



**Santiago  
Canyon  
College**

MAY 2011



# 2011 FACILITIES MASTER PLAN

SANTIAGO CANYON COLLEGE • RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT



SANTIAGO CANYON COLLEGE  
2011 FACILITIES MASTER PLAN  
RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT



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## MISSION AND GOALS

### Mission Statement

Santiago Canyon College (SCC) is a diverse learning community dedicated to intellectual and personal growth. Our purpose is to foster a learning environment that helps students develop knowledge and understanding, critical thinking, sound decision making, cultural awareness, effective communication skills, and a commitment to local and global citizenship.

Santiago Canyon College offers a comprehensive curriculum that includes university transfer, associate degree and certificate programs. In addition, we provide community services, career education, continuing education, high school diploma program, basic skills development, and a range of support services for full and part-time students, including those with family and career responsibilities. At SCC we encourage students to plan, implement, and evaluate their educational progress through meaningful reflection and interaction with both the college and community.

## Goals

- Promote a learning community environment that is innovative, student-centered, and celebrates student achievement.
- Increase access and retention for completion of programs, including transfer, vocational, and high school diploma programs, and prepare students for success in their academic, career, and personal life endeavors.
- Implement facilities master plans and incorporate “green” efforts into facilities development and other efforts where possible and cost-effective.
- Promote flexible, cost-effective educational programs and services, including the use of cutting-edge technology and educational program delivery via technology.
- Pursue alternative funding sources to implement the district’s vision and goals, and encourage the foundations to create plans for capital campaigns and alumni association development.
- Maintain a positive, productive working environment for employees, recognizing and embracing diversity, and enhancing staff development opportunities that address innovation and technology.
- Expand partnerships with business, labor, community groups, universities, schools, and other public agencies in order to ensure student access and success, ensure robust economic development programs, and be responsive to workforce development needs and high demand career fields.
- Assess the educational needs of the communities we serve, and enhance awareness of the colleges, and community involvement through outreach and advocacy among community constituencies and leaders.



## LETTER FROM THE PRESIDENT



Santiago Canyon College's history began over 35 years ago when the residents of the City of Orange agreed to a self-imposed tax used to purchase 30 acres of land in East Orange. In 1985, the doors opened to the Orange Campus of the Rancho Santiago College. In 1996, the Board of Trustees of the Rancho Santiago Community College District announced its intention to make the Orange Campus a separate college. Soon after, the new college was named Santiago Canyon College (SCC), and its sister college assumed its former name of Santa Ana College, thus creating a multi-college district. In January, 2000, Santiago Canyon College became a fully accredited community college.

During the past few years, the college has experienced tremendous growth in enrollment; it now has close to 12,000 students per semester, making us one of the fastest growing community colleges in the state. In response to such increased demand, the Rancho Santiago Community College District acquired for SCC's campus the remaining acreage bordered by Santiago Canyon Road to the north, Jamboree to the east, Chapman Avenue to the south and Newport Avenue to the west.

In 2002, the residents served by the district passed Bond Measure E providing resources needed to implement our initial facilities master plan, paving the way for a student services/instructional building, a state-of-the-art library, a science center, a humanities building, gymnasium and additional parking for our increasing student body. In 2010, the SCC Facilities Committee, with the assistance of HMC Architects, developed a new facilities master plan, which will help direct the completion of SCC's physical plant and provide the environment that supports its excellent education programs.



The SCC Facilities Committee includes representatives from faculty, classified staff, students and administrators. It is our belief that this plan supports the goals and objectives enumerated in the Educational Master Plan. The Santiago Canyon College family is excited to participate in developing a campus that students and the surrounding community can utilize and celebrate for years to come.

Our thanks to all who participated in the facilities master planning process and creation of this document.

Sincerely,

A handwritten signature in black ink that reads "Juan A. Vázquez". The signature is written in a cursive style with a large, prominent initial "J".

Juan Vázquez  
President  
Santiago Canyon College

February 2011



# Introduction



## INTRODUCTION

### Purpose

The 2011 Santiago Canyon College Facilities Master Plan has been created to serve as a guide for future campus development. It provides a graphic and narrative description of the College's strategy to support the initiatives of the 2007-2012 Educational Master Plan, address the growth in enrollment that is anticipated for the next decade, and position the college to maximize state funding opportunities.

The Master Plan includes recommendations for future development, including renovations and replacement of facilities and site improvements. A Central Plant Study is part of the plan and was developed to investigate the potential to improve the energy efficiency of heating and cooling the campus facilities.





## Master Planning Process

The HMC Planning Team worked in close collaboration with the Facilities Committee, comprised of key faculty, staff, administrators and student representatives. The planning process included a series of meetings with the Facilities Committee, as well as additional presentations and discussions to broaden the planning perspective and enhance acceptance by the College community.

At the start of the planning process, a set of goals was developed to guide the planning process and to measure its success. During the planning process, the committee reviewed the analysis of the existing conditions, evaluated a series of development options, and made the decisions that led to the development of the facilities master plan recommendations.

## Document Organization

The 2011 Facilities Master Plan describes a plan for site and facilities improvements that will support current and future needs at Santiago Canyon College. The document is organized into the following sections.

- i. Recommendations
- ii. Existing Conditions
- iii. Appendix





# Recommendations



The Santiago Canyon College campus is in the process of being transformed through the construction of new facilities funded through the Measure E Bond Program and the state Community College Capital Outlay Program. Additional facilities are in the capital outlay planning process. The 2011 Facilities Master Plan includes the projects that are under construction, as well as those in the planning pipeline. The campus with its existing facilities and these projected facilities served as the starting point for the planning of future development.

The Facilities Master Plan drawings presented in this section describe an overall picture of the future developed campus, and include recommendations and descriptions of the following.

- New Construction
- Renovations
- Site Improvements
- Phasing Plans



SANTIAGO CANYON

## Master Plan Project Goals

The Facilities Master Plan addresses the College's primary goals, as identified during the planning process.

### Provide Facilities to Meet Future Needs

- Plan to accommodate the future student population
- Replace temporary buildings with permanent space
- Replace aging facilities
- Renovate facilities to address program needs
- Provide flexible interdisciplinary use of space for efficiency
- Plan facilities and infrastructure for green operations

### Improve Access to Learning

- Meet the demand for parking capacity
- Improve mass transportation service
- Provide a safety office near the main entry
- Continue technological advancements

### Enhance the Campus Environment

- Provide convenient student services
- Improve food services and the bookstore
- Provide places to hang out, study and socialize
- Provide spaces for indoor and outdoor assemblies and functions



## Master Plan Recommendations

The 2011 Facilities Master Plan for Santiago Canyon College presents a guide for future development that is based on the College's 2007-2012 Educational Master Plan and addresses the current and projected needs through the year 2020. The Facilities Master Plan Recommendations are intended to address a projected enrollment of 12,934 students.

It is important to understand that, for planning purposes, the exact year in which projected "build-out" is achieved is not critical. What is critical is that the trend in student enrollment will be recognized and instructional programs, support services, facilities and staffing is master planned to be responsive when that level of enrollment is ultimately achieved.

Although the drawings in the Plan appear specific, the design is intended to be a conceptual guide, conveying the location and purpose of improvements. The detailed programming and design of site and facility project will take place as they are funded. Detailed programming for new construction and renovations projects will address specific needs for space. Notable among these is the need for permanent instructional facilities to house the Business Career Technical Education Division, the Mathematics Department and the Social Sciences Departments.

A series of facilities planning priorities were established to serve as a foundation of good planning practices and a guide to the development of the recommendations. The following is a summary of the priorities.







## Facilities Planning Priorities

### Maximize functional space

- Renovate facilities
- Address program needs

### Eliminate non-functional space

- Remove temporary buildings
- Replace aging facilities

### Improve efficiency/utilization of facilities

- Consolidate related programs
- Create flexible, interdisciplinary spaces

### Enhance the campus environment

- Create gathering spaces to support collaboration
- Develop clear pedestrian connections

### Right- size the campus to address program needs

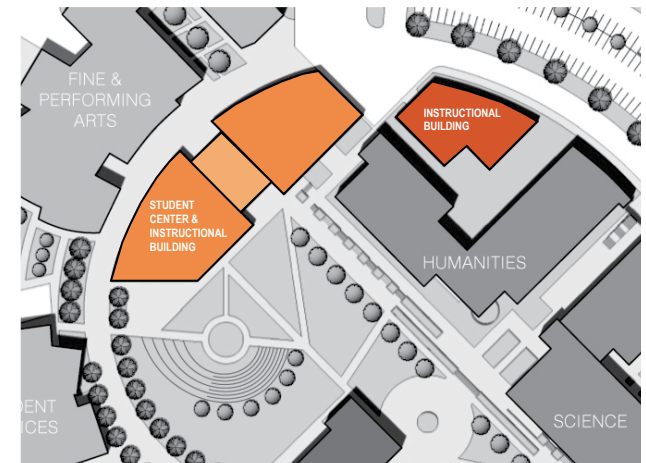
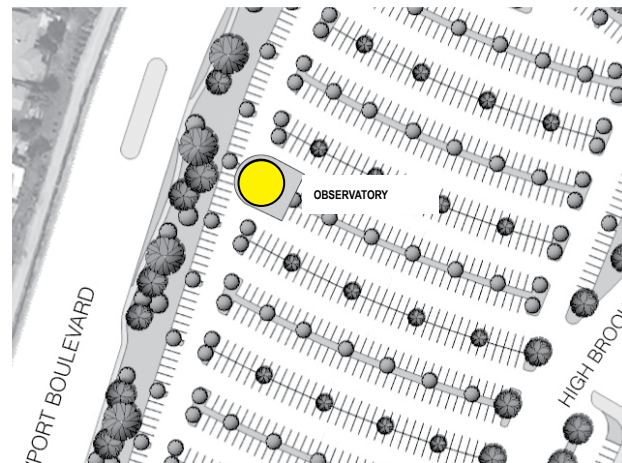
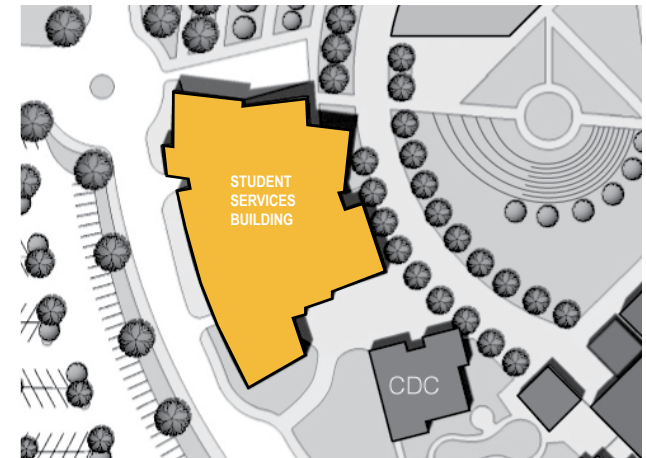
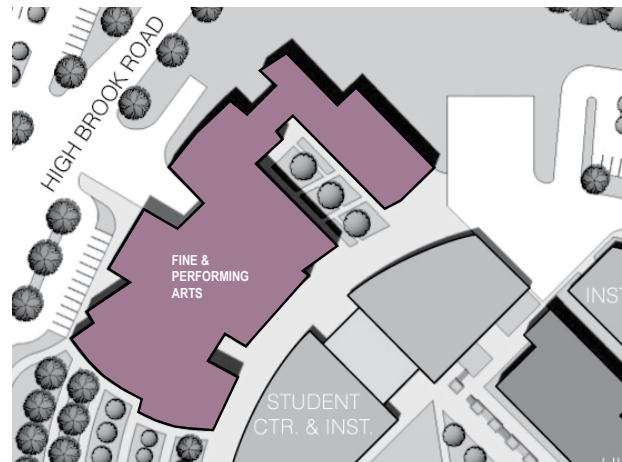
- Align the projected space inventory with state guidelines
- Position the College to maximize funding from local, state and federal sources, and to seek opportunities for partnerships with community organizations



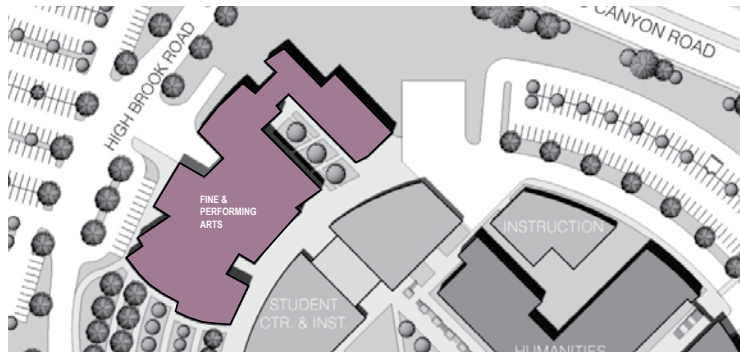
## NEW CONSTRUCTION PROJECTS

The recommendations for new construction projects are included on the following pages.

