












University of Colorado
Anschutz Medical Campus

Anschutz Medical Campus 2012 Facilities Master Plan

September 2013

prepared by:
Office of Institutional Planning, University of Colorado Denver | Anschutz Medical Campus

with:

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S.A. Miro, Inc.
RMH Group, Inc.
Walker Parking Consultants

The Anschutz Medical Campus 2012 Facilities Master Plan was approved by the University of Colorado Board of Regents on September 17, 2013.

University of Colorado
Anschutz Medical Campus

September 5, 2013

Dear Regents and Commissioners:

Please accept this Master Plan as a vision and guide for future development that will enable the best in health sciences education, health care services, and basic and clinical research to continue to flourish at the University of Colorado Anschutz Medical Campus.

As is true at universities across the country, an academic medical campus represents a unique and complex component of higher education. Our four-fold mission of educating future health care providers, providing the best possible clinical care, conducting ground-breaking basic science and clinical translational research and improving the health of our community combine to provide a critical role in society.

The University of Colorado Anschutz Medical Campus has emerged from the former Fitzsimons Army Medical Base to become an exemplar among academic medical campuses, and along the way has created a thriving economic engine for the state of Colorado. In 1998, the first Master Plan for our campus envisioned a unique opportunity to create an environment that would enable excellence in education, research, and clinical care. Fifteen years have passed since that vision was outlined, and just over 10 years have passed since the first of the University's new campus buildings emerged. Combined annual direct expenditures from the University and the hospitals are greater than $2.4 billion, and this campus represents one of the largest economic and educational enterprises in the State of Colorado. The Master Plan submitted herein charts a course that will enable CU to continue to provide the highest quality health care education and health care service to our state and region in the years to come.

On 230 acres, the Anschutz Medical Campus includes the University of Colorado health sciences programs, the University of Colorado Hospital, and Children's Hospital Colorado. Our health sciences education offers health professional degrees through the School of Medicine, the College of Nursing, the School of Dental Medicine, the Skaggs School of Pharmacy and Pharmaceutical Sciences, the Colorado School of Public Health and the Graduate School. The leadership, faculty, staff, and students from all of our health professional programs contributed directly to the development of this master plan.

Within the six schools and college, more than 4,000 students take health professional courses, and with more than 16,000 people employed at CU and the hospitals on campus, our population is greater than 20,000 people. Aside from the educational component, the majority of this master plan reflects the combined vision of the organizations that support this population. Unlike traditional campuses of higher education, CU does not exist on the Anschutz Campus alone. In many respects, our education program unfolds not only within traditional classrooms but also within the walls of the hospitals' operations as well as in our research laboratories. In reality, our whole campus is a classroom. It is critical to understand that for much of the physical planning purposes, there was direct input from the other institutions co-located on campus. Therefore, this document, and the associated Site-wide Coordinated Master Plan reflect the University's

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and hospitals' programmatic vision and related physical and infrastructure planning. Further, the site-wide master plan was collaboratively developed with input from the three campus institutions and additional input from the City of Aurora, the Fitzsimons Redevelopment Authority, and University Physicians, Inc.

The goals of our combined plans are to maintain and continually improve health care outcomes and education through connectivity, innovation, and stewardship. The campus Master Plan identifies anticipated growth related to changes in education programming and student enrollment, growth in clinical services and changes to the research enterprise and outlines a physical plan to accommodate these changes. Additionally, the Master Plan and the Site-wide Plan improve existing traffic and circulation conditions as well as other campus infrastructure items necessary to accommodate growth from all campus constituents.

We are pleased to present this Master Plan to the University of Colorado Board of Regents, the Colorado Commission on Higher Education, and the citizens of Colorado. Through what this campus has become, we have much to be proud of, and even more to look forward to. With enormous input from all our campus stakeholders, we believe it represents the blueprint for maintaining and expanding the enormous success of the Anschutz Medical Campus and the major impact we have on the citizens and economy of the State of Colorado.

Sincerely,

Lilly Marks
Vice President of Health Affairs
University of Colorado
Executive Vice Chancellor
Anschutz Medical Campus

ACKNOWLEDGMENTS

The Anschutz Medical Campus 2012 Facilities Master Plan represents a collaborative effort of many, over a period of more than a year. Creating this comprehensive plan would not have been possible without the participation of many people, and their contributions are gratefully acknowledged and appreciated. With their wisdom, vision, guidance, and willingness to help, this plan should shape the physical makeup of their campus for years to come.

Executive Vice Chancellor Lilly Marks was instrumental in leading the planning in directions that would most benefit the university, the campus, and its surrounding community. Special thanks to the hundreds of CU Anschutz students, faculty, and staff, and representatives from the University of Colorado Hospital, Children's Hospital Colorado, University Physicians, Inc., City of Aurora, Fitzsimons Redevelopment Authority, and the Veterans Affairs Medical Center who gave generously of their time, energy, and invaluable input.

As with any project of this magnitude, there may be individuals whose names were overlooked. We apologize for any oversights. A list of all participants is included in Appendix VII.1.

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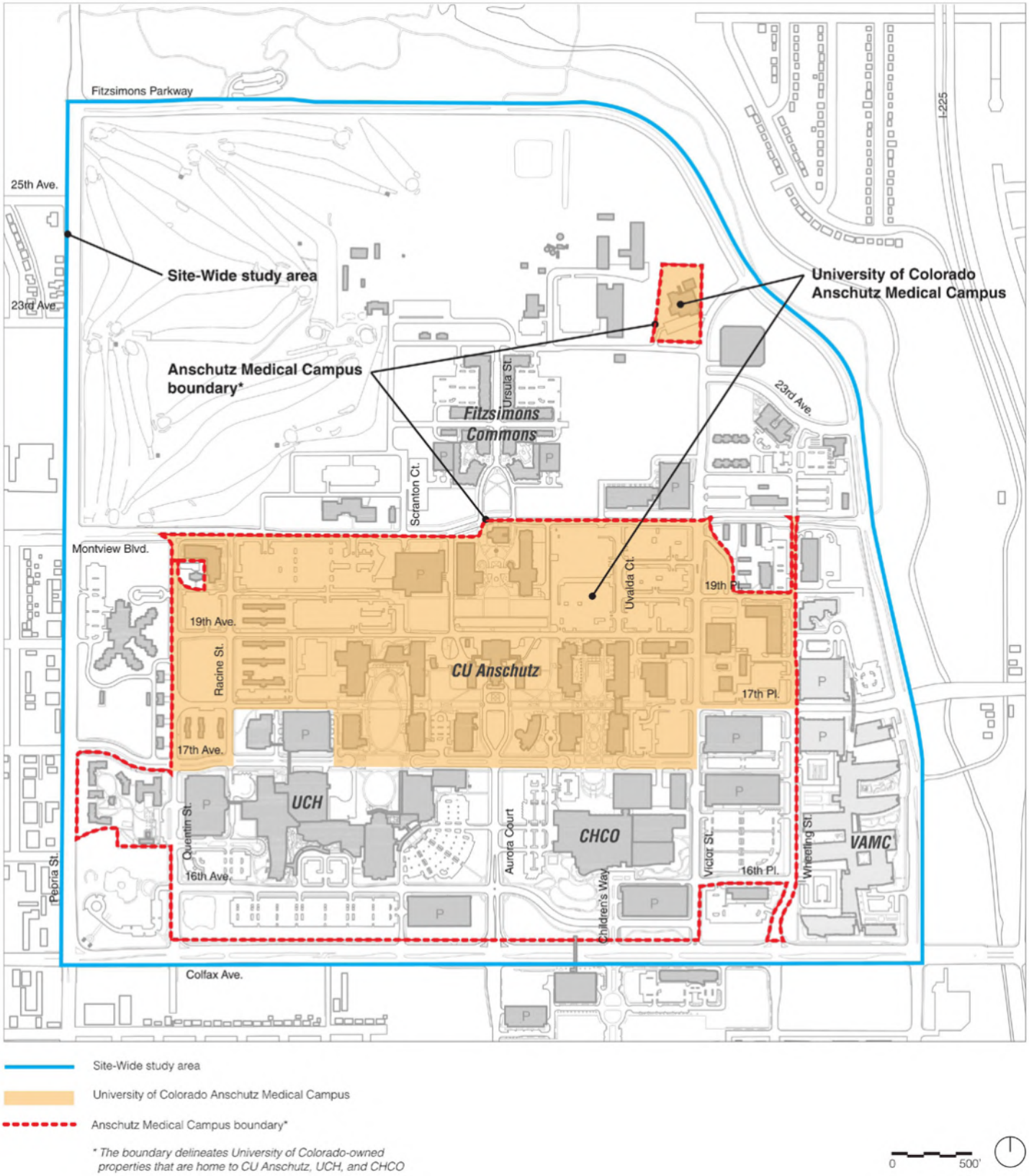


Figure A.1 - Study Area Boundary Definitions

2012 FACILITIES MASTER PLAN TERMS AND DEFINITIONS:

University of Colorado

The University of Colorado system is currently comprised of three institutions with distinct campuses at four locations: Boulder, Colorado Springs, and Denver and Aurora. The University of Colorado's official abbreviation is CU.

