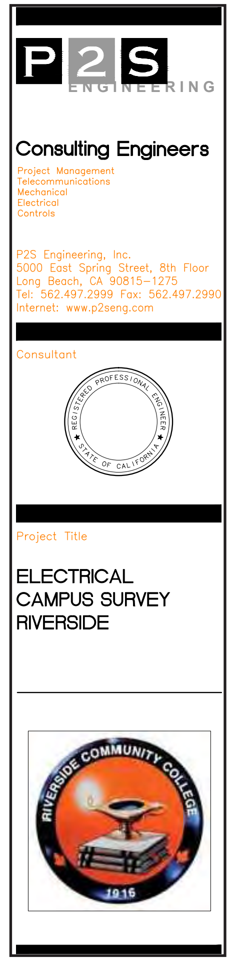
28 31 00 FIRE DETECTION AND ALARM

FIRE ALARM SURVEY

The following document has been excerpted from:

Electrical Campus Survey Riverside

June 7, 2007



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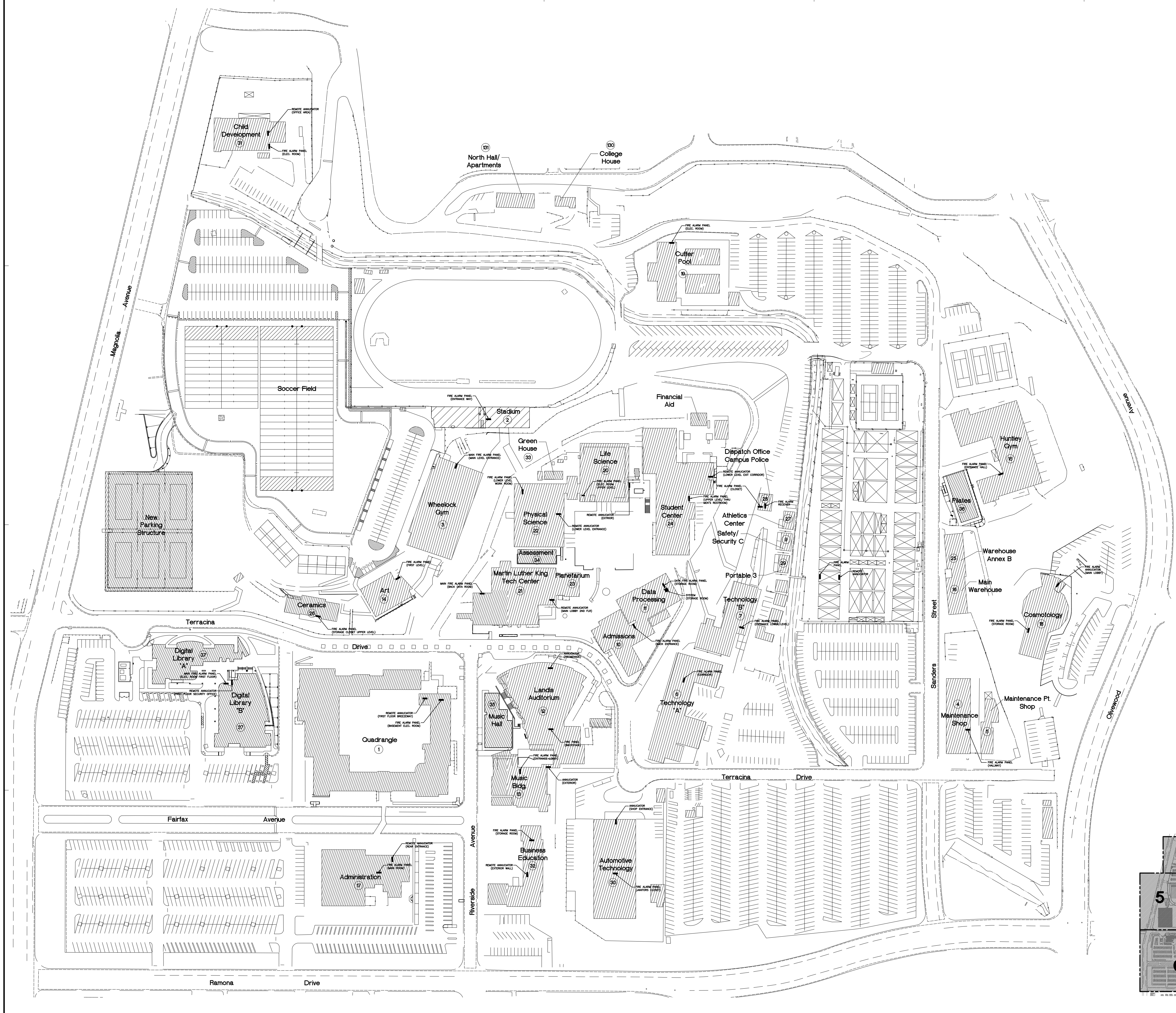

BUILDING LIST

1. QUADRANGLE
2. STADIUM
3. WHEELOCK GYM
4. MAINTENANCE SHOP
5. MAINTENANCE PT SHOP
6. TECHNOLOGY 'A'
7. TECHNOLOGY 'B'
9. SAFETY/SECURITY C
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14. ART BUILDING
15. HUNTLEY GYM
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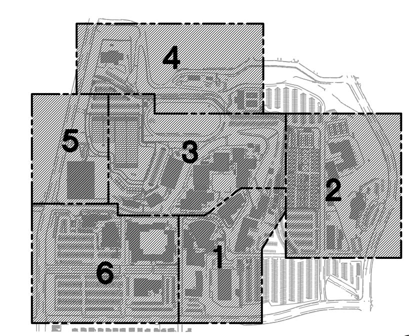

KEYPLAN

NORTH CAMPUS

CAMPUS SITE PLAN

SCALE: 1"=80'

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Consultant

REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

Project Title

ELECTRICAL
CAMPUS SURVEY
RIVERSIDE

RIVERSIDE COMMUNITY COLLEGE
1916

Revisions

Number	Description	Date
1.	SURVEY	06/07/07

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Submittal	SURVEY
Scale	AS NOTED

Sheet Title

FIRE ALARM
CAMPUS
SITE PLAN

Sheet Number

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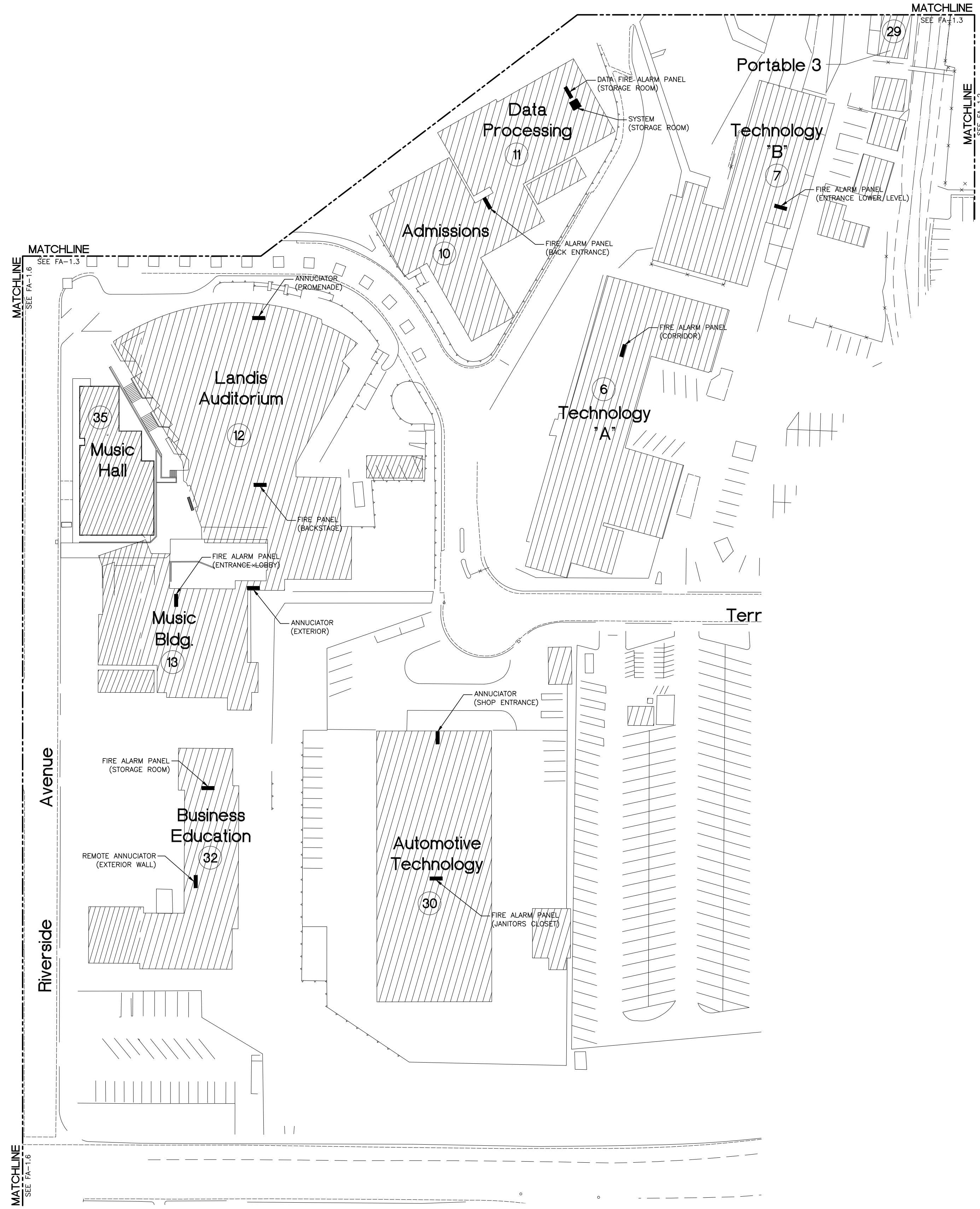
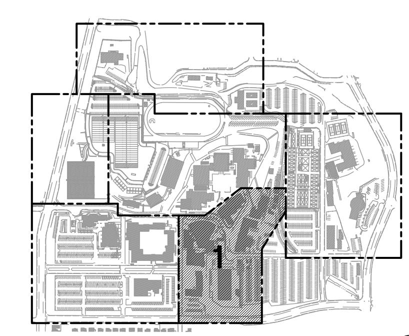
NOTES





KEYPLAN

NORTH

CAMPUS

SCALE: 1"=40'

SITE PLAN - AREA 1

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Submittal SURVEY

Scale AS NOTED

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FIRE ALARM
PARTIAL CAMPUS
SITE PLAN
AREA 1

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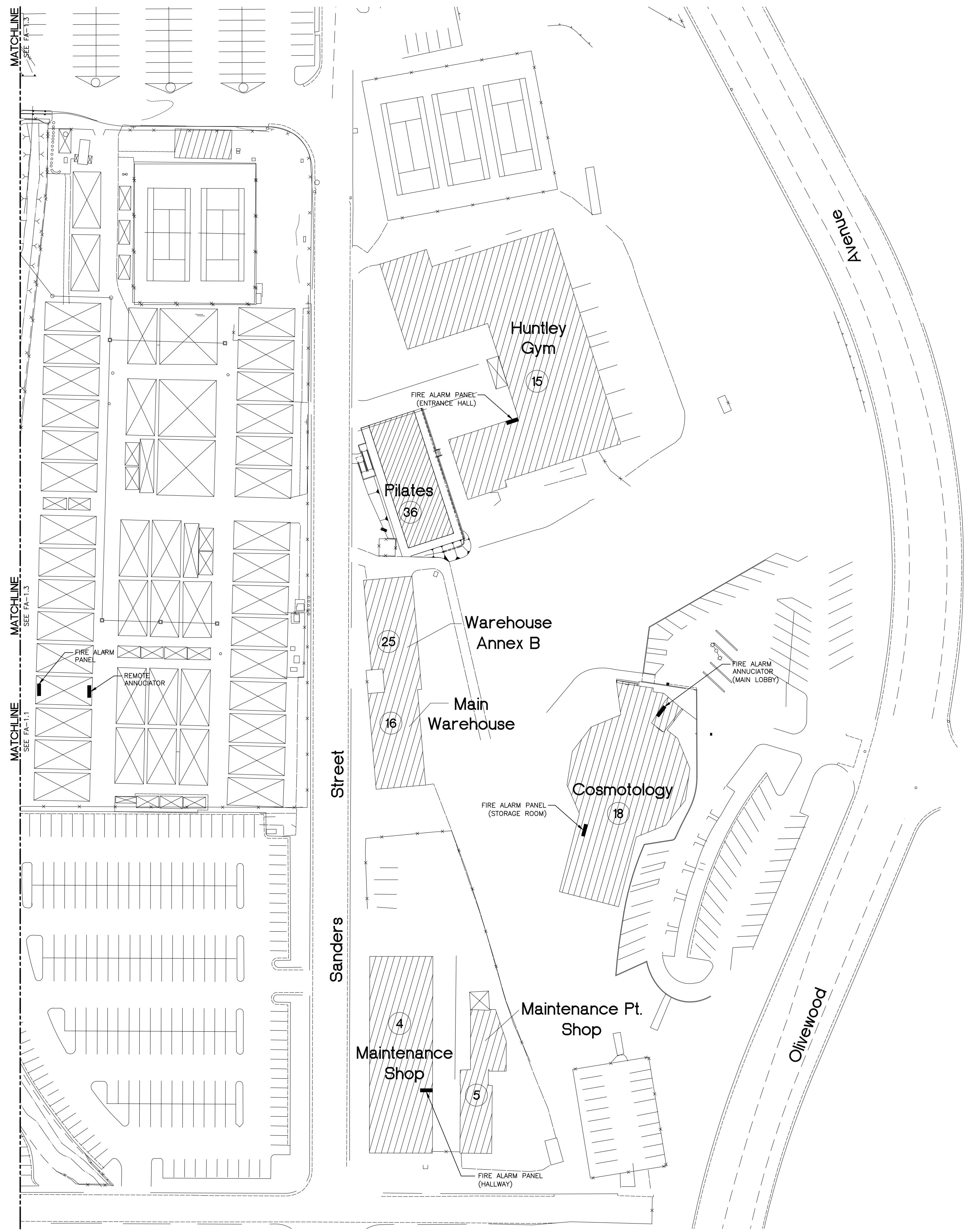
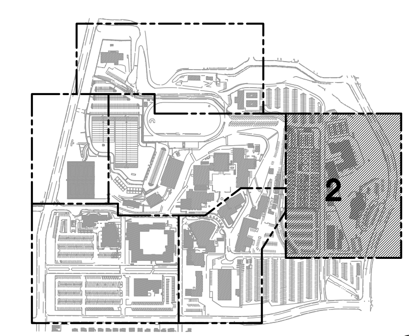
NOTES





KEYPLAN

NORTH CAMPUS

SITE PLAN - AREA 2

SCALE: 1"=40'

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Scale	AS NOTED

Sheet Title

FIRE ALARM PARTIAL CAMPUS SITE PLAN AREA 2

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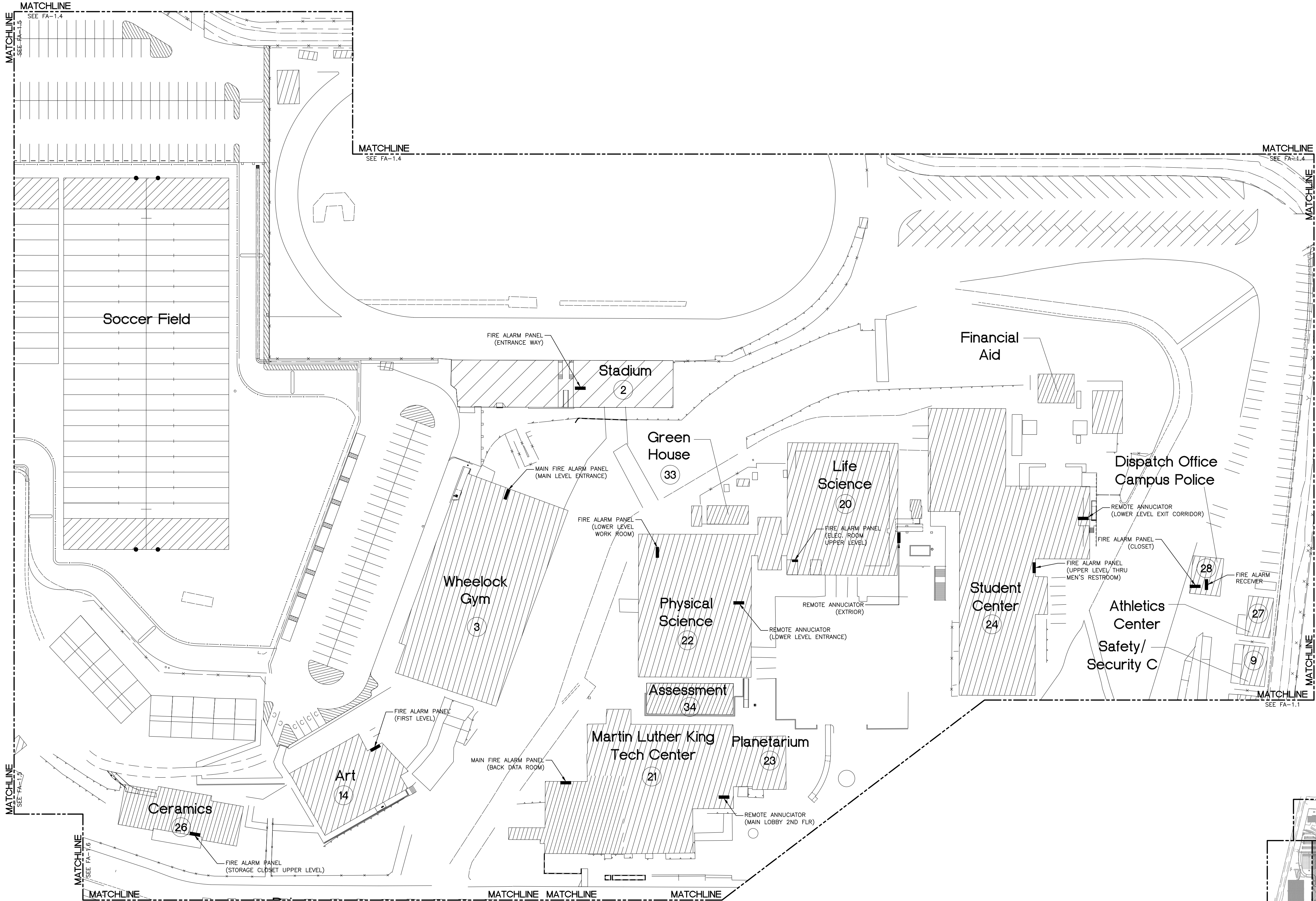
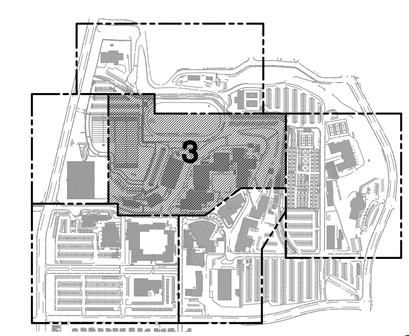
NOTES





KEYPLAN

NORTH
CAMPUS

SITE PLAN - AREA 3

SCALE: 1"=40'

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RIVERSIDE COMMUNITY COLLEGE 1916

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FIRE ALARM
PARTIAL CAMPUS
SITE PLAN
AREA 3

Sheet Number

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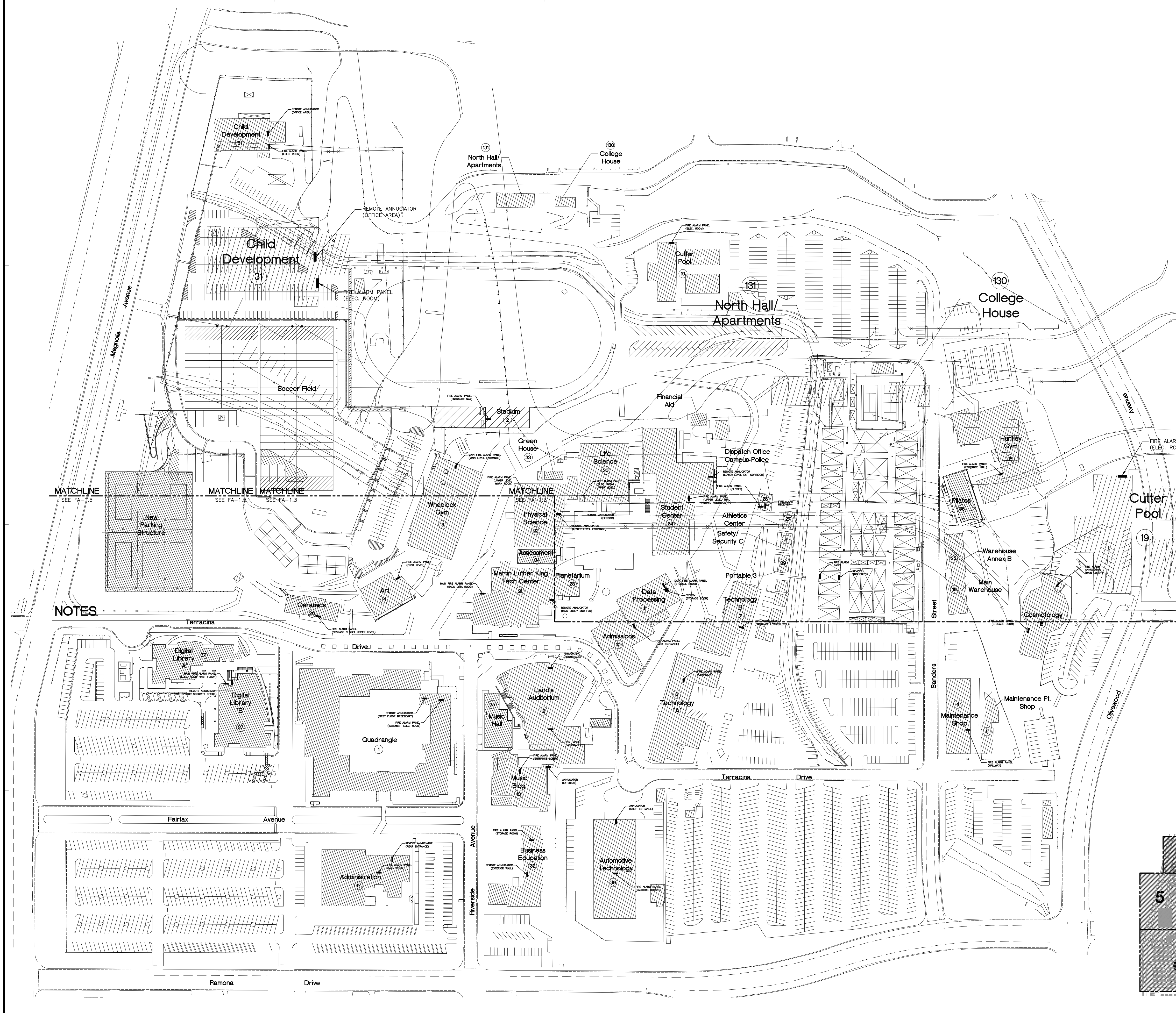