- Fine and Performing Arts Building
- Student Services Building
- Observatory
- Student Center and Instructional Building
- Instructional Building





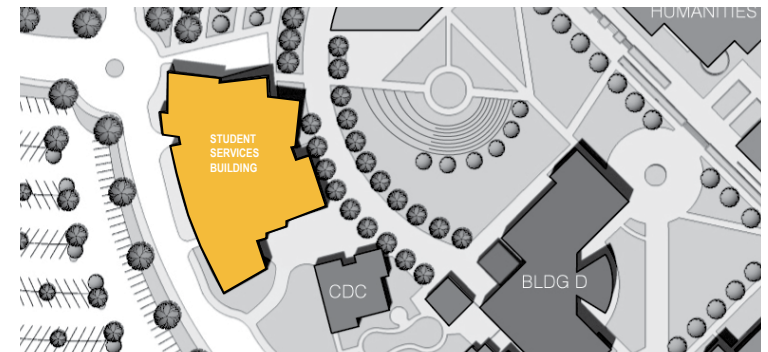


### Fine and Performing Arts Building

The new Fine and Performing Arts Center will provide performance, exhibition and specialized instructional space that is currently lacking at the college.

It will consolidate the current fine and performing arts facilities into this new location and provide opportunities to expand programs to support the Educational Master Plan. The new center will be a highly visible destination for the College and community on the northwest side of the campus. Along with the Student Services Building, it flanks a gateway plaza into the campus core, welcoming users from the newly developed campus entrance. Adjacency to the campus drive will facilitate passenger loading and service vehicle access. Direct access to exterior courtyards will enhance options for outdoor art instruction and display.

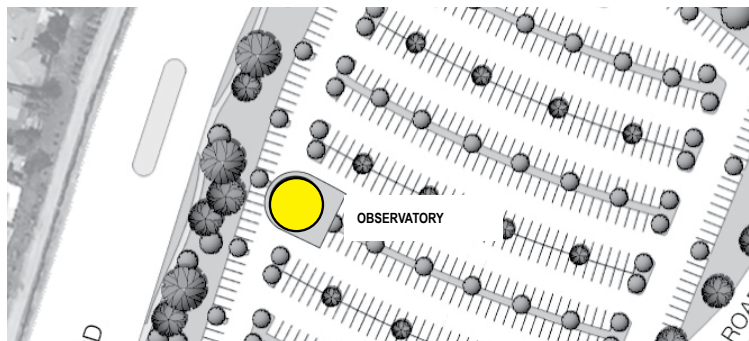
**Secondary Effects: Spaces in Buildings D and E will be vacated**



### Student Services Building

This building will centralize student services functions into one location and create a welcoming gateway to the college. Its prominent entry location will welcome visitors and new students seeking assistance for the first time, and provide convenient access to student services functions. Along with the Fine and Performing Arts Building, it creates a gateway plaza into the campus core. The two story building will be designed to negotiate the transition between the higher parking and the lower building zones, providing accessible pathways into the campus core. Its proximity to the Student Center and Instructional Building places student services at the focus of student activity.

**Secondary Effects: Spaces in Buildings A and E will be vacated**

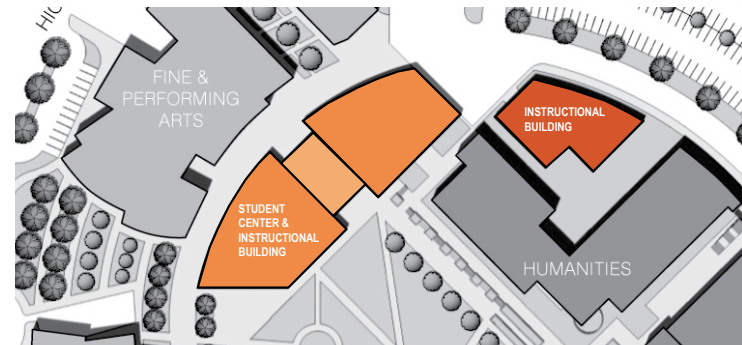


## Observatory

The site is being readied for the future construction of this facility with the installation of utility connections during the construction of the parking lot. This work is part of the Humanities Building and Gymnasium construction project.

## Central Plant

The Central Plant project will provide chilled water to cool most of the conditioned spaces on campus, and saving money and energy by taking advantage of cooling load diversity and off-peak production. It is estimated to reduce campus electrical consumption by 40%. This facility will include a small building, the thermal energy storage (TES) tank, the chilled water distribution pipe loop, and the adaptation of existing building mechanical equipment. The pipe loop will be built under the campus drive. The location of the building and TES tank will be determined during design.



## Student Center & Instructional Building

The project will provide student activity, food service, and bookstore facilities, as well as instructional space. Existing Building A will be removed. The two story building is oriented to be a topographic transition element. The upper story will approximate the level of the Fine and Performing Arts Building, provide instructional space for the Arts as well as other disciplines, and creating a courtyard between these two buildings which would support outdoor art instruction. The lower story will approximate the first floor of the Humanities Building, creating a second edge for the central quadrangle. Spaces facing the entry court and Quadrangle will have community uses and provide entrances and windows opening onto these outdoor spaces. Deliveries and waste handling will be accommodated in a service yard at the end of the campus drive. The food service and bookstore facilities will be designed for direct and convenient access to the service yard. An exterior pass through courtyard will provide circulation from the main quadrangle to the Fine and Performing Arts Building. This courtyard will incorporate terraced patios for outdoor dining along a stepped transition to the upper level courtyard.

## Instructional Building

This two story building will provide instructional space. Adjacent to the service yard at the end of the campus drive, it will be well positioned to house specialty labs needing access to service vehicles. Care will be taken to integrate this building into the existing courtyard of the Humanities Building.

## RENOVATION PROJECTS

Santiago Canyon College is a relatively new institution; however a number of buildings will be entering their third decade of service soon. Advances in energy efficiency and educational technology, evolving programs and secondary effects contribute to the need for renovation and repurposing. The following buildings have been identified for repurposing and renovation.

Following the priority to improve the efficiency and utilization of facilities, the renovation of Buildings D and E will offer the opportunity to consolidate related programs and create state-of-the-art facilities for flexible, interdisciplinary spaces such as the Math Study Hall and the Academic Success Center.

- Building D
- Building E
- Child Development Center



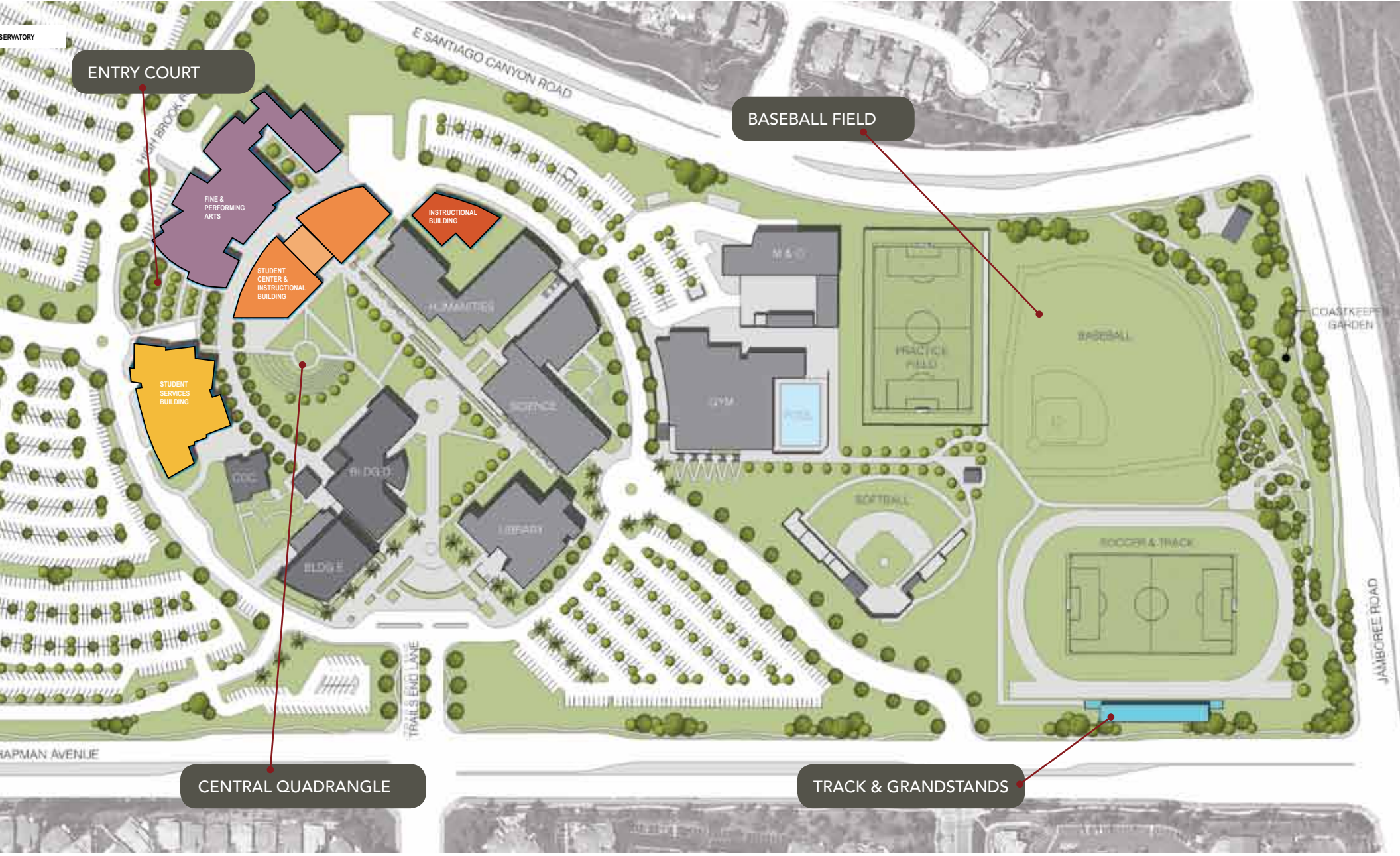


## SITE IMPROVEMENTS

- Entry Court
- Campus Quadrangle
- Baseball Field
- Track and Grandstands







## Entry Court

This courtyard will be a gateway welcoming visitors to the campus core. It will also serve as a grand arrival plaza for visitors to the Fine and Performing Arts Building and the Student Services Building. It will accommodate activities flowing out of the surrounding buildings. Accessible parking and passenger loading zones for cars and buses will be provided. The design will ease the transition in grade level from the campus drive to the Central Quadrangle using well integrated steps and ramps. The landscaping will partially screen, and provide a preview of the Central Quad.



## Central Quadrangle

The College's planning goals to enhance the campus environment and improve access has guided the revisioning of the space at the campus core. The removal of Building B allows for a well proportioned space that enhances pedestrian circulation between the buildings at its edges. Pedestrian circulation from the perimeter parking flows into the Quad at both ends of the Student Services Building. A new arced wall visually screens the yard of the Child Development Center. The edge of the Quad at the Student Center and Instructional Building, as with the Humanities and the Science Buildings, will be defined by a stepped transition to the raised building pad, providing a plinth for perimeter circulation and space for outdoor activities that flow out of the adjacent building. The Quad will provide open level space to accommodate large outdoor functions and performances. Wind resistant canopy trees will provide filtered shade on warm days. Trees will be appropriately scaled to the space and surrounding buildings. Seating for



study, eating, socializing, resting will invite students to remain on campus. Outdoor instruction will be accommodated with appropriate spaces, plantings and signage. The fire access will be extended as required.



### Recommendations:

- Amphitheater
- Open level space for large functions
- Raised, pedestrian scale "street front" at building edges
- Science Garden

## Baseball Field

The baseball field, bleacher seating and support facilities will occupy a place on the upper tier of the campus topography. It will be designed to fit in a space constrained by the Coastkeeper Demonstration Garden, the path to the garden and the Irvine Ranch Water District easement. Given these constraints, there is one available option for the orientation of the field. The athletic fields are the most impacted during Santa Ana wind conditions. Wind and solar exposure must be considered in the final programming and design.

## Track and Grandstands

A track will be added around the existing soccer field. To enable use of the field for spectator events and College functions, grandstands will be built on the south side of the track, a location with a potential for high visibility to the community. As with the Baseball Field, wind and solar exposure must be considered in the final programming and design.



## PHASING PLANS

The projects in the Plan are grouped into three construction phases as shown on the following pages. The final order and timing of construction will be determined by specific priorities and funding opportunities.