University of Colorado Denver

The legal name of CU's consolidated campuses at Denver and Aurora (the CU Denver | Anschutz Medical Campus).

University of Colorado Denver | Anschutz Medical Campus

The rebranded name of the University of Colorado's consolidated Denver Campus and Anschutz Medical Campus.

University of Colorado Anschutz Medical Campus

The University of Colorado Anschutz Medical Campus in Aurora is home to the university's health professions–related schools, colleges, and centers. Approved short-form names are:

CU Anschutz Medical Campus

CU Anschutz

the university

University of Colorado Health Sciences Center

The name of what is now referred to as the University of Colorado Anschutz Medical Campus, prior to 2004.

Anschutz Medical Campus

The official name of the 230-acre area owned by the University of Colorado on which are located CU Anschutz Medical Campus core facilities and the independent University of Colorado Hospital and Children's Hospital Colorado.

Academic Health Center (AHC)

An academic health center consists of an allopathic or osteopathic medical school, one or more other health profession schools or programs (such as allied health, dental medicine, graduate studies, nursing, pharmacy, public health, veterinary medicine), and one or more owned or affiliated teaching hospitals or health systems. There are more than 100 academic health centers nationwide, and they have enormous impact regionally, nationally, and internationally. (Source: *Association of Academic Health Centers*)

Facilities Master Plan

A facilities master plan provides direction for the physical development of the campus over a 10-year period based on current conditions, future trends, and institutional priorities. The Colorado Department of Higher Education requires a reassessment of any facilities master plan every 10 years.

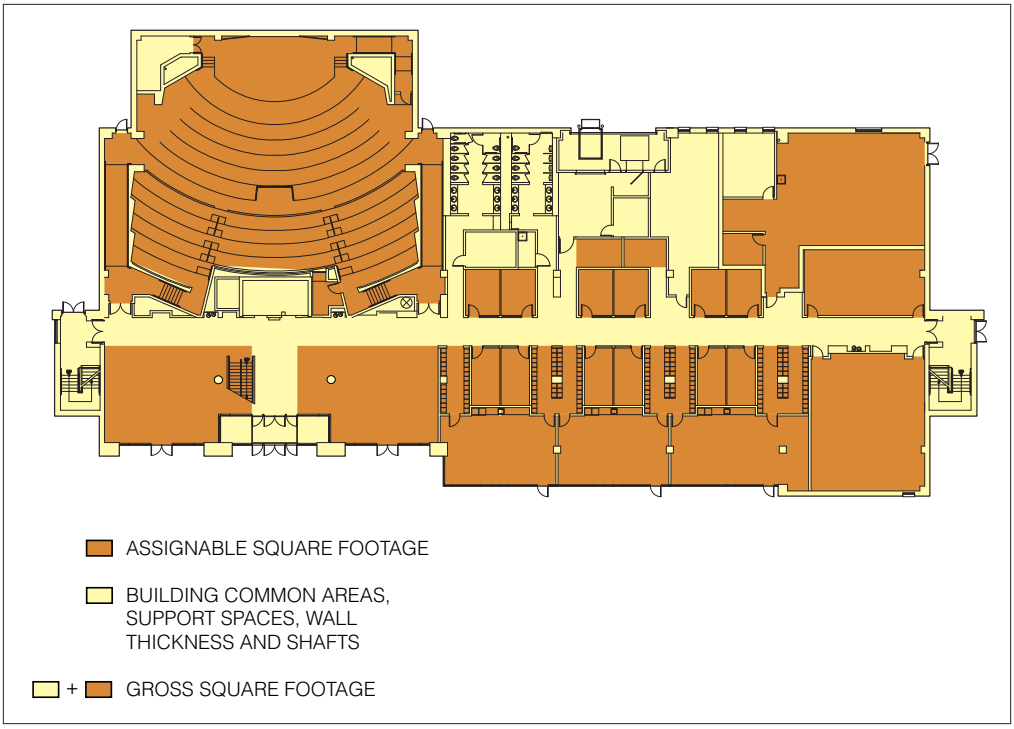


Figure A.2 - Assignable Square Feet (ASF) Versus Gross Square Feet (GSF)

Full-Time Equivalent (FTE)

A unit that makes calculating employees and/or students comparable across various contexts: An FTE of 1.0 means that the person is equivalent to one full-time worker or student.

Headcount

Headcount is an unduplicated actual count of employees and/or students (literally the number of heads) counted only once, whether the individual works full or part time and/or is enrolled in one class or a full course load.

Assignable Square Feet (ASF)

A term used to describe the space in a building that occurs within a room—from interior wall to interior wall—that can be assigned to an occupant. Excluded are building spaces such as restrooms and circulation (corridors, stairs, and elevators).

Gross Square Feet (GSF)

Gross square feet includes the total area of all floors of a building, including all areas within the outside faces of exterior walls and floor penetrations. GSF also includes all space above and below grade and building structural, mechanical, and infrastructure systems, all building circulation, restrooms, and support spaces.

Fitzsimons Army Medical Garrison (FAMG)

The former 578-acre ("square mile") Department of Defense facility in Aurora, Colorado, also known as the Fitzsimons Army Medical Center, closed in 1994 by U.S. Congress.

Site-Wide

A term used to describe the 578-acre former Fitzsimons Army Medical Garrison site, also referred to as the square mile, that encompasses the Anschutz Medical Campus, State of Colorado Veterans Home, Center for Dependency, Addiction, and Rehabilitation (CeDAR), City of Aurora's (CoA) facilities and General's Park, Veterans Affairs Medical Center (VAMC), and Fitzsimons Redevelopment Authority (FRA).

Fitzsimons Redevelopment Authority (FRA)

The FRA directs the commercial developments in the Fitzsimons Life Science District, along with its partner, Forest City Science + Technology Group. The land for development by the FRA is located primarily north of Montview Boulevard.

LIST OF FIGURES

I. OVERVIEW

I. OVERVIEW

The Anschutz Medical Campus 2012 Facilities Master Plan is the next stage in a continuous planning process begun in 1997 when the new campus—which consists of University of Colorado Anschutz Medical Campus (CU Anschutz), University of Colorado Hospital (UCH), and Children's Hospital Colorado (CHCO)—was known as University of Colorado Health Sciences Center (UCHSC). This plan aspires to create a dynamic physical environment that fully sustains and advances the campus's role as one of the nation's premier academic health centers (AHCs).

In 1998, UCHSC completed its pivotal master plan, which proposed relocation of all university health science schools, colleges, centers, and UCH from 9th Avenue and Colorado Boulevard to a new site in Aurora, Colorado. At the time, the new site was approximately 192 acres. The plan reflected an institutional awareness that the new property presented an extraordinary one-time opportunity to create a campus that would exceed other renowned national centers in innovation and quality, and become a destination of choice for students, faculty, staff, and patients.

The 1998 facilities master plan envisioned the new campus as a pioneering 21st-century environment that would expand and promote greater academic, research, clinical, and collaborative opportunities with affiliates and partners co-located on the campus. University leadership recognized that a critical mass of prestigious institutions working collaboratively and in close proximity would provide the basis for an exceptional AHC that would promote health profession excellence, sustained wellness, and economic benefit in the region, state, and world.

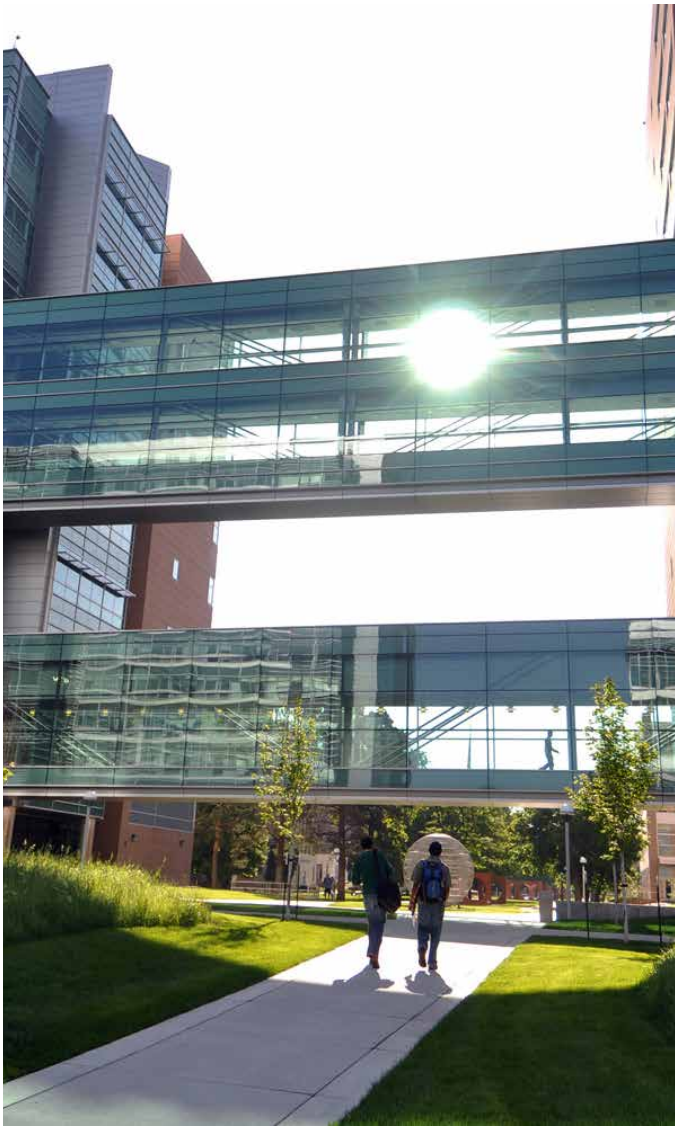
In conformance to Colorado Department of Higher Education (CDHE) requirements, UCHSC had prepared facilities master plan updates every 10 years. In 2002, however, the health sciences center undertook an update to its 1998 master plan—four years before the CDHE requirement. The speed at which the new campus had developed precipitated the need for an updated plan and allowed the university to address rapidly changing trends in health science pedagogy, research, and clinical care, as well as its evolving priorities and aspirations.