BUILDING LIST

1. QUADRANGLE
2. STADIUM
3. WHEELOCK GYM
4. MAINTENANCE SHOP
5. MAINTENANCE PT SHOP
6. TECHNOLOGY 'A'
7. TECHNOLOGY 'B'
9. SAFETY/SECURITY C
10. ADMISSIONS COUNSEL
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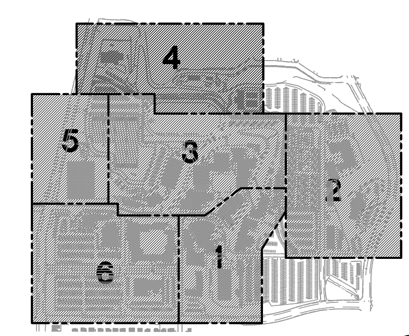
35. MUSIC HALL
36. PILATES
37. DIGITAL LIBRARY 'A' AND 'B'
130. COLLEGE HOUSE
131. NORTH HALL/APARTMENTS

MATCHLINE
SEE FA-1.3



KEYPLAN

NORTH

CAMPUS

SCALE: 1"=80'

CAMPUS PLAN SITE AREA 4

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Scale	AS NOTED

Sheet Title

FIRE ALARM
PARTIAL CAMPUS
SITE PLAN
AREA 4

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NOTES

BUILDING LIST

1. QUADRANGLE
2. STADIUM
3. WHEELOCK GYM
4. MAINTENANCE SHOP
5. MAINTENANCE PT SHOP
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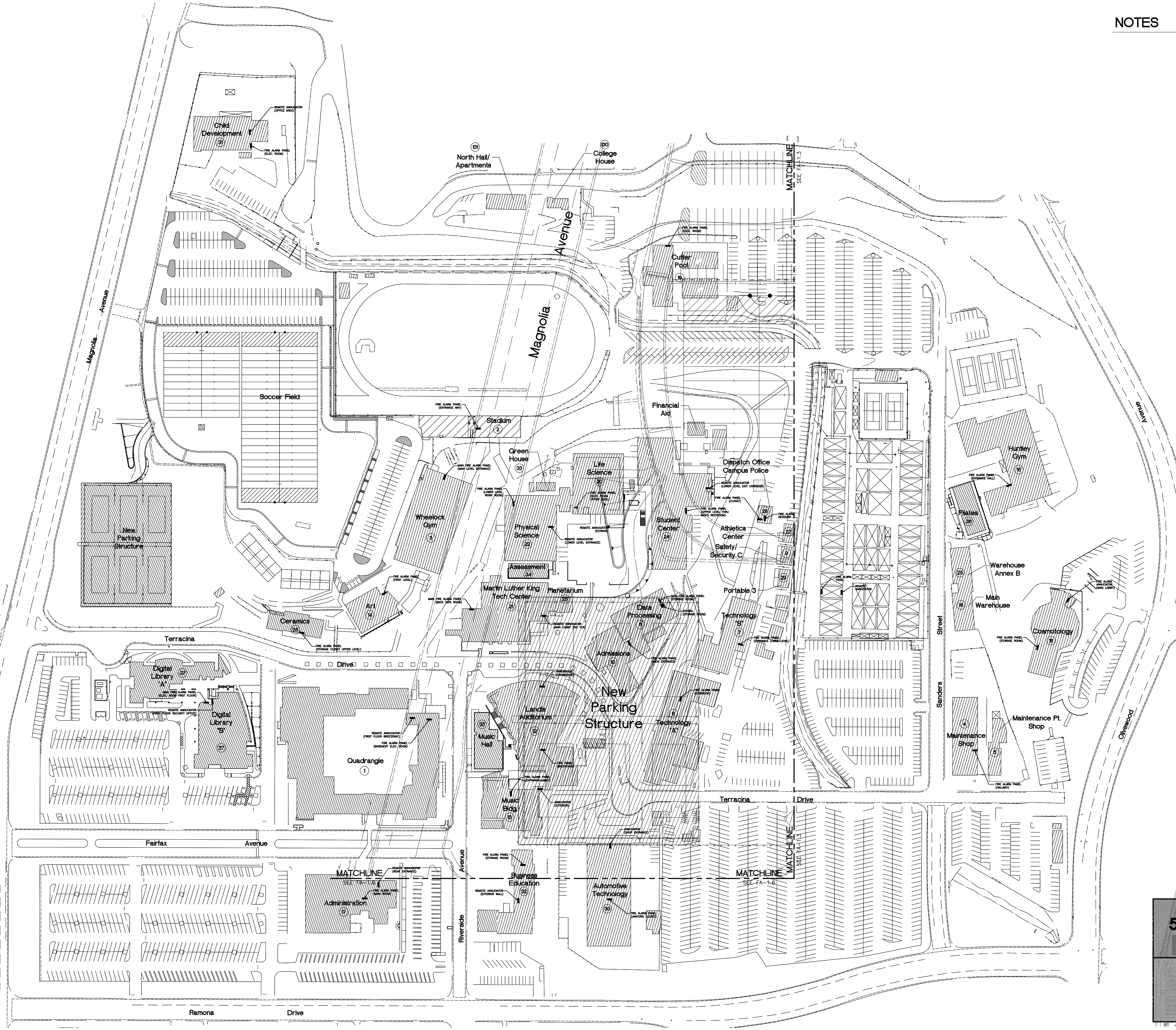

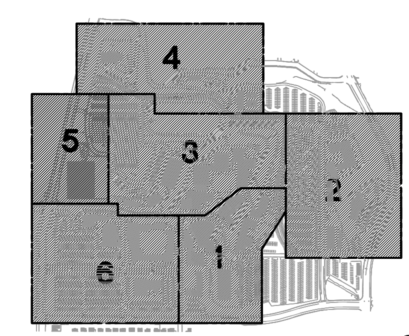

KEYPLAN

NORTH

CAMPUS

SCALE: 1"=80'

SITE PLAN AREA 5

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FIRE ALARM
PARTIAL CAMPUS
SITE PLAN
AREA 5

Sheet Number

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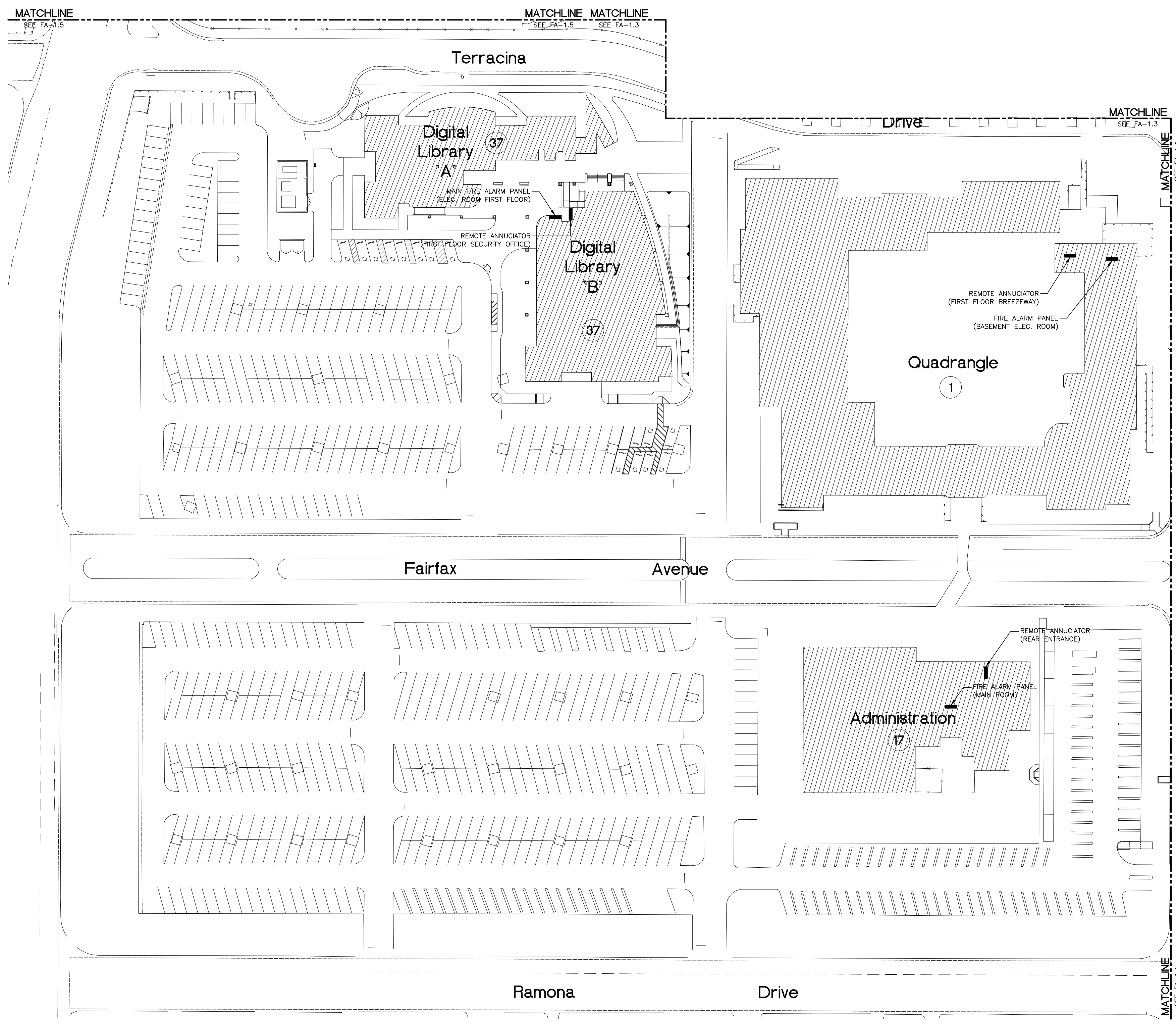
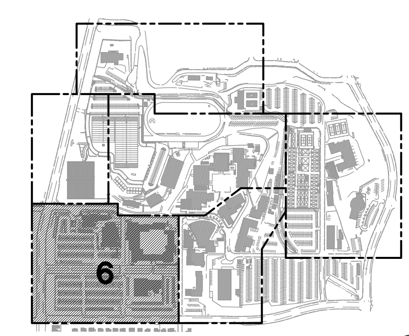


SITE PLAN - AREA 6

SCALE: 1"=80'

NOTES



KEYPLAN

NORTH
CAMPUS

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1916

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Submittal SURVEY

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FIRE ALARM
PARTIAL CAMPUS
SITE PLAN
AREA 6

Sheet Number

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15 CONVEYING SYSTEMS

INTRODUCTION

This section describes the fundamental design criteria for incorporating new elevators at the public areas of existing and new buildings throughout the Riverside Community College District (RCCD).

Guide specifications are included herein that provide the minimum acceptable standards for such conveying equipment. These standards are intended to assist the architects and engineers in integrating these systems into their construction documentation including detailed drawings and specifications.

Div 14

CONVEYING SYSTEMS

14 00 00 CONVEYING SYSTEM

All document submittals related to this section shall comply with Riverside Community College District (RCCD) submittal requirements described in the following guide specifications and general submittal requirements. Submittal requirements specific to vertical transportation equipment are detailed within these guide specifications.

It shall be noted that Riverside Community College District (RCCD) has undergone a system upgrade to many of the existing elevators within existing buildings. In this program, many of the existing elevators were upgraded with equipment that is compliant with current code requirements including disabled access.

Confirm with your RCCD representative if such an upgrade has been performed within the area of the proposed renovation.

Where new elevators are desired, specifying the proper elevator speed and capacity is critical and shall be justified via the analysis of interval and handling capacity needs. Elevator cab sizes shall be selected based upon both the ability to transport people and the need to move other materials. This analysis shall take into account other modes of transportation within each building.

The latest, proven conveying technologies shall be considered in systems selection. But, technology, alone, shall not be the driving factor in the selection of equipment. For instance, machine room-less technology is not recommended where the available capacities will not allow satisfaction of handling capacity or material handling needs.

14 00 00 CONVEYING SYSTEM (CONT'D)

The guide specifications that follow, describe the actual equipment parameters. The system design for such equipment shall be preceded by a thorough analysis of traffic handling needs. This formal analysis shall be approved by RCCD prior to developing equipment designs. This analysis shall include, but is not limited to:

1. Development of elevator target criteria.

2. Identification of peak period populations and durations derived from class schedules, frequency of building or garage turnover, peak period calculations in administrative buildings, and material movement needs.

3. How populations are assigned to the various types and groups of vertical transport units.

4. Discussion on the effects of all passenger support functions such as parking, security, food courts, and retail/support services.

5. Analysis results shall show, at a minimum:
    a. The frequency of elevator departures from the main terminal floor (Average Interval).
    b. The average individual car load and number of persons, carts, and wheelchairs.
    c. The average group handling capacity of each elevator zone during these peak periods.
    d. Development of population divisions between elevators where applicable.

14 00 00 CONVEYING SYSTEM (CONT'D)

6. The suggested design criterion for evaluation of the group passenger elevator systems is then:

	Admin Building	Classroom Building	Parking Garage
Average Interval		≤ 40 – 45 Seconds	≤ 40 – 45 Seconds
Group Handling Capacity*	15% of buiilding population over 5-minute of am peak	100% of passenger requirements (*based on 10% building population)	≤ 8 – 10% of parkers moved
Measurement Period	5-minute, 1-way peak	5-minute, 2-way peak	Same

*Estimated at up to 10% of the peak population to be moved on the elevators in buildings of three stories or less.

**2.5%, 5%, or 10% group handling capacity requirements are also utilized for specific passenger applications.

Note: Criteria can vary by building type and number of floors. Buildings of four stories or more will frequently have more stringent handling capacity requirements as the percentage of population willing to traverse stairs diminishes.

14 00 00 CONVEYING SYSTEM (CONT'D)

7. Approximate elevator response times shall be reported.

	Average System Response Time* (Seconds)	% Distribution of Waiting Times		
		Under 30 Seconds	Under 60 Seconds	Under 90 Seconds
Excellent	<26	>72	>95	>98
Good	<26-30	>65	>90	>95
Fair	<30-35	>60	>86	>92
Poor	>35	<60	<86	<92

*Define "average system response time" in your report.

NOTE: Typical measurements are for the all-day period, the peak hour, and the peak 1/4hour. The peak 1/4-hour increment should approximate these same standards; during extremely heavy traffic, it may drop one category.

8. Details of analysis input shall be provided. The readers should be aware of equipment acceleration/deceleration rates, door speeds, door open/close times, door dwell times, passenger load/unload times, etc. The analysis input shall reflect the nuances of passenger traffic in the type of building being analyzed. (Example: Classroom Buildings, Administration, etc.)

9. This nominal capacity shall not be based on code capacity or industry published nominal numbers.

10. Clear recommendations with regard to elevator car size and capacity shall be presented. Recommendations shall include elevator car plans depicting an average car load with people ellipses.

14 00 00 CONVEYING SYSTEM (CONT'D)

CAB ENCLOSURES/FINISHES:

- Refer to *Section 9 – Space Standards: Part L: Vertical Circulation* for elevator cab enclosure finishes. Architect to provide finish floor type and thickness.

CONTROLS: GUIDELINES FOR SERVICE BY ANY COMPANY.

- Provide diagnostic equipment complete with access codes, adjusters manuals and set-up manuals for the adjustment, diagnosis, and troubleshooting of the elevator system and performance of routine safety tests.

- Provide straight-line wiring diagrams of "as-installed" elevator circuits, with index of location and function of components. Provide one set reproducible master. Mount one set of wiring diagrams on panels, racked, or similarly protected, in elevator machine room. Provide remaining set rolled and in a protective drawing tube and deliver to District representative. Maintain all drawing sets with addition of all subsequent changes. These diagrams are Purchaser's (RCCD) property.

MACHINE ROOMS:

- Machine rooms, if required, must be adjacent to the elevator hoistway at the lowest level. (Hydraulic only)

CONTROLLER ROOMS:

- Controller rooms, if required, should be located within 100 feet of the center of the hoistway.

WHEELCHAIR LIFTS:

- Inclined and vertical platform lifts are usually not allowed in new construction where an accessible route is required. Refer to current building code.

PERMITS:

- Contractor shall be responsible for obtaining and paying fee, either itself or through its subcontractors, for all permits required by Labor code Section 7301.1. Contractor shall bear all responsibility for, and assumes all risk with regards to any delay associated with the issuance of such permits.

ELEVATOR REPORTING PROTOCOL:

14 20 00 ELEVATORS

PART 1 - GENERAL

1.1 INTRODUCTION

A. This Section includes vertical transportation for the entire project. The vertical transportation work includes, but is not limited to the, following:
   1. All elevator work.
   2. All work.
   3. Anchors, embedments, shims, fasteners, inserts, hoisting equipment, fall protection/prevention tie-offs, expansion devices, accessories, support brackets, hoist beams, temporary work platforms, backing and attachments for the above.
   4. All testing for the above.
   5. Closed-circuit television (CCTV), security system, and Automatic Logic Controls (ALC) components will be incorporated into the vertical transportation work. Coordinate with the CCTV, security system, and ALC component contractors to incorporate CCTV, security system, and ALC components and interface requirements during the course of the Work.
   6. Refer to *Section 14—Electronic Safety + Security; Section 7—Lighting; Section 18—Division 25*

B. Related work including the elevator hoistway and pit, control/machine room and electrical provisions shall be listed on the Vertical Transportation (VT) drawings and detailed in the appropriate specification sections and on the drawings.

14 20 00 ELEVATORS (CONT'D)

1.2 QUALITY REQUIREMENTS

A. Manufacturer Qualifications: Award the fabrication of the vertical transportation work to one of the following firms who are specialized in the fabrication of vertical transportation equipment and who have successfully produced work similar in design and extent to that required for the project:

1. Otis Elevator Company (BASIS OF DESIGN)
2. Schindler Elevator Corporation
3. KONE Inc.
4. ThyssenKrupp Elevator Company
5. Motion Control Engineering
6. Hollister Whitney
7. Substitutions: Other manufacturer's products may be incorporated into the Work if approved by RCCD.

B. Engage the vertical transportation manufacturer or an experienced installer approved by the vertical transportation manufacturer who has completed not less than three (3) elevator and installations similar in material, design, and extent to that indicated for this Project, as determined by RCCD, for a period of five (5) years and with a record of successful in-service performance and who is acceptable to RCCD.

C. A professional engineer who is legally qualified to practice in the State of California and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of elevators and that are similar to those indicated for this Project in material, design, and extent.

14 20 00 ELEVATORS (CONT'D)

1.2 QUALITY REQUIREMENTS (CONT'D)

D. The following standards shall govern the vertical transportation work. Where standards conflict, that standard with the more stringent requirements shall be applicable.

1. Elevator, Escalator and Moving Walk code: In addition to requirements of authorities having jurisdiction, comply with the latest edition of ASME A17.1, “Safety code for Elevators and Escalators,” ASME A17.2 “Guide for Inspection of Elevators, Escalators and Moving Walks,” and ASME A17.5 “Requirements for Elevator and Electrical Equipment,” including supplements, as published by the American Society of Mechanical Engineers. Wherever “code” is referred to in the vertical transportation specifications, the ASME A17.1 code shall be implied.
    a. The vertical transportation systems shall be designed to resist the seismic loads required under the 2007 California Building code taking into account IBC Seismic Design Category, IBC Design Spectral Response Acceleration (SDS), IBC Importance Factor, and Seismic Story Drift. Conform to the applicable portions of Section 8.4 “Elevator Safety Requirements for Seismic Risk Zone 2 or Greater” of ASME A17.1 “Escalator and Moving Walk Safety Requirement for Seismic Risk Zone 2 or greater” of ASME A17.1 also comply with CCR Title 8, Rules 3137(a) and 3137(d). Comply with the requirements of CBC (DSA) and the AISC Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings.

2. Electrical code: For electrical Work included in the vertical transportation Work, comply with “National Electrical code” (ANSI C1), NFPA, all applicable local codes, and the Authorities having jurisdiction.

3. Welding: Comply with AWS standards.

4. Americans with Disabilities Act (ADA).

14 20 00 ELEVATORS (CONT'D)

1.2 QUALITY REQUIREMENTS (CONT'D)

5. Local Fire Jurisdiction.

6. Requirements of IBC and all other codes, Ordinances, and Laws applicable within the governing jurisdictions.

7. Life Safety code, NFPA 101, and CCR Title 19.

8. California code of Regulations Title 8 and California Building code Title 24.

9. Upon nominal completion of each elevator installation, and before permitting use of the same (either temporary or permanent), perform tests as required and recommended by the "code" and applicable law. Verification that such tests have been completed, all corrective work accomplished, and installation approved for issuance of a permit or certificate to operate, shall be required before acceptance of each unit.

   Before final acceptance, the Contractor shall furnish permits, or certificates, by the Building Department or other City, County, or State departments having legal jurisdiction, as required to allow the use of each unit. All certificates shall be furnished to RCCD through the Contractor.

10. Upon completion of each elevator and installation and before final acceptance, make a contract load test of each in the presence of the local authorities having jurisdiction with full maximum load, (or in accordance with local code requirements) to determine whether the equipment as installed meets the speed, capacity, and all other requirements of the specifications.

14 20 00 ELEVATORS (CONT'D)

1.3 SUBMITTALS

A. Submit shop drawings and required material samples for review in accordance with Section Special Conditions, Submittals. Include certification or other data verifying compliance with required characteristics. Indicate by transmittal form that copy of each has been distributed to the installer.

1. Scaled Fully Dimensioned Layout: Plan of pit, hoistway, wellway and machine room indicating equipment arrangement, elevation section of hoistway, and wellway, details of car enclosures, hoistway entrances, car/hall signal fixtures, and seismic attachments.

2. Design Information: Indicate equipment lists, reactions, and design information on layouts.

3. Power Confirmation Information: Design for existing conditions for elevators. Provide complete power data submittals including heat emission data.

4. Fixtures: Cuts, samples, or shop drawings.

5. Finish Material: Submit 3" x 12" samples of actual finished material for review of color, pattern, and texture. Compliance with other requirements is the exclusive responsibility of the Provider. Include, if requested, signal fixtures, lights, graphics, Braille plates, and detail of mounting provisions.

6. Design Information: Provide calculations verifying the following:

   a. Adequacy of existing electrical provisions.
   b. Adequacy of retained equipment relative to code requirements if car weight increased by more than 5%.
   c. Machine room heat emissions in B.T.U.'s.
   d. Adequacy of elevator machine beams and supports.
   e. Adequacy of car platform structure for intended loading.

14 20 00 ELEVATORS (CONT'D)

1.3 SUBMITTALS (CONT'D)

B. The following documents are required prior to final payment:

1. Provide three sets of neatly bound written information necessary for proper maintenance and adjustment of equipment within 30 days following final acceptance of the project. Final retention will be withheld until data is received, accepted, and approved by Engineer and reviewed by Design Consultant. Include the following as minimums:

    a. Straight line wiring diagram of "as installed" circuits, with index of location and function of components. Provide one reproducible master set. Mount one set wiring diagrams on panels, racked, or similarly protected, in machine room. Provide remaining set rolled and in a protective drawing tube. Maintain machine room set with addition of all subsequent field changes. These diagrams are RCCD's property.
    b. Lubricating instructions, including recommended grade of lubricants.
    c. Parts catalogs for all replaceable parts including ordering forms and instructions.
    d. Four sets of neatly tagged keys for all switches and control features properly tagged and marked.
    e. Neatly bound instructions explaining all operating features including all apparatus in the car, exterior and moving walk switches and remote control panels.
    f. Neatly bound maintenance and adjustment instructions explaining areas to be addressed, methods and procedures to be used, and specified tolerances to be maintained for all equipment.
    g. Diagnostic test device complete with access codes, adjusters manuals and set-up manuals for adjustment, diagnosis and troubleshooting of elevator system and performance of routine safety tests.

14 20 00 ELEVATORS (CONT'D)

1.3 SUBMITTALS (CONT'D)

B. (cont'd)

2. Preventive Maintenance Contract: Furnish properly executed contract for continuing, preventive maintenance. Utilize contract form provided, by RCCD.