# PHASE 1

## Phase 1 Projects

- Fine and Performing Arts
- Student Services Building
- Entry Court
- Building D Renovation
- Observatory





PHASE  
2

Phase 2 Projects

- Student Center and Instructional Building
- Building E Renovation







PHASE

3

**Phase 3 Projects**

- Instructional Building
- Child Development Center Renovation
- Central Quadrangle
- Baseball Field
- Track and Grandstands





CENTRAL QUADRANGLE

BUILDING C - CHILD DEVELOPMENT CENTER

TRACK & GRANDSTANDS

INSTRUCTIONAL BUILDING

BASEBALL FIELD



# Existing Conditions

EXISTING CONDITIONS





## EXISTING CONDITIONS

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Opened in 1985 as the Orange Campus, the second campus of Rancho Santiago Community College, Santiago Canyon College became a full-accredited college in 2000. The campus has grown to 82 acres, and occupying most of the land bounded by Jamboree Road, East Chapman Avenue, Newport Boulevard, and East Santiago Canyon Road. The building inventory has grown to over 356,000 square feet and continues to grow. Most recently, the Science building opened in Fall 2010, and construction of the Humanities Building, Gymnasium, and Swimming Pool are in progress.

## COMMUNITY CONTEXT

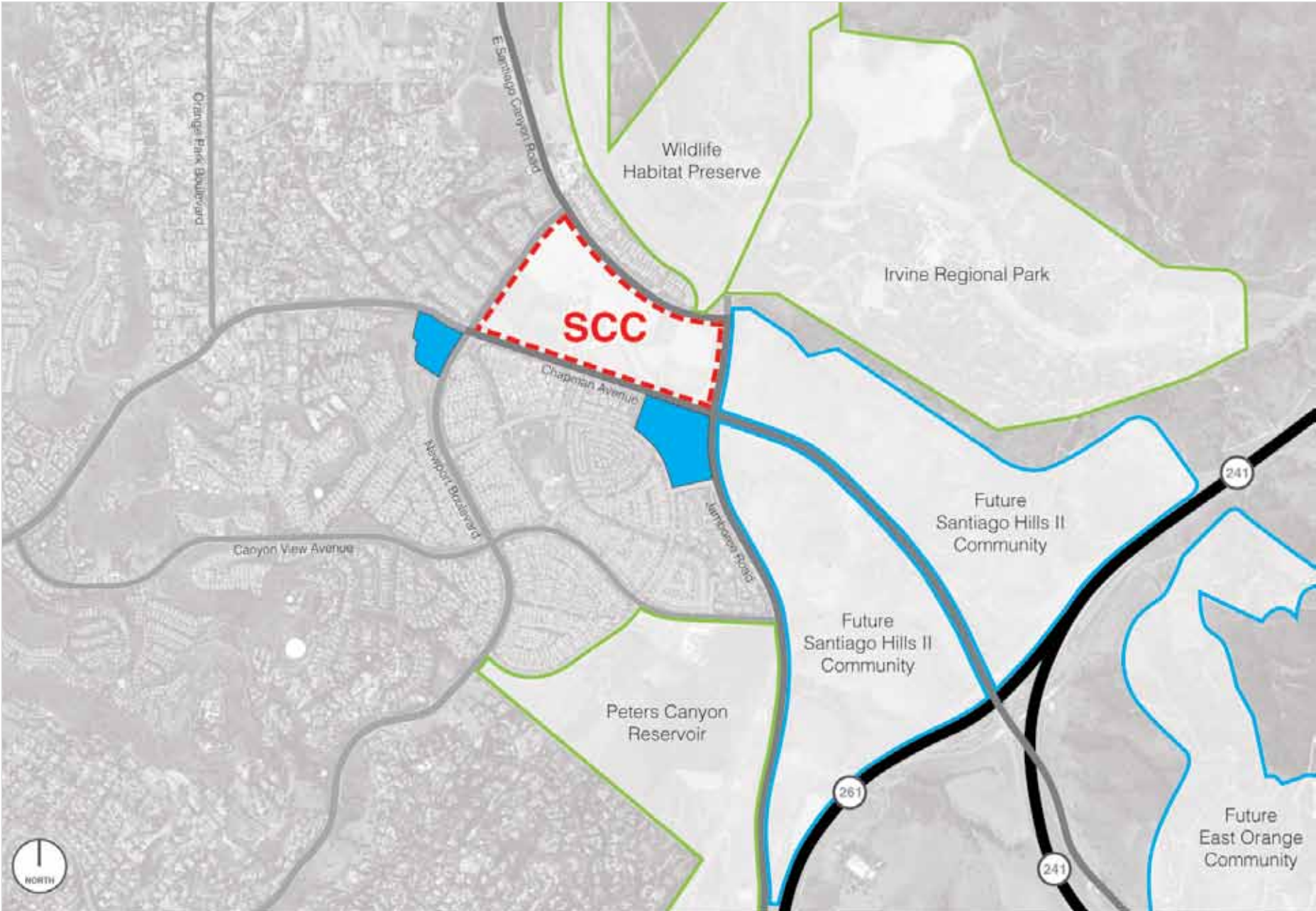
Santiago Canyon College is located in Santiago Canyon in the foothills of the Santa Ana Mountains. It is located where suburban development at the eastern edge of the City of Orange gives way to undeveloped land, parkland and wildlife preserves. New residential communities are planned for the adjacent undeveloped land, although the District does not anticipate a large increase in enrollment from these communities.

### Observations:

Although its canyon location seems remote, SCC is connected to surrounding population centers, and has been attracting more students from Riverside County, who arrive on Santiago Canyon Road via the Imperial Highway.







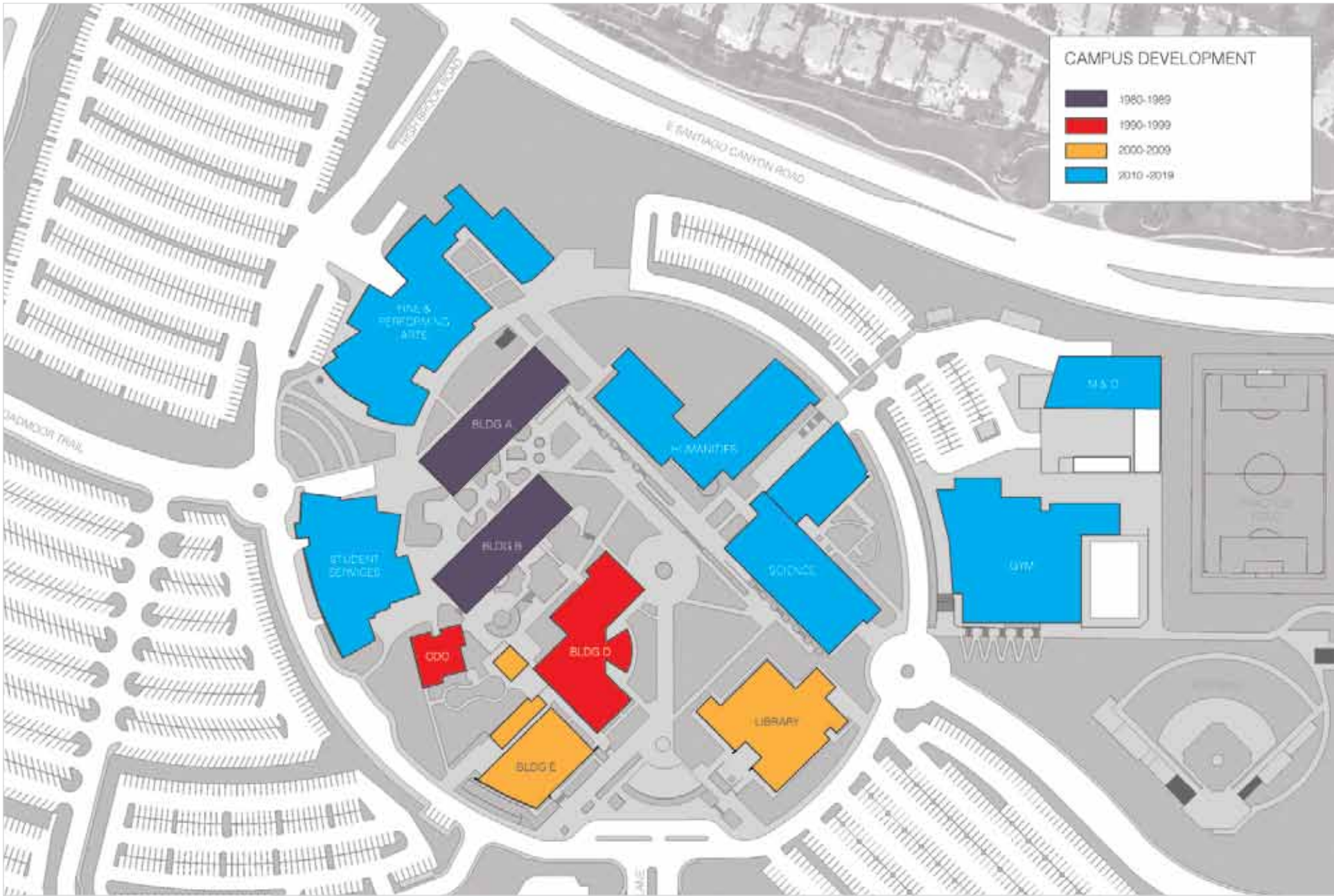
## CAMPUS DEVELOPMENT HISTORY

The campus was opened in 1985 and is undergoing a major building program that is being funded in part by Measure E bonds.

### Observations:

The oldest buildings and courtyards, which are located at the core of the campus, are very different in scale, materials and design from the newer facilities.





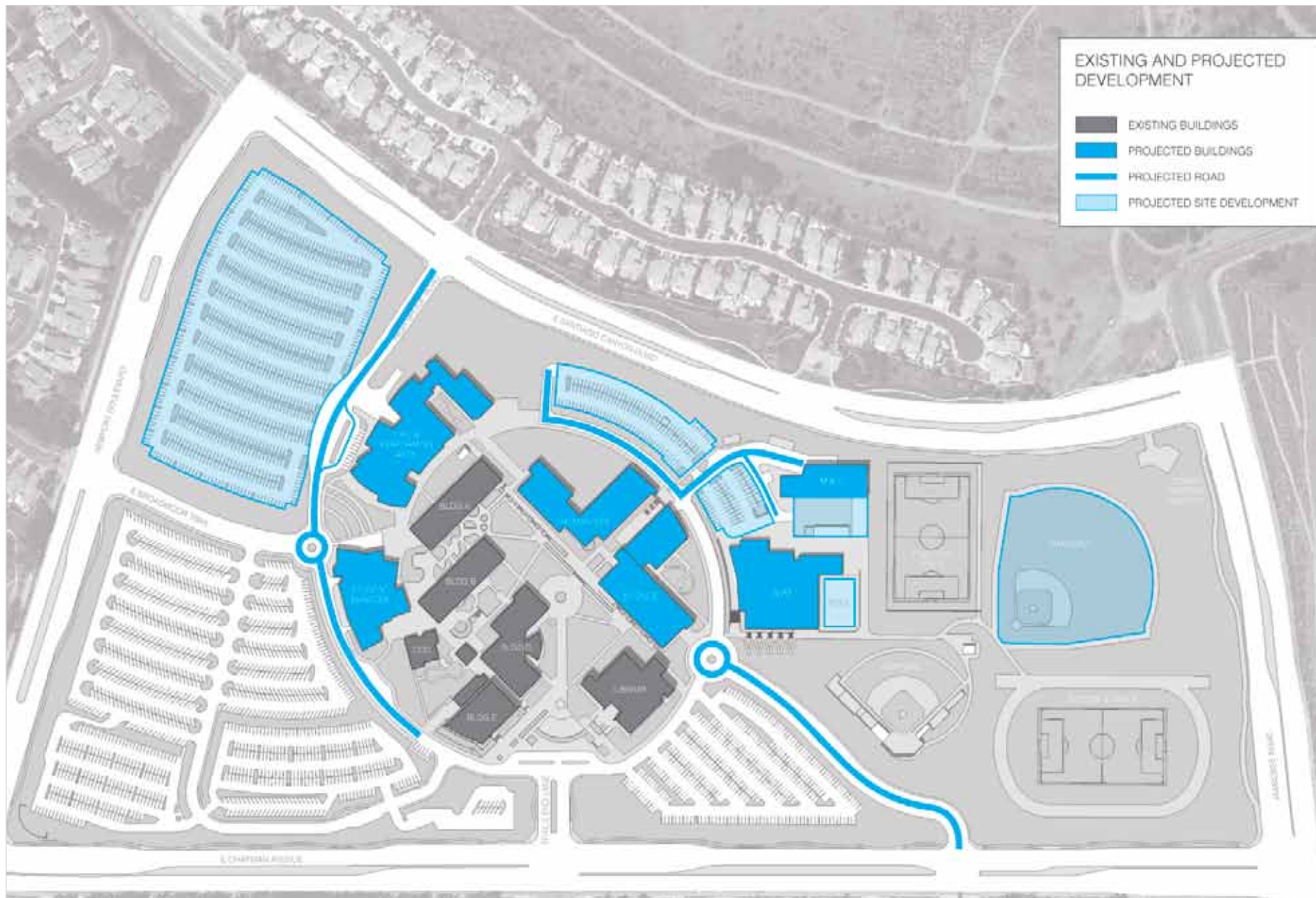
# CAMPUS DEVELOPMENT

## CAMPUS DEVELOPMENT HISTORY

### Existing & Projected Campus

The 2011 Facilities Master Plan includes the projects that are under construction, as well as those in the planning pipeline. The campus with its existing facilities and these projected facilities was taken as the starting point for the planning of future development.