In 2004, the University of Colorado (CU) Board of Regents (BOR) officially joined the UCHSC and Denver Campus to create a new, consolidated university. Initially named the University of Colorado Denver and Health Sciences Center, the new university was rebranded in 2011 as the University of Colorado Denver | Anschutz Medical Campus.

As in 2002, the university and its affiliates continue to be challenged today by the numerous internal and external changes in health science education, research, and clinical care, which are transforming institutional priorities and require new responses and solutions. To accommodate this dynamic environment, the 2012 Facilities Master Plan was designed not as a prescriptive, inflexible blueprint for development but as a living, adaptable framework for future campus growth through implementation strategies that can flexibly meet the changing strategic needs of the three institutions.

We will be a model for public universities in this century: ***comprehensive, innovative, and entrepreneurial.***

Strategic Plan 2008–2020: University of Colorado Denver



The Anschutz Medical Campus Art Walk, looking east from the Research Commons.

I.1 2020 STRATEGIC PLAN

In 2007 the newly consolidated University of Colorado Denver | Anschutz Medical Campus undertook a comprehensive strategic planning process with goals to guide and drive its own strategic future; respond to a request from the CU BOR for each of its three institutions (Boulder, Colorado Springs, and Denver | Anschutz Medical Campus); and serve as the foundation for the university's renewal of accreditation in 2010 by the Higher Learning Commission of the North Central Association of Colleges and Schools (NCA).

Guided by the University Planning and Accreditation Committee (UPAC)—made up of senior university officers and elected leadership of the faculty, staff, and students—the strategic planning process was inclusive and involved more than 200 faculty, staff, and students on seven task forces, as well as input from alumni and external stakeholders.

Each task force focused on one of the following areas: *Mission, Vision, and Values; Learning; Discovery, Creativity, and Innovation; Health Care; Engagement; Institutional Image and University Communication;* and *Resource Needs, Infrastructure, and Development.*

The overall process was collaborative. Biweekly updates were provided to the campus community online with a feedback component and in a series of open forums. The strategic plan document represents an evolution from initial discussions through task force reports and various iterations of a plan. The final Strategic Plan 2008–2020 was approved by the CU BOR in spring 2008. The full document can be accessed at http://www.ucdenver.edu/about/WhoWeAre/Chancellor/Pages/StrategicPlan.aspx.

The Strategic Plan 2008–2020 proposed a new mission for the university, offered a vision of what the university could look like in 2020, and expressed the values that would guide the university throughout its development. The document also acknowledged that *"our mission, vision, and values are just words"* and that *"what ultimately counts will be our actions."*

The three foundational elements of the 2008 strategic plan—mission, vision, and values—have guided the 2012 Facilities Master Plan decision-making process. Past planning priorities, new ideas, and alternative concepts were all assessed by how each aligned with the strategic plan, and their ability to help the university achieve its mission, vision, and values, which are:

*The **mission** declares our purpose. The **vision** expresses our direction. The **values** assert our behavior. Taken together, they provide a road map to our destination.*

Strategic Plan 2008–2020: University of Colorado Denver

MISSION

University of Colorado Denver | Anschutz Medical Campus is a diverse teaching and learning community that creates, discovers, and applies knowledge to improve the health and well-being of Colorado and the world.

VISION

By 2020, University of Colorado Denver | Anschutz Medical Campus will be a leading public university with a global reputation for excellence in learning, research and creativity, community engagement, and clinical care.

VALUES

To be a university greater than the sum of its parts, University of Colorado Denver | Anschutz Medical Campus embraces excellence in:

Learning and Scholarship

The university respects academic freedom and the rigorous quest for knowledge and understanding. We share knowledge and foster student success through a continuous process of inquiry, critical thinking, reflection, collaboration, and application.

A pedestrian passes under the Education Commons bridge on the Art Walk.

Discovery and Innovation

The university fosters an energetic, collaborative, and creative environment where we develop and employ new ideas and technologies. Our entrepreneurial culture enables us to expand the frontiers of knowledge and human experience.

Health and Care of Mind, Body, and Community

The university enriches the well-being and sustainability of communities and our cultural, living, and natural environments. We promote healthy lifestyles; prevent, diagnose, and treat disease; and deliver high-quality and compassionate health care.

Diversity, Respect, and Inclusiveness

The university seeks the richness that an increasing diversity of our communities brings to our learning, research, and service endeavors. Our common humanity leads us to create an inclusive and respectful ethos characterized by caring, empathy, compassion, nurturing, collegiality, and mentoring.

Citizenship and Leadership

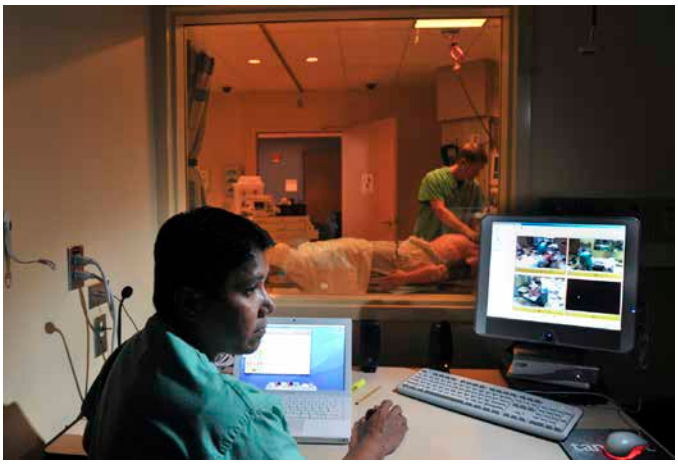
The university serves Colorado and the world as a recognized source of talent, knowledge, informed judgment, exemplary health care, and professional practice. We are responsible stewards of the resources entrusted to us and utilize them with integrity for the betterment of our community.

STRATEGIC PLAN UPDATE

The search for excellence did not stop in 2008 with approval of the Strategic Plan 2008–2020. The university initiated a review and update of the plan in 2012, led by UPAC, to ensure that the road map was still relevant to today's ever-changing education, research, and clinical care landscape. This effort is still under way at the time of this writing and should be completed by fall of 2013.

FACILITIES MASTER PLAN GOALS

The following goals, selected through campus consensus, are broad concepts that independently and collectively embody the ambitions of the campus. The three goals that guided the decision making during the 2012 Facilities Master Plan process are ***innovation***, ***connectivity***, and ***stewardship***. These goals are discussed in more detail in Chapter III, which identifies detailed principles and criteria to guide the application of the goals.



Simulation Control Room in the School of Medicine.

Lab work at the School of Dental Medicine.

I.2 PURPOSE

Much has been accomplished on the Anschutz Medical Campus over the past 15 years. Campus facilities have been developed more quickly than was originally anticipated in the 1998 and 2002 facilities master plans. Looking forward, new priorities and opportunities are emerging that were not previously evident.

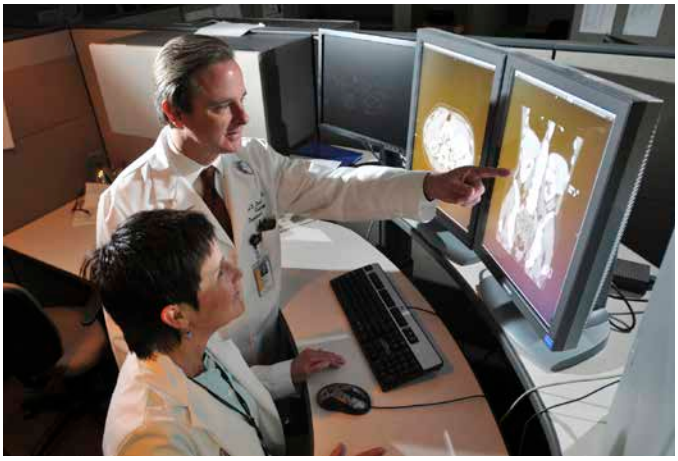
Now that critical core facilities are in place, CU Anschutz, UCH, and CHCO are focused on collaboratively improving the campus from a great to exceptional environment. The future campus is envisioned to be even more of an eminent academic, research, clinical, and entrepreneurial environment that is inviting, friendly, safe, and memorable. It should be a destination where faculty, students, staff, and visitors can—and want to—walk, bike, eat, shop, learn, work, live, and gather.