3. Acceptance of such records by RCCD/Design Consultant shall not be a waiver of any Provider deviation from Contract Documents or shop drawings or in any way relieve Provider from his responsibility to perform work in accordance with Contract Documents.

C. Materials, And Tools: General: Within 60 days following initial acceptance of the elevator installation, provide written information and diagnostic tools necessary for proper maintenance and adjustment of the equipment, as follows:

1. Provide two copies and one Mylar reproducible of all wiring diagrams, including straight-line wiring diagrams of all "as built and installed" elevator electrical circuits with index of location and function of all components. Provide logic diagram for all microprocessors. NOTE: Leave one complete set of corrected installation diagrams and wiring dope sheets on the job for each unit.

2. Provide two copies of all "final" construction and installation drawings.

14 20 00 ELEVATORS (CONT'D)

1.3 SUBMITTALS (CONT'D)

C. (cont'd)

1. Provide three neatly bound and indexed sets of the following:
    a. Sequence of operation and/or floor charts of the motion control and supervisory control panels, and related operating equipment, including individual and group microprocessors.
    b. Operating instructions and complete, detailed adjustment and application data and instructions for all equipment components including controller, microprocessor, selectors, motors, drives, valves, switches, etc.
    c. Lubricating instructions, including recommended grade of lubricants.
    d. Parts catalogs for all replaceable parts, including ordering forms and instruction. If a given component is made up of smaller parts, the smaller parts shall also be clearly identified by number.
    e. Provide a summary of contract data for each type of equipment furnished, including quantity and part number.
    f. Supplemental data required or requested by RCCD to facilitate equipment maintenance and adjustment.

4. Provide all special tools, including top-level solid-state diagnostic equipment, which the Manufacturer and Installer supplies to his adjusters and service personnel for proper maintenance and adjustment of all equipment. Special tools shall become the property of RCCD. NOTE: If solid-state microprocessor or group supervisory diagnostic equipment and/or tools are not available for sale Elevator Contractor shall quote RCCD on lease or rental of this equipment, including acceptable terms. Quote as a separate item.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Machine room-less elevators should be considered first when designing the vertical transportation system. Conventional hydraulic, geared, or gearless equipment may be employed where passenger capacity needs or material movement needs exceed those offered within available machine room-less product lines.

PART 2 - PRODUCTS

2.1. GENERAL

A. All elevators supplied shall be the product of a single manufacturer.

B. Subject to compliance with the requirements of the *14 20 00 Elevators* section, Elevator Cab design shall be per Contract Drawings.

C. Refer to *Section 9—Space Standards: Part L—Vertical Circulation*

2.2 SPECIAL FEATURES

A. General

1. Elevator size, arrangement, and capacity shall be justified via thorough analysis of passenger and material transport needs and shall comply with design criteria specified in this Section 3.7.1 and 3.7.2. Elevators shall be provided in accordance with the requirements of CCR Title 8 and the ASME A17.1-Safety code for Elevators and Escalators, hereinafter in this Section the “code.”

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.3 SUMMARY OF FEATURES

A. Machine Room-Less Passenger Elevators

Elevator Use	Passenger C-3 loading
Contract Load, in Pounds	4000 minimum
Contract Speed, in FPM	350 for travel distances of 20'-0" or more. 200 for travel distances of less than 20'-0"
Machine Location	Overhead in hoistway
Machine Type	Gearless
Type of Control	AC variable voltage, variable frequency
Operation	Simplex selective collective or group automatic
Platform Size	8'-0" wide by 6'-2" deep
Clear Car Inside	7'-8" wide by 5'-5" deep
Canopy Height	Passenger: 8'-0" (unless passenger elevators are used for service functions than a 10'-0";
Car and Hoistway Door Size	4'-0" wide by 8'-0" high
Car and Hoistway Door Type	Single speed, center opening
Car and Hoistway Door Operation	Power operated. High-speed, heavy-duty (Minimum opening speed 3.0 FPS)
Hoistway Entrance	As specified on a project-by-project basis
Cab Enclosure	As specified on a project-by-project basis. Refer to *Section 9 – Space Standards Part L: Vertical Circulation* for elevator cab finishes
Car Operating Station	Dual
Direction Indicator	Hall
Hall Call Stations	Single riser
Special Features	Fire control panel, machine room monitor, load weighing device, communication system, security features, handicap features, standby power, monitoring features

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.3 SUMMARY OF FEATURES (CONT'D)

B. Machine Room-Less Service Elevators

Elevator Use	Service C-3 loading
Contract Load, in pounds	5000 minimum
Contract Speed, in FPM	350 for travel distances of 20'-0" or more. 200 for travel distances of less than 20'-0"
Machine Location	Overhead in hoistway
Machine Type	Gearless
Type of Control	AC variable voltage, variable frequency
Operation	Simplex selective collective or group automatic
Platform Size	6'-0" wide by 9'-4" deep
Clear Car Inside	5'-8" wide by 8'-4" deep
Canopy Height	Provide 10'-0" nominal clear height under canopy
Car and Hoistway Door Size	4'-6" wide by 8'-0" high
Car and Hoistway Door Type	Two speed, side slide
Car and Hoistway Door Operation	Power operated. High-speed, heavy-duty (minimum opening speed 3.0 FPS)
Hoistway Entrance	As specified on a project-by-project basis
Cab Enclosure	As specified on a project-by-project basis. Refer to *Section 9 – Space Standards Part L: Vertical Circulation* for elevator cab finishes
Car Operating Station	Single (dual with front and rear entrances)
Direction Indicator	Hall
Hall Call Stations	Single riser
Special Features	Fire control panel, machine room monitor, load weighing device, communication system, security features, handicap features, standby power, door hold button, monitoring features

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.4 CAR PERFORMANCE

A. Car Speed: ±3% of contract speed under any loading condition.

B. Car Capacity: Safely lower, stop and hold 125% of rated load.

C. Car Leveling Zone: ±1/4" under any loading condition.

D. Door Opening Time:
   1. Passenger Elevators: 1.8 seconds.
   2. Service Elevators: 3.0 seconds.

E. Door Closing Time:
   1. Passenger Elevators: 2.7 seconds.
   2. Service Elevators: 5.1 seconds.

F. Car Floor-to-Floor Performance Time: Seconds from start of doors closing until doors are 3/4 open and car level and stopped at next successive floor under any loading condition or travel direction. (Based on a floor height of 16'-0". Adjust .3 seconds per foot of travel for 200 fpm elevators and .2 seconds for 350 fpm elevators.)

G. Car Ride Quality:
   1. All elevators shall have a maximum decibel reading of 65 dBA with the doors closed during a run in the up direction, measured 5 feet above the floor in the center of the cab.
   2. All elevators shall have a maximum vibration of 15 milligrams in the X, Y, and Z axis measured with an A95 filter.
   3. Acceleration and Deceleration: Smooth constant and not more than 3 feet/second2 with initial ramp between 0.5 and 0.75 second.
   4. Sustained Jerk: Not more than 8 feet/second^3.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.5 DOOR OPERATOR AND DOOR REOPENING DEVICE EQUIPMENT

A. Closed Loop Door Operator: High speed, heavy-duty door operator capable of opening doors at no less than 2-1/2 f.p.s. Accomplish reversal in no more than 2-1/2" of door movement. Provide solid-state door control with closed loop circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Maintain consistent, smooth, and quiet door operation at all floors, regardless of door weight or varying air pressure.

1. Three Dimensional Infrared Reopening Device: Black, fully enclosed device with full screen infrared matrix or multiple beams extending vertically along leading edge of each door panel to minimum height of 7'-0" above finished floor. Provide additional beams full height of door panel(s). Device shall prevent doors from closing and reverse doors at normal opening speed if beams are obstructed while doors are closing, except during nudging operation. In event of device failure, provide for automatic shutdown of car at floor level with doors open.

2. Nudging Operation: After beams of door control device are obstructed for a predetermined time interval (minimum 20.0 - 25.0 seconds), warning signal shall sound and doors shall attempt to close with a maximum of 2.5 foot pounds kinetic energy. Activation of the door open button shall override nudging operation and reopen doors.

3. Interrupted Beam Time: When beams are interrupted during initial door opening, hold door open a minimum of 3.0 seconds. When beams are interrupted after the initial 3.0-second hold open time, reduce time doors remain open to an adjustable time of approximately 1.0 - 1.5 seconds after beams are reestablished.

4. Differential Door Time: Provide separately adjustable timers to vary time that doors remain open after stopping in response to calls.
   a. Car Call: Hold open time adjustable between 3.0 and 5.0 seconds.
   b. Hall Call: Hold open time adjustable between 5.0 and 8.0 seconds. Use hall call time when car responds to coincidental calls.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.6 HOISTWAY EQUIPMENT

A. Guide Rails:
   1. Guides shall be steel T-section rails.

B. Car Buffers: Oil type with blocking and support for car contract speeds exceeding 200 fpm. Spring type for speeds of 200 fpm or less.

C. Counterweight Buffers: Oil type with blocking and support for contract speeds exceeding 200 fpm. Spring type for speeds of 200 fpm or less.

D. Roller Guides: Spring dampened roller guides shall be mounted on top and bottom of the car and counterweight frames to engage the guide rails. Provide slide guides with renewable oil less inserts where C3 loading is required.

E. Suspension Means: If steel core ropes are supplied, a means to provide constant lubrication shall be provided.

F. Machine: Provide AC gearless machine, with permanent magnet synchronous motor, direct current electromechanical disc brakes, and integral traction drive sheave. Machine to be mounted to the car guide rail or support beam mounted at the top of the hoistway.

G. Governor: Friction type over-speed self-resetting governor rated for the duty of the elevator specified and to operate the car safety.

H. Life Safety Provisions: Life safety hooks and/or other life safety devices for fall protection or prevention to be in accordance with OSHA standards/guidelines. Life safety hook, and/or other life safety devices locations to be coordinated and installed by the Installer.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.7 CONTROLLER

A. General

1. The elevator control equipment shall contain diagnostic capabilities as required for the ease of complete maintenance. The diagnostic system shall be an integral part of the controller and provide user-friendly interaction between the service person and the controls. All such systems shall be free from decaying circuits that must be periodically reprogrammed by the manufacturer.

2. The elevator control system shall be serviceable and maintainable by a trained, certified/qualified elevator mechanic of the RCCD's or Architect's choice. A complete set of as-built, adjustor's-level wiring diagrams and all service tools and software necessary to perform safety tests, diagnose problems, view or reset codes and/or change operational parameters of the elevator control system shall be provided to the RCCD or Architect as part of the contract and shall be retained by the RCCD or Architect and shall function for the life of the equipment. Hardware and software needed for diagnosis and operating parameter modification shall be products offered as standard by the manufacturer of the control system. **No substitutions of proprietary circuit boards, EPROMS, hardware locks, software passwords, or coding shall be allowed.**

3. **As a condition of the installation, the original equipment manufacturer shall guarantee to sell and deliver, on a timely basis, proprietary component repair services, replacement and stock parts, and software updates to the RCCD or Architect and/or to a third party elevator maintenance company of the RCCD or Architect's choice at a fair market price and provide to the Original Equipment Manufacturer (OEM) organization in order to keep the equipment current.** Technical and engineering support and assistance for control adjustment, maintenance, or troubleshooting shall be provided by the original equipment manufacturer to any maintaining contractor designated by the RCCD or Architect.

4. Elevator manuals, drawings, diagrams, and prints shall be provided with the equipment at time of delivery. All documentation shall be available for replacement purchase, at reasonable cost, by any maintaining elevator contractor designated by the RCCD or Architect.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.8 OPERATION

A. Provide simplex selective collective operation for single cars and group operation for multiple car groups.

B. Standby Power Panel and Operation (when required) – Contractor shall provide operation as follows: When standby power is detected by an input, one elevator at a time in each group, and single elevators, shall be returned to the main lobby one elevator at a time, and remain there with the doors open. Once all cars have been returned to the lobby, one elevator in each group, and single elevators may be selected to run under standby power. Selection of the cars shall be done automatically. This automatic selection may be overridden through manual selection. Provide necessary wiring and contacts to allow elevator systems to sequence under standby operation. Provide group selection switches in the fire control panel. Provide standby power indicators in the fire control panel and main floor hall station.

2.9 HOISTWAY ENTRANCES

A. Complete entrances bearing fire labels from a nationally recognized testing laboratory approved within the governing jurisdiction.

B. Provide Arabic floor designation/Braille plates, centered at 60" above finished floor, on both side jambs of all entrances. Floor designation shall be white, a minimum of 2" and on a black background. Provide plates at main egress landing with "Star" designation. For designated emergency car, provide "Star of Life" designation plates at height of 78" – 84" above finished floor on both side jambs at all floors. Braille indications shall be below Arabic floor designation. Provide cast floor designation/ Braille plates as manufactured by SCS, Vision Mark, or Entrada. Provide cast elevator identification plates at designated landing.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.10 CAB ENCLOSURE COMPONENTS

A. General
   1. Elevator car and car components shall meet the applicable requirements of the code. Car control station(s) and position indicator(s) shall be per Contract drawings.

   2. Entire car assembly, including car frame and platform, shall be free from warps, buckles, and squeaks and rattles. Joints shall be lightproof.

B. Sills: Car sills shall be extruded stainless steel or aluminum supplied with grooves and trash slots for door guides and machine planed for minimum clearance. Provide with matching sill extensions to face of front return(s).

C. Car Enclosures: Refer to *Section 9 – Space Standards Part L: Vertical Circulation* for finishes.

   1. General: The enclosure shall be adequately reinforced and ventilated to meet code requirements. Provide sound-deadening mastic to exterior.

   2. Shell:
      a. Passenger Elevators: Refer to *Section 9*.
      b. Service Elevators: Refer to *Section 9*. Panel width shall not exceed 20". Provide sound deadening to rear of panel.

   3. Canopy:
      a. Refer to *Section 9*.
      b. Passenger Elevators: Provide 8'-0" (unless passenger elevators are used for service functions, than a 10'-0").
      c. Service Elevators: Provide 10'-0" nominal clear height under canopy.
      d. Reinforced 14-gauge stainless steel No. 4 brushed finish.
      e. Arrange for hinged top emergency exit including lock and electrical contact as required by code.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.10 CAB ENCLOSURE COMPONENTS (CONT'D)

C. Car Enclosures (cont'd)

4. Suspended Ceiling and Lighting:
    a. Refer to *Section 9*.
    b. Provide as shown in Architect's drawings.
    c. Provide clear access to the emergency exit per code requirements.
    d. Omit suspended ceiling in service elevators. Provide fluorescent lighting flush with canopy. Clad or construct canopy of textured stainless steel.

5. Floor Covering:
    a. Passenger Elevators: Refer to *Section 9*. Floor by others Wt./Ft = 10#.
    b. Service Elevators: Refer to *Section 9*.

6. Front Return Panels and Entrance Columns:
    a. Refer to *Section 9*.
    b. 14-gauge stainless satin (vertical) steel.
    c. Return panel shall be stationary type with flush type fixtures.

7. Transoms:
    a. Refer to *Section 9*.
    b. 14-gauge stainless steel.

8. Car Door Panels:
    a. Refer to *Section 9*.
    b. Same construction as hoistway door panel.
    c. Finish shall be stainless steel No. 4 satin (vertical).

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.10 CAB ENCLOSURE COMPONENTS (CONT'D)

C. Car Enclosures (cont'd)

9. Handrails:
    a. Refer to *Section 9*.
    b. Provide a 1 1/2" diameter stainless steel tubular handrail at the rear of each passenger elevator. Return ends to wall.
    c. Provide adequate mounting.
    d. Top of handrail to be 32" above the finished floor.
    e. Provide service elevators with side and rear wall mounted handrails and bumper rails. Return ends to wall.
    f. Bolt handrails and bumper rails through car shell.
    g. Provide backing plates and captive nuts.

10. Bases:
    a. Refer to *Section 9*.
    b. Provide a 4" high base.
    c. Finish as shown in Architect's drawings.

11. Pads and Hooks:
    a. Refer to *Section 9*.
    b. Provide pad hooks and pads.
    c. Pad hooks shall be conspicuous type (buttons) at all walls.
    d. Mount pad hooks at sides and rear above suspended ceiling line.
    e. Pads shall cover all walls and front return panels and include cutouts for access to the operating fixtures.

12. Ventilation:
    a. Refer to *Section 9*.
    b. Two-speed exhaust blower.
    c. Provide Original Equipment (OE) type in passenger elevators and AA type in service elevators.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.10 CAB ENCLOSURE COMPONENTS (CONT'D)

D. Emergency Car Lighting and Alarm System:

a. Unit shall provide emergency light in car upon failure or interruption of normal car lighting.
b. Emergency lighting unit shall provide a minimum illumination of 0.2 footcandles at 4' above car floor approximately 1' in front of main car operating panel for not less than 4 hours.
c. Battery shall be 6-volt minimum, sealed rechargeable lead acid or equal.
d. Battery charger shall be capable of restoring battery to full charge within 16 hours after resumption of normal power.
e. Provide means within the car service panel for testing battery, lamps, and alarm bell.
f. When multiple units are provided in a car, all units shall illuminate.
g. Illuminate a portion of normal car lighting.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.11 SIGNAL DEVICES AND FIXTURES

A. General: Provide vandal resistant signal fixtures and control devices for each elevator.

B. Car Operating Station:

1. Provide car-operating stations with faceplates flush with front returns. Braille/ Arabic designations shall be identified by a minimum of 5/8" Arabic numeral, standard alphabet character, or standard symbol immediately to the left of the control button.

2. Provide a lockable service cabinet with concealed hinges. Cabinet door shall include a flush integral certificate frame for viewing the operating permit.
    a. Cabinet shall contain the following type controls:
        i. A light switch.
        ii. Two speed fan switch.
        iii. Inspection keyswitch, conforming to the ASME code.
        iv. Independent service keyswitch.
        v. Emergency light test button.
        vi. Keyed stop switch.
        vii. A duplex 120-volt, A.C. G.F.C.I convenience outlet.

3. Provide black paint filled (except as noted), engraved signage as follows with approved size and font. Stick-on signs are not acceptable.
    a. Phase II firefighters' operating instructions on rear of locked Phase II compartment door.
    b. Car number over main and auxiliary car operating panel.
    c. "No Smoking" over main car operating panel.
    d. Car capacity in pounds on main car operating panel.
    e. 3/16" "Push for Alarm" and telephone usage instructions.

14 21 23.16 MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS (CONT'D)

2.11 SIGNAL DEVICES AND FIXTURES (CONT'D)

C. Car Position Indicators: Provide segmented digital readout type with 2" high (minimum) indications.

D. Floor Annunciator: Provide digitized voice annunciator providing both male and female voices in a system capable of up to 5-minutes of speech.

1. Provide riser of vandal resistant hall pushbuttons. Provide spanner type security fasteners. Finish matching faceplate.

E. Hall Lanterns: Provide UP and DOWN vandal resistant lanterns at intermediate landings, single lantern at terminal landings.

F. Hoistway Access Switches: Provide with faceplate in entrance frame side jamb at all top and bottom terminals.

G. Fire Control Station: Where required by code, provide a common control panel for all elevators, locate as directed.

2.12 COMMUNICATION SYSTEM

A. Telephone System: Provide automatic dial "Hands-Free" telephone station located in the car station. Provide permanent means of communication between the elevator car and the controller room if required by code. Provide A17.1, 2.27.1.1.4 emergency system when elevator travel exceeds 60'-0".

14 24 00 HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes hydraulic service and passenger elevators.
   1. Submit, for information only, copies of structural calculations indicating load assumptions. Calculations shall be signed, and sealed by the qualified Professional Engineer responsible for their preparation.

PART 2 - PRODUCTS

2.1. GENERAL

A. All elevators supplied shall be the product of a single manufacturer.
B. Subject to compliance with the requirements of the 14 20 00 Elevators section, Elevator Cab design shall be per Contract Drawings.
C. Refer to *Section 9—Space Standards: Part L—Vertical Circulation*

2.2 SPECIAL FEATURES

A. General

   1. Elevator size, arrangement, and capacity shall be justified via thorough analysis of passenger and material transport needs and shall comply with design criteria specified in this Section 3.7.1 and 3.7.2. Elevators shall be provided in accordance with the requirements of CCR Title 8 and the ASME A17.1-Safety code for Elevators and Escalators, hereinafter in this Section the “code.”

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.3 SUMMARY OF FEATURES

A. Hydraulic Passenger Elevators

Elevator Use	Passenger C-3 loading
Contract Load, in Pounds	4000 minimum
Contract Speed, in FPM	125 (verify via analysis)
Machine Location	Adjacent at bottom landing
Machine Type	Hydraulic pump
Type of Control	Single speed AC with SCR soft start with closed-loop transition
Operation	Simplex selective collective or group automatic microprocessor based
Platform Size	8'-0" wide by 6'-2" deep
Clear Car Inside	7'-8" wide by 5'-5" deep
Canopy Height	Passenger: 8'-0" (unless passenger elevators are used for service functions than a 10'-0")
Car and Hoistway Door Size	4'-0" wide by 8'-0" high
Car and Hoistway Door Type	Single speed, center opening
Car and Hoistway Door Operation	Power operated. High-speed, heavy-duty (Minimum opening speed 3.0 FPS)
Hoistway Entrance	As specified on a project-by-project basis
Cab Enclosure	As specified on a project-by-project basis. Refer to *Section 9 – Space Standards Part L: Vertical Circulation* for elevator cab finishes
Car Operating Station	Dual
Direction Indicator	Hall
Hall Call Stations	Single riser
Special Features	Fire control panel, machine room monitor, load weighing device, communication system, security features, handicap features, standby power, monitoring features

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.3 SUMMARY OF FEATURES (CONT'D)

B. Hydraulic Service Elevators

Elevator Use	Service C-3 loading
Contract Load, in pounds	6000 minimum
Contract Speed, in FPM	125 (verify via analysis)
Machine Location	Adjacent at bottom landing
Machine Type	Hydraulic pump
Type of Control	Single speed AC with SCR soft start with closed-loop transition
Operation	Simplex selective collective or group automatic microprocessor based
Platform Size	6'-4" wide x 10'-5" deep
Clear Car Inside	6'-6" wide by 8'-6" deep
Canopy Height	Provide 10'-0" nominal clear height under canopy
Car and Hoistway Door Size	4'-6" wide by 8'-0" high
Car and Hoistway Door Type	Two speed, side slide
Car and Hoistway Door Operation	Power operated. High-speed, heavy-duty (minimum opening speed 3.0 FPS)
Hoistway Entrance	As specified on a project-by-project basis
Cab Enclosure	As specified on a project-by-project basis. Refer to *Section 9 – Space Standards Part L: Vertical Circulation* for elevator cab finishes
Car Operating Station	Single (dual with front and rear entrances)
Direction Indicator	Hall
Hall Call Stations	Single riser
Special Features	Fire control panel, machine room monitor, load weighing device, communication system, security features, handicap features, standby power, door hold button, monitoring features

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.4 CAR PERFORMANCE

A. Car Speed: ±3% of contract speed under any loading condition.

B. Car Capacity: Safely lower, stop and hold 125% of rated load.

C. Car Leveling Zone: ±1/4" under any loading condition.

D. Door Opening Time:
   1. Passenger Elevators: 2.2 seconds.
   2. Service Elevators: 2.3 seconds.

E. Door Closing Time:
   1. Passenger Elevators: 2.7 seconds.
   2. Service Elevators: 3.0 seconds.

F. Car Floor-to-Floor Performance Time: Seconds from start of doors closing until doors are 3/4 open and car level and stopped at next successive floor under any loading condition or travel direction. (Based on a floor height of 16'-0". Adjust .3 seconds per foot of travel for 200 fpm elevators and .2 seconds for 350 fpm elevators.)