# EXISTING AND PROJECTED DEVELOPMENT

## CAMPUS ENVIRONMENT

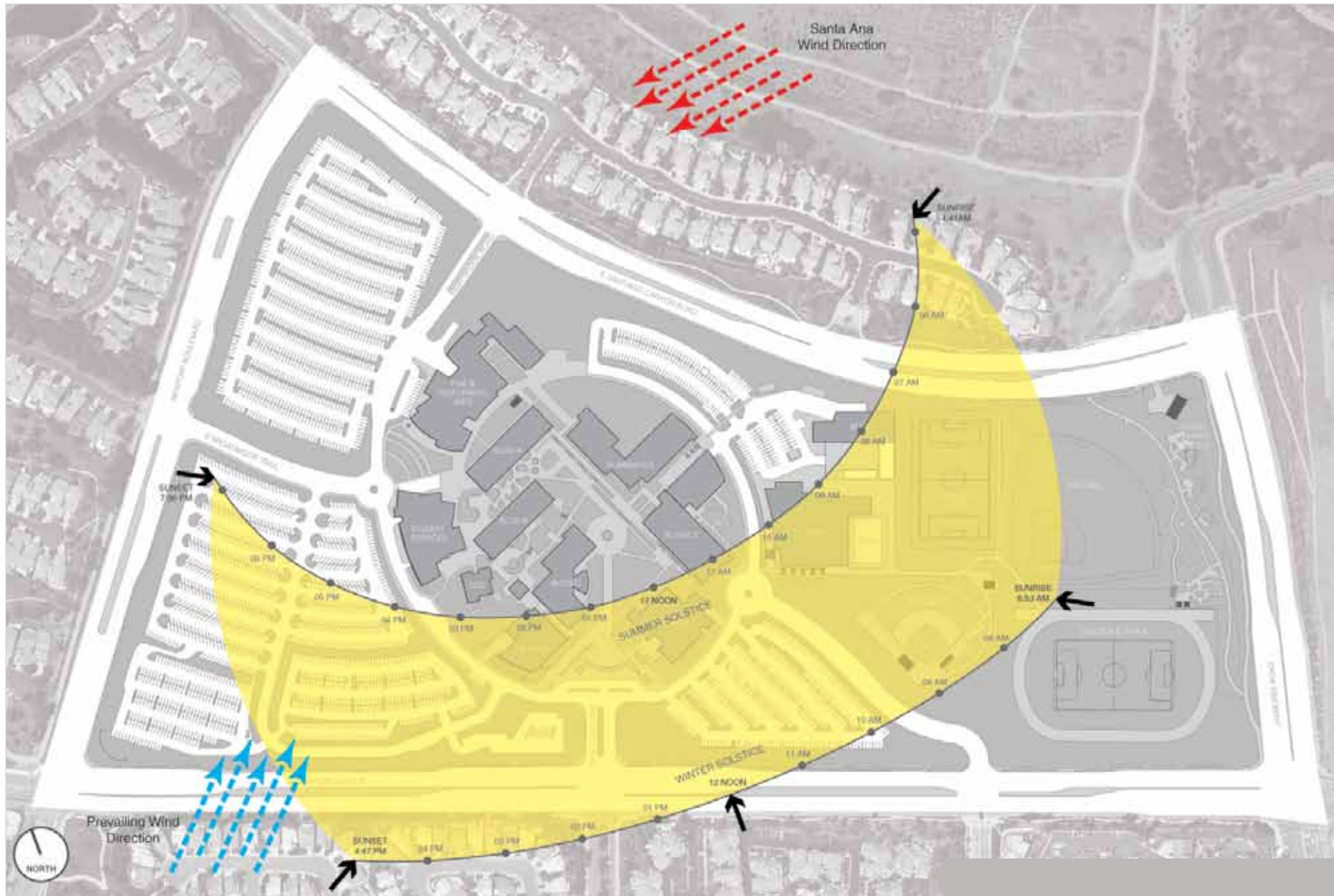
Santiago Canyon is partially shielded from the tempering influence of the Pacific Ocean by the foothills of the Santa Ana Mountains. It experiences much warmer days than the nearby coastal plain. The campus is also more strongly impacted by the Santa Ana winds, especially at the athletic fields, but also in the campus core where the topography and building massing can magnify its effects.

### Observations:

Outdoor gathering spaces would benefit from shade

The courtyard between Buildings B and D is strongly impacted during the Santa Ana winds, due to the existing grade levels and bridge.





# ENVIRONMENTAL ANALYSIS

## VEHICULAR CIRCULATION

With the completion of the campus drive, the south entrance from East Chapman Avenue and the north entrance from East Santiago Canyon Road, the vehicular circulation will be clearly organized. OCTA bus stops serve the perimeter public roads, and campus core. Service and emergency vehicles use the campus drive. Emergency and fire access ways extend into the campus core and athletic fields on paths that are well integrated into the landscape design.

When completed, the current construction projects will increase the parking stall count from 1500 to 2600. The enrollment is projected to be 12,934 in 2020, yielding an acceptable ratio of 5 students per parking space. Should enrollment increase beyond this projection, space for a parking structure will be available along the northern edge of the campus, roughly where Lot P7 is located.










### Observations:

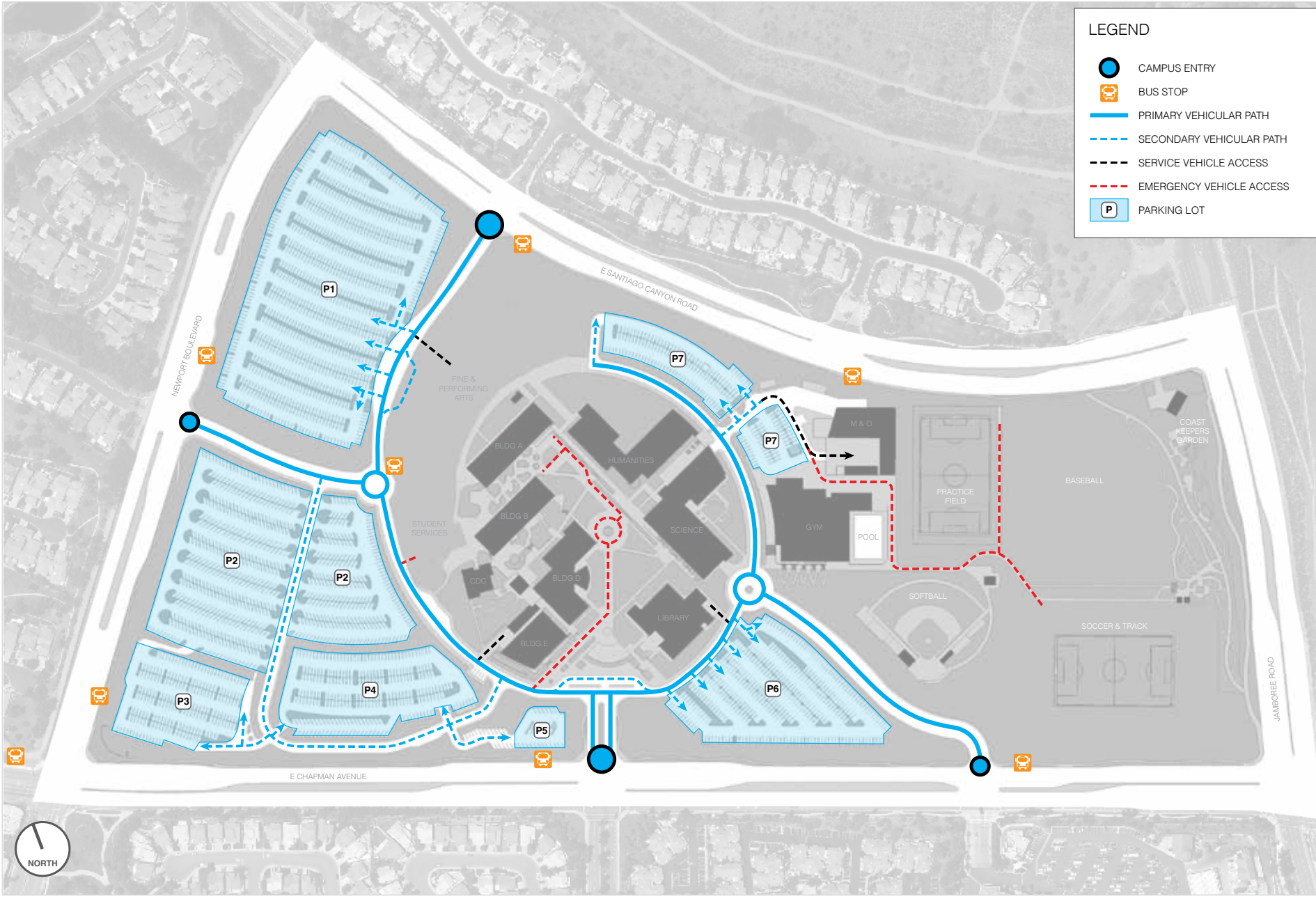
The projected East Santiago Canyon Road campus entrance is expected to be more heavily used than the Newport Boulevard entrance.

Complete the campus drive loop by connecting to the start of the drive near the East Santiago Canyon Road entrance.



**LEGEND**

-  CAMPUS ENTRY
-  BUS STOP
-  PRIMARY VEHICULAR PATH
-  SECONDARY VEHICULAR PATH
-  SERVICE VEHICLE ACCESS
-  EMERGENCY VEHICLE ACCESS
-  PARKING LOT



# VEHICULAR CIRCULATION

## PEDESTRIAN CIRCULATION

The clear campus organization helps with wayfinding.

### Topography

The topographic elevation varies dramatically over the campus. Even within the campus core the changes in elevation are significant as shown in the sections and site plan on this page.

### Observations:







Topography obstructs direct circulation between buildings and is difficult for those with mobility challenges.

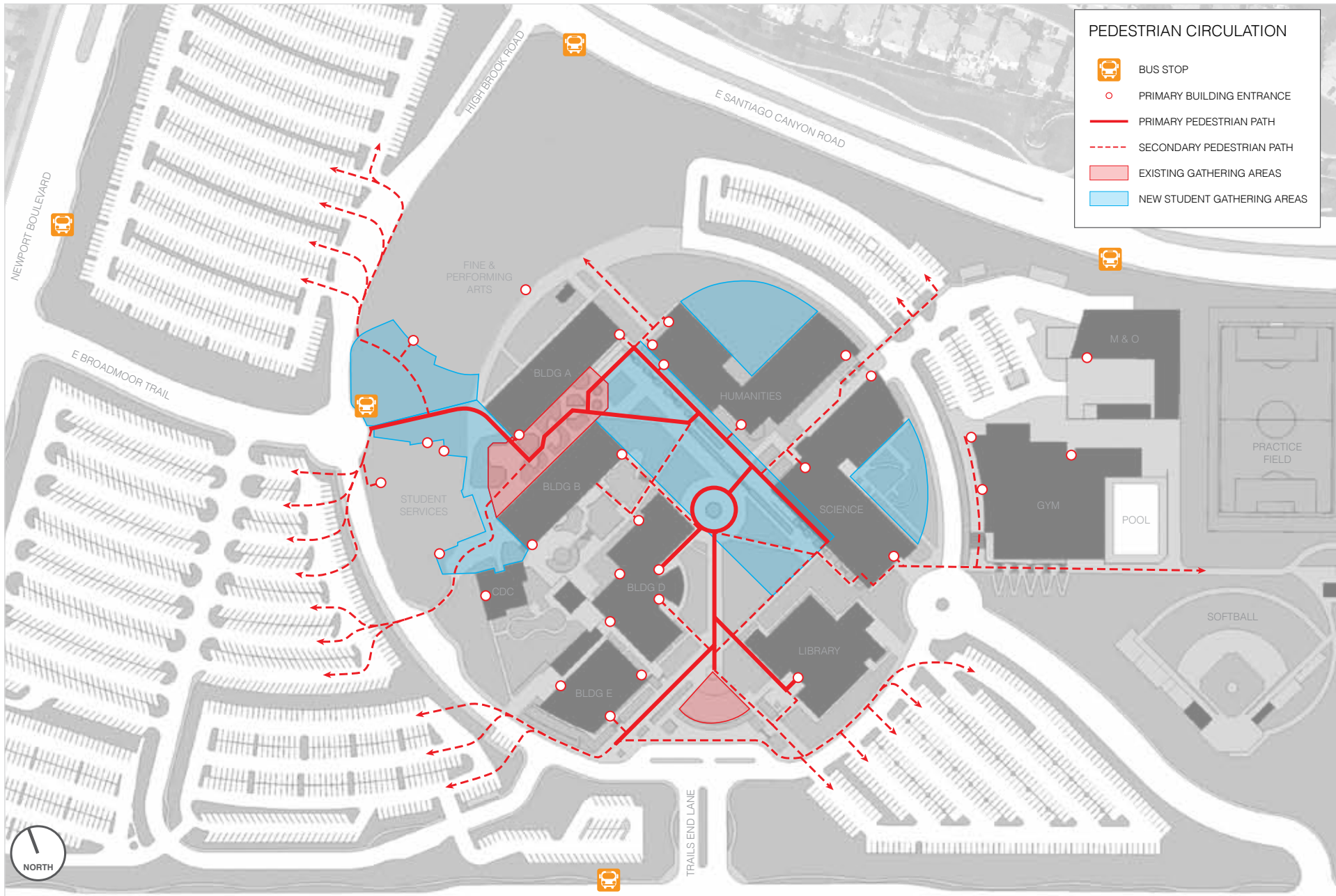
Gathering spaces are fairly small and separated.