Recognizing that academic, research, and clinical care endeavors are rapidly changing, adapting, and reinventing themselves, in 2001 CU Anschutz initiated a process to update its facilities master plan. The focus of the effort was to ensure that as the state's only AHC and model health and wellness community, all future Anschutz Medical Campus development would advance innovation, collaboration, and synergy and enhance the quality of life of its faculty, students, staff, patients, visitors, and neighbors. The Anschutz Medical Campus 2012 Facilities Master Plan is just one tool among many that the university uses to remain a nationally renowned academic, research, and clinical destination of choice.

The Anschutz Medical Campus in 2003 looking northeast from Peoria Street and Colfax Avenue.

This master plan maintains the underlying campus order and strengths of the original 1998 plan. However, it also recommends a new, clear direction for planning of the unbuilt portion of the Anschutz Medical Campus. The plan builds upon the organization of areas of the existing campus while it clarifies goals and guidelines that allow greater integration and connection among the campus institutions and adjacent Site-Wide partners. It also considers the timelines, costs, and possible locations of projected projects (buildings and infrastructure) within a 10-year window and models their planning implications into an integrated whole.

Building 500.



Doctors utilize advanced imaging technology in the Radiology Lab.

CONTEXT

The current Anschutz Medical Campus is an inter-professional, collaborative environment where the proximate co-location of the university and two hospitals within one campus has enhanced and expanded access for all constituents to academic, research, and clinical activities that increase opportunities for learning, creativity, and discovery. Many university faculty and students are actively involved in CHCO and UCH, and university administration, staff, and faculty coordinate and cooperate with hospital colleagues.

UCH and CHCO are both nationally ranked hospitals, each with several prominent programs recognized for their excellence. CU Anschutz has six prestigious schools and colleges, several of which are nationally ranked, and numerous centers recognized for their excellence.

The schools and colleges of CU Anschutz are the College of Nursing (CON), Colorado School of Public Health (SPH), Graduate School (GS), School of Dental Medicine (SDM), School of Medicine (SOM), and Skaggs School of Pharmacy and Pharmaceutical Sciences (SOP).

Anschutz Medical Campus Vital Statistics:

- Total 2012 population on campus: 21,224
- Total 2012 graduates from all schools: 1,073
- Size of the Anschutz Medical Campus: 230 acres
- Total area of buildings: 10,000,000+ gross square feet (GSF)
- CU Anschutz annual budget: $1.2 billion

Chapter II of this report contains a detailed account of the existing conditions on campus, including population and growth projections, an analysis of the ownership and regulatory structure, documentation of the current state of the natural site conditions and utility infrastructure, assessment of the current university facilities, a summary of the transportation and parking systems and issues, and documentation of the current open-space preservation.

PHYSICAL PLAN

The Anschutz Medical Campus 2012 Facilities Master Plan aligns with the Site-Wide Master Plan - Phase II and recent City of Aurora (CoA) community, neighborhood, and transportation planning. The facilities master plan also builds upon elements of the 1998 and 2002 plans that were determined by constituent consensus to still be relevant in shaping a 21st-century campus.

The 2012 Facilities Master Plan provides maximum planning flexibility to accommodate the changing nature of AHCs. The plan provides an adaptable framework for growth that considers both fixed public realm systems and flexible site-specific development. This two-pronged growth framework is interconnected by an overarching emphasis on the intended character, quality, and scale for all future development consistent with specific features of the distinct campus area in which it occurs. The result is not prescriptive, but encourages unique solutions that respond to context and each project's specific program and needs.

The primary departure from past planning efforts is the recognition that campus constituents require greater proximity and connectivity of functions and facilities than was provided in the previous "campus in the prairie" model. The preferred proposition is to establish an urban model that balances the increasing need for connectivity through campus density with safe, functional circulation and open spaces.

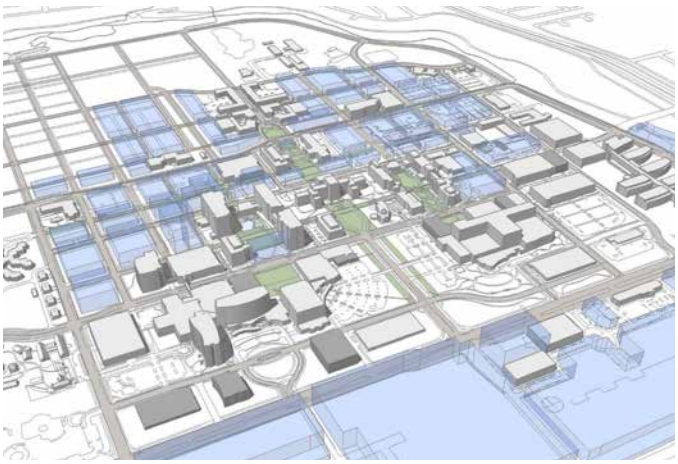
As a result, revisions proposed in the plan to the built campus are intended to create more integrated and enhanced pedestrian, vehicular, and landscape areas consistent with the character and quality of the vibrant urban campus described in the vision statement.

The physical plan is detailed in Chapter V of this report and is organized around a central premise: The fixed infrastructure systems should provide a framework to support the flexible design and development of future building sites. The fixed systems include circulation, transit, bicycles, pedestrian, open space, and utilities and infrastructure. The flexible site strategy includes potential for site-specific building, landscape, and parking development.

IMPLEMENTATION

Chapter VI of this document contains the implementation plan, including the individual building projects and how they are planned to be phased. It also includes preliminary cost estimates for new building, renovation, and infrastructure projects, as well as a summary of the university's financial plan.

Included as an appendix in Chapter VII, the campus Design and Development Guidelines serve as a comprehensive compendium of planning and design recommendations and strategies meant to inform and direct all future campus development. Intended to support the 2012 Facilities Master Plan, the guidelines establish uniform character and quality recommendations for all elements of the campus including, but not limited to, roadways, streetscape, pedestrian circulation, parking, open spaces, buildings, and sustainability.



Digital model of the Site-Wide area.

I.3 PROCESS

As stated previously, CU Anschutz is located within the Anschutz Medical Campus, which it shares with UCH and CHCO. This co-location of university and hospital facilities has allowed for a meaningful integration—physically and functionally—of the three entities to the benefit of all.

The Anschutz Medical Campus is part of the former Fitzsimons Army Medical Garrison (FAMG) and is now one of the nation's most successful bioscience, health, and technology centers. This approximately square-mile site, often referred to as the Site-Wide area, Fitzsimons, or Health Sciences City, is home to more than 40 large and small institutions, organizations, and businesses—including numerous bioscience-related, start-up initiatives—that function, to varying degrees, in collaborative partnerships. Fortunately, this seamless blending is the desired functional model of a 21st-century AHC. However, it is challenging to translate this new dynamic model into the traditional university campus typology for master planning purposes.

As a result, the Anschutz Medical Campus 2012 Facilities Master Plan doesn't follow conventional campus planning processes that focus on the university as a fixed and clearly delineated entity set apart from its neighbors. As an urban AHC, CU Anschutz is too physically interconnected to its neighboring partners and affiliates to successfully plan in isolation.

Acknowledging this new planning paradigm, the university engaged its partners, affiliates, and neighbors in a collaborative and integrative master planning process designed to allow for both joint Site-Wide planning of shared "public realm" elements (roadways, utilities, infrastructure, etc.) and individual stakeholder planning for institution-specific components (facilities, parking, landscape, etc.).

Anticipating complexity and a lengthy planning process, the university decided that to best serve all stakeholders, the comprehensive effort should be split into two distinct parts, with data gathering and analysis separate from physical planning and implementation. Although the first phase included all Site-Wide institutions and entities (see list on page I.8), the second phase effort was complicated by CU Anschutz's need to develop a separate facilities master plan that would conform to CDHE guidelines, which require a more in-depth, comprehensive product than envisioned for the Site-Wide effort.