G. Car Ride Quality:
   1. All elevators shall have a maximum decibel reading of 65 dBA with the doors closed during a run in the up direction, measured 5 feet above the floor in the center of the cab.
   2. All elevators shall have a maximum vibration of 15 milligrams in the X, Y, and Z axis measured with an A95 filter.
   3. Acceleration and Deceleration: Smooth constant and not more than 3 feet/second2 with initial ramp between 0.5 and 0.75 second.
   4. Sustained Jerk: Not more than 8 feet/second^3.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.5 DOOR OPERATOR AND DOOR REOPENING DEVICE EQUIPMENT

A. Closed Loop Door Operator: High speed, heavy-duty door operator capable of opening doors at no less than 2-1/2 f.p.s. Accomplish reversal in no more than 2-1/2" of door movement. Provide solid-state door control with closed loop circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Maintain consistent, smooth, and quiet door operation at all floors, regardless of door weight or varying air pressure.

1. Three Dimensional Infrared Reopening Device: Black, fully enclosed device with full screen infrared matrix or multiple beams extending vertically along leading edge of each door panel to minimum height of 7'-0" above finished floor. Provide additional beams full height of door panel(s). Device shall prevent doors from closing and reverse doors at normal opening speed if beams are obstructed while doors are closing, except during nudging operation. In event of device failure, provide for automatic shutdown of car at floor level with doors open.

2. Nudging Operation: After beams of door control device are obstructed for a predetermined time interval (minimum 20.0 - 25.0 seconds), warning signal shall sound and doors shall attempt to close with a maximum of 2.5 foot pounds kinetic energy. Activation of the door open button shall override nudging operation and reopen doors.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.6 HOISTWAY EQUIPMENT

A. Guide Rails: Planed steel T-sections for car of suitable size and weight for the application, including seismic reactions, including brackets for attachment to building structure. Provide rail backing to meet code requirements.

B. Car buffers: Spring type with blocking and support channels.

C. Hydraulic Jack Assembly:
   1. Cylinder(s): Seamless steel pipe. Design head to receive unit-type packing and provide means to collect oil at cylinder head and return automatically to oil reservoir. Provide secondary containment/cylinder protection. Provide evacuation ports. Provide head assembly access ladder(s) and platform(s), if required. Provide cylinder stabilizer bracketing between guide rails as required.
   2. Plunger(s): Polished seamless steel tubing or pipe. If plunger length exceeds 24 feet, provide two or more sections not exceeding 16 feet in length, or coordinate installation of longer unit at the jobsite. Join sections by internal threaded couplings. Multiple section jack units shall be factory polished while assembled and marked for proper future reassembly. Isolate plunger from car frame(s).
   3. Provide dual jack holeless application where approved.

D. Jack Support and Fluid Shut-Off Valve(s): Provide steel pit channels to support jack assembly and transmit loads to building structure. Provide intermediate stabilizers as required. Provide manual on/off valve(s) in oil line(s) adjacent to pump unit and jack unit(s) in pit adjacent to jack unit(s).
   1. Well Hole Casing:
   2. Well hole is to be provided by Elevator Contractor. No additional compensation will be allowed for unforeseen conditions of any kind or spoil removal.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.6 HOISTWAY EQUIPMENT (CONT'D)

E. Install steel outer casing minimum 18" diameter. Install watertight sleeve over jack assembly for secondary containment prior to insertion into the outer casing. Extend PVC sleeve through pit floor slab to underside of jack support beams and seal with non-permeable membrane. I.D. of PVC sleeve shall be capable of containing 110% of system fluid capacity. Seal well opening at the pit floor with hydraulic quick setting cement. Provide PVC vision/evacuation ports.

F. Overspeed Valve(s): Provide a pressure sensitive, mechanically-actuated seismic safety valve, conforming to ASME A17.1, Rule 3.19.4.7. Weld pipe protruding from cylinder at inlet and thread to receive shut-off valve. Activate the automatic shut-off valve when there is a ten percent drop in no-load operating pressure. When activated, this device shall immediately stop the decent of the elevator, and hold the elevator until it is lowered by use of the manual lowering feature of the valve. Arrange the manual lowering feature of the automatic shut-off valve to limit the maximum descending speed of the elevator to 15 fpm. The exposed adjustments of the automatic shut-off valve shall have their means of adjustment sealed after being set to their correct position.

G. Terminal Stopping: Provide normal and final devices.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.7 CONTROLLER

A. General

1. The elevator control equipment shall contain diagnostic capabilities as required for the ease of complete maintenance. The diagnostic system shall be an integral part of the controller and provide user-friendly interaction between the service person and the controls. All such systems shall be free from decaying circuits that must be periodically reprogrammed by the manufacturer.

2. The elevator control system shall be serviceable and maintainable by a trained, certified/qualified elevator mechanic of the RCCD's or Architect's choice. A complete set of as-built, adjustor's-level wiring diagrams and all service tools and software necessary to perform safety tests, diagnose problems, view or reset codes and/or change operational parameters of the elevator control system shall be provided to the RCCD or Architect as part of the contract and shall be retained by the RCCD or Architect and shall function for the life of the equipment. Hardware and software needed for diagnosis and operating parameter modification shall be products offered as standard by the manufacturer of the control system. **No substitutions of proprietary circuit boards, EPROMS, hardware locks, software passwords, or coding shall be allowed.**
3. **As a condition of the installation, the original equipment manufacturer shall guarantee to sell and deliver, on a timely basis, proprietary component repair services, replacement and stock parts, and software updates to the RCCD or Architect and/or to a third party elevator maintenance company of the RCCD or Architect's choice at a fair market price and provide to the Original Equipment Manifacturer (OEM) organization in order to keep the equipment current.** Technical and engineering support and assistance for control adjustment, maintenance, or troubleshooting shall be provided by the original equipment manufacturer to any maintaining contractor designated by the RCCD or Architect.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.7 CONTROLLER (CONT'D)

A. General (cont'd)

4. Elevator manuals, drawings, diagrams, and prints shall be provided with the equipment at time of delivery. All documentation shall be available for replacement purchase, at reasonable cost, by any maintaining elevator contractor designated by the RCCD or Architect.

5. Interrupted Beam Time: When beams are interrupted during initial door opening, hold door open a minimum of 3.0 seconds. When beams are interrupted after the initial 3.0 second hold open time, reduce time doors remain open to an adjustable time of approximately 1.0 - 1.5 seconds after beams are reestablished.

6. Differential Door Time: Provide separately adjustable timers to vary time that doors remain open after stopping in response to calls.
   a. Car Call: Hold open time adjustable between 3.0 and 5.0 seconds.
   b. Hall Call: Hold open time adjustable between 5.0 and 8.0 seconds. Use hall call time when car responds to coincidental calls.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.8 OPERATION SYSTEMS

A. Provide simplex selective collective operation for single cars and group operation for multiple car groups.

B. Single-Car Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated:

1. Standby Power Operation: On activation of standby power, car is returned to a designated floor and parked with doors open. Car can be manually put in service on standby power, either for return operation or for regular operation, by switches in control panel located at fire command station. Manual operation causes automatic operation to cease.

2. Battery Lowering: Where stand by power is not required, provide emergency battery lowering devices.

C. Security Features: Provide the following security features, where indicated. Security features shall not affect emergency firefighters' service.

1. Card-Reader Operation: System uses card readers at hall pushbutton stations and/or car control stations to authorize calls. Security system determines which landings and at what times calls require authorization by card reader. Provide required conductors in traveling cable and panel in machine room for interconnecting card readers, other security access system equipment, and elevator controllers. Provide stripe-swipe card reader integral with each car control station.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.9 HOISTWAY ENTRANCES

A. Complete entrances bearing fire labels from a nationally recognized testing laboratory approved within the governing jurisdiction.

B. Provide Arabic floor designation/Braille plates, centered at 60" above finished floor, on both side jambs of all entrances. Floor designation shall be white, a minimum of 2" and on a black background. Provide plates at main egress landing with "Star" designation. For designated emergency car, provide "Star of Life" designation plates at height of 78" – 84" above finished floor on both side jambs at all floors. Braille indications shall be below Arabic floor designation. Provide cast floor designation/ Braille plates as manufactured by SCS, Vision Mark, or Entrada. Provide cast elevator identification plates at designated landing.

2.10 CAB ENCLOSURE COMPONENTS

A. General

1. Elevator car and car components shall meet the applicable requirements of the code. Car control station(s) and position indicator(s) shall be per Contract drawings.

2. Entire car assembly, including car frame and platform, shall be free from warps, buckles, and squeaks and rattles. Joints shall be lightproof.

B. Sills: Car sills shall be extruded stainless steel or aluminum supplied with grooves and trash slots for door guides and machine planed for minimum clearance. Provide with matching sill extensions to face of front return(s).

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.10 CAB ENCLOSURE COMPONENTS (CONT'D)

C. Car Enclosures: Refer to *Section 9 – Space Standards Part L: Vertical Circulation* for finishes.

1. General: The enclosure shall be adequately reinforced and ventilated to meet code requirements. Provide sound-deadening mastic to exterior.

2. Shell:
   a. Passenger Elevators: Refer to *Section 9*.
   a. Service Elevators: Refer to *Section 9*. Panel width shall not exceed 20". Provide sound deadening to rear of panel.

2. Canopy:
   a. Refer to *Section 9*.
   b. Provide 10'-0" nominal clear height under canopy. Reinforced 14-gauge stainless steel No. 4 brushed finish. Arrange for hinged top emergency exit including lock and electrical contact as required by code.

4. Suspended Ceiling and Lighting:
   a. Refer to *Section 9*.
   b. Provide as shown in Architect's drawings.
   c. Provide clear access to the emergency exit per code requirements.
   d. Omit suspended ceiling in service elevators. Provide fluorescent lighting flush with canopy. Clad or construct canopy of textured stainless steel.

5. Floor Covering:
   a. Passenger Elevators: Refer to *Section 9*. Floor by others Wt./Ft = 10#.
   a. Service Elevators: Refer to *Section 9*.

6. Front Return Panels and Entrance Columns:
   a. Refer to *Section 9*.
   b. 14-gauge stainless satin (vertical) steel.
   c. Return panel shall be stationary type with flush type fixtures.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.10 CAB ENCLOSURE COMPONENTS (CONT'D)

a. C. Car Enclosures (cont'd)

7. Transoms:
   a. Refer to *Section 9*.
   b. 14-gauge stainless steel.

8. Car Door Panels:
   a. Refer to *Section 9*.
   b. Same construction as hoistway door panel.
   c. Finish shall be stainless steel No. 4 satin (vertical).

9. Handrails:
   a. Refer to *Section 9*.
   b. Provide a 1 1/2" diameter stainless steel tubular handrail at the rear of each passenger elevator. Return ends to wall.
   c. Provide adequate mounting.
   d. Top of handrail to be 32" above the finished floor.
   e. Provide service elevators with side and rear wall mounted handrails and bumper rails. Return ends.
   f. Bolt handrails and bumper rails through car shell.
   g. Provide backing plates and captive nuts.

10. Bases:
    a. Refer to *Section 9*.
    b. Provide a 4" high base.
    c. Finish as shown in Architect's drawings.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.10 CAB ENCLOSURE COMPONENTS (CONT'D)

C. Car Enclosures (cont'd)

11. Pads and Hooks:
    a. Refer to *Section 9*.
    b. Provide pad hooks and pads. Pad hooks shall be conspicuous type (buttons) at all walls.
    c. Mount pad hooks at sides and rear above suspended ceiling line.
    d. Pads shall cover all walls and front return panels and include cutouts for access to the operating fixtures

12. Ventilation:
    a. Refer to *Section 9*.
    b. Two-speed exhaust blower. Provide OE type in passenger elevators and AA type in service elevators.

D. Emergency Car Lighting and Alarm System

c. Unit shall provide emergency light in car upon failure or interruption of normal car lighting.
d. Emergency lighting unit shall provide a minimum illumination of 0.2 footcandles at 4' above car floor approximately 1' in front of main car operating panel for not less than 4 hours.
e. Battery shall be 6 volt minimum, sealed rechargeable lead acid, or equal. Battery charger shall be capable of restoring battery to full charge within 16 hours after resumption of normal power.
f. Provide means within the car service panel for testing battery, lamps, and alarm bell.
g. When multiple units are provided in a car, all units shall illuminate.
h. Illuminate a portion of normal car lighting.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.11 SIGNAL DEVICES AND FIXTURES

A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with LEDs.

B. Stationary-Return Car Control Stations: Provide car control stations with faceplates mounted on return panel adjacent to car door and with buttons, switches, controls, and indicator lights projecting through faceplate. Faceplate shall be mounted substantially flush with face of return panel.

1. Mark buttons and switches with standard identification for required use or function that complies with the California Building code and ADA. Use both tactile symbols and Braille.
2. Provide "No Smoking" engraving integral with car control station, with text and graphics as required by authorities having jurisdiction. Provide all code required engraving. Stick-on signage shall not be used.
3. Provide locked service panel and locked Phase II firefighters service panel.

C. Emergency Communication System: Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station. System provides two-way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.

D. Firefighters' Two-Way Telephone Communication Service: Provide telephone jack in each car and fire control room station, and required conductors in traveling cable for firefighters' two-way telephone communication service, where required by "code".

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.11 SIGNAL DEVICES AND FIXTURES (CONT'D)

E. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. In elevators with a rated speed above 200 feet per minute, provide a reprogrammable electronic voice synthesizer in addition to the floor passing tone.

   1. Include travel direction arrows.

F. Hall Push-Button Stations: Provide one hall push-button station at each landing for each single elevator.

   1. Provide units with flat custom faceplate for mounting with body of unit recessed in wall.
   2. Equip units with buttons for calling elevator and for indicating desired direction of travel.
      a. Provide for connecting units that require destination registration to building security access system so a card reader can be used to register calls.
      b. Provide code required engraving and pictorial regarding non-use of elevator in a fire.
      c. Provide illuminating LED jewels for firefighter's service and standby power. Identify with engraving.

   3. Provide telephone jack in each unit for firefighters' two-way telephone communication service, where required by "code."

G. Hall Lanterns: Provide units with illuminated arrows. Provide single arrow at terminal landings. Provide the following:

   1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.
   2. Units with flat faceplate for mounting with body of unit recessed in wall and with illuminated elements projecting from faceplate for ease of angular viewing.
   3. Units not mounted above entrances shall be vandal resistant.

14 24 00 HYDRAULIC ELEVATORS (CONT'D)

2.11 SIGNAL DEVICES AND FIXTURES (CONT'D)

H. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.

I. Standby Power Elevator Selector Switches: Provide switches, as required by ASME A17.1, where indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed. For each elevator, provide illuminated signals that indicate when they are operational and when they are at the designated emergency return level with doors open.

J. Fire Command Center Annunciator Panel: Provide panel containing illuminated position indicators for each elevator, clearly labeled with elevator designation; include illuminated signal that indicates when elevator is operational and when it is at the designated emergency return level with doors open. Provide standby power elevator selector switch(es), as required by ASME A17.1, adjacent to position indicators. Provide illuminated signal that indicates when normal power supply has failed.

K. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station, unless otherwise indicated. Engrave signage directly on hall button faceplate.

2.12 COMMUNICATION SYSTEM

A. Telephone System: Provide automatic dial "Hands-Free" telephone station located in the car station. Provide permanent means of communication between the elevator car and the controller room if required by code. Provide A17.1, 2.27.1.1.4 emergency system when elevator travel exceeds 60'-0".

END OF SECTION 15

16

FIRE SUPPRESSION + PLUMBING

INTRODUCTION

This introduction describes the pragmatic aspects of new or renovation projects as it relates to fire suppression and plumbing. The design of engineered systems will respond to standards set forth in this section with the objective of ensuring compatible infrastructure components working together in easily maintainable configurations.

Div 21
FIRE SUPPRESSION

21 00 00 FIRE SUPPRESSION

- A licensed Sprinkler Contractor should submit all documentation, including hydraulic calculations and head locations, in conjunction with submittal of plumbing drawings. All equipment, sprinkler heads, detectors, required panel alarms, post indicator valves, fire department connections, etc. should be coordinated with architectural drawings, including reflected ceiling plans.

- Types of systems to be utilized should include but are not limited to: wet, dry, combined standpipe, pre action, and clean agent.

- All underground piping should be ductile iron.

- Sprinkler main riser to be located in a dedicated room with exterior access.

- All sprinkler heads to be quick response and located in the center of tiles. Sprinker guards to be provided where required.

- All sprinkler head types to be coordinated with the project architect.

- Fire risers to be located in a separate room, accessible from the outside.

Div 22

PLUMBING

22 00 00 PLUMBING

DESIGN GUIDELINES

- Systems Compatibility
  - All software systems and or protocols used in Riverside Community College District (RCCD) shall be compatible with the State of California Community College System's FUSION + GIS + ONUMA —Refer to Section 2: Part D.
  - Open source software and protocols are the standard and proprietary systems shall be avoided.
  - Refer to Section 2: Part B: Sustainable Design Guidelines.
  - The design shall incorporate LEED features for plumbing fixtures and equipment. Water conserving fixtures shall be selected that will include high efficient flush valves in the faculty/staff, public, and general toiletrooms. These fixtures shall provide a minimum 20% reduction of water usage compared to 1992 EPACT baseline standard.
  - The design shall incorporate energy-efficient domestic hot water system(s) that contribute to an overall building efficiency of 15% better than Title 24, latest edition, utilizing a performance run and including process energy.

of what?

22 00 00 PLUMBING (CONTINUED)

GENERAL

- Plumbing systems shall be installed in accordance with the current California Building Code and Plumbing Code (CBC - part of California Code of Regulations, Title 24), as well as CCR Titles 19 and B.

- Designs shall utilize systems and products that are:
  - Long-life, industrial quality.
  - Readily available products and components with service support available.
  - Maintainable arrangements with multiple units.
  - Readily available spare parts and materials incorporate multiple equipment elements in key systems to provide reduced capacity operation when portions are down for maintenance or failure.

- For alteration and renovations, the designer shall obtain appropriate as-built documents from the Riverside Community College District (RCCD) archives for design and implementation.

- The plumbing system designer shall consider using such techniques as:
  - Controlling hot water temperatures, water pressures, and providing faucets with flow restrictors.
  - The economic use of thermal insulation, automatic shutdown of water heating and circulating systems, use of occupancy sensors for automatic flushing, use of automatic closing faucets, and using minimum energy consuming equipment to provide maximum efficiency. Energy conservation design practices shall become integrated into the building allowing it to operate more efficiently and use less energy, while meeting the needs of the user.

22 00 00 PLUMBING (CONTINUED)

- The designer shall study water usage periods and set to operate pumps just prior to usage periods and limit operation as much as possible. A 7-day 12-hour timer shall be installed to control such pump operation, especially during peak demand periods as an energy conservation measure.

- All items and equipment requiring electrical power, and scheduled to be on emergency power, shall be brought to the attention of the Electrical Engineer and the Architect prior to submittal.

- All equipment and/or valve assemblies weighing over 100 pounds shall be brought to the attention of the Structural Engineer and the Architect prior to submittal.

- Calculations for all systems, including but not limited to: gas, water, waste and vent, storm, and pumps shall be prepared and filed, subject to review by RCCD.

- The Contractor shall field verify all of the exact locations, elevations, and capabilities of proposed points of connections to service piping, including existing equipment. Any part of these systems that are deemed inadequate for the proposed project shall be immediately reported to the Architect prior to bid and start of work.

- Access doors and/or panels shall be coordinated with the Architect, including reflected ceiling plans, prior to installation.

- All piping installed outdoors or in corrosive environments shall be prime coated and painted, or otherwise protected.

22 00 00 PLUMBING (CONTINUED)

- Public and Private Toilet Rooms:
  - All exposed metal work at fixtures shall be brass and chrome plated. All faucets, fittings, supply stops for fixtures, and similar devices shall be one (1) manufacturer unless otherwise required. Each fixture shall contain standardized interchangeable operating units made up of separate renewable stem, seat, washer retainer, and nut. All faucets and fittings must close with the water pressure. All fixtures shall be installed with supply stops/ valves accessible at the fixtures.
  - Each toilet room hot and cold water supply shall be provided with accessible shut off valves. Access panel locations to be coordinated with the Architect.
  - Waste cleanout for maintenance shall be provided per code.
  - Each toilet room shall be provided with floor drain and trap primer.
  - All fixtures with quick closing controls shall be provided with water hammer arrestors.
  - Hose bibb with vacuum breaker in recessed box with locking cover located underneath group of lavatories.

- Seismic bracing for piping and equipment shall conform to Title 24. Calculations and details shall be reviewed and signed by a Licensed Structural Engineer with California registration where applicable.

22 05 48 VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

DESCRIPTION	
Inertia Bases	• All package based mounted rotary or reciprocating equipment shall be mounted on a concrete filled inertia base with open spring mounts with brackets and seismic snubbers to control noise, vibration and limit seismic movement. Manufacturer: Mason Ind., M.W. Sausse & Co.

22 05 53 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

DESCRIPTION	
Nameplate	• All equipment shall be provided with a laminated three-layer plastic plate, 1/8" thick, with engraved black letters on light contrasting background color. Nameplates shall be engraved with the name of the equipment. The symbol designation on the drawings & specific service. Example: Domestic Water Heater WH-1, 120 degree F water, BMST thru 3rd Floor. Provide equipment chart with number, location & purpose. Manufacturer: Brady, Seton, Kolbi
Valve Tags	• Each tag shall be a minimum 18 gauge polished brass, 1 1/2" diameter. Tags shall contain the service (1/4" stamped or engraved black-filled letters) and appropriate valve number (1/2" stamped or engraved black-filled). Tag shall be securely fastened to valve. Provide valve chart with number, location and purpose. Manufacturer: Seton, Brady, Kolbi
Pipe Markers	• All piping shall be clearly identified per the color and lettering: Scheme conform to ASME A13.1. Directional flow arrows shall be included in each marker. Manufacturer: Seton, Brady, Kolbi
Plastic Underground Pipe Markers	• Bright colored continuously printed plastic ribbon minimum of 6" wide by 4 mil thick. Installed 6" to 8" below finished grade. Manufacturer: Seton, Brady, Kolbi
Charts	• Charts of all valves and equipment shall be furnished in duplicate with one chart mounted and framed. Manufacturer: Brady, Seton, Kolbi

22 07 00 PLUMBING INSULATION

DESCRIPTION	
Domestic and Industrial Hot Water Supply and Return	• All hot water supply and return pipe shall be insulated with performed heavy duty density fiberglass insulation with standard factory applied all purpose jacket with double pressure sensitive adhesive self-sealing closure system. • Fitting, valves and flanges, except in piping installed outdoors, shall be insulated with thermally equivalent thickness of fiberglass insulation with a PVC fitting cover. • All insulated piping installed outdoors or exposed to the weather shall be covered with a polished 0.016” aluminum or 0.010” stainless steel metal jacket. Fittings other than elbows and tees shall be covered with weather resistant insulation cement to a thickness equal to the adjacent insulation. • For insulated pipe, support shields shall be provided at each hanger and support Manufacturer: John Manville, Owens-Corning, Certain Teed, Knauf
Disabled use Lavatories	• Hot water supply riser, fixture tailpiece, trap, and trap arm to be insulated. Manufacturer: Truebro, McGuire
Domestic Hot Water Storage Tank	• Hydrous calcium silicate block or molded sections with 6 ounce canvas or fiberglass reinforcing cloth. Manufacturer: John Manville, Owens-Corning, Certain Teed, Knauf

22 11 00 FACILITY WATER DISTRIBUTION

	DESCRIPTION
Domestic Industrial Water Piping, Above grade	• Within five feet of the building • Copper type L, hard drawn tube with wrought copper joint fittings. • Joints shall be made with tin based, lead free solder, and a paste flux. Manufacturer: Mueller, Cerro, Elkhart, Nibco
Domestic and Industrial Water Piping, Below grade	• Within five feet of the building • Copper type K, hard drawn tube with wrought copper joint fittings. • Joints shall be brazed using a silver bearing copper phosphorus alloy with a silver content not less than 14.5%.The use of flux is prohibited. Manufacturer: Mueller, Cerro, Elkhart, Nibco
Domestic and Industrial Water Pressure Gauges	• Bourdon tube type, 4-1/2” diameter, recalibrating adjustment, corrosion resistant movement. • Gauges on pulsating or reciprocating equipment to be liquid filled. All gauges to be provided with shut-off cock. Manufacturer: Trerice, Weiss, Ashcroft, U.S.Gauges
Thermometers	• Vapor tension type, 4-1/2” dial, adjustable pointer, adjustable angle type, separate brass socket. Manufacturer: Ashcroft, Trerice, Weiss
Flow Control Valves	• Brass or Bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, combination blow-down or back-flush drain. Manufacturer: Bell & Gossett, Armstrong, Griswold

22 11 00 FACILITY WATER DISTRIBUTION (CONTINUED)

	DESCRIPTION
Pressure Reducing Valves	• Main supply line to be pilot-operated, globe type with stainless steel trim, pilot inlet strainer, shut-off valves, and flow stabilizer. Manufacturer: Cla-Val, Watts
Backflow Preventers	• Cross contamination shall be prevented with the use of a reduced • Pressure principle backflow device complete with inlet/outlet shut-off valves. Provide air gap funnel and drain. Manufacturer: Cla-Val, Febco, Watts
Trap Primers	• Automatic - Pressure type, cast bronze with access panel • Electronic type in recessed cabinet. • Unit shall activate at 2 or 3 psi pressure drop when low-flow fixtures are used. Manufacturers: MIFAB, PPP Inc
Water Hammer Arrestors	• Copper construction, bellows or piston type. Pre-charged suitable for 35 to 100 degrees temperature range, working pressure. • Provide distribution box as required. Manufacturer: MIFAB, J.R. Smith, PPP Inc, Sioux Chief
Domestic and Industrial Water Unions and Flanges	• Unions for piping 2” and smaller to be Class 150, bronze with soldered or brazed joints. • Union 2-1/2” and larger, to be Class 150, slip-on cast bronze flanges with 1/16” preformed neoprene gasket. Manufacturer: Nibco, Elkhart, Ameriflex, Paragon Steel, Taco Inc.