Some entry points from the parking lots are too narrow to accommodate the flow.



**PEDESTRIAN CIRCULATION**

-  BUS STOP
-  PRIMARY BUILDING ENTRANCE
-  PRIMARY PEDESTRIAN PATH
-  SECONDARY PEDESTRIAN PATH
-  EXISTING GATHERING AREAS
-  NEW STUDENT GATHERING AREAS



# PEDESTRIAN CIRCULATION

## CAMPUS ZONING

Campus zoning of buildings and site functions are illustrated on this graphic. Colors indicate the current assigned functions of buildings and identify the general zoning of uses on the campus.

### Observations:

The campus is well zoned and clearly organized.

Facilities visited by the community are located near vehicular access and parking.

With ongoing campus development, there is a need to repurpose spaces which will be vacated.





# CAMPUS ZONING



# Appendix







APPENDIX

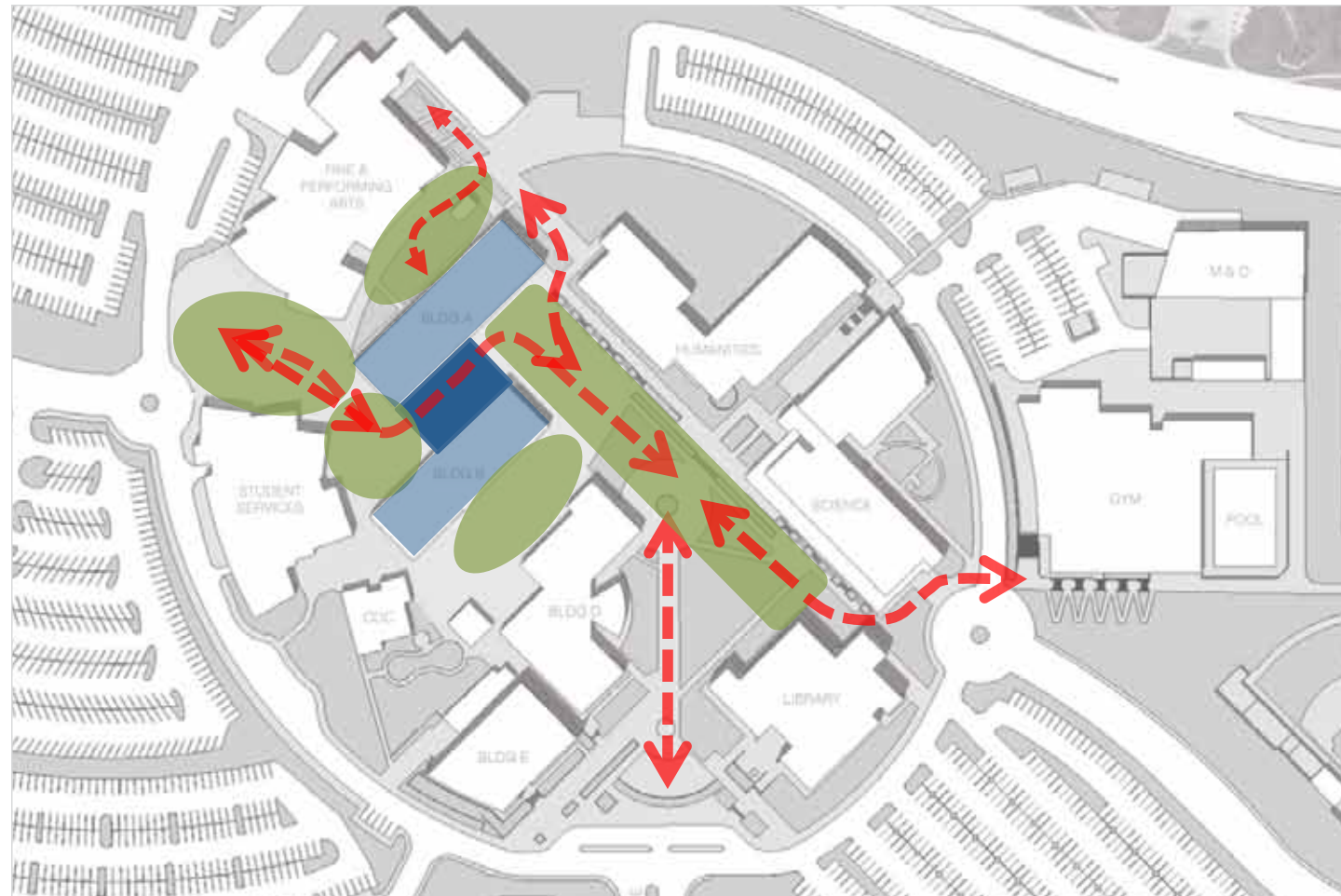


## PRELIMINARY OPTIONS

Following the analysis of existing conditions, the planning process included the review of several options which identified potential locations of new permanent facilities to replace aging facilities and temporary buildings.

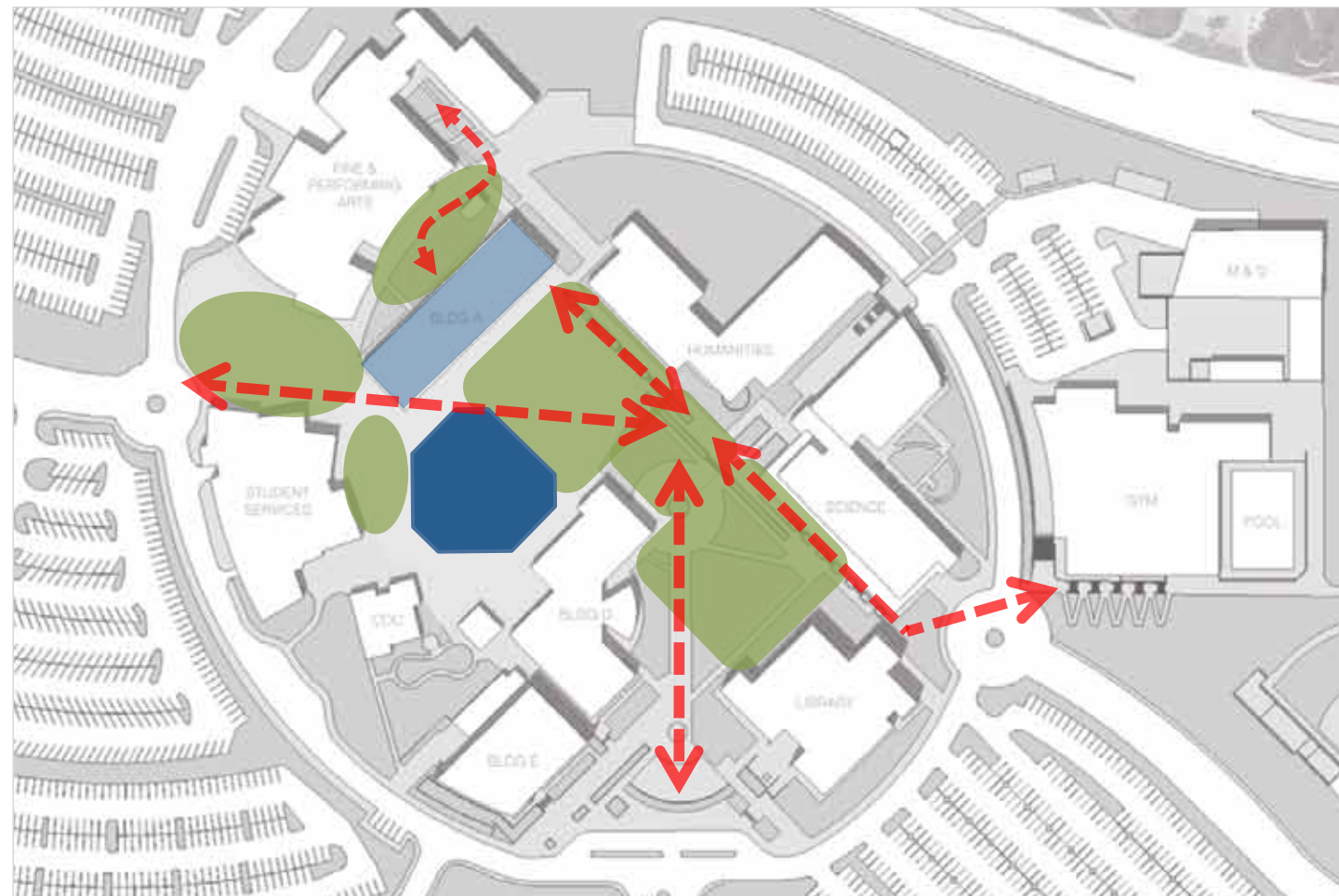
## Option A

Description: Renovate Buildings A and B, and construct an addition that connects Buildings A and B to provide additional space and create an entry passage way into the campus core.



## Option B

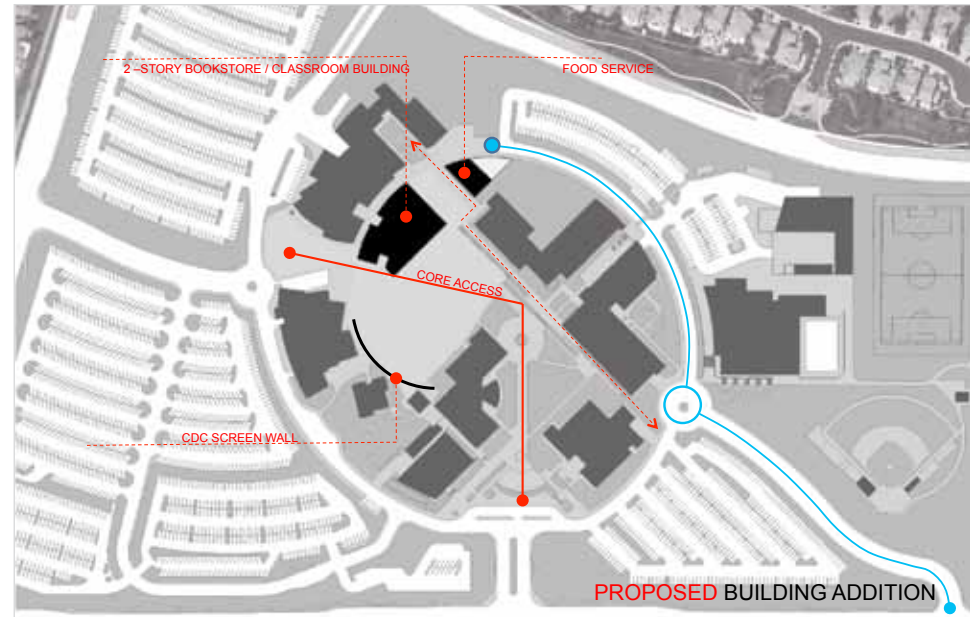
Description: Renovate Building A and replace Building B. Create a larger central quad with direct pedestrian connections to adjacent buildings and open space.



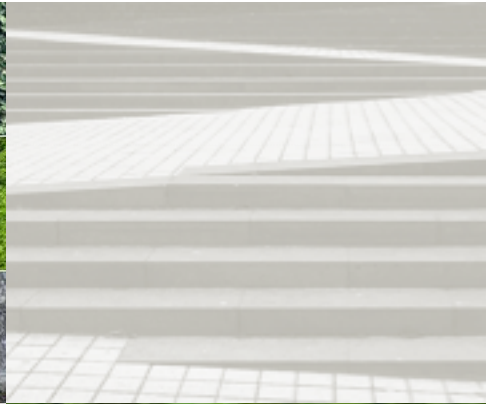
## OPTION DEVELOPMENT

### May 24, 2010 Option Development

A new building zone was identified, which would result from the removal of Buildings A and B. The new building would house the food service facility, the bookstore, and provide outdoor dining and gathering space. The building and site development will facilitate grade transitions, develop pedestrian connections, include an amphitheater, and address the privacy needs of the Child Development Center.