As a result, the Site-Wide effort included all stakeholders, while the Anschutz Medical Campus process focused on planning for the institutions located within the CU property boundary. The two phases are:

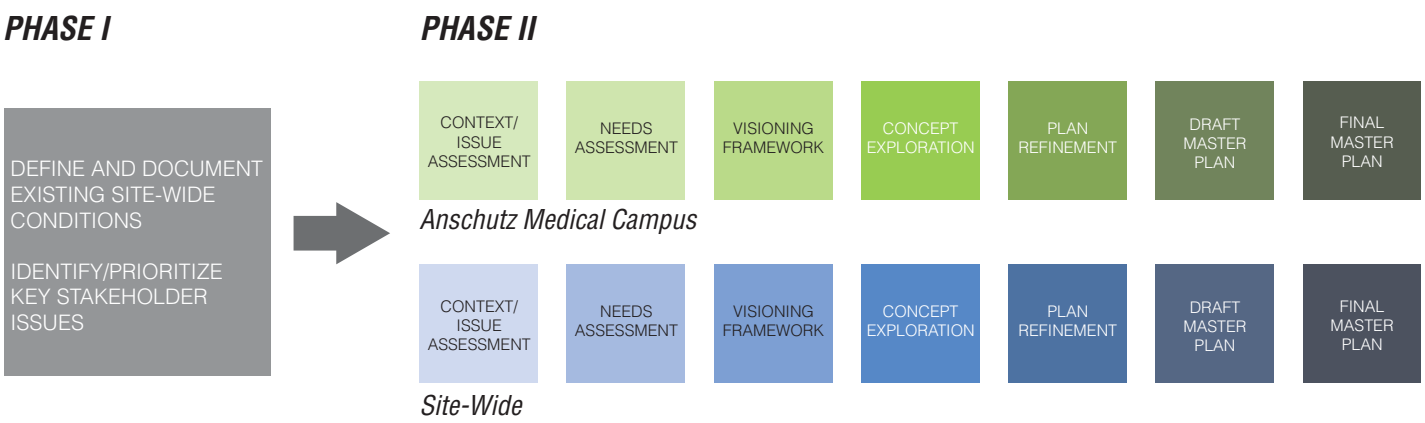


Figure I.1 - Process Diagram

SITE-WIDE COORDINATED MASTER PLAN - PHASE I

The purpose of this document was to define, document, and analyze existing Anschutz Medical Campus and Site-Wide conditions and to identify and prioritize key stakeholder issues. Completed and adopted in January 2012, this document formed the basis for Phase II in terms of reprioritizing key issues, concerns, and opportunities developed through stakeholder collaboration and consensus building.

SITE-WIDE COORDINATED MASTER PLAN - PHASE II AND ANSCHUTZ MEDICAL CAMPUS 2012 FACILITIES MASTER PLAN

The two separate efforts of Phase II, defined below, were developed concurrently.

Site-Wide Coordinated Master Plan - Phase II

The goal of this document is to establish a consensus-driven framework for Site-Wide infrastructure and utility development that accommodates short- and long-term growth needs consistent with the newly established Site-Wide physical vision, goals, and principles.

Anschutz Medical Campus 2012 Facilities Master Plan

Working within a 10-year planning horizon, this document outlines population and program growth for the university, UCH, and CHCO that will drive both individual institutional and campuswide facility, information technology, utility, infrastructure, and parking needs both short-term (1–5 years) and long-term (6–10 years), consistent with the newly established Anschutz Medical Campus physical vision, goals, and principles.

In this phase of the process, the university also undertook a comprehensive program planning effort to identify its needs for the next decade.

Workshops with stakeholders and the planning team.

ENGAGEMENT

The university's commitment to campuswide engagement is reflected in the inclusive, responsive, and communicative approach implemented in campus planning that ensured the needs of stakeholders were heard and addressed.

An essential element in the successful development of the Anschutz Medical Campus 2012 Facilities Master Plan was crafting a comprehensive engagement strategy. This strategy was designed to clarify the planning process and manage stakeholder expectations by conducting workshops and disseminating information pertinent to the formulation and execution of a viable campus development framework.

The engagement strategy used various types of communication, including a website and social media, which were implemented at milestones in the project schedule, as well as regular, ongoing contact with campus and off-campus stakeholders. The seven principal Site-Wide stakeholder institutions and entities engaged in Phase I and II of the Site-Wide Coordinated Master Plan included:

- CHCO
- CoA
- Fitzsimons Redevelopment Authority (FRA)
- CU Anschutz
- UCH
- University Physicians, Inc. (UPI)
- Denver Veterans Affairs Medical Center (VAMC)

Although participation in the two concurrent planning efforts was similarly organized, there were some differences in process structure and decision making. As a result, the following section details engagement and organization for only the Anschutz Medical Campus 2012 Facilities Master Plan. The principal stakeholder institutions engaged in Phase II of the Anschutz Medical Campus 2012 Facilities Master Plan included:

- CU Anschutz
- CHCO
- UCH

As with all complex planning efforts, a successful process requires the organization of stakeholders into distinct groups with defined expectations and outcomes. To this end, stakeholders were organized into three comprehensive categories, which include:

- Core Participants
- Advisory/Consultative Participants
- Statutory Review and Approval

Core Participants

Core participants were active contributors in all aspects of the planning process and had representation on one or more of the following master planning committees:

- Anschutz Medical Campus Executive Committee
- Anschutz Medical Campus Steering Committee
- Anschutz Medical Campus Planning Committee
- Task force(s)

Planning strategies, concepts, and schemes were vetted at each level, from task force brainstorms to feedback and direction from the Steering Committee to decision making from the Executive Committee. Ideas, expertise, and concepts originated at the task force level, which was organized around seven planning areas of focus: academics, research, clinical, urban design, circulation, parking, and utilities/infrastructure. Experts in each task force discipline, administrators, and staff met in four workshops linked with critical project milestones over the course of Phase II.

After each workshop, points of consensus and issues requiring further study were reviewed by the Planning Committee, which was charged with assessing and identifying the proposals that would then be recommended to the Steering Committee for review, refinement, and direction. The resulting proposals were submitted regularly to the Executive Committee for further refinement and approval.

This process resulted in a constructive feedback loop, with proposals returned to the task forces for either improvement or further development, beginning the next iteration of the decision-making cycle.