22 13 00 FACILITY SANITARY SEWERAGE

	DESCRIPTION
Sanitary Soil, Waste, Grease Waste and Vent Piping	• Service weight, no hub cast iron soil pipe and fittings. Standard neoprene compression gasket with stainless steel shield and clamp couplings to be provided for above grade piping and heavy-duty type for below grade. All materials shall comply with CISPI 301 & 310 and ASTM A888. • All underground piping shall be a 6" minimum diameter. Manufacturer: AB & I, Charlotte, Anaco, Husky, Clamp-All
Chemical Resistant Waste and Vent Piping (Above and Below grade)	• Schedule 40, flame retardant polypropylene pipe and fittings with fused joints in concealed locations and mechanical joints in accessible locations. The use of type 304 or 316 stainless steel pipe with compression joint fittings is optional. Manufacturer: +GF+ Fuseal, Enfield, Orion, Blucher-Josam
Floor Drains/ Floor Sinks/ Indirect Waste Receptors	• Duco cast iron body and flashing collar with adjustable nickel bronze strainer for floor drains. • Floor sink shall be provided with seepage holes and acid resistant coated interior with aluminum dome bottom strainer and nickel bronze rim and grate. • Indirect waste receptors shall have sump receiver, solid water dam, underdeck clamp and dome bottom drainer. • See **22 40 00** for additional info. Manufacturer: J.R. Smith, MiFAB
Back Water Valves	• Cast iron body and cover, removable bronze swing valve, extension sleeve as required, bolted access cover, horizontal or vertical type, threaded or hubless ends. Manufacturer: J.R. Smith, MiFAB
Grease Interceptors	• Reinforced precast concrete tank with manways, riser extension, frame, and covers extended to grade. System shall be completed with sampling box. Manufacturer: Pro-Cast Inc, Jensen Precast
Sand/Oil Interceptors	• Reinforced precast concrete tank with manways, riser extension, frame, and covers extended to grade. Manufacturer: Pro-Cast Inc, Jensen Precast
Sewage Ejectors	• Ejector station to incorporate duplex column or submersible type pump with alternating controls. Sump to be fabricated fiberglass, HDPE, precast or poured in place concrete. Submersible system shall have the quick railing disconnect feature. Manufacturer: Zoeller, Weil Aquatronics, Paco, J.D.L. Systems

22 13 00 FACILITY SANITARY SEWERAGE (CONTINUED)

	DESCRIPTION
Cleanouts	• All cleanouts except process waste to have bronze countersink rectangular slotted plugs, tapered threads, lubricated with emulsified lead paste. Flush with floor cleanout tops shall have non-skid covers secured independent of plug. Where cleanout occurs in waterproof membrane, provide flashing flange and ring. All wall cleanouts shall be located so that the bottom of the access panel or plate is above the top of the baseboard, or in the case of location inside of a cabinet, above the inside bottom of the cabinet. • Floor cleanouts in finished room floors to be cast iron adjustable floor level cleanout assembly with round nickel bronze top. • Floor cleanouts in unfinished floors to be cast iron adjustable floor level assembly with round double extra heavy cast iron top. • Wall cleanouts in drywall or block wall to be bronze plug with test tee. • Provide prime coated steel concealed hinge type access covers with removable door. • Wall cleanouts in tile surfaces to be bronze plug with cover plate, screw and test tee. • Cleanout in yard box to be cast iron surface level cleanout assembly with lifting device, for concrete or blacktop surface. In non-surfaced areas, set in 18” x 18” x 4” concrete support. • Floor cleanout in equipment room floor to be cast iron adjustable floor cleanout assembly with round double extra heavy nickel bronze top. • Floor cleanouts in terrazzo floors to be cast iron adjustable floor level cleanout assembly with square nickel bronze top, with center lifting device. Top depression to be filled with terrazzo and smoothed flush. • Floor cleanouts in ceramic tile floors to be cast iron adjustable floor level cleanout assembly with square nickel bronze top. • Floor cleanouts in vinyl, asphalt tile or linoleum floors to be cast iron adjustable floor level cleanout assembly with round nickel bronze top. • Floor cleanouts in carpeted floors to be cast iron adjustable floor level cleanout with round nickel bronze top and carpet cleanout marker. • Floor cleanout for chemical resistant waste to be durion cleanout plug and ferrule. Manufacturer: J.R. Smith, MiFAB, Durion

22 14 00 FACILITY STORM DRAINAGE

DESCRIPTION	
Storm and Overflow Piping	• Service weight, no hub cast iron soil pipe and fittings. Standard neoprene compression gasket with stainless steel shield and clamp couplings to be provided for above grade piping and heavy-duty type for below grade. All materials shall comply with CISPI 301 & 310 and ASTM A888. Manufacturer: AB & I, Charlotte, Anaco, Husky, Clamp-All
Roof, Overflow and Area Drains	• Roof, overflow and area drains shall have Duco cast iron body with flashing collar and underdeck clamps, gravel stops and cast iron domes. • Overflow drains to be provided with an exterior water dam. • Area drains shall have duco cast iron body, standard or wide flange, flashing clamps, seepage openings, adjustable extension sleeve underdeck clamp & grate suitable for all applications. Manufacturer: J.R. Smith, MIFAB
Sump Pumps	• Sump pump station to incorporate duplex column or submersible type pump with alternating controls. Sump to be fabricated fiberglass, HDPE, precast or poured in place concrete. Submersible system shall have the quick railing disconnect feature. Manufacturer: Zoeller, Weil Aquatronics, Paco, J.D.L. Systems

22 31 00 DOMESTIC WATER SOFTENERS

DESCRIPTION	
Centralized Water Softening Equipment	• Provide an automatic duplex water softening system. Exchange material shall be high quality resin having an exchange capacity expressed as CaCO3 of 30,000 grains per cubic grains per cubic foot when regenerated with 15 lbs. of salt per cubic foot, and 20,000 grains per cubic foot when regenerated with 6lbs. of salt per cu.ft. • Softener tanks shall have 60% or more freeboard. ASME labeled for not less than 120 psi working pressure, structural steel legs welded to tank. • Operating valves on each softener shall be automatic, slow opening and closing and free of water hammer. A. Valving may be a single multi-port type unit or multiple hydraulically actuated diaphragm valves, controlled by a multi-port rotary pilot valve. • Face Piping: Schedule 40 galv. steel pipe with 150 lb. galv. malleable iron I.P.S. fittings or Victaulic or equal grooved end galv. malleable iron fittings with couplings. A. Provide dielectric isolators at inlet and outlet of each softener. B. Option: Schedule 40 PVC or CPVC Pipe & Fittings. • Controls: Regeneration shall be controlled by an electronic sensor with manual override. A. The sensor shall initiate regeneration automatically and be interwired to permit only one softener to regenerate at a time during off peak hours. B. The manual override shall permit regeneration at any time of the day or night, any or every day of the week, and shall allow for push button start (override). C. All control mechanisms shall be enclosed in a gasketed moisture resistant case, rated as a NEMA 4 enclosure, listed by Underwriters' Laboratories. D. The unit shall have provisions for individual adjustment of the backwash and rinse cycles, and provisions for manually regenerating the water softener in the event of power failure. E. The control valve mechanism shall prevent hard water bypass to service during regeneration. F. A duplex alternator shall be provided to allow only one unit to be in regeneration at a time while the other unit is in service. G. This system shall provide a continuous supply of soft water. H. Indicating lights shall be provided to show which unit is in the service position.

22 31 00 DOMESTIC WATER SOFTENERS (CONTINUED)

	DESCRIPTION
Centralized Water Softening Equipment (Continued)	• Controls (con't): I. Self-adjusting flow regulators shall control the rate off low during the backwash (to prevent resin loss), brine-rinse and fast rinse positions regardless of pressure fluctuations. J. Automatic controls for brine metering shall be included. • Brine System: Combination salt storage and brine measuring tank with cover, sized to hold salt for at least 10 regenerations between refills. The tank shall be molded of corrosion free, rigid polyethylene or commercial grade fiberglass reinforced plastic. • Accessories: Inlet and outlet pressure gauges, 4-1/2" diameter, totalizing meter, sampling cock on soft water outlet and hard water inlet, and water quality test kit. Manufacturer: Marlo, Culligan, Siemens, U.S. Filter
Point of Use Filters	• Cellulose cellulose/glass fiber – melamine resin, 5 micron, with cartridge housing and mounting bracket. Provide inlet and outlet shut-off valves and gauges. Manufacturer: Aqua Pure, Cuno, 3M Purification Inc., Filtrene

22 33 00 ELECTRIC DOMESTIC WATER HEATERS

	DESCRIPTION
Electric Water Heaters – Tank Type	• Corrosion resistant glass lining, vertical storage, thermally insulated with Non-CFC foam, lining, magnesium anode rod, heavy gauge steel tank with baked enamel finish, dielectric fittings, brass drain valve, T&P relief valve. • Automatic water thermostat with adjustable temperature range from 120 to 160 degrees F, screw-in immersed elements, enclosed controls and electrical junction box. Wire double element units so elements do not operate simultaneously. • Provide seismic anchoring straps, listed and approved. Manufacturer: Lochinvar, Bradford White, A.O. Smith
Electric Water Heaters – Instantaneous/ Point-of-Use	• Factory-assembled and wired with microprocessor temperature control, celcon waterways and nichrome heating coils and factory set a 104 degrees F. Manufacturer: Chromite, Eemax, Rinnau

22 34 00 FUEL-FIRED DOMESTIC WATER HEATERS

DESCRIPTION	
Commercial Gas Fired Water Heaters – Storage Type	• Glass lined welded steel with single flue passage, flue baffle and draft hood; brass dip tube, drain valve, magnesium anode, thermally insulated with Non-CFC foam and encased in corrosion-resistant steel jacket; baked-on enamel finish; floor shield and legs, dielectric fittings, brass drain valve, T&P relief valve. • Comply with Ultra Low NOx SCAQMD Rule 1146.2 or later. • Automatic water thermostat and built-in gas pressure regulator; temperature range adjustable from 120 to 180 degrees F, cast iron or stainless steel burner, safety pilot and thermocouple, and electronic ignition. • Provide anchoring straps, listed and approved. Manufacturer: PVI, Bradford White, Lochinvar, A.O. Smith
Commercial Gas Fired Water Heaters – Boiler/ Storage Tank	• Natural gas-fired water tube boiler, with copper finned tube heat exchanger, one inch minimum diameter, 13 gage steel boiler tubes and copper tube heat exchanger with bronze heads, steel jacket with glass fiber insulation, and tank circulating pump. • Comply with Ultra Low NOx SCAQMD Rule 1146.2 or later. • Components to include, thermometer and pressure gauge. Immersion thermostats for operating and high limit protection, 100 percent safety shut-off. Electric gas valve with transformer, electronic safety pilot and pilot burner, gas pressure regulator. Manual gas shut-off, low water cut off, ASME rated temperature and pressure relief valve, coil relief valve, expansion tank, draft inverter. • Storage tank to be cement lined, 120 psi ASME rated, vertical or horizontal with preformed, fiberglass board insulation. Manufacturer: Lochinvar, Raypak, Teledyne Laars, AJAX

22 42 00 COMMERCIAL PLUMBING FIXTURES

DESCRIPTION		
Water Closets	Water closet: • Vitreous china, elongated bowl, wall hung • Low flow (1.28 gallons per flush) Manufacturer: American Standard, Kohler	 
	Flush valve: • Conventional type or infrared sensor type hard wired to a 120-volt circuit Manufacturer: Sloan	
	Toilet seats: • Open end with self sustaining check hinges Manufacturer: Olsonite, Bemis, Church	
	Wall-mounted support carriers: • To be equipped with cast iron anchor foot assemblies, 300 pound minimum Manufacturer: J.R. Smith, MIFAB	
Urinals	Urinal: • Vitreous china, wall hung • Low flow (0.5 gallon per flush) Manufacturer: Kohler, Sloan	
	Flush valve: • Conventional type or infrared sensor type hard wired to a 120-volt circuit Manufacturer: Sloan	
	Support carriers: • Adjustable floor-mounted uprights Manufacturer: JR Smith	
Waterless Urinals	• Waterless urinals have not performed well in institutional or public applications within the District. • Architects and Mechanical Engineers must propose the fixture type very early in the design to enable it to be tested by the District.	

22 42 00 COMMERCIAL PLUMBING FIXTURES (CONTINUED)

	DESCRIPTION	
Lavatories	Lavatory: • Vitreous china, wall hung • Model: American Standard - Murro universal design, wall hung lavatory with vitreous china shroud/knee contact guard Manufacturer: American Standard, Kohler *Note: where conditions preclude the use of the preferred lavatory, alternatives shall be approved on project-by-project basis	 is this rated with a 0.5 gallons per minute flow?
	Faucet: • Solid brass, polished chrome plated of the conventional type or infrared sensor type hard wired to a 120-volt circuit. Manufacturer: Sloan	
	Traps: • 17 gauge tubing Manufacturer: E&S, JR Smith, LA Pattern	
	Stops: • Loose key angle type and supplies Manufacturer: Chicago, McGuire	
	Support carriers: • Floor-mounted upright; wall hangers are prohibited Manufacturer: JR Smith, MIFAB	
Service Sinks	Sink: • Cast iron, wall type with 3" trap or • Cast iron, floor corner type with stainless steel splashguards Manufacturer: American Standard, Kohler, CECO	
	Faucets: • Solid brass, chrome plated equipped with integral vacuum breaker, wall brace and pail hook. Include 5 foot heavy duty hose and stainless steel wall bracket. Manufacturer: Chicago, Delta	

22 42 00 COMMERCIAL PLUMBING FIXTURES (CONTINUED)

DESCRIPTION		
Showers	• Mixing valve to be pressure balancing type, inlet check stops, lever handle, deluxe arm and flange with low flow brass shower heads. ADA stalls to be provided with hand held shower, long reinforced vinyl hose, long, in-line vacuum breaker, vertical adjusting bar. Manufacturer: Acorn, Powers, Symmons, Delta	
Hose Bibbs	• Wall, standpipe or recessed, polished chrome plated, loose key with vacuum breaker. Manufacturer: Acorn, Woodford	
Floor Drains/ Sinks	• 4"x4" finished area adjustable floor drain with square top Manufacturer: JR Smith, MIFAB	

22 45 00 EMERGENCY FIXTURES

DESCRIPTION		
Emergency Fixtures	Floor-mounted: emergency shower, emergency shower & eyewash, and eyewash: • Stainless steel shower head and eyewash bowl with polished chrome plated brass piping and trim and stay open. • Secure to floor or wall. Counter-mounted: • All stainless steel, swing- or hand-held type with hose. Manufacturer: Bradley, Guardian, Haws	

22 47 00 DRINKING FOUNTAINS

DESCRIPTION		
Electric Water Cooler	• “Hi-Lo” barrier free, dual round sculpted bowls, wall-mounted with access panel and in-the-wall mounting system Model: H1011.8 or H1011.8 HO Finish: Satin finish stainless steel Manufacturer: Haws, Acorn	 
Pedestal Drinking Fountain	• Barrier-free, trough style pedestal drinking fountain Model: 3202 Finish: Galvanized steel with green powder-coated finish Manufacturer: Haws	

END OF SECTION 16

17 HEATING, VENTILATING, + AIR CONDITIONING

RIVERSIDE COMMUNITY COLLEGE DISTRICT - DISTRICT STANDARDS + CAMPUS GUIDELINES HANDBOOK

INTRODUCTION

This section describes the design guidelines for district wide heating, ventilating, and air conditioning systems.

Div 23

HEATING, VENTILATING, + AIR CONDITIONING

23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

DESIGN GUIDELINES

- Systems Compatibility
  - All software systems and or protocols used in Riverside Community College District (RCCD) shall be compatible with the State of California Community College System's FUSION + GIS + ONUMA —Refer to Section 2: Part D.
  - Refer to Section 2: Part B: Sustainable Design Guidelines.
  - Open source software and protocols are the standard and proprietary systems should be avoided.
  - The design shall incorporate LEED features for mechanical systems and equipment.
  - The design shall incorporate energy-efficient mechanical systems that contribute to an overall building efficiency of 15% better than Title 24, latest edition, utilizing a performance run and including process energy.

of what?

BEST PRACTICES:

- Designs shall utilize systems and products that incorporate the following characteristics:
  A. Long-life, industrial quality.
  B. Readily available products, spare parts, and components with local service support available.
  C. Incorporate multiple equipment elements in key systems to provide reduced capacity operation when during normal operations as well as providing redundancy in the system when portions are down as a result of failure or for maintenance.
- For alteration and renovations, the designer shall obtain appropriate as-built documents from the Riverside Community College District (RCCD) archives for design and implementation.

- Large Equipment Installation Sequencing:
  A. In conjunction with other design disciplines, provide the necessary scheduling, sequencing, movement, and positioning of large equipment into the building during construction, including provisions for temporary removal/replacement of existing building components.

23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (CONTINUED)

BEST PRACTICES (CONTINUED):

- Special and Riverside Community College District (RCCD) Furnished Equipment:
  A. Special types of equipment, including RCCD-furnished and contractor-installed materials, shall be coordinated for correct rough-in and attachment requirements.

- Interferences:
  A. Air Conditioning (AC) units, valves, fans, piping, ducts, pumps, and other equipment shall be reviewed for interferences that would prevent proper installation of each system. These components shall be coordinated with other trades for routing, service, etc.

- Clearances:
  A. Provide, at a minimum, manufacturer's recommended space for service access around each AC unit, Air Handling Unit (AHU), pump, boiler, fan, cooling tower, heat exchanger, etc. Clearances shall be coordinated with other disciplines and clearly indicated on mechanical drawings.

- Penetrations:
  A. Piping/utility and duct penetrations through floors, walls, and roofs shall be coordinated and identified on the architectural and structural construction drawings.

23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (CONTINUED)

BEST PRACTICES (CONTINUED)

- Equipment Protection and System Protection:
    A. Project specifications shall clearly indicate that all equipment and systems intended for a project shall be properly protected from damage, corrosion, and weather during shipment, in-transit storage, job-site storage, field/shop preparation, installation, and checkout until the work is accepted by RCCD. Ends of piping, valves, and fittings shall be protected from abuse and the entry of moisture. Electrical equipment controls, and insulation shall be protected against moisture and water damage. During construction, the project shall meet or exceed the recommended control measures of the Sheet Metal and Air Conditioning National Contractor's Association (SMANCA) IAQ Guidelines for Occupied Buildings under Construction, latest edition, ANSI/SMACNA 009-2008 (Chapter 3).

- Special Support and Anchors:
    A. All equipment including piping supports, anchors, supports-guides, and pre-insulated versions thereof, which exert force on the structure other than those forces produce by gravity, and equipment shall be designed and detailed on the drawings and coordinated with structural engineer. Support and anchors shall be coordinated with all trades.

23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (CONTINUED)

OTHER DESIGN ISSUES:

A. Mounting of air moving equipment:
   - For roof-top installations, the units should be mounted on curbs, or on housekeeping pads to be coordinated with the structural engineer.
   - Curbs should be supplied or coordinated by the manufacturer/supplier.
   - Housekeeping pads should be minimum 4-inches high and extend 6-inches on all sides of the equipment mounting base.

B. Equipment anchoring:
   - For moving equipment, vibration isolators may be required, depending on the equipment location.
   - Seismic restraints are required in all locations.
   - All suspended piping related to the mechanical system shall be isolated from the building structure.
   - Custom air moving equipment is generally internally isolated; in this instance, external vibration isolation may not be necessary.

C. Duct Air Velocities:
   - Duct air velocities should be limited to values that ensure that the noise from equipment and air movement is not excessive and is compliant with applicable noise criteria.
   - Duct systems shall be designed with maximum velocities as follows:
     * Supply Ductwork: 1800 feet per minute for main ductwork. Pressure drop of 0.10 inch water gage per hundred feet for main ducts and 0.05 inch water gage per hundred feet for ducts downstream of Variable Air Volume (VAV) boxes.
     * Return Ductwork: 1500 feet per minute for main ductwork. Pressure drop of 0.10 inch water gage per hundred feet.
     * Exhaust Ductwork: 1800 feet per minute for main ductwork. Pressure drop of 0.10 inch water gage per hundred feet.
   - Verify noise criteria for the spaces.
     * All occupied spaces shall meet room noise criteria (NC) of NC- 35, except for conference and meeting rooms that shall be less than NC-30.
   - Provide sound attenuators if necessary.

23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (CONTINUED)

OTHER DESIGN ISSUES (CONTINUED):

D. Chiller systems
- Generally the buildings within Riverside Community College District are served by a Central Utility Plant (CUP). This needs to be verified in all instances.

E. Fans in air moving equipment
- Generally plug fans are preferred.
- A fan-wall system should be considered where possible.
    * Fan-wall systems save on space, reduce noise, and allow the system to continue operating if a fan becomes inoperative for some other reason (motor or drive failure).

23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (CONTINUED)

DESIGN AND CALCULATIONS:

- The following information shall be used in the cooling and heating load calculations and design of this project. Where authorities having jurisdiction have applicable design limitation requirements, those design requirements shall prevail. Allowable design safety factors permissible by code shall be applied to equipment selections to ensure adequate cooling capability. (Example: Title 24 indoor and ambient design criteria may take precedence over table below per State of California Regulatory requirements).