ENTRY COURT



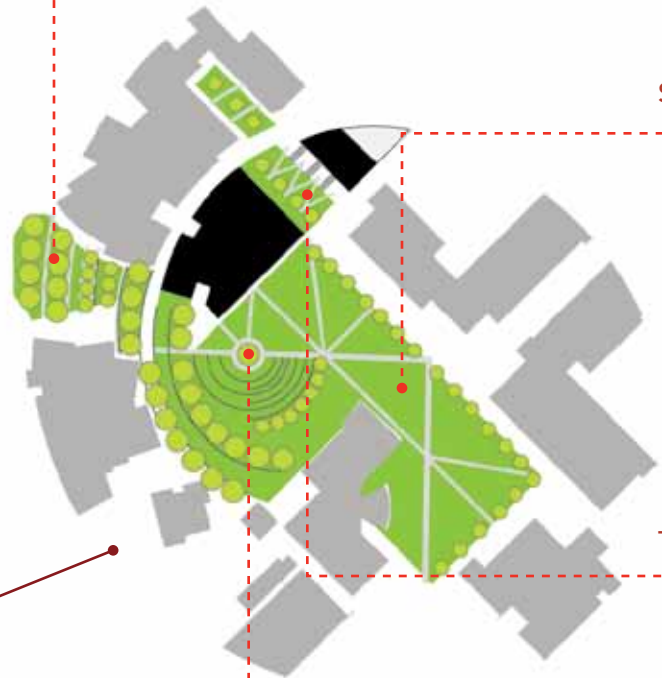
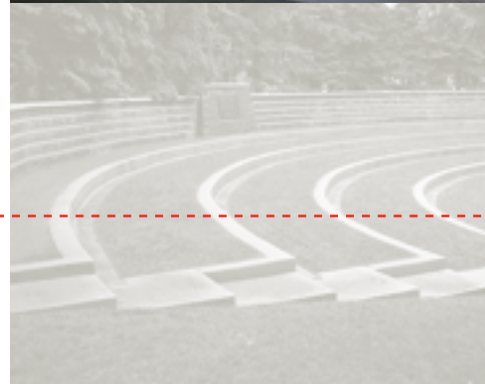
SCIENCE GARDEN



TERRACE GARDEN



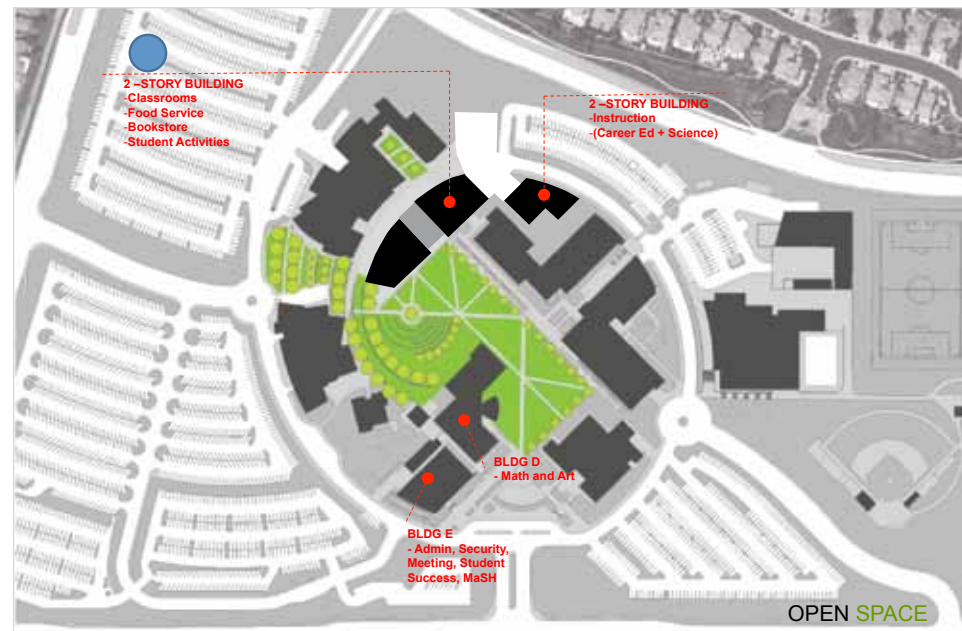
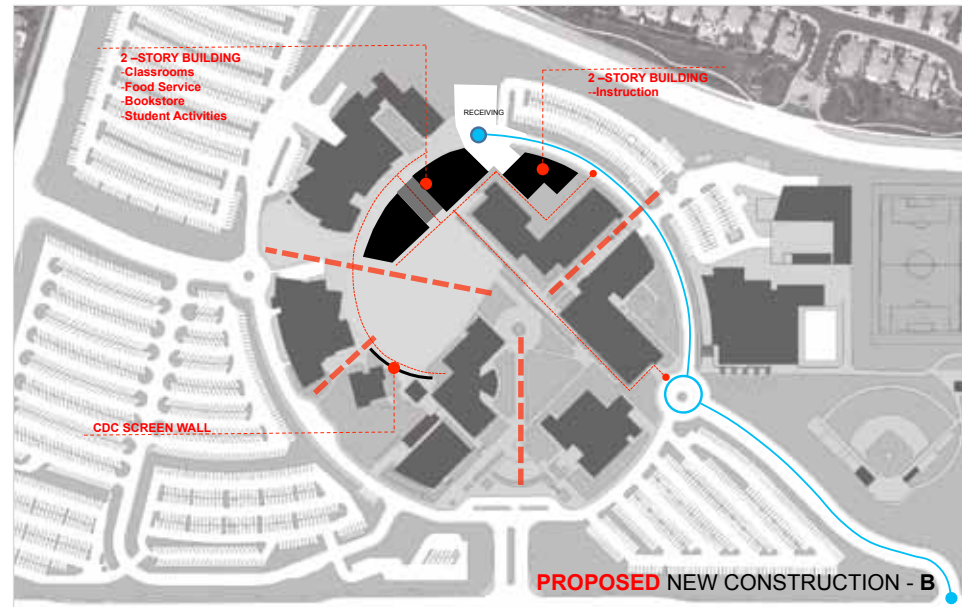
CAMPUS QUADRANGLE



# OPTION DEVELOPMENT

## June 7, 2010 Option Development

The preferred option was refined to include a more developed service and loading zone which would serve both proposed buildings. The western building was revised to show a larger wing to house the food service facility and the bookstore, allowing both to be adjacent to the loading zone.

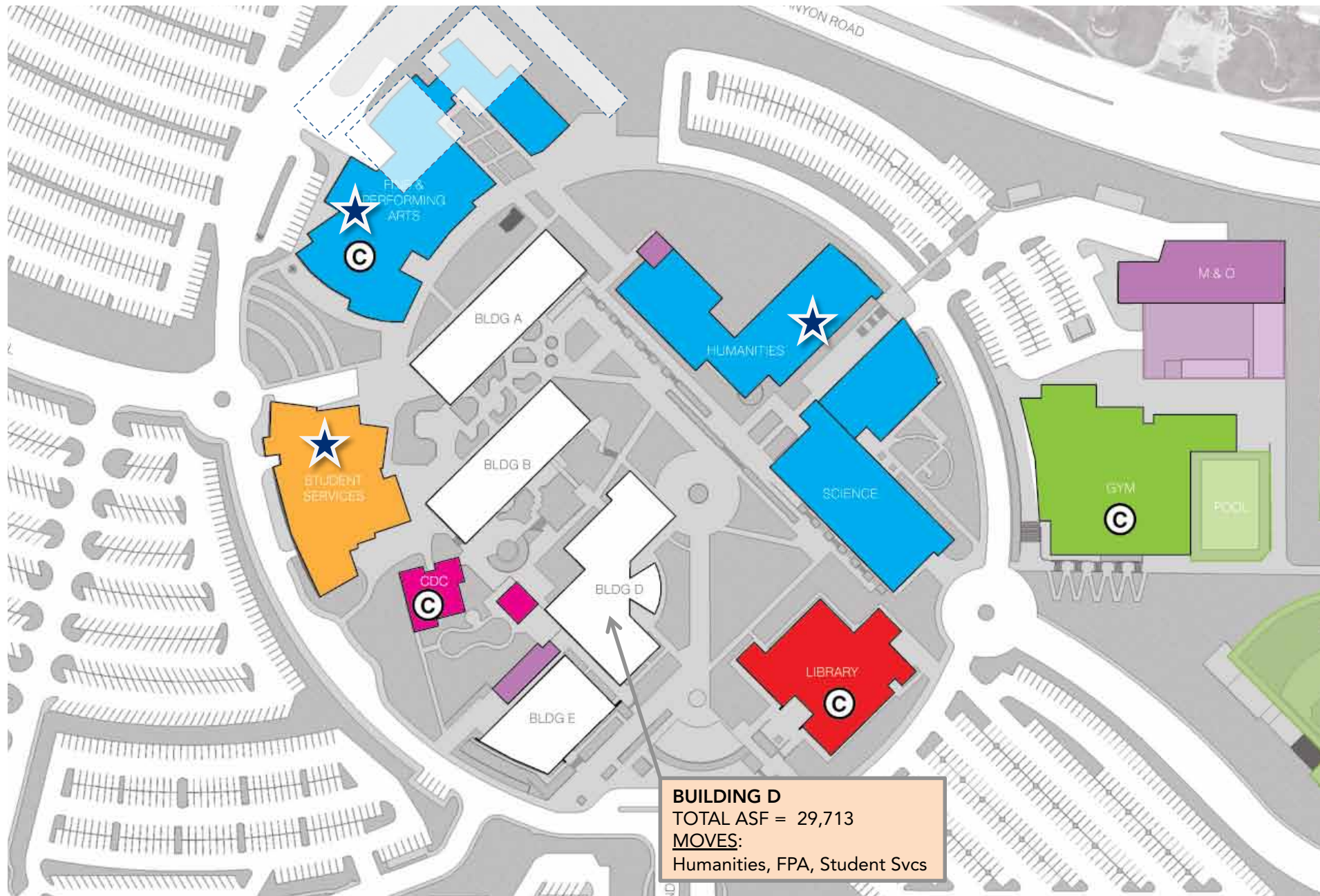


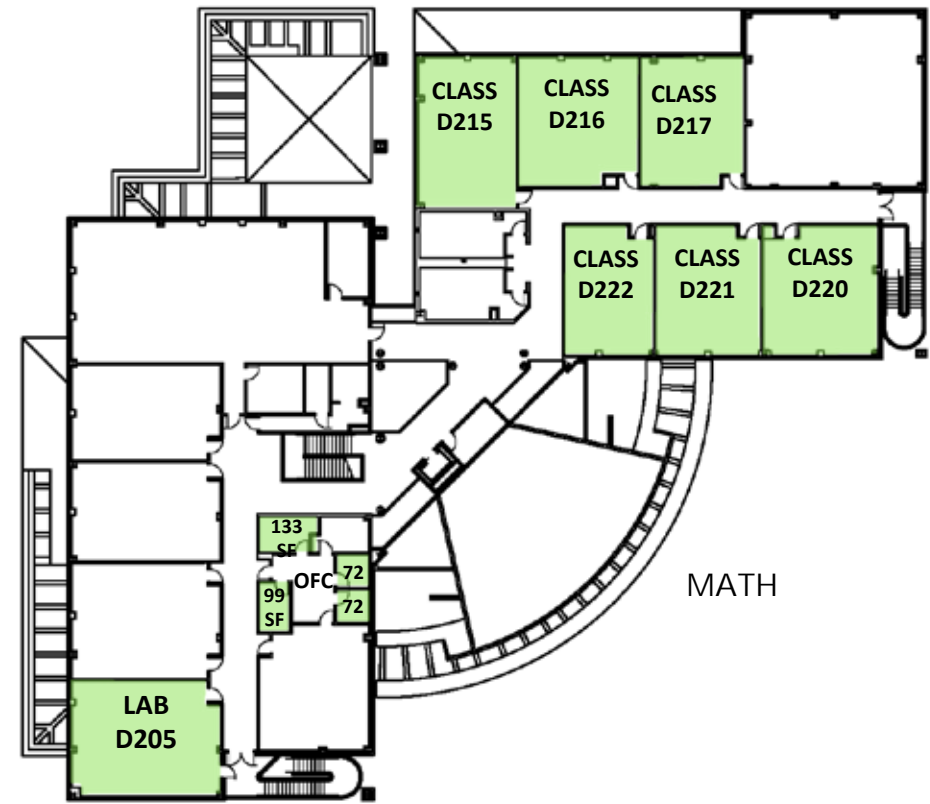
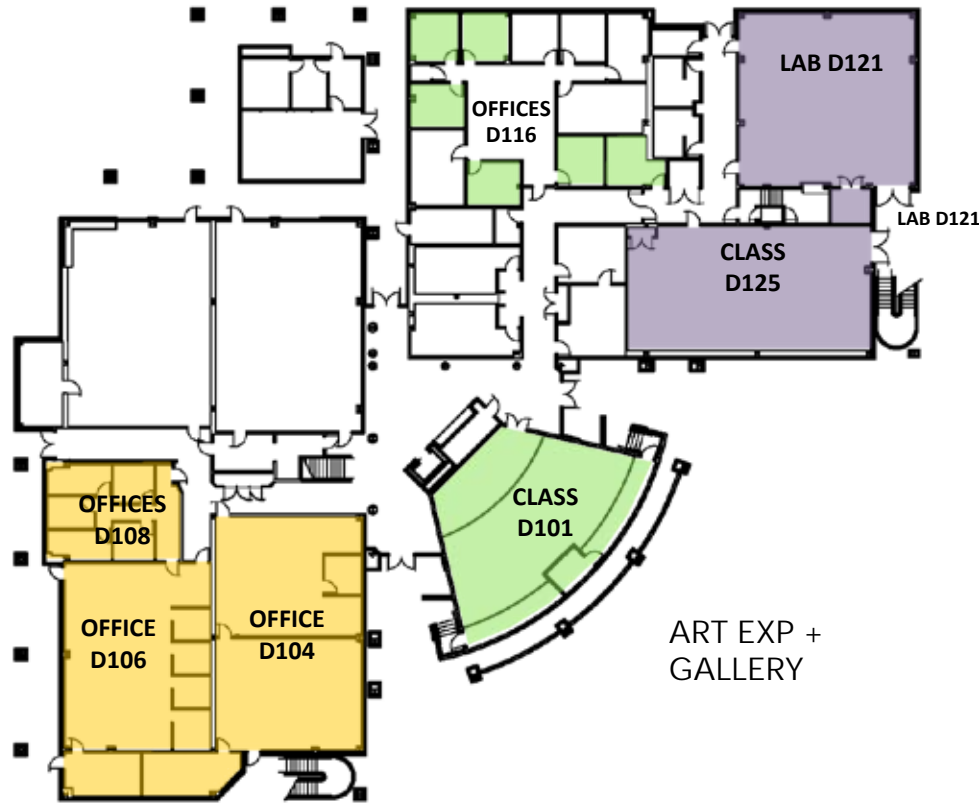