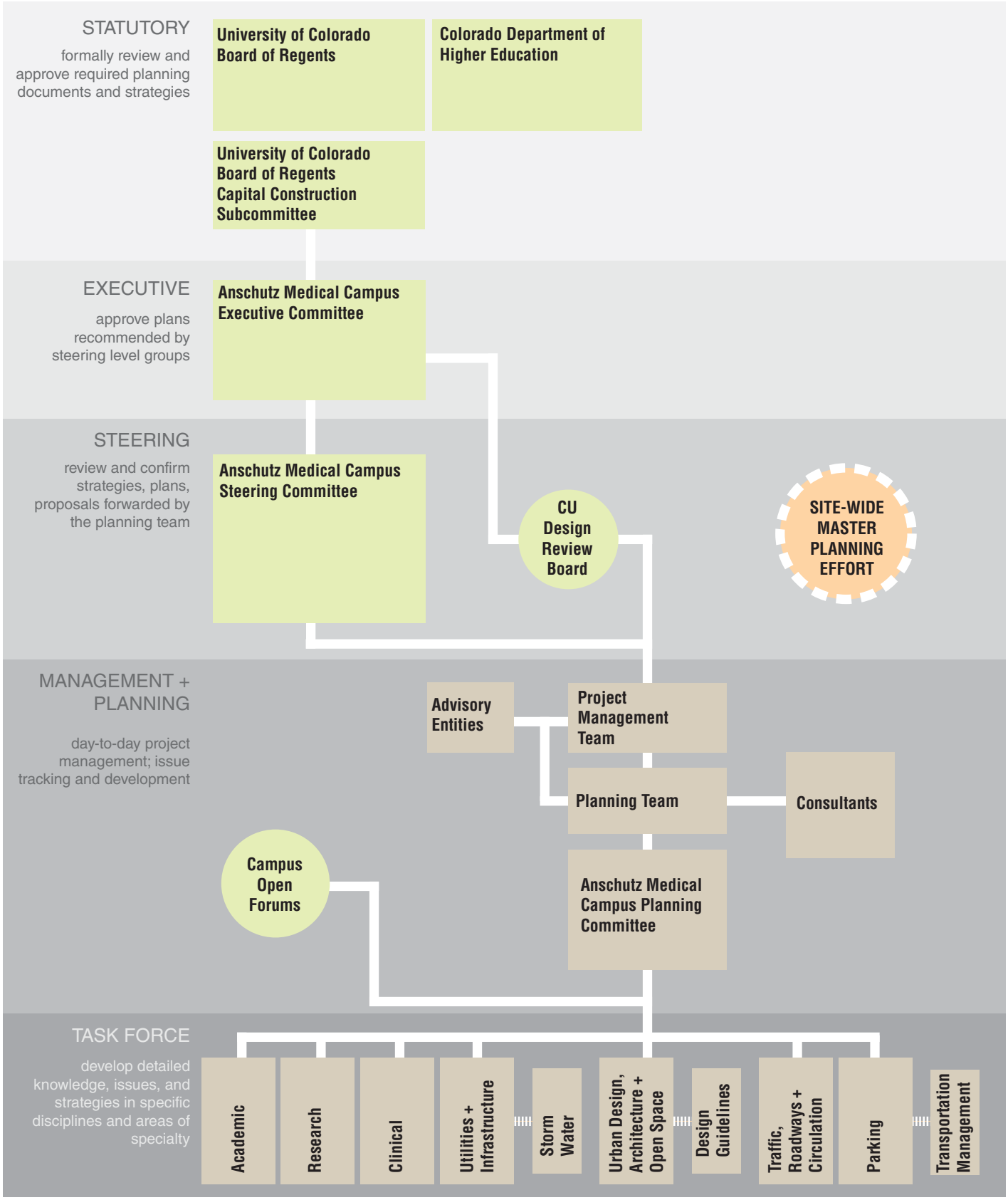


Figure I.2 - Organizational Framework And Decision-Making Process

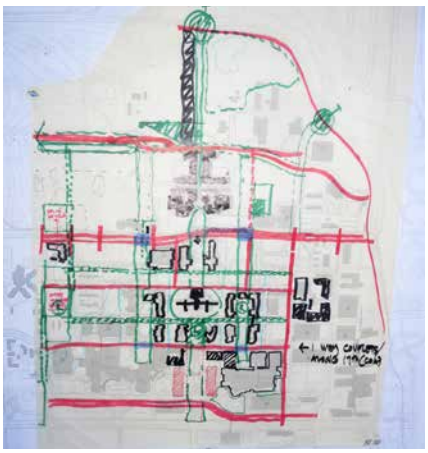
Advisory/Consultative Participants

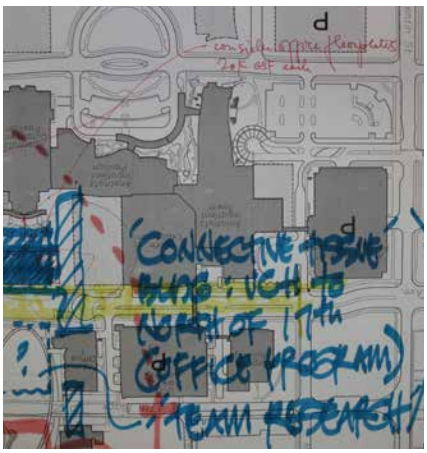
Embedded within this iterative process were continuous meetings with a variety of advisory/consultative groups that helped inform and shape the master plan. These entities included the CU Anschutz Student Senate, CU Anschutz Faculty and Staff Assemblies, SOM Faculty Senate, CU Design Review Board (DRB), FRA Board, Regional Transportation District (RTD), CoA Neighborhood Organizations/Associations, and CoA Planning and Development Services, Parks, Recreation, and Open Space, and Public Works Departments. A full list of participants can be found in Appendix VII.1.

Statutory Review/Approval

The CU BOR is charged constitutionally with the general supervision of all four CU campuses and the exclusive control and direction of all funds of and appropriations to the university, unless otherwise provided by law. The CU BOR Capital Construction Subcommittee (CCS) reviews all building and master planning projects before they go to the full board for formal approval. The CU BOR CCS must approve the Anschutz Medical Campus 2012 Facilities Master Plan before it can be submitted for approval to the larger board, which is necessary for university adoption of the plan.

The CDHE has the authority to prescribe uniform policies, procedures, and standards of space utilization and to review master plans and program plans for all higher education capital construction projects in Colorado. The ability to review master plans for state institutions of higher education allows CDHE and state-elected officials to attain a better understanding of educational facilities' needs and priorities. CDHE requires a reassessment of any facilities master plan every 10 years.





A variety of conceptual development strategies were explored and tested during the planning process.

ORGANIZATION

The engagement strategy also established an organization framework that identified the make-up and defined the roles of the various committees, working groups, focus groups, and community forums. The framework also established ongoing client and consultant team meetings for review and feedback of work in progress. The organization framework and flow of process decision making is depicted in Figure I.2.

METHODOLOGY

The focus of Phase II for the Anschutz Medical Campus 2012 Facilities Master Plan process and product is CU Anschutz, UCH, and CHCO. However, to avoid planning in isolation, Site-Wide elements have been introduced, as needed, to clarify planning strategies, solutions, and recommendations.

Phase II planning methodology identified seven distinct tasks that occurred over a 16-month period. Some were performed sequentially, others concurrently. The tasks and the defined primary purpose of each are described on the following page.

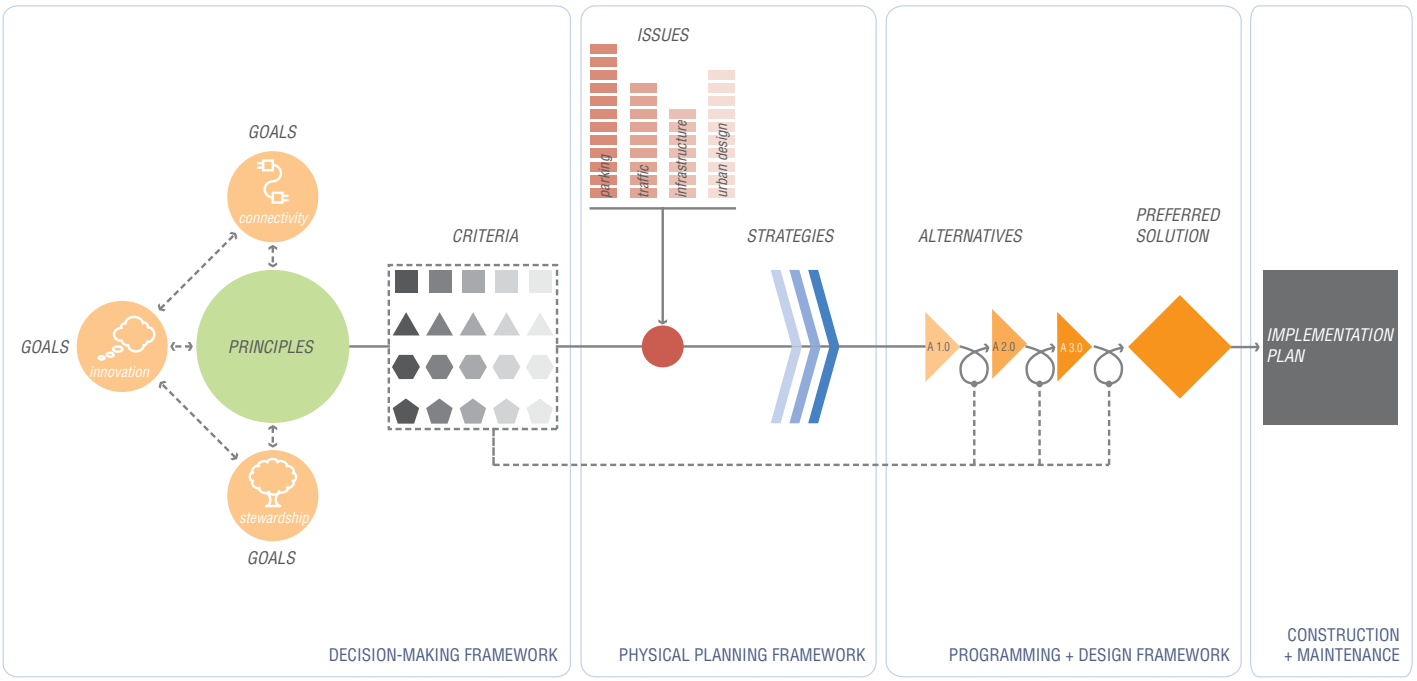


Figure I.3 - Project Process Diagram

I. Context and Issue Assessment

Validate and confirm Phase I: Site-Wide Consolidated Master Plan data and issues.

II. Education Program

Establish 10-year projections from fiscal year (FY) 2011–2012 to FY 2021–2022 for all space needs to accommodate anticipated population growth and existing and new academic, research, clinical, administrative, and support functions. In addition, this task involved calculating current space utilization and identifying goals and strategies to increase utilization efficiency.

III. Visioning Framework

Establish the physical vision, goals, principles, and criteria that are proposed to guide conceptual development and decision making in planning the Anschutz Medical Campus over the next 10 years.

IV. Concept Exploration

Create and evaluate conceptual development strategies for campus circulation, facilities, urban design, open space, infrastructure, and utilities that meet short- and long-term growth needs and support the missions, visions, and strategic plans of the three institutions.

V. Plan Refinement

Refine, enhance, and strengthen the campus community's consensus-based preferred conceptual development strategy and develop a preliminary implementation plan that includes phasing, costing, financial strategies, and design guidelines.

VI. Draft Facilities Master Plan

Prepare a DRAFT facilities master plan narrative report, with associated support diagrams, illustrations, tables, and imagery, in conformance with CDHE facility planning guidelines and contracted contents.

VII. Final Facilities Master Plan

Prepare a FINAL facilities master plan narrative report, with associated support diagrams, illustrations, tables, and imagery, in conformance with CDHE facility planning guidelines and contracted contents. This document will be submitted to CU Anschutz and CU BOR for adoption.

FUTURE STUDIES

The planning process resulted in the identification of several planning areas that would need further in-depth study. The studies are meant to be undertaken within the context of the 2012 Facilities Master Plan, which will serve as a baseline for each effort.

II. CONTEXT

II. CONTEXT

II.1 OVERVIEW

The Anschutz Medical Campus is situated within CU-owned property located in the city of Aurora within Adams County, Colorado. Aurora is part of the Denver-Aurora-Broomfield Metropolitan Statistical Area (MSA), which the U.S. Office of Management and Budget identified in 2012 as the 21st-largest MSA, with a population of 2,645,209. Located in northwestern Aurora, the campus is approximately nine miles east of the CU Denver Campus and Denver's central business district. Colfax Avenue directly links the two CU campuses. It is the region's primary east-west surface arterial roadway and, at 26.5 miles, the country's longest continuous commercial street.