- Outdoor Design Criteria:
  A. Location: Riverside County, California.
  B. Climate Zone: 10.
  C. Latitude: 33.9 North.
  D. Longitude: 117.23 West.
  E. Elevation: 1,600 feet above mean sea level.
  F. Outdoor design dry bulb temperature (cooling): 99 degrees F.
  G. Outdoor design wet bulb temperature: 71 degrees F.
  H. Outdoor design dry bulb temperature (heating): 30 degrees F.

- Indoor Space Design:

ROOM	SUMMER	WINTER	RH (RANGE)	PRESSURIZATION
Office Space	74°F	69°F	(30-60)	Positive
Conference room	74°F	69°F	(30-60)	Positive
Rest rooms	74°F	69°F		Negative
Locker rooms	74°F	69°F		Negative
Janitorial	74°F	69°F		Negative
Electrical room	74°F	69°F	**	Positive
UPS room	68°F	68°F	**	Positive
Corridor	74°F	69°F	(30-60)	Positive
Tele/Data room	68°F	68°F	**	Positive

** Specific manufacturer's recommendations.

23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (CONTINUED)

- Hours of Operation:
  A. The building operation schedule shall be verified with Riverside Community College District (RCCD) to allow for appropriate occupancy, lighting, and office equipment loads.

- Building Envelope:
  A. Insulation R-value alone shall not be directly used to determine the assembly.
  B. R-value. The R-value shall be calculated from each assembly material. The thermal bridging effect of assembly framing, mullions, cladding, etc. through conduction paths shall be used to determine the actual R-values of the construction assemblies.

- Ventilation:
  A. Ventilation shall be provided to meet the requirements of Section 121 of the latest edition of Title 24 or ASHRAE 62.1, whichever is more stringent.
  B. Reasonable assumptions (diversity, etc.) should be used in keeping with industry standards to determine the population for purposes of calculating the ventilation air quantity. Assumptions must be documented and understood by the District.
  C. Demand ventilation controls shall be provided per Section 121 of Title 24, latest edition. Where spaces become unoccupied, the minimum requirements for demand control ventilation shall be maintained based on CO2 sensors. CO2 sensors shall be located within 3-ft and 6-ft above the finished floor or at the anticipated height of the occupants.
  D. Locker rooms and toilet room exhaust shall be no less than 12 air changes per hour.
  E. Battery Rooms shall be ventilated according to the type of batteries. Rooms with wet cell batteries shall be provided with a minimum six air changes per hour, and dry cell battery rooms shall be provided with a minimum of four air changes per hour and per the requirement of the Fire Marshall.

23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (CONTINUED)

- Building Pressurization:
  - A. The outside air requirement shall be based on the greater of the ventilation requirements, or the positive air balance requirement as compared to the total rate of building exhaust. The building shall be kept under positive pressure via building static pressure sensors and the building supply fan variable frequency drives.

- Air Filtration:
  - A. Face velocity shall not exceed 450 feet per minute.
  - B. Airtight blank-off panels shall be required for irregular modular perimeter panels.

23 05 19 METERS AND GAUGES FOR HVAC PIPING

- Thermostats shall be Automated Logic Corporation, model RS Plus
- Thermostats shall be wall mounted. A lockable cover shall be provided for thermostats at Riverside City College and Norco College. Moreno Valley?

23 05 48 VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

- Carefully refer to Section 20 and to other documents to assure a complete acoustic system is achieved.
- All equipment shall be supported or suspended using vibration isolators.
- Provide calculations by Vibrex/Sausse, Mason Industries, or equal for seismic restraints including details.
- Sound attenuators shall be provided where acoustic considerations are deemed important by the architect or owner. This will typically be for multi-media rooms, large lecture rooms, theaters, certain labs, or other areas as determined.
- The test and Balance Report shall include sound and vibration data assuring strict compliance with design intent.

23 05 53 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

- Comply with ANSI/ASME A13.1 Scheme for the Identification of Piping Systems, latest edition.
- Confirm with other sections and the owner for other schemes particular to a campus.

23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

- Provide complete Test and Balance services for air and water systems by an Associated Air Balance Council (AABC) Certified company.

23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC (CONTINUED)

- Testing Agency:
  A. A non-affliated agency that is certified by the Associated Air Balance Council (AABC) should perform theTotal System Balance test. The non-affiliated agency should specialize in the balancing and testing, ventilating, and air conditioning systems, to balance, adjust, and test air moving and distribution systems, water systems and steam systems.
  B. Minimum of five (5) years as air balance and testing agency and proof of having successfully completed at least five (5) projects of similar size and scope.
  C. All work shall comply with applicable procedures and standards of the National Standards for Field Measurements and Instrumentation, Total System Balance@ by the Associated Air Balance Council (AABC).

- Test and Balance Reports:
  The Test and Balance agency shall prepare and submit minimum of three (3) copies of the Test and Balance Analysis to RCCD within five (5) working days of completion. This report shall contain, at a minimum:
  A. AABC Certification credential(s) for the responsible Air Balance Company Engineer of record and all certified technicians involved in the project.
  B. Project Summary and comments.
  C. Table of contents and test forms for all systems.
  D. Calibration certificates for all test equipments.
  E. Drawings:
     - Full scale single line schematic drawings showing actual duct runs and outlet/inlet locations.
     - Drawings shall be in BIM based program. Confirm appropriate software release/version with District. Files should be compatible with GIS ONUMA.
     - Copy of AABC National performance guaranty
     - Copy of data for all fans
     - Copy of data for the coils
     - Copy of data for the pumps

- Guarantee:
  - Air Balance Testing agency shall provide an extended warranty of 90 days after completion of test and balance work for recheck or resetting of any outlet, supply air fan, VAV box, return/exhaust fan, or pump as listed in test report.

23 07 00 HVAC INSULATION

- Insulation materials shall not exceed Flame Spread of 25 or Smoke Developed 50 ratings as tested by procedure ASTM E 84, NFPA 255, and UL 723
- All supply air and return air shall be insulated. Where there are acoustical considerations, internal duct liner may be used as duct insulation.

Manufacturer: CertainTeed, Johns Manville, Knauf, or Owens Corning.

23 08 00 COMMISIONING OF HVAC

- During the acceptance phase the commissioning authority will carry out the following scope of work:
    A. Verify by sample, the testing, adjusting, and balancing work that has been carried out by the Testing and Balance (TAB) agency.
    B. Conduct functional performance testing of subsystems, systems, and interactions between systems, leading to acceptance of the completed work. Document results of tests witnessed.
    C. Organize and direct the training of O + M personnel.

- During the post acceptance phase the commissioning authority will carry out the following scope of work:
    A. Verify by sample, the testing, adjusting, and balancing work that has been carried out by the TAB agency.
    B. Conduct functional performance testing of sub systems, systems and interactions between systems, leading to acceptance of the completed work. Document results of tests witnessed.
    C. Organize and direct the training of O + M personnel.

23 09 23 DIRECT-DIGITAL CONTROL (DDC) SYSTEM FOR HVAC

- Automatic temperature controls field monitoring and control system using field programmable microprocessor based units with communications to District Building Automation and Control System. District Building Automation and Control System is Automated Logic Corporation.
- DDC system shall be BACnet based and web hosted allowing password protected access from the internet.
- Base system on distributed system of fully intelligent, stand alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.
- Provide computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, and actuators.

need to also address ongoing maintenance and software upgrades.

23 09 23 DIRECT-DIGITAL CONTROL (DDC) SYSTEM FOR HVAC (CONTINUED)

- Provide control systems consisting of thermostats, control valves, dampers, and operators indicating devices, interface equipment, and other apparatus and accessories to operate mechanical systems and to perform functions specified.
- Provide installation, calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.
- Provide BTU meter at both chilled water and heating hot water services entering each building, where applicable.

Manufacturer: Onicon System or equal.

23 11 23 FACILITY NATURAL GAS PIPING

NATURAL GAS PRESSURE REGULATOR:

- Low pressure gas (9" WC and lower) piping 2" and smaller shall be standard weight, schedule 40, black steel pipe with malleable iron fittings. All low pressure gas piping 2-½" and larger and all medium pressure piping, shall be schedule 40, black steel with plain ends. Fittings shall be standard butt weld fittings. Valves 2" and smaller to be non-lubricated bronze with square heads or lubricated semi-steel body with tapered plug, valves 2-½" and larger to be lubricated semi-steel flanged.

Manufacturer: Continental Steel & Tube, Pinnacle Industrial Supply, A-1 Alloys, Nordstrom, A.Y. McDonald

NATURAL GAS PRESSURE REGULATOR:

- Spring loaded, general purpose, self-operating service regulator including internal relief type diaphragm assembly and vent valve. Diaphragm case can be rotated 360 degrees in relation to body.

Manufacturer: Fisher, Rockwell, Equimeter

SEISMIC VALVE:

- Flanged or screwed semi-steel body, manual reset, high flow efficiency to eliminate gas pressure drop, soft seat construction, non-creeping tripping mechanism, visual open-close indicator. The valve shall close within five (5) seconds when subject to a horizontal sinusoidal oscillation with a peak acceleration of 0.3g for a period of 0.4 seconds. The valve shall be UL Listed and State of California Certified.

Manufacturer: Pacific Seismic Producers (KOSO), Seismic Safety Products, Earthquake Safety Systems

23 21 13 HYDRONIC PIPING

- Above grade chilled and heating hot water piping shall be standard weight schedule 40 black steel pipe, ASTM A 53.Copper piping will be considered for pipes under 3-inches. Submit request to District and College for each particular project.
- Use brazed, welded, or soldered fittings. Grooved piping and Victaulic couplings will not be considered.
- Underground chilled water piping, 2-½" inches and larger shall be PVC, ASTM 2241 SDR 26 Class 160. Pipe shall be pre-insulated.
- Underground heating hot water piping shall be ductile iron.
- If a combination of steel and copper pipe is allowed, use dielectric unions when connecting the two metals.
- Provide manual air vents at all high points of chilled and hot water piping systems.
- Provide unions at all pieces of equipment.
- Provide Pete's Plugs and isolation valves at all pieces of equipment.
- Provide dielectric unions when connecting dissimilar metals.

23 23 00 REFRIGERANT PIPING

- Field Fabricated Pipe. Furnish copper water tube Type L or ACR, drawn temper with wrought copper fittings
- Pre charged Piping. Furnish copper tube Type L, annealed, with "Quick Connect" fittings matched to equipment.
- Follow manufacturer's recommendations.

23 29 23 VARIABLE FREQUENCY DRIVES (VFD)

- VFDs shall be UL listed.
- VFDs shall be tested to UL 508C.
- VFDs shall be compatible with BACnet District District Digital Control (DDC) system.
- The VFD's full load output current rating shall meet or exceed NEC Table 430-150. The VFD shall be able to provide full rated output current continuously, 110% of rated current for 60 seconds and 120% of rated torque for up to 0.5 second while starting.
- A programmable automatic energy optimization selection feature shall be provided standard in the VFD. This feature shall automatically and continuously monitor the motor's speed and load to adjust the applied voltage to maximize energy savings.
- Galvanic isolation shall be provided between the VFD's power circuitry and control circuitry to ensure operator safety and to protect connected electronic control equipment from damage caused by voltage spikes, current surges, and ground loop currents. VFDs not including either galvanic or optical isolation on both analog input/output (i/o) and discrete digital i/o shall include additional isolation modules.

23 29 23 VARIABLE FREQUENCY DRIVES (VFD) (CONTINUED)

- Protect from under voltage. The VFD shall provide full rated output with an input voltage as low as 90% of the nominal. The VFD will continue to operate with reduced output, without faulting, with an input voltage as low as 70% of the nominal voltage.
- Protect from over voltage. The VFD shall continue to operate without faulting with an input voltage as high as 130% of the nominal voltage.
- VFDs shall be provided by a single-source manufacturer.

Manufacturer: ABB, Danfoss, or Yaskawa.

23 31 00 HVAC DUCTS AND CASINGS

- All ductwork shall conform to the California Mechanical Code and SMACNA standards.
- Ductwork shall be galvanized steel and internally lined with acoustical insulation where shown or required for a quiet system—refer to Section 20.
- Provide turning vanes in all elbows.
- Provide manual balancing dampers at all branch run outs to individual diffusers.
- Provide leak testing of all duct systems.

23 34 00 HVAC FANS

- Provide fans as required.
- In general, exhaust fans shall be roof mounted centrifugal upblast or downblast type with curb by fan manufacturer.
- Where upblast and downblast fans are not practical, single inlet centrifugal utility sets may be used.
- All fans shall be Air Movement and Control Association (AMCA) certified and by the same manufacturer.

Manufacturer: Cook, Greenheck, or equal approved by the District.

23 36 00 AIR TERMINAL UNITS

- If applicable to the existing system or new design, provide hot water reheat VAV terminals.
- Terminal units shall be pressure independent with an overall maximum pressure airside drop of 0.75” WC.
- Hot water coils shall provide a minimum of 95 degree F. discharge air and be either one or two row as required.
- Units shall be complete with factory mounted Direct Digital Control (DDC) controls and sound attenuation extensions.
- Provide one VAV box with temperature controls for each multi-occupant space, i.e., conference rooms, etc.

Manufacturer: Trane, Titus, Krueger, Anemostat or equal approved by the District.

23 37 00 AIR OUTLETS AND INLETS

DISTRICT		
Supply	• Supply air devices for walls will be double deflection type with the front blades parallel to the long dimension. • These may also be used in hard ceilings if so desired for architectural reasons. Manufacturer/Model: Titus Model 350 or equal by Price or Krueger.	
Linear	• Where linear diffusers are desired for architectural reasons, they should come with supply air boot provided by the diffuser manufacturer. Matching linear diffusers can also be used for return air. Manufacturer/Model: Titus ML Series or equal by Price or Krueger.	
Eggcrate	• Eggcrate type grilles are acceptable in Janitor Closets and equipment rooms for exhaust.	
Return/ Exhaust	• Return and Exhaust air grilles in hard ceilings and walls will be single parallel blade grilles. Blades can be at either 30 or 45 degrees depending on architectural preference. Manufacturer/Model: Titus Model 300 or equal by Price or Krueger.	

MORENO VALLEY COLLEGE		
Return	• In general, plaque supply air diffusers will be used. These are readily used in 24" x 24" acoustical tile ceilings. Smaller sizes may be used in hard type ceilings provided the correct frame is provided. Manufacturer/Model: Titus Model Omni or equal by Price or Krueger. • Return air grilles in acoustical ceilings will also be plaque face. Manufacturer/Model: Titus Model Omni or equal by Price or Krueger.	

23 37 00 AIR OUTLETS AND INLETS (CONTINUED)

NORCO COLLEGE + RIVERSIDE CITY COLLEGE		
Return	• In general, modular core supply air diffusers will be used. These are readily used in 24"x24" acoustical tile ceilings. Smaller sizes may be used in hard type ceiling provided the correct frame size is provided. **Manufacturer/Model**: Titus Model Omni or equal by Price or Krueger. • Return air grilles in acoustical ceilings will be perforated face. A modular core is not required, but a duct connection (for ducted return air systems) will be required. **Manufacturer/Model**: Titus MCD or equal by Price or Krueger.	

* NOTE: All diffussers in one building shall be consistent in appearance.

23 40 00 HVAC AIR CLEANING DEVICES

- All air handling units, when possible, shall have two (2) sets of filters; pre-filters and final filters.
- Pre-filters shall be MERV 8.
- Final filters shall be MERV 13.
- Provide temporary filters to protect equipment during construction if fans are running.
- Upon completion of the work provide College with one spare set of new filters for each application.

In some smaller units it may not be possible to install all the filtration required. In some instances, filtration systems may be installed in the ductwork.

23 74 00 ROOFTOP CENTRAL-STATION AIR-HANDLING UNITS – LARGE CAPACITY

- Provide custom Air Handling Units (AHUs) as needed.
- Carefully review space requirements for AHUs.
- Units are chilled water with air side economizers, dual filters, plug or wall supply and return fans, and Variable Frequence Devices (VFDs) for controlling fan speeds. Heating hot water pre-heat coils shall be provided as needed to ensure proper entering air temperatures to the cooling coil.

Manufacturer: Temtrol, Alliance, Climate Craft, or Energy Labs

23 74 13 ROOFTOP AIR CONDITIONING UNITS - SMALL CAPACITY

- In general, where units are over five (5) tons nominal capacity, chilled water rooftop Air Handling Units will be used. Chilled water units shall be used where campus chilled water is accessible.
- Units are chilled water with air side economizers, filters, supply and return fans, and VFDs for controlling fan speed. Heating hot water pre-heat coils shall be provided as needed to ensure proper entering air temperatures. Relief fans may be used in lieu of return fans, where applicable.

Manufacturer: Trane, Carrier, York, PDP, or Lennox

23 81 13 PACKAGED DX ROOFTOP AIR CONDITIONING UNITS - SMALL CAPACITY

- Packaged DX rooftop units will only be used where chilled water is impractical and their use is pre-approved by the District/College.
- In general, where units are over five (5) tons nominal capacity, chilled water Air Handling Units will be used. Units shall use R-134a, R-410, or other HFC refrigerant.
- Units shall include dry bulb economizer, two (2) sets of filters (pre and final), relief fan, coils (copper fins on copper coils), gas fired furnaces, and curbs including vibration isolation and seismic restraints.

Manufacturer: Trane, Carrier, York, or Lennox

23 81 23 COMPUTER-ROOM AIR-CONDITIONERS

- Where required, provide unit specifically designed for use in a computer room.
- Units shall use chilled water for cooling. If chilled water is impractical or a split system is desired as back up, provide air condensing unit by the same manufacturer as the indoor computer room air handling unit. Condensing coils shall be copper fins on copper tubes.
- Reheat may be accomplished by either hot water coil if hot water is available, or by hot gas bypass within the unit. Electric heat may be used as a last resort.
- Provide humidification if required for conditions requested by computer equipment supplier. Provide high intensity quartz lamps mounted above stainless steel evaporator pan, or self contained replaceable cylinder, microprocessor controlled electrode steam generating unit.

Manufacturer: Liebert, Compu-Aire, or Stulz

23 81 26 DUCTLESS SPLIT-SYSTEM AIR-CONDITIONERS

- Units may be used for small rooms requiring 24-hour air conditioning, no more than five (5) tons total. Typical applications are small server rooms, elevator equipment rooms, remote office in a warehouse, etc.
- Refrigerant shall be R410A.
- Outdoor units shall either have copper fins on copper tube condensing coils or a coating approved by the District/College.
- Indoor fan coils may be wall mounted, ceiling mounted, or above ceiling fan coils depending on the application.
- Refrigerant piping shall be installed in accordance with manufacturer's recommendations.
- Thermostat shall be hard wired to connect to the campus Direct Digital Control (DDC) system. Where manufacturer supplied thermostat is not capable of being hard wired to connect to the campus DDC system, a separate space temperature sensor shall be provided to be hard wired to connect to the campus DDC system for feedback and an alarm.

Manufacturer:

- Moreno Valley College: Mitsubishi, Sanyo, LG, Samsung, or Daiken
- Norco College: Fujitsu, Mitsubishi, Samsung or Daiken
- Riverside City College: Fujitsu, Mitsubishi, Samsung or Daiken

23 81 29 FAN COIL UNITS

- In general, a majority of the existing buildings consist of ducted fan coil units located in a mechanical room inside the building. For these systems, outside air shall be provided with a chilled water pre-cooling coil.
- Units are chilled water with filters and a constant volume supply fan. Heating hot water re-heat coils are also provided.
- Thermostat must be capable of being hard wired to connect to the campus DDC system.

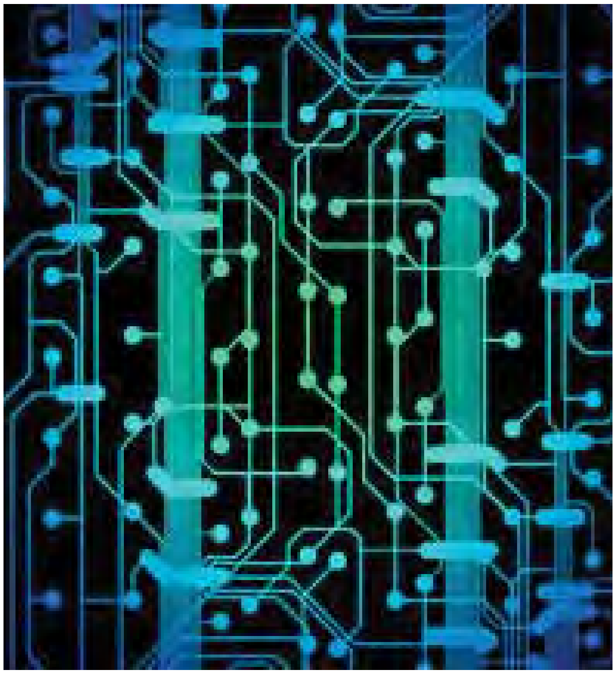
Manufacturer: York, Trane, or equal

where do you specify thermostats and CO2 sensors? Add section 230913 Instrucmentation and Control Devices for HVAC.

Add Note: Do not display info district standard is model RS Plus by ACC.

END OF SECTION 17

18 INTEGRATED AUTOMATION + ELECTRICAL



INTRODUCTION

This section describes the integrated automation of mechanical components for a district-wide Building Management System (BMS) and design guidelines for district-wide electrical systems.

Div 25

INTEGRATED AUTOMATION

25 00 00 INTEGRATED AUTOMATION

- Building Management System (BMS):

  The BMS shall monitor and control all building mechanical systems and equipment.

  A. The District Standard manufacturer/product is Automated Logic Corporation (ALC). The following systems should be integrated into the system
     - Open Protocols
     - Security
     - Industrial
     - Competitive Control Systems
     - Variable Speed Drives
     - Fire
     - Lighting
     - Chillers
     - Boilers
     - Power Monitoring
     - Fume Hood Control
     - Task Monitoring
     - Generators
     - UPS Monitoring
     - Static Transfer Switches and Switchgear
     - Computer Room Air Conditioning Units

  B. Integrated automation system should be BACnet compatible.

  C. Each mechanical system shall be complete with factory controls, and shall be specified with accessory integration modules, hardware, computer cards, and software required for a full and complete integration to the BMS.

  D. The BMS shall monitor mechanical equipment for failure alarms, and all operating set point variables shall be capable of being reset.

  E. Additional integration modules, hardware, software, and programming shall be provided by the BMS vendor as required to complete system integration.

  lighting?

  F. The emergency generator, UPS, battery plant, main circuit boards, transfer switch, electrical gear, and other building electrical systems and subsystems shall be integrated, and/or monitored.

  G. The security system and fire control panel shall also be integrated for central monitoring.

  H. The BMS system shall be compatible with existing systems.

  I. Coordinate requirements with each discipline and with Riverside Community College District requirements.

Div 26

ELECTRICAL

26 00 00 ELECTRICAL

DESIGN GUIDELINES:

- Systems Compatibility
  - A. All software systems and or protocols used in Riverside Community College District (RCCD) shall be compatible with the State of California Community College System's FUSION + GIS + ONUMA —Refer to Section 2: Part D.
  - B. Open source software and protocols are the standard and proprietary systems should be avoided.
  - C. Refer to Section 2: Part B: Sustainable Design Guidelines.
  - D. The design shall incorporate LEED features for plumbing fixtures and equipment. Water conserving fixtures shall be selected that will include high efficient flush valves in the faculty/staff, public, and general toiletrooms. These fixtures shall provide a minimum 20% reduction of water usage compared to 1992 EPACT baseline standard.
  - E.

P2S: building efficiency note?