## SECONDARY EFFECTS ANALYSIS

This study identifies the secondary effects resulting from the construction of the Science Building, Humanities Building, Student Services Building and Fine and Performing Arts Building; and the removal of Building A, Building B and the Portables.

- Building D – Space to be Vacated
- Building E – Space to be Vacated
- Building A – Space to be Replaced
- Building B – Space to be Replaced
- Portables – Space to be Replaced



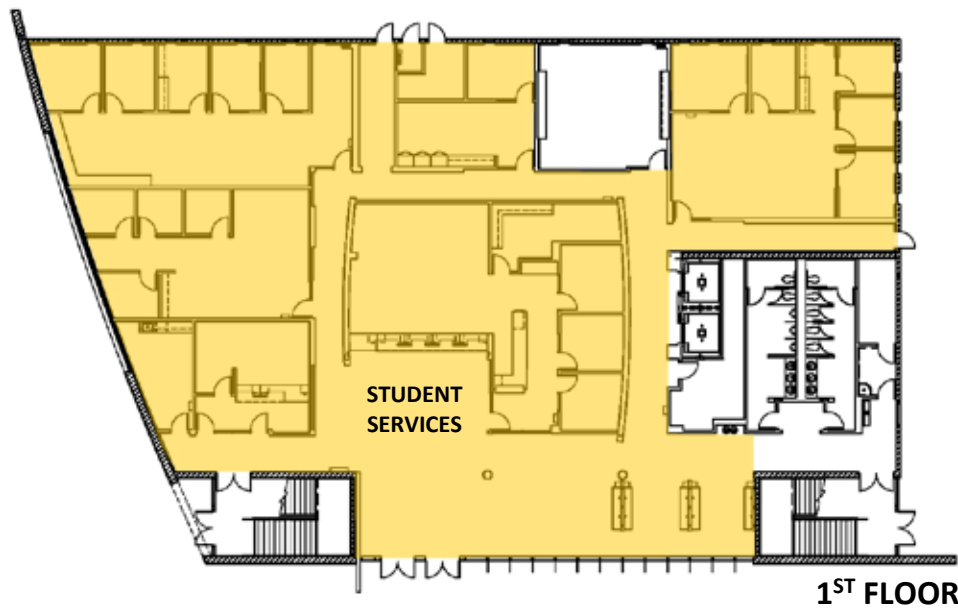
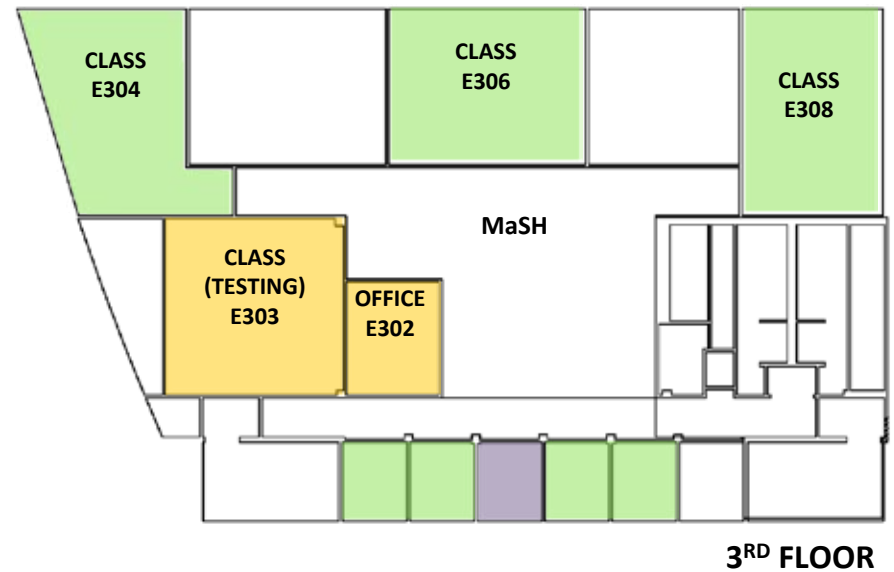
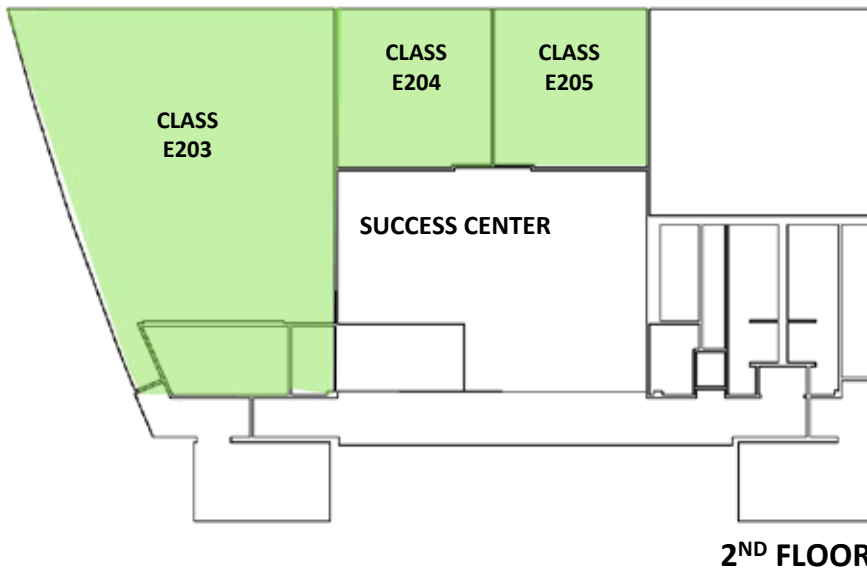


- MOVES TO HUMANITIES
- MOVES TO FINE & PERFORMING ARTS
- MOVES TO STUDENT SERVICES CENTER

	ASF	USE
<b>TOTAL</b>	<b>29,713</b>	<b>Student Svcs, Instruction</b>
<b>VACATED</b>	<b>16,407</b>	<b>Student Svcs, Instruction</b>
<b>REPURPOSE</b>	<b>16,407</b>	<b>Instruction</b>

# Building D



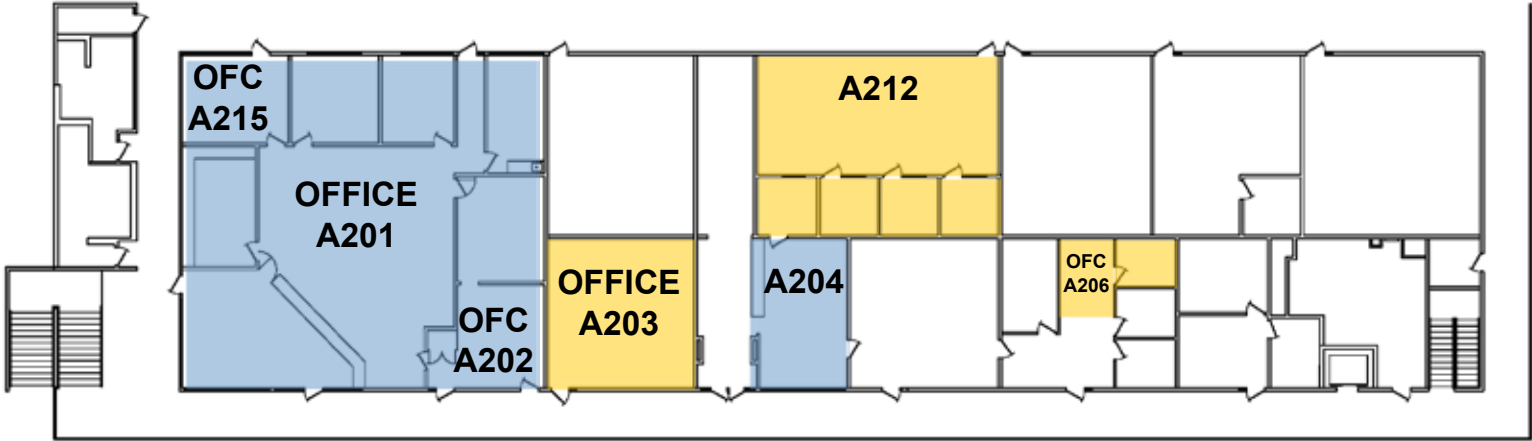


# Building E

- MOVES TO HUMANITIES
- MOVES TO FINE & PERFORMING ARTS
- MOVES TO STUDENT SERVICES CENTER

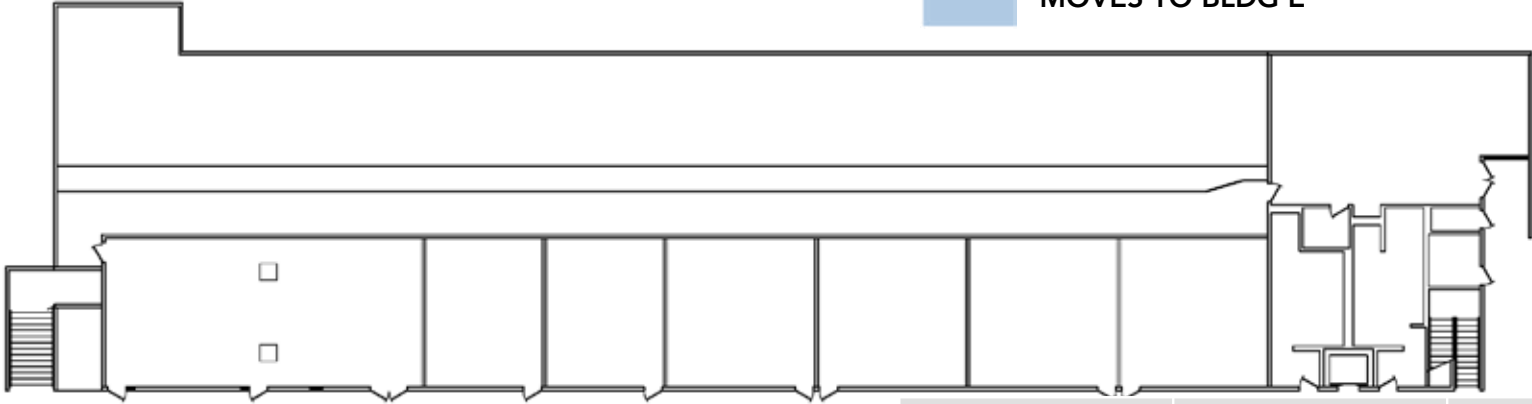
	ASF	USE
<b>TOTAL</b>	<b>19,753</b>	<b>Student Svcs, Instruction</b>
<b>VACATED</b>	<b>14,886</b>	<b>Student Svcs, Instruction</b>
<b>REPURPOSE</b>	<b>14,886</b>	<b>Security, Admin + Meeting Rms</b>