Currently comprised of 230 acres, the Anschutz Medical Campus is home to CU Anschutz and its partner and affiliated hospitals, UCH and CHCO, respectively. CU's health-related schools, colleges,

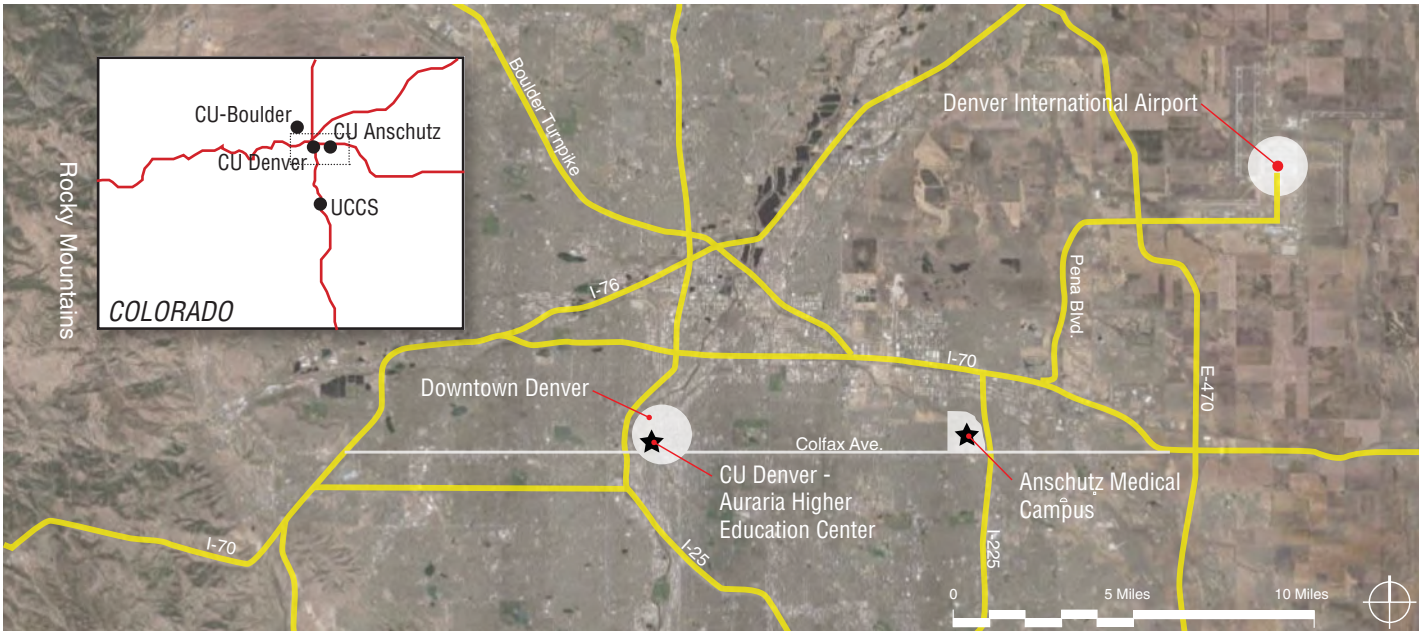


Figure II.1 - Regional Context

centers, and research and clinical care facilities are located within the Anschutz Medical Campus. Much of the campus property was conveyed to CU through the U.S. Department of Education (DOE). UCH and CHCO occupy parcels that are long-term land leased to those institutions. To date, the three institutions that make up the Anschutz Medical Campus have together invested over $4 billion dollars in new facilities and infrastructure, making it the largest medical-related development in the United States.

Several of CU Anschutz's schools, colleges, and programs are nationally ranked within the top 10 and/or 50 by *U.S. News and World Report*. In addition, *U.S. News and World Report* ranked CHCO in the top 10 and/or 50 nationally in 10 pediatric specialties and ranked UCH in the top 50 nationally in five adult specialties. The University HealthSystem Consortium has ranked UCH number one in patient survival rates among academic hospitals in the U.S.

In 2012, the Anschutz Medical Campus had a total population of approximately 21,224 people (not including patients or visitors). This includes 3,999 at UCH, 4,365 at CHCO, and 12,860 at CU Anschutz.

In 2012, the 12,860 people at CU Anschutz included 3,836 faculty, 2,549 staff, 1,336 professional research assistants (PRAs), 1,010 medical residents, and 4,129 students.

Campus life.

II.2 BACKGROUND

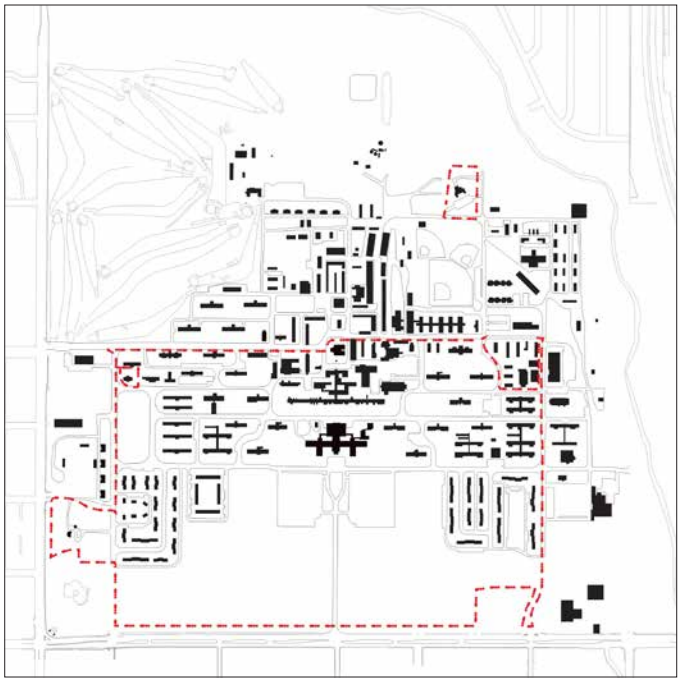
The world-class AHC now established on the former FAMG has a notable history of achievement and excellence that began in 1883 at CU-Boulder, where SOM was established as the Department of Medicine and Surgery. In 1925, the school moved to a new medical center built three miles east of downtown Denver on 17 acres of land donated by Frederick G. Bonfils, then publisher of *The Denver Post*. The new site was concentrated along 9th Avenue on the eastern side of Colorado Boulevard and was often referred to as the 9th Avenue campus. SOM shared a building with the University of Colorado Hospital until 1965, when a new hospital was constructed. Soon after, the SOM was joined in Denver by CU's CON and SDM.

In 1975, the CU Medical Center became an autonomous CU campus, and in 1979 it was renamed UCHSC to reflect the interrelationships between units. In 1988 CU's SOP was transferred from Boulder to the UCHSC, and it was relocated to a new facility in 1992.

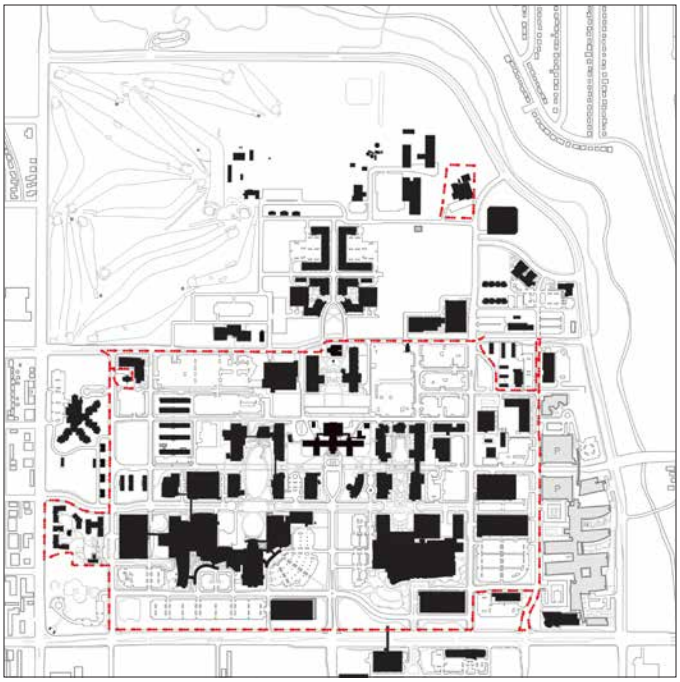
AURORA, COLORADO: CU'S NEW CAMPUS SITE

In 1995, the U.S. Congress voted to approve the Base Realignment and Closure Commission (BRAC) bill that included closure of the 578-acre FAMG, also known as the Fitzsimons Army Medical Center, in Aurora. In 1999, the army officially closed the Fitzsimons facility. However, many of the U.S. Army's properties had been conveyed in 1998, prior to closure, to a variety of federal and state governmental agencies, including the U.S. DOE. In 1998 alone, the DOE conveyed five parcels equaling approximately 87.5 acres to CU.

In the 19 years since its closure, approximately 230 acres have been transferred, at no cost, to CU to build its new AHC. In the fall of 1997, the CU BOR voted unanimously to move the entirety of its health sciences programs to its then 192-acre site on the former FAMG. UCH's Board of Directors also voted unanimously to move the hospital to the new site in Aurora.