- Designs shall utilize systems and products that are:
  - A. Long-life, industrial quality.
  - B. Readily-available products and components with service support available.
  - C. Maintainable arrangements with multiple units.
  - D. Readily available spare parts and materials incorporate multiple equipment elements in key systems to provide reduced capacity operation when portions are down for maintenance or failure.

- For alteration and renovations, the designer shall obtain appropriate as-built documents from the RCCD archives for design and implementation.

- Power Shut-Down Procedures:
  - A. The Contractor's construction schedule shall indicate dates of proposed electrical power shutdowns required to perform the installation. The Contractor shall notify the District/College a minimum of 14 days prior to each shutdown. All shutdown coordination meetings shall be arranged by the Contractor for each shutdown.
  - B. Power shutdowns shall occur between the hours of 12:00am and 4:00am.
  - C. The Contractor shall be responsible for investigating and listing all affected loads that will be switched off during a power shutdown.

DESIGN GUIDELINES (CONTINUED):

- Product Specifications:
    A. In all instances, three manufacturers should be specified. The basis of design should be the first manufacturer named in the specifications and this same name should show on the drawings.
    B. The first named manufacturer is the standard of quality, performance, space requirements.
    C. Any names beyond the first named is an acceptable manufacturer. However, being listed as an acceptable manufacturer does not imply that the manufacturer has a product that meets or exceeds the project requirements.
    D. The Contractor should verify this information and make adjustments as needed to accommodate equipment other than the first named manufacturer.

- Building Normal Power Distribution:
    A. Place equipment such that space for expansion is available and usable.
    B. Provide 4” housekeeping pads for floor mounted equipment.
    C. Provide a separate ground bar in the main electrical room.
    D. Motors greater than ½ HP shall be 480V-3 Phase in buildings where 480 volts is available. ½HP and below shall be 120V-1 phase.
    E. Provide a minimum of 25 percent spare load and circuit breaker capacity in branch circuit panelboards.
    F. Type AC/MC cable is not permitted, except for specific applications where other methods will not work.
    G. Include a separate grounding conductor, other than the raceway, in all feeders and branch circuits.

- Building Emergency Powers Systems:
    A. Shall be sized to maintain egress lighting operations for a minimum of 90 minutes. Refer to **26.33.23** Central Battery Equipment for specifics.

- Emergency Power Distribution (Life Safety):
    A. Provide required egress lighting maintaining 1 foot candle minimum.
    B. Fire alarm systems shall be on the life safety system.

- Emergency Power Distribution (Stand-by):
    A. Provide Uninterruptible Power Supplies (UPS) for data rooms.

26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

- Use only copper conductors, #12 AWG minimum for power wiring; #14 AWG for control circuitry.
- AC and MC cables are not permitted except as specifically noted in this section.
- A separate grounding conductor, other than the raceway, shall be included in all feeders and branch circuits.
- Manufactured wiring systems are not acceptable except within modular partition systems.

26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

- Provide separate insulated conductor within each feeder and branch circuit raceway.
- Use copper-clad steel ground rods.
- Ground resistance testing shall be performed by a Contractor engaged independent testing company.
- Provide exothermic weld connections.
- Utilize the following elements for grounding:
  - Metal underground water pipe
  - Metal building frame.
  - Concrete-encased electrode.
  - Rod electrode.
  - Ground rings.
- 5 ohm maximum system ground performance for Data Center Buildings.
- 15 ohm maximum system ground performance.
- Well pipes shall be 8” deep by 24” long fiberglass with cast iron cover marked “GROUND.”

26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

- Utilize the following mounting, anchorage, and attachment components:
  - A. Powder actuated fasteners.
  - B. Zinc-coated steel mechanical-expansions anchors.
  - C. Concrete inserts.
  - D. Clamps for attachment to structural steel elements.
  - E. Toggle bolts.
  - F. Hanger rods.
- Concrete bases: use 3000-psi, 28 day compressive-strength concrete.

26 05 33 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

- Conduit Materials:
  - Rigid steel and PVC-coated rigid steel.
  - Electrical metallic tubing (EMT).
  - Galvanized flexible steel conduit.
  - PVC schedule 40 and schedule 80.
- Conduit applications:
  A. Underground, more than 5 feet outside foundation wall: provide PVC schedule 40 or PVC-coated rigid steel conduit.
  B. Underground, within 5 feet from foundation wall: provide rigid steel conduit wrapped with corrosion protective electrical tape, or PVC coated rigid steel conduit.
  C. In or under slab on grade: provide PVC schedule 80 conduit.
  D. Outdoor locations above grade: provide galvanized rigid steel conduit. EMT may be used in areas 10’ above finished grade.
  E. In slab above grade: provide PVC schedule 80 conduit.
  F. Wet and damp locations: provide galvanized rigid steel conduit.
  G. Exposed dry locations: provide galvanized rigid steel conduit. EMT may be used in areas 10’ above finished grade or floor.
  H. Concealed dry locations: provide EMT.
- Provide sheet metal boxes; provide flush mounting outlet box in finished areas.
- Minimum conduit size shall be 3/4”.
- Multi-outlet metal raceways in laboratories shall be aluminum.
- Provide pull ropes in all empty conduit.
- Provide compression type fittings, screw type are not acceptable.

26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

- Electrical Identification Materials and Devices:
  A. Identification for raceways.
  B. Identification for conductors and communication and control cable.
- Raceway and Metal-Clad Cable Identification:
  A. Adhesive labels and warning tape for underground lines.
- Conductor and Cable Identification:
  A. Colored adhesive tape and brass or aluminum tags.
- Equipment Labels: engraved plastic attached with rivets or screwed on.
  A. Warning Signs: Baked enamel and metal backed butyrate.
  B. Instruction Signs: Engraved, laminated acrylic or melamine plastic.

26 05 73 OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

- Provide computer-based, fault current and over current protective devices coordination study including ground fault protection and arc fault hazard analysis studies to be performed by the contractor.
- Protective devices shall be set based on the result of the protective device coordination study. Arc fault hazard analysis warning nameplates shall be printed and affixed to the electrical system equipment after the final protective relay settings have been applied and confirmed operational.
- Settings and adjustments of the relays shall be performed by an independent qualified agency familiar with this work and the agency is to be retained by the contractor.
- The person performing this work shall have a minimum of five years experience.
- Contractor shall retain a 3rd party independent consultant to perform the study indicated in this section.
- Perform study under direct supervision of Professional Engineer experienced in design of this Work and licensed at in State of California with minimum of five years experience in power system analysis.

26 09 26 LIGHTING CONTROL PANELBOARDS

- The campus standard lighting control panel is by Automated Logic Corporation. Approved "or equal" lighting control panels shall be compatible with Automated Logic controllers and use BACnet protocol. The lighting control panel shall be controlled by the Riverside City Campus Energy Management System (EMS). Connections (Cat5 cable or other) shall be made from the lighting control panel to the IDF Room network in the building.

26 22 00 LOW-VOLTAGE TRANSFORMERS

- Provide continuous copper windings.
- Ventilated enclosures.
- Insulation class: 220 degrees.
- Taps: 25KVA transformers and larger shall have two 2.5 percent full capacity taps above and two 2.5 percent full capacity taps below normal.
- Transformers shall be NEMA TP-1 compliant and meet Class 1 efficiency levels and NEMA sound criteria.
- Provide K- rated transformer or harmonic mitigating transformers for non-linear load applications.

26 24 13 SWITCHBOARDS

- The manufacturer of the switchboard assembly shall be the same as the manufacturer of circuit breakers and installed within the assembly. The campus standard is Square-D USA and shall be use in the base bid with G.E. and Siemens as alternates.
- Mains shall be individually or panel mounted; branch feeder breakers shall be group mounted.
- Provide ground bussing the full length of the switchboard assembly.
- Bussing: copper with silver or tin plating of standard size.
- Connections shall be bolted, accessible from the front for ease of maintenance.
- Provide bus extensions on ends for future sections.
- Install individual circuit breaker nameplates.
- Testing shall be done by a separate contractor-engaged testing firm.
- Provide electronic metering for building main switchboard.

26 24 16 PANELBOARDS

- The manufacturer of the panelboard assembly shall be the same as the manufacturer of circuit breakers and installed within the assembly. The campus standard is Square-D USA and shall be use in the base bid with G.E. and Siemens as alternates.
- Copper bussing.
- Copper ground bussing shall be installed in all panelboards.
- Circuit breakers shall be bolt-on type.
- For non-linear load applications subject to harmonics, furnish 200 percent rated, plated copper, solid neutral.
- Install spare conduits out of each recessed panelboard to accessible location above ceiling or below floor. Minimum spare conduits: 5 empty 1 inch. Identify each as “SPARE.”
- Provide minimum 25 percent spare load capacity and 25 percent spare circuit breakers in panelboards.
- Circuit directories shall be typed under clear plastic contained within a metal frame inside the panelboard door.

26 24 19 MOTOR-CONTROL CENTERS

- The manufacturer of the motor control center assembly shall be the same as the manufacturer of circuit breakers and starters installed within the assembly.
- Horizontal Bus: copper bus with continuous rating. Include copper ground bus entire length of control center.
- Vertical Bus: copper.
- All indicating and pilot lights shall be LED with metal housing and easily replaceable parts.
- Control wiring shall be installed in Panduit wiring ducts. Control wiring shall be stranded copper.
- Provide engraved nameplates describing load on each cubicle.

26 27 13 ELECTRICAL METERING

- The power monitoring system shall provide for software support for 5 years and shall be the latest version at project completion.
- Veris Industries shall be the District standard.

26 27 26 WIRING DEVICES

- Receptacles: 120V, 20A
    - A. Straight blade.
    - B. GFCI: feed-thru type.
    - C. Isolated ground in IT equipment rooms.

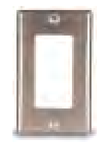
- Snap Switches: 120/277V, 20A, Heavy Duty
    - A. Pilot light switches.
    - B. Key-operated switches.
    - C. Momentary contact, center off switches.

- Occupancy Sensors: District standard “Watt Stopper”
    - A. Wall-Switch Sensors: Infrared type with adjustable time delay.
    - B. Long-Range Wall-Switch Sensors: Passive-infrared type with adjustable time delay.
    - C. Wide-Range Wall-Switch Sensors: Passive-infrared type with adjustable time delay.
    - D. Exterior Occupancy Sensors: Passive-infrared type with adjustable time delay.

26 27 26 WIRING DEVICES (CONTINUED)

- Wall Plates:
    - A. Material for Finished Spaces: Type 302 stainless steel, satin finish
    - B. Material for Unfinished Spaces: Galvanized steel
    - C. Material for Damp and Wet Locations: Thermoplastic

- Finishes:

DESCRIPTION		
Finishes	• Switches and receptacles connected to normal power system • Refer to Section 9: Part B for colors	 
	• Switches and receptacles connected to emergency power system: Red.	
	• TVSS Devices: Blue.	
	• Isolated-Ground Receptacles: Orange.	

26 28 13 FUSES

- Cartridge fuses rated 600 V and less for use in switches.
- Spare-fuse cabinets. Wall-mounted steel unit with fuse pullers for each size of fuse. Quality Standard: NEMA FU 1.
- Cartridge Fuses: Nonrenewable
- Fuse Applications:
    - A. Service Entrance: Class L, fast acting.
    - B. Feeders: Class L, fast acting.
    - C. Motor Branch Circuits: Class RK1, time delay.
    - D. Other Branch Circuits: Class RK1, time delay.

26 28 16 ENCLOSED SWITCHES AND CIRCUIT BREAKERS

- Fusible and Nonfusible Switches:
  - A. Fusible Switch, 600 A and Smaller: NEMA KS 1, Type HD.
  - B. Nonfusible Switch, 600 A and Smaller: NEMA KS 1, Type HD.
  - C. Accessories:
    - Equipment ground kit.
    - Neutral kit, where required.
    - Auxiliary contact kit.

26 29 13 ENCLOSED CONTROLLERS

- Control relay and contactors: The District standard is Deltrol.

26 32 13 ENGINE GENERATORS

- Moreno Valley: Gas Engine. On site gas storage, verify with AHJ.
- Norco: Diesel Engine.
- Riverside City: Diesel Engine.
- Muffler/Silencer: Critical type.
- Outdoor Generator: Generator set enclosure

26 33 23 CENTRAL BATTERY EQUIPMENT

- Centrally located Lighting Inverters shall be UPS type and maintain power to High Intensity Discharge (HID) fixtures.
- The District standard is Myers Power Products.
- Nickel-Cadmium wet cell batteries.
- Warranty: 5 years

26 36 00 AUTOMATIC TRANSFER SWITCHES

- Double-through type.
- Automatic closed transition transfer switch- make before break operation.
- Onan Cummins, Kholer Power systems, Generac Power System Inc, Emerson: Asco Power Tech, or approved equal.

END OF SECTION 18

26 28 16 ENCLOSED SWITCHES AND CIRCUIT BREAKERS

- Fusible and Nonfusible Switches:
  - A. Fusible Switch, 600 A and Smaller: NEMA KS 1, Type HD.
  - B. Nonfusible Switch, 600 A and Smaller: NEMA KS 1, Type HD.
  - C. Accessories:
    - Equipment ground kit.
    - Neutral kit, where required.
    - Auxiliary contact kit.

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- Automatic closed transition transfer switch- make before break operation.
- Onan Cummins, Kholer Power systems, Generac Power System Inc, Emerson: Asco Power Tech, or approved equal.

19 GENERAL SPECIFICATIONS

INTRODUCTION

Section 19 of this handbook describes the pragmatic aspects of capital improvements and implementation of the Master Plan. The design of engineered systems will respond to standards set forth in this section with the objective of ensuring compatible infrastructure components working together in easily maintainable configurations. The specifications herein set forth product, system and/or manufacturer criteria specific to Riverside Community College District (RCCD).

The section is organized based on the 2010 Master Format® list of numbers and titles classified by work results or construction practices.

Div 00

PROCUREMENT AND CONTRACTING REQUIREMENTS

Div 00 General Conditions Criteria

- Division 00 General Conditions, Special Conditions, and instructions to bidders have been prepared by Community College District Legal Council and have been approved by the Associat Vice Chancellor, Facilities Planning + Development (FP+D)

Div 01

GENERAL REQUIREMENTS

Div 01 General Conditions Criteria

- Division 01 General Conditions, Summary, Administrative Requirements, and Quality Requirements have been prepared by Community College District Legal Council and have been approved by the Associat Vice Chancellor, Facilities Planning + Development (FP+D)

Div 02

EXISTING CONDITIONS

02 41 13 SELECTIVE SITE DEMOLITION

- Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties

02 41 13 STRUCTURE DEMOLITION

- Do a full demolition of everything within limit line, including foundations. Everything is demolished if not serving something else.

Div 03
CONCRETE

03 35 00 CONCRETE FINISHING

A. All concrete floors must be sealed.

03 45 00 PRECAST ARCHITECTURAL CONCRETE

B. Build mockups to comply with the following requirements:

- 1. Build mockups of the following:
- a. Typical exterior site wall of cast-in-place architectural concrete as shown on Drawings
- 2. Demonstrate curing, cleaning, and protecting of cast-in-place architectural concrete, finishes, and contraction joints, as applicable.
- 3. In presence of Architect, damage part of the exposed-face surface for each finish, color, and texture, and demonstrate materials and techniques proposed for repair of tie holes and surface blemishes to match adjacent undamaged surfaces.
- 4. Obtain Architect's approval of mockups before casting architectural concrete.
- 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

Div 04
MASONRY

04 22 00 CONCRETE UNIT MASONRY

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, un-chipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Exterior surfaces of concrete or masonry construction generally shall not be painted. A clear or colored (stain) water repellent sealer shall be used. Where subject to graffiti, use anti-graffiti system to a height of 10 feet above grade (flat or semi-gloss finish where appropriate).

Div 05

METALS

05 00 00 METALS

A. Where metals are used at the exterior of a building, they shall be finished so as to protect the metal and its surrounding materials from degradation typically known in the industry.

05 12 00 STRUCTURAL STEEL FRAMING

A. Where exact sizes and weights called for are not readily available, secure the Structural Engineer's acceptance of suitable sizes in time to prevent delay due to such substitutions.

05 12 00 STRUCTURAL STEEL FRAMING

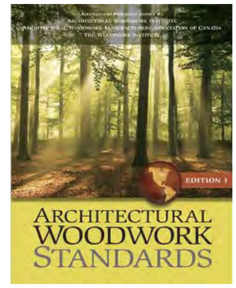
A. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

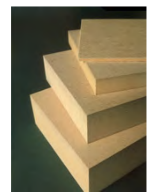
Div 06

WOOD, PLASTICS, + COMPOSITES

06 41 00 ARCHITECTURAL WOOD CASEWORK

- Refer to Division 12 for countertops.
- Wood-Veneer-Faced Architectural Cabinets: Materials, workmanship and installation shall be "Custom Grade" in accordance with Architectural Woodwork Standards (AWS).
- Casework shall be factory finished unless noted otherwise.
- Plastic Laminate Clad Architectural Cabinets: Materials, workmanship and installation shall be "Custom Grade" in accordance with Architectural Woodwork Standards (AWS).
- All exposed and semi-exposed surfaces of casework shall be finished in specified high pressure decorative laminate (HPDL).
- All cabinet interiors shall be finished in melamine
- Avoid use of plastic laminate on countertops.
- Substrate: MDF - Sierra Pine Medite II (no added formaldehyde)





CASEWORK HARDWARE		
Hinge		
Manufacturer:	Blum	
Model:	CLIP top 170 degree concealed hinge	
Finish:	Nickel-plated steel	
Pulls		
Manufacturer:	Doug Mockett	
Model:	DP3B Tab pull	
Finish:	Satin nickel	
Drawer Slides		
Manufacturer:	Accuride	
Model:	9301 Series, full extension, heavy duty slides	
Finish:	Clear zinc (C)	
Shelf Supports		
Manufacturer:	U.S. Futaba Inc.	
Model:	Medium duty application, continuous line bore in millwork cabinet with spoon type supports	
Finish:	Nickel	
Cabinet Locks		 
Manufacturer:	Schlage	
Model:	CL Series 626, Master Keyed Schlage Cylinders (No Cam Locks)	
Finish:	US 26D Satin chrome	

Div 07

THERMAL + MOISTURE PROTECTION

REFER to Section 12 for specification sections

Div 08
DOORS + WINDOWS

08 10 00 DOORS AND FRAMES

- **REFER to Chapter 13 for specification sections**

08 40 00 ENTRANCES, STOREFRONTS, AND CURTAIN WALLS

- **REFER to Chapter 13 for specification sections**

08 50 00 WINDOWS

- Locate and specify windows, when possible, to enable convenient window cleaning by occupants and maintenance personnel. - both side of glazing units.
- Pivoting windows or easily accessible windows for cleaning are desirable.
- Window installations need to accomodate building movements including inter storey drift during seismic loading.
- Water tightness rating for windows to be selected based upon exposure to elements related to location on the facade and site conditions.
- Sound attenuation ratings for windows to be selected based upon interior requirements.
- Thermal transmission and shading coefficient for windows to be selected in coordination with mechanical consultant.

08 70 00 HARDWARE

- **REFER to Chapter 13 for specification sections**

Div 09

FINISHES

EXTERIOR FINISH DESIGN GUIDELINES

A. Material Durability under all environmental conditions and abuse by occupants must be considered.
B. Exterior walls shall be constructed of durable, minimal materials consistent with espectations for buildings with a usable life of 50-100 years.
C. Economy in maintenance costs.
D. Aesthetic quality. Inadequacies in design which allow problems such as cracks, or water run-off staining to develop may severely affect the aesthetic quality of a building.
E. Typical stucco has not proven to be a durable material in high traffic areas. However, its use is acceptable where not subjected to abuse, or if an impact-resistant substrate is used.
F. Consider using a durable wainscot with stucco above in high traffic locations
G. Where split-face CMU is used, indicate smooth-face units for locations to receive signage, light fixtures, louvers, and other items.
H. In detailing, avoid horizontal ledges where birds can perch or nest.
I. In detailing, avoid exterior openings where birds, bees and insects can enter structures.
J. Exterior walls and assemblies form a weather barrier and a selective filter for heat, sound, fire and the passage of people. Structurally, walls must provide stability under all environmental conditions. Selection considerations of all exterior wall systems include.
   - Code requirements for combustibility and fire-ratings.
   - Functional and security requirements related to glazing and openings.
   - Structural frame, whether load-bearing or non-load -bearing, the spacing of horizontal framing members may affect the choice.

09 20 00 PLASTER AND GYPSUM BOARD

- Lightly textured finish.
- Finish levels described have been adapted from ASTM GA-214 and GA-216.
- Location of use:
  - Level 1: Not permitted.
  - Level 2: Use at concealed areas and construction not indicated to be Levels 3, 4, or 5.
  - Level 3: Use at locations such as storage, service rooms, riser closets, electrical rooms, and equipment rooms.
  - Level 4: Use at locations with light textures and flat paint finishes, or under medium weight fabric-backed patterned low sheen wallcoverings
    - Use at locations under fabric-backed wall coverings through which substrate variations would not be noticeable.
    - Use typically at walls with flat paint finishes.
  - Level 5: Use at public areas such as lobbies, restrooms, stairways, or other areas to receive painted finish.
    - Use at walls used as projection screens, provide continuous, smooth, uniform, and virtually flawless finish for application of marker/projection screen wall covering.
    - Use typically at ceilings.
- Finish descriptions:
  - Level 1: Not permitted.
  - Level 2: Surface Appearance: Surface shall be free of excess joint compound. Tool marks and ridges will be acceptable.
  - Level 3: Surface Appearance: Joints compound shall be smooth and free of tool marks and ridges.
  - Level 4: Surface Appearance: Smooth and free of tool marks and ridges.
  - Level 5: Surface Appearance: Smooth and free of tool marks and ridges.
- Smooth finish may be used in specific areas if approved by College.

09 24 00 CEMENT PLASTERING

EXTERIOR

A. Do not use expanded metal lath; use wire mesh or self furring metal lath; shall meet CBC requirements.
B. Do not apply stucco over masonry.
C. Where allowable by Code, use plywood or Georgia Pacific DensGlass® Exterior Sheathing as substrate beneath lath and plaster; otherwise, use high-impact resistant gypsum board.
D. Though cracking of Portland Cement plaster generally cannot be completely eliminated, the proper detailing and installation of the cement plastic stucco can greatly reduce cracking
    - Thickness shall be 7/8" at exterior walls, and 3/4" at interior walls or soffits;
    - Recommended Drying/Curing times shall be 7 days for scratch coat; 3-5 days for brown coat; and 28 days for finish coat before painting.
    - "For exterior Portland cement plaster, install Control joints to create panels no larger than 144 sq. ft. with no dimension exceeding 18 ft. or a length to width ratio of 2.5 to 1." (Reference: Plaster and Lathing Systems Manual - National Association of Architectural Metal Manufacturers)
    - Expansion screeds shall be provided in exterior Portland cement plaster where breaks in structural systems and dissimilar substrates are included in the design of the walls. The panels of plaster within the boundary of joints should be kept as square as possible. Lath shall be broken along expansion joint lines. Joints shall also be provided at the perimeters and edges of plaster membranes that would otherwise be restrained against movement. Attempt to align expansion joints wherever possible with other architectural elements and consistent with a modular spacing. Show joints on contract drawings.
E. Integral color finish coats may be used in lieu of painting (short life-cycle requires future painting). Color plaster finish coat shall be a minimum of 1/8 inch thick.
F. Exterior cement plaster weep screeds shall be placed a minimum of six inches above adjacent ground.
G. Precautions when using Portland Cement plaster
    - Smooth troweled Portland Cement plaster should be avoided
    - Plaster over plywood paneling and wood frame
    - Plaster stress concentration causes cracks.
    - Use medium or float finish on exterior cement plaster stucco finishes. Do not use heavy texture finishes.