2<sup>ND</sup> FLOOR

- MOVES TO STUDENT SERVICES CENTER
- MOVES TO BLDG E



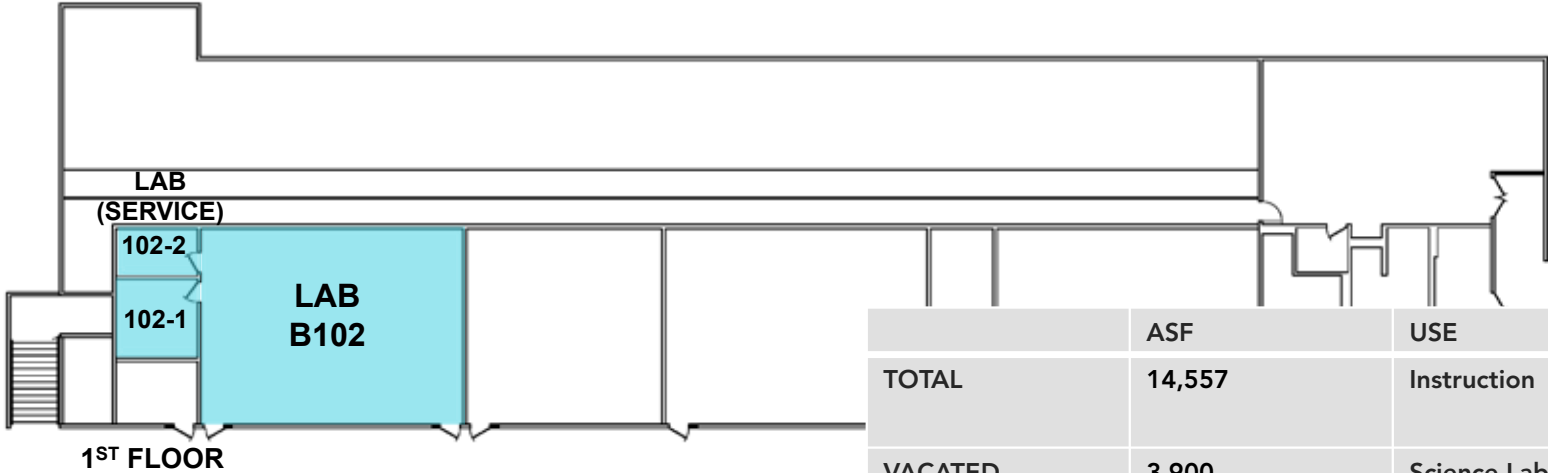
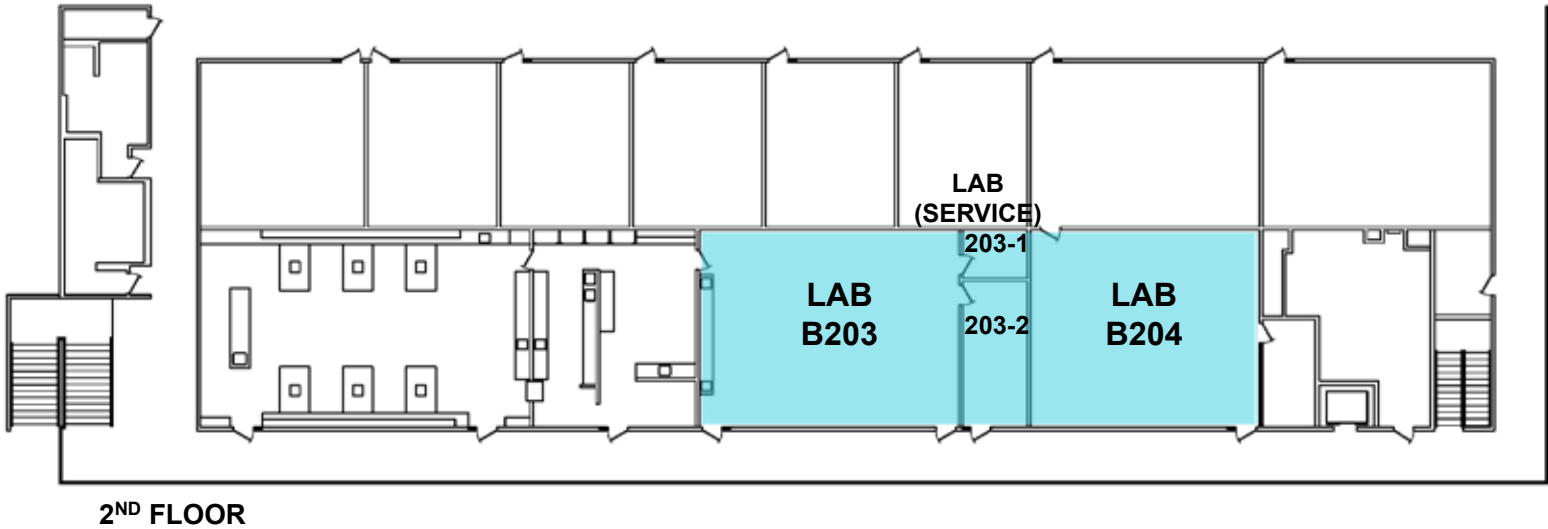
1<sup>ST</sup> FLOOR

	ASF	USE
TOTAL	14,759	Admin, Student Svcs, Instruction
VACATED	4,628	Admin, Student Svcs
REMAINING	10,131	Relocate

# Building A

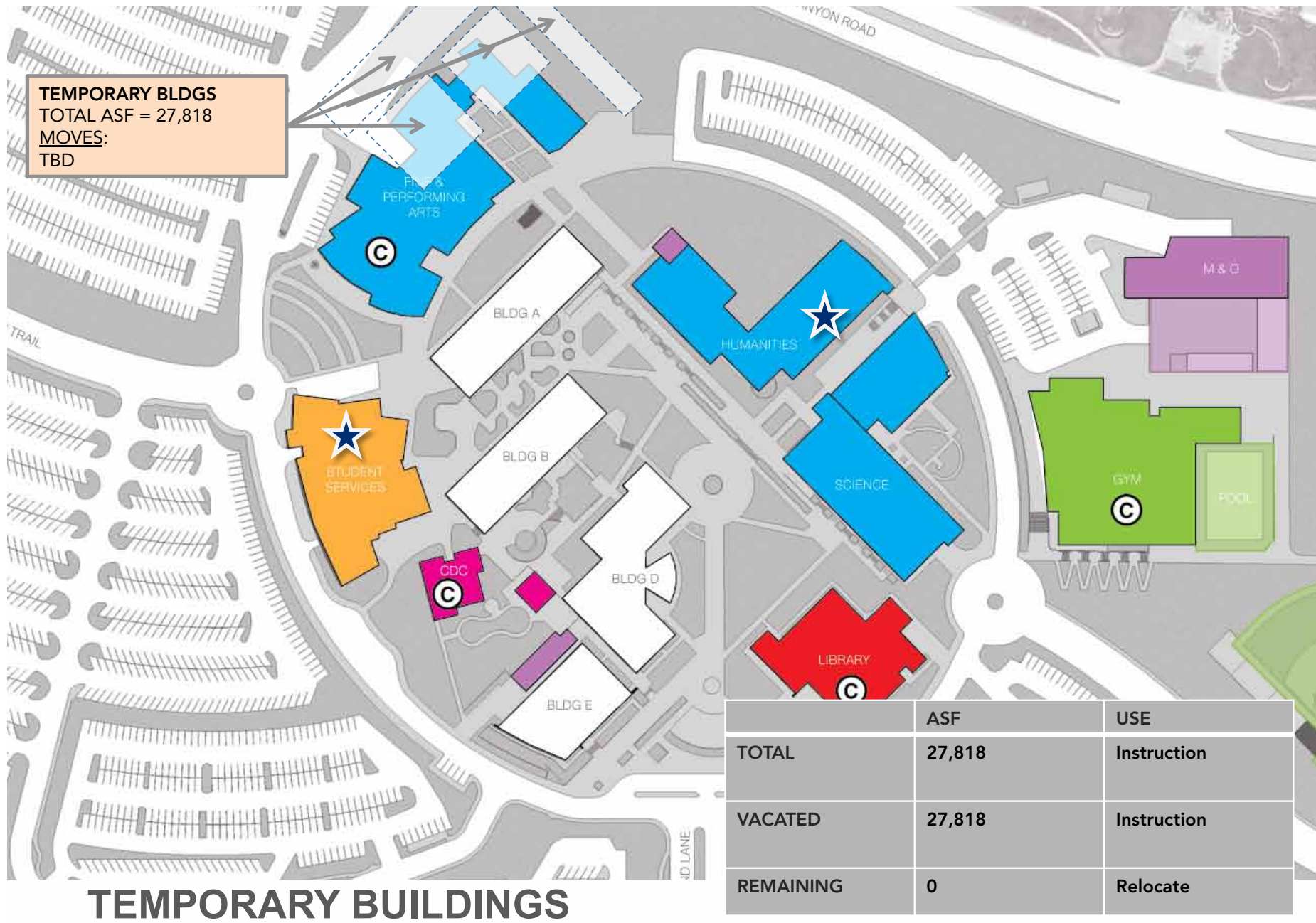






	ASF	USE
TOTAL	14,557	Instruction
VACATED	3,900	Science Labs
REMAINING	10,657	Relocate

# Building B



## Secondary Effects Summary

Description: The upper table summarizes the need for assignable space to house functions currently in Buildings A, B and the Portables, which are not being accommodated in currently planned buildings. The lower table summarizes the assignable space which will be vacated in Buildings D and E, and made available for repurposing. The difference between these figures reinforces the need for additional space.

Building to be Removed	Current ASF	Vacating ASF	Remaining ASF to be Relocated
Building A	14,759	4,628	10,131
Building B	14,557	3,900	10,657
Temporaries	27,818	0	27,818
<b>Total</b>			<b>48,606</b>

Building to be Repurposed	Current ASF	Vacating ASF	Master Plan Use
Building D	29,713	16,407	Instruction
Building E	19,753	14,886	Security, Admin, Meeting Rooms
<b>Total</b>		<b>31,293</b>	



## Central Plant Study

Executive summary, excerpted from the report titled "Santiago Canyon College Central Heating & Cooling Plant Study", prepared by P2S Engineering, Inc., dated August 2010.

### Executive Summary

This study looked at the feasibility of constructing a new central cooling plant for Santiago Canyon College (SCC). We concluded the campus will best be served by a plant with 1000-tons of chiller capacity and 8,500-ton-hours of thermal energy storage. The new plant will be located on the north side of campus, near the Plant Operations Complex. The plant will consist of a single story chiller & pump building and a cylindrical thermal energy storage tank. There also will be an underground chilled water distribution pipe system installed to connect the campus buildings to the central plant. The proposed central plant will reduce energy cost with better operating efficiency and reduced peak energy demand as compared to the existing systems.

We estimated the energy, operating, and construction costs for a central plant to connect to four existing buildings and seven future buildings. We compared three different plant designs against the existing systems on campus. We determined that a plant designed with a thermal energy storage capacity sized to cover the high-peak electrical demand period to be an optimal design.

The proposed central plant will have a building with a 56ft x 35ft foot print. The building will house two chillers, four chilled water pumps, and two condenser water pumps. There will be an attached mechanical yard that will have the two cooling towers. The mechanical yard will be concealed by a screen wall. The thermal energy storage tank will be 59ft in diameter and 45ft tall.

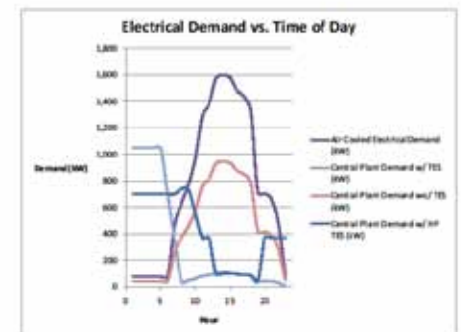


Figure 1-2.3 Graphical representation of the College's cooling load profile and energy demand. Note that the systems with TES reduce demand from 1000kW to less than 1000kW. This study included existing buildings and future buildings. We assumed future buildings would either be connected to the central plant or air-cooled DX like the existing buildings are.

The existing buildings will need their HVAC systems to be modified to work with a centralized cooling plant. The existing systems, with the single exception of building “D”, have air-cooled DX AC units. The cooling coils and refrigeration compressors in these machines will not work with chilled water. The machines will be converted to chilled water operations by removing and replacing the unsuitable components. The details of these requirements are in our Buildings Report chapter.

The existing heating systems will remain in operation, as we do not recommend a centralized heating plant.

We estimate the central plant will reduce the campus electrical bill by approximately 50%; this is for the portion of the bill that pertains to cooling only. The electrical consumption of the campus will be reduced by approximately 40% and demand will be reduced by 50%. We expect the emission of greenhouse gasses that result in the production of electricity to be reduced by the same amount as electrical consumption.