1996



2012

Figure II.2 - Site Development: 1996 Fitzsimons Army Medical Garrison | 2012 Anschutz Medical Campus

In 1998, the first move of administrative units into the partially renovated former Army Hospital (Building 500) occurred. Planning and design of new buildings for the campus began in 1999, and the first move of personnel into newly constructed buildings at the site began in June 2004. By January 2009, the move from the former 9th Avenue health sciences center in Denver to the new campus in Aurora was complete.

By 2009, investment by CU, UCH, and CHCO in facilities and infrastructure on the Anschutz Medical Campus had totaled more than $2.1 billion, and between 1997 and 2011, the university alone completed approximately $1 billion in construction projects.

Raising this level of financing required the assistance of multiple partners, including the CoA, state legislators, and private philanthropists. In recognition of the role of the largest contribution from an individual donor, the new campus was renamed the Anschutz Medical Campus in November 2007, in honor of businessman Philip Anschutz.

Today, the Anschutz Medical Campus includes over 7.1 million GSF of facilities that support education, including classroom, laboratory, library, support space, research, institutional administrative support, and health care facilities, including all typical hospital and ambulatory medical services and general physical plant operations. In addition, CU Anschutz, UCH, and CHCO have a combined total of 2.5 million GSF of structured parking facilities. In total, the Anschutz Medical Campus has just over 9.6 million GSF of built facilities. (Note: the numbers do not include facilities currently under construction or completed in FY 2012–2013).

CU ANSCHUTZ MEDICAL CAMPUS

In academic year 2011–2012, CU Anschutz graduated 1,073 students, including 275 from SOM, 105 from SDM, 221 from CON, 193 from SOP, 90 from SPH, and 189 from GS. Many of these students have received part of their training at on-campus clinical facilities and/or at several university affiliate/partner hospitals, including UCH, CHCO, Denver Health, and the VA.

The relocation of UCH (2000) and CHCO (2007) to the Anschutz Medical Campus further enhances faculty and staff access to clinical areas and facilitates, to the flow of discoveries made from bench to bedside, and ultimately to the community.

Degrees Awarded Report
University of Colorado Anschutz Medical Campus
Office of Institutional Research and Effectiveness, 2012

College/School	*Degrees Awarded*
School of Medicine	275
School of Dental Medicine	105
College of Nursing	221
Skaggs School of Pharmacy	193
Colorado School of Public Health	90
Graduate School	189
Total Degrees	1073

Figure II.3 - Degrees Awarded Report

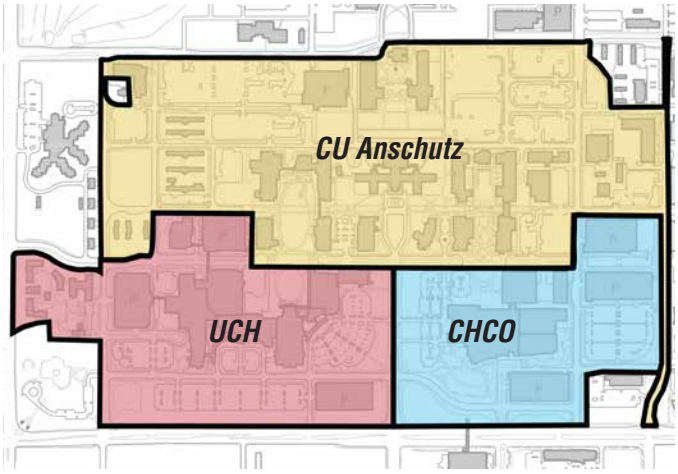
II.3 STUDY AREA

A. Campus and Region

The Anschutz Medical Campus occupies most of the southern half of the former 578-acre FAMG, and it is bound to the north by Montview Boulevard, to the east by North Wheeling Street, to the south by Colfax Avenue, and to the west by Quentin Street. Although the institutions on the Anschutz Medical Campus collaborate on a variety of efforts, the 230-acre campus is divided into three distinct contiguous portions and two outparcels. CU Anschutz occupies the area of the campus north of 17th Avenue, and the hospitals occupy the southern portion, with UCH in the southwestern zone and CHCO in the southeastern zone. The two outparcels are located within the northeastern section of the FRA, and they house the CU Anschutz Perinatal Research Facility and the Fitzsimons Early Learning Center, associated with CHCO.

The portion of the former FAMG now occupied by the Anschutz Medical Campus has undergone significant change, especially since the initial land conveyances in 1998. Since then, the campus has grown from 6.4 million square feet of existing and new facilities in December 2008 to over 11 million GSF by 2013. During that 14-year period of robust development, most of the army's buildings were razed to accommodate newer, more specialized facilities. A few notable on-campus structures were retained, including the Red Cross Building, Colonel's Row (four former officers' residences), and the former Army Hospital, known as Building 500.

The campus is linked to the metropolitan region via Peoria Street, Colfax Avenue, and U.S. Interstates 225 and 70. With completion of RTD's I-225 light rail line in 2016, the campus will be linked via two adjacent light rail stations to all regional transportation destinations including Union Station and Denver International Airport.



The three contiguous portions of the Anschutz Medical Campus.

Fitzsimons Army Medical Garrison, 1941.

Building 500.

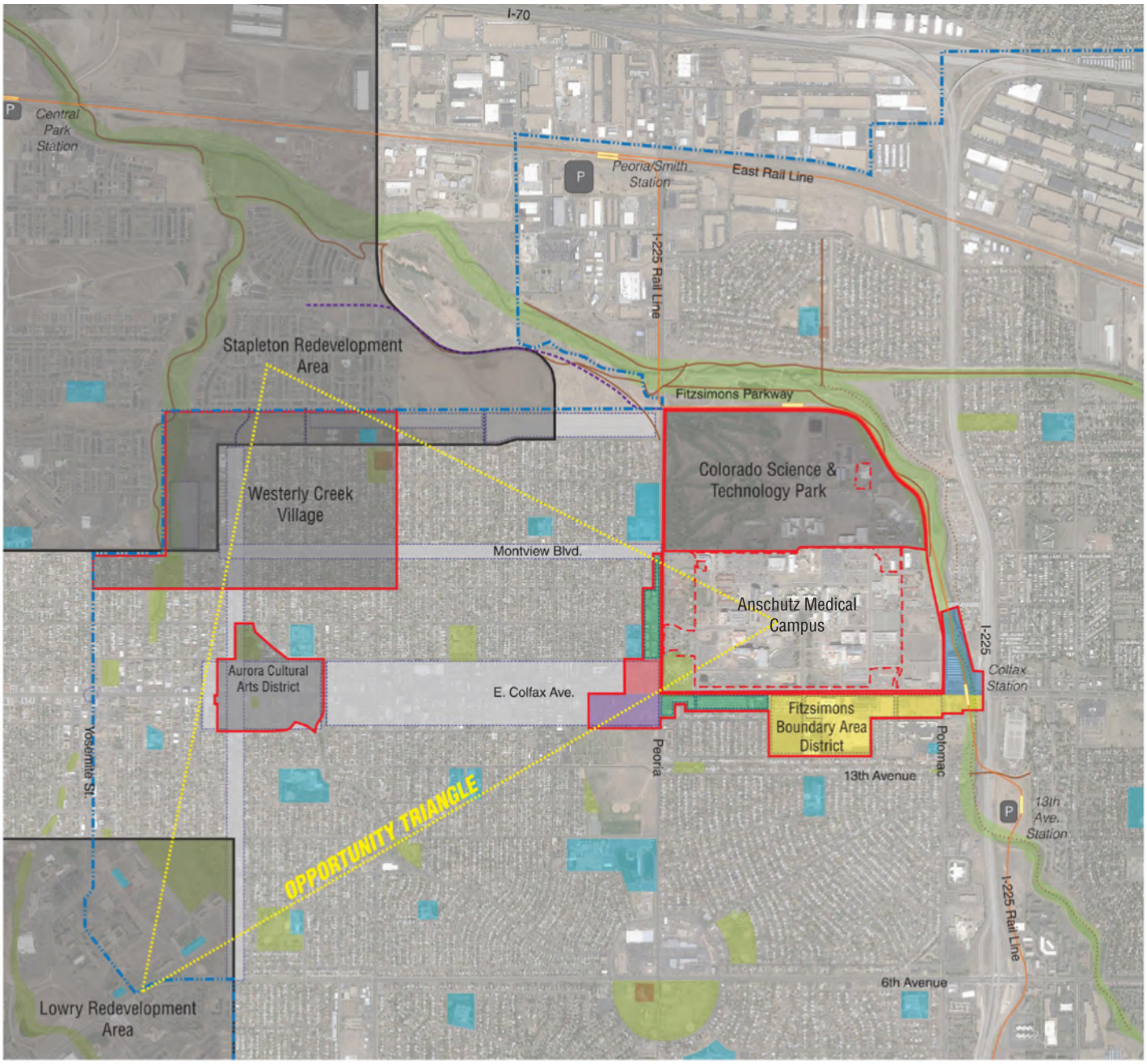