09 24 00 CEMENT PLASTERING (continued)

INTERIOR

A. Ceiling finishes: Ceilings are important for various considerations. They offer the designer opportunities for acoustical control and light reflectance. Ceilings shall be easily maintained and replaced. They also shall provide access to overhead systems.
B. Sound Transmission Classification must be considered for each space.
C. STC ratings shall be considered in developing SDCCD building standards
D. Material Selection
   - Durability, ease of maintenance, and lower life cycle costs should be considered during the selection of materials for future projects. This will create comfortable and long-lasting buildings for the campuses and provide the District with long-term financial benefits.

09 30 00 TILING

- Wall tile: Ceramic or recycled glass
- Floor tile: Porcelain or stone
- Base: Porcelain to match floor tile, coved
- Threshold: Solid surface or Stone

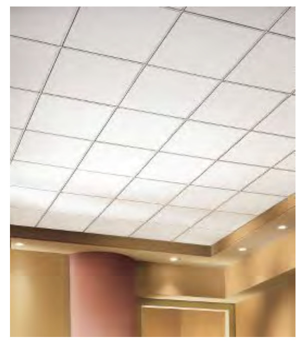
Installation: Floor: mortar-bed
Walls: thin-set
Grout: dark color

- Colors and shades of selected tiles shall be of medium intensity (not so light as to easily show soiling, or so dark as to show dust and lint).
- Submit sample for review and approval by District.
- Ceramic tile: ceramic tile is appropriate for use in restrooms and showers.
- Insure that the color and style selected has been in production for at least 5 years. Do not use discontinued tiles.
- American made tiles are strongly preferred.
- Use cementious backer board for walls. DensShield Tile Backer is acceptable. Comply with TCNA standards.
- Tile in food preparation areas, shower and locker rooms, and other “wet” areas, shall have a smooth, easily cleanable surface which is moisture and grease resistant. Also, flooring in wet areas shall meet the code and industry standard for non-slip surfaces.

09 50 00 CEILINGS

A. Sound rated fiberglass batting above the ceilings is required to achieve industry standard levels of sound transmission. Refer to Section 20.

09 51 00 ACOUSTICAL CEILINGS



- Acoustical Tile
  Manufacturer: Armstrong Ceilings
  Style : 9/16" Optima Square Tegular
  Color: White
  Size: 24 x 48 (24 x 24 as approved by District
- Suspension System
  Manufacturer: Armstrong
  Grid: 9/16" Suprafine, heavy-duty suspended grid
  Color: White or factory painted Satin Silver
- The extent and type of suspended acoustical ceilings shall be reviewed with the District prior to commencing working drawings.
- Suspended acoustical grid ceilings shall not be used in student toilet rooms
- Detail and specify suspension systems for seismic restraint in accordance with CCR and interpretation of regulations issued by DSA. These regulations are more stringent than those included in California Building Code.

09 54 00 SPECIALTY CEILINGS

- As approved by District on a project-by-project basis

09 65 00 RESILIENT FLOORING

- Vinyl Tile / Sheet Vinyl
- Linoleum / Sheet Linoleum
- Rubber Tile / Sheet Rubber
- Resilient flooring is required under fixed floor cases and cabinets

09 65 13 RESILIENT BASE AND ACCESSORIES

- Rubber base:
  - 4" High, 120' coiled material
  - Coved with toe at resilient flooring
  - pre-formed corners
  - Straight (toeless) at carpet
- Reducer strip:
  - Minimal profile at transitions from carpet to vinyl or other flooring
- Stair accessories:
  - Integral tread and riser
  - Stringer to match tread and riser

09 67 00 FLUID APPLIED FLOORING

09 69 00 ACCESS FLOORING

A. Consider access flooring for ease of renovations particularly where ease of access is anticipated.

B. Include also the engineering and anchoring of all posts.

09 68 00 CARPETING

- Manufacturer: As approved by District
- Style: As approved by District
- Color: As approved by District
- Sizes: 24" X 24" Tile
  Roll goods

C. Colors and shades selected should be of medium intensity (not so light as to easily show soiling, or so dark as to show dust and lint). Multi-colored heathers and non-directional patterns are desirable for their soil-hiding capability. Solid color carpet should <u>not</u> be used.

D. District Approved Carpet Manufacturers shall contain Recycled material

E. Preferred Carpet Performance Criteria: ALL CARPET MATERIALS ARE NOT CREATED EQUAL. Soft surface flooring is typically treated as an aesthetic component of the environment. In reality, carpet plays a much greater role. Carpet can add comfort underfoot and acoustic values to the education environment. It also has the ability to improve dB ratings, reduce glare and reduce hot spots. The wrong carpet material can contribute to indoor air quality concerns, maintenance difficulties, and a premature degradation period. Allergens (pigpen effect), biological growth, and indoor air quality are of great concern therefore a minimum carpet standard is in place and shall be adhered to by all parties.

09 91 00 PAINTING

- Materials shall be top-of-the-line products by firms with over 5 years manufacturing experience with a full product line. Prime coats and finish coats for any 1-paint system shall be the products of the same manufacturer.
- Paint products shall be low or zero VOC, low odor type, where available for the type of paint required.
- Backprime all wood installed against steel, concrete, plaster, or tile, and all wood with surfaces exposed in exterior locations.
- A single color matching walls and ceilings shall be used on all surfaces. Visible surfaces behind vents, grilles, etc., shall be painted flat black. Insides of all drawers, shelves inside cabinets, and other wood surfaces where scheduled or noted shall be given one coat of clear gloss lacquer, or clear polyurethane-base varnish.
- Manufacturer: As approved by District
- Color: As approved by District
- Finish: Walls - eggshell (not flat), semi-gloss at wet areas
Ceilings - flat, semi-gloss at wet areas
- After the completion of the project, before final payment, a color chart of all colors and the locations will be provided to the District FP+D. The paint contractor upon completion of the project will provide to the District a floor plan of the area (building) showing all areas that have been painted with a legend identifying what colors are on what walls, door, trim and any other surfaces that were painted. In addition to the floor plan the contractor will also provide to the District a draw down with paint formula for each color and gloss used to paint the building. The draw downs will be 8.5 by 11 inches and presented in a notebook.
- Contact information on the painting contractor, including name and phone numbers will be provided to the District FP+D for future reference.
- The District prefers including the project color schedule in the bid documents. District approval of the color schedule is required prior to its incorporation into the project.

EXTERIOR

- Color integral exterior cement plaster stucco finish shall be used in conjunction with paint finish. Color plaster finish coat shall be a minimum of 1/8 inch thick.

09 91 00 PAINTING (continued)

EXTERIOR

- Classrooms/hallways that have been painted shall have a 2-Coat Semi-Gloss finish. Also, provide 3-Coats if industrial grade semi-gloss finish for high traffic trim and doors.
- Use only one color for custodial and supply rooms, closets, storage, and other utility type spaces.
- Confirm that gypsum wall finish is at least a Level 4 finish. Provide Level 5 finish at high traffic areas like lobbies

09 96 00 HIGH-PERFORMANCE COATINGS

- Graffiti-resistant coatings:
  - Provide at a minimum 9’-0” height at all exterior walls in public areas. Preferable to align with reveal, construction joint or other architectural feature to conceal edge.
  - Silicone-based at concrete/CMU surfaces
  - 2-part aliphatic polyurethane clear coats at painted surfaces

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Div 10
SPECIALTIES

10 11 00 VISUAL DISPLAY UNITS

- Markerboards
  - Porcelain enamel-on-steel writing surface
  - Claridge LCS-II “low gloss” with satin anodized aluminum
  - Color: white

- Tackboards
  - Natural cork
  - Claridge Tackboards with satin anodized aluminum frame

- Accessories
  - Maprail
  - Hooks
  - Tray/marker rail

10 11 16 MARKERBOARDS

- In schools, offices and industry, the whiteboard, or dry erase board, has become an important tool for teaching and training processes. With the addition of computers to the classroom and office, chalk dust from the old chalkboards became troublesome to the keyboards, hard drives and monitors of computers, as well as to those people who suffered from allergies. Due to necessity and convenience, whiteboards are now a more popular alternative to chalk.
- NOTE: use steelbackground which allows for magnets to be applied to them.

10 14 16 PLAQUES

- Each new Campus building shall have a Bronze Project Team Recognition Plaque including the names of the Board of Trustees and LEED information as directed by the District Architect.

10 21 13 TOILET COMPARTMENTS

- Manufacturer: Legacy
- Color: to be determined on a project-by-project basis
- Material: Solid Plastic
  - Floor to Ceiling Pilaster and Urinal Screens w/ floor to ceiling pilaster
  - Integral Hinge system
  - Stainless steel or polymer to match continuous wall brackets
  - Integral Privacy System
- Coordinate brackets and fasteners with tile wainscot and wall system to ensure an even substrate for anchorage
- Stainless steel or polymer to match pilaster shoes
- Heat strip on bottom of all panels and doors

10 22 19 DEMOUNTABLE PARTITIONS

- Consider demountable partitions when frequent changes (such as office areas) are expected.
- Selection of system to also be based on long-term availbility of components and finishes.
- Carefully establish and coordinate electrical and communications requirements.
- Include also the engineering and anchoring of all lateral bracing, which is to be independent of, or coordinated with, metal suspension systems for ceilings.

10 26 13 CORNER GUARDS

- Material: Brushed satin stainless steel
- Size: 2” wing
- Installation: Double back tape
- Location: At heavy use corridors and areas subject to abuse

10 28 13 TOILET ACCESSORIES

- Numbers refer to keynotes on drawings in *Section 9: Space Standards, Part K - Toilet Rooms.*
- OFCI: Toilet accessories to be provided by the District/College, Contractor Installed.
- At Norco College, black is the standard color. for OFCI items
- Provide theft resistant fasteners for all accessory mountings.

DESCRIPTION		
Waste receptacle		
6	Freestanding waste receptacle Manufacturer: Bobrick Model: B-2300 Mount: Freestanding Finish: Stainless steel	
Hand dryer - as approved by College		
7	Hand dryer - recess-mounted, rapid dry electric Manufacturer: Excel Dryer Model: Xlerator with recess kit Mount: Recessed Finish: Stainless steel Manufacturer: Dyson Model: Airblade NSF AB02 Mount: Surface Finish: Aluminum	 
Toilet seat cover dispenser		
8	Toilet seat cover dispenser Manufacturer: OFCI Model: OFCI Mount: Surface Finish: To be determined on a project-by-project basis	

10 28 13 TOILET ACCESSORIES (CONTINUED)

DESCRIPTION		
Paper towel dispenser		
9	Paper tower dispenser Manufacturer: OFCI Model: OFCI Mount: Surface Finish: To be determined on a project-by-project basis	
Toilet tissue dispenser		
10a	Jumbo roll toilet tissue dispenser - surface mount Manufacturer: OFCI Model: OFCI Mount: Surface Finish: To be determined on a project-by-project basis	
10b	Combination toilet seat cover and toilet tissue dispenser Manufacturer: Bobrick Model: B-3474 Mount: Recessed Finish: Stainless steel *At accessible stalls only (Men)	
10c	Combination toilet seat cover, sanitary napkin disposal, and toilet tissue dispenser Manufacturer: Bobrick Model: B-3574 Mount: Recessed Finish: Stainless steel *At accessible stalls only (Women)	
10d	Combination toilet seat cover and toilet tissue dispenser Manufacturer: Bobrick Model: B-3471 Mount: Partition Finish: Stainless steel *At semi-ambulatory stall only (Men)	

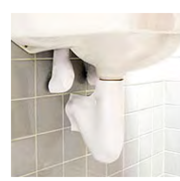
10 28 13 TOILET ACCESSORIES (CONTINUED)

DESCRIPTION		
Toilet tissue dispenser (continued)		
10e	Combination toilet seat cover, sanitary napkin disposal, and toilet tissue dispenser Manufacturer: Bobrick Model: B-3571 Mount: Partition Finish: Stainless steel *At semi-ambulatory stall only (Women)	
10f	Combination toilet seat cover and toilet tissue dispenser Manufacturer: Bobrick Model: B-3479 Mount: Surface Finish: Stainless steel *At accessible stalls only (Men) when recessed is <u>not</u> an option	
10g	Combination toilet seat cover, sanitary napkin disposal, and toilet tissue dispenser Manufacturer: Bobrick Model: B-3579 Mount: Surface Finish: Stainless steel *At accessible stalls only (Women) when recessed is <u>not</u> an option	
Soap dispenser		
11	Soap dispenser Manufacturer: OFCI Model: OFCI Mount: Surface Finish: To be determined on a project-by-project basis	

10 28 13 TOILET ACCESSORIES (CONTINUED)

DESCRIPTION		
Mirror		
12	Mirror Manufacturer: Bobrick Model: B-290 (welded frame mirror) Mount: Surface Finish: Stainless steel Size: 18”x36”	
Napkin/tampon vendor		
13	Napkin/tampon vendor Manufacturer: Bobrick Model: B-37063 Mount: Recessed Finish: Stainless steel	
Sanitary napkin disposal		
14a	Sanitary napkin disposal Manufacturer: Bobrick Model: B-254 Mount: Surface Finish: Stainless steel *At standard partition stalls	
14b	Sanitary napkin disposal Manufacturer: Bobrick Model: B-353 Mount: Recessed Finish: Stainless steel * If necessary	
Grab bar		
15a 15b	Horizontal grab bar Manufacturer: Bobrick Model: B-6806 series Mount: Surface Finish: Stainless steel * Provide lengths as required * Avoid use of wraparound grab bars for ease of construction	

10 28 13 TOILET ACCESSORIES (CONTINUED)

DESCRIPTION		
Diaper changing station		
16a	Diaper changing station Manufacturer: Bobrick Model: KB110-SSRE Mount: Recessed Finish: Stainless steel	
16b	Diaper changing station Manufacturer: Bobrick Model: KB110-SSWM Mount: Surface Finish: Stainless steel *If necessary	
Hooks		
17	Coat hook with bumper Manufacturer: Bobrick Model: B-212 Mount: Surface Finish: Stainless steel * 2 coat hooks per stall standard	
Underlavatory guards		
	Underlavatory guard, molded vinyl covering Manufacturer: IPS Corporation Model: Soft Guard Plus Mount: N/A Finish: White * Avoid use if using specified lavatory - see *Section 16: Fire Protection + Plumbing: Division 22*	
Utility shelf/holder		
	Utility shelf with mop/broom holder and rag hooks Manufacturer: Bobrick Model: B-239 Mount: Surface Finish: Stainless steel	

10 44 13 FIRE EXTINGUISHER CABINETS

- Fire Extinguisher Cabinets
  Manufacturer: Potter Roemer
  Model: "Dana" 7250-7265 series, stainless steel, with duo-vertical panel with rolled radius return, provide fire rated as required
  Mount: Recessed
  Finish: #304 stainless steel with #4 finish
  Lettering: Vertical ascending in red (-VAR)

- Valve Cabinet
  Manufacturer: Potter Roemer
  Model: "Dana" 8260-8265 series, stainless steel, with duo-vertical panel with rolled radius\ return, provide fire rated as required
  Mount: Recessed
  Finish: #304 stainless steel with #4 finish
  Lettering: Red (-RH)

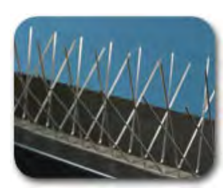
10 51 30 WOOD, PLASTIC, AND LAMINATE LOCKERS

- Manufacturer: As approved by District
- Model: As approved by District
- Size: As approved by District
- Mount: Surface
- Material: Solid Plastic
- Color: As approved by District
- Locking Mechanism: ADA

* Provide slope tops, end panels, and base

10 81 13 BIRD CONTROL DEVICES

- Manufacturer: Bird Barrier
- Model: Dura-Spike
- Size: 3'-0" long lengths
- Mount: Glue or screw base to any surface
- Finish: Stainless Steel
- Location: Ledges, parapet caps, roof peaks, chimneys



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Div 11
EQUIPMENT

11 12 00 PARKING CONTROL EQUIPMENT

- Manufacturer: Ventek International
- Model: System VI
- Mount: Pedestal

DISTRICT TO CONFIRM

11 53 00 LABORATORY EQUIPMENT

- Manufacturer shall have at least 5 years experienec in the fabircation of the specified equipment and shall have 10 installa tions of equal or larger size

Div 12

FURNISHINGS

12 24 13 ROLLER SHADES

- Manual operating, double solar and room darkening blackout shades, independent operation
- Manufacturer: Mechoshades
- Shadecloth: Thermoveil 1600 medium vertical weave, 5-6% openness factor
- Blackout material: 0700 group fiberglass-coated fabric
- Location as approved by District

12 30 00 CASEWORK

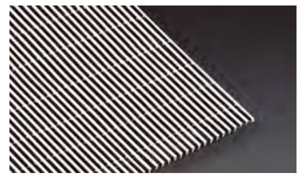
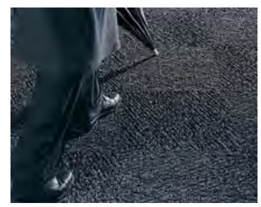
- See Division 6

12 36 00 COUNTERTOPS

- Solid surface
- Epoxy
- Stainless steel
- Or other material approved by District
- Recycled-Glass Concrete
- Synthetic Cast Slabs
- No plastic laminate
- Integral curb
- Edge: Squared self edge

12 48 13 ENTRANCE FLOOR MATS AND FRAMES

- Employ permanent entryway systems to capture dirt, particulates, etc. from high volume building entries.

DESCRIPTION	
Manufacturer: Construction Specialties Pedisystems Model: Gridline G6 1-1/8" Gridline Size: As approved by District Mount: Recessed Finish: Satin finish stainless steel type 304 Location: Exterior	
Manufacturer: Lee's Model: FirstStep Modular Tile L8513 Size: 24" x 24" Mount: N/A Installation: Monolithic or vertical/brick ashlar Finish: Tufted carpet Location: Interior	

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Div 13
SPECIAL CONSTRUCTION

This section is not applicable at this time.

Div 14

CONVEYING EQUIPMENT

REFER to Section 15 for specification sections

Div 21
FIRE SUPPRESSION

REFER to Section 16 for specification sections

Div 22
PLUMBING

REFER to Section 16 for specification sections

Div 23

HEATING, VENTING, AND AIR CONDITIONING (HVAC)

HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

REFER to Section 17 for specification sections

Div 25

INTEGRATED AUTOMATION

REFER to Section 18 for specification sections

Div 26

ELECTRICAL

REFER to Section 18 for specification sections

Div 27

COMMUNICATIONS

27 53 13 CLOCK SYSTEMS

- Manufacturer: Primex Wireless
- Product: SNS Metal Series Analog Clocks
- Finish: Contemporary Brushed Aluminum Frame with Glass Lens
- Face: M (Metro)
- Metal Series:
    - Battery: SNS4Z180 PoE: SNS5Z180 Description: 12.5” Silver Tone
    - Battery: SNS4Z227 PoE: SNS5Z227 Description: 15” Silver Tone, Dual-Sided

Clock Specifications:

A. Automatically adjust for Daylight Savings Time
B. Clock Lock availble on most models features two uniquely shaped hangers that require a sequence of movements to install and remove the clock.
C. Configuration is accomplished via the on-board Web-server or remotely using the SNS AMP software.

PoE Models:

A. 802.3 at/af compatible
B. Optional batter back-up (4D cells, not included)

Dual-Sided Models:

A. Mount to wall or ceiling
B. Ideal for hallway applications to view from many angles
C. Easy to assemble
D. 15” diameter
E. Brushed aluminum bezel, acrylic bracket and polycarbonate lens

REFER to Section 10 for additional specification sections

Div 28
ELECTRONIC SAFETY AND SECURITY

REFER to Section 14 for specification sections

Div 31

EARTHWORK

REFER to Section 5 for specification sections

Div 33

UTILITIES

REFER to Section 3 for specification sections

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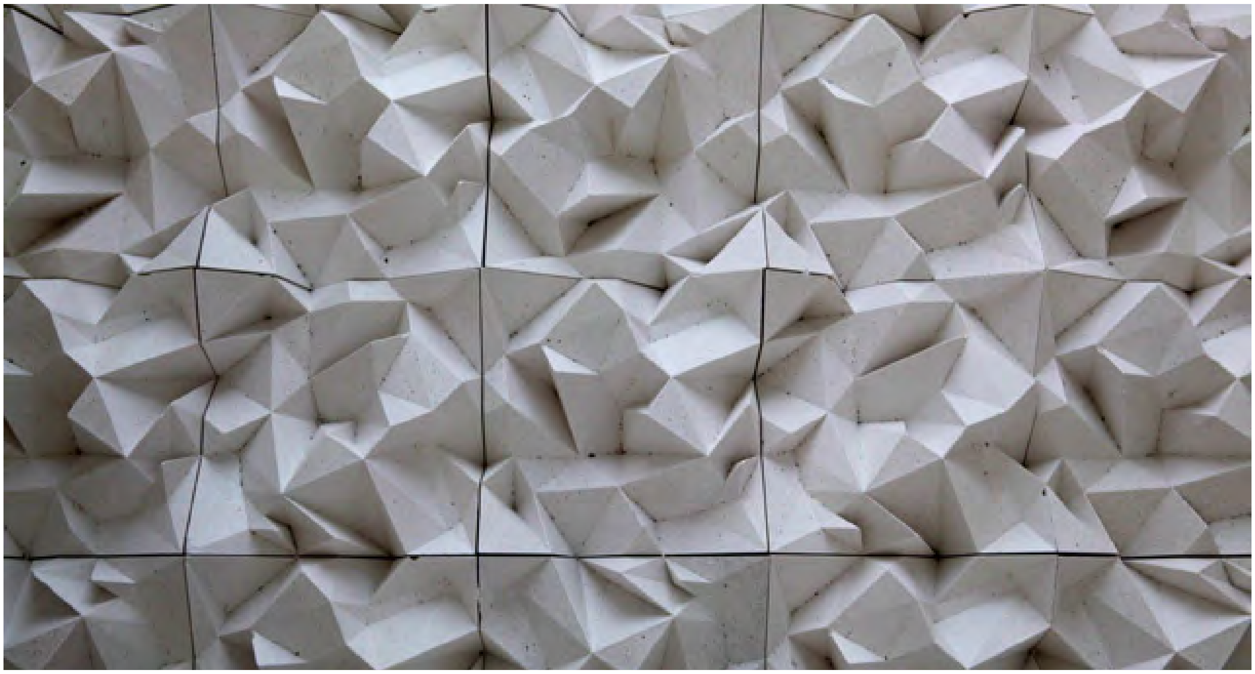
20 ACOUSTICAL + SOUND ISOLATION



INTRODUCTION

The main purpose of establishing acoustical and sound isolation guidelines is to provide acoustical performance criteria that will ensure that the acoustical environments in Riverside Community College District (RCCD) classrooms, lecture halls, and other learning spaces are of high quality for the majority of instructors and students.

In particular guidelines ensure that excellent verbal communication is possible between students and teachers. This is achieved by ensuring, at all seats, sufficiently high levels and sufficiently low noise levels, as well as appropriate reverberation. Spaces with acoustical environments that do not meet these criteria would be expected to present barriers to teaching and learning.

Until this chapter is completed, refer to:

American National Standard (ANSI/ASA S12.60-2010/Part 1) Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Part 1: Permanent Schools.

Note: the current scope of this Handbook does not include development of comprehensive acoustical + sound isolation design guidelines. In the future, it is highly recommended that this section be completed.

Furthermore, it is recommended that the design team retain the services of a qualified acoustical consultant to assist in complying with the guidelines. Such an individual should be experienced with the acoustical requirements for a wide range of higher educational facilities.

END OF SECTION 20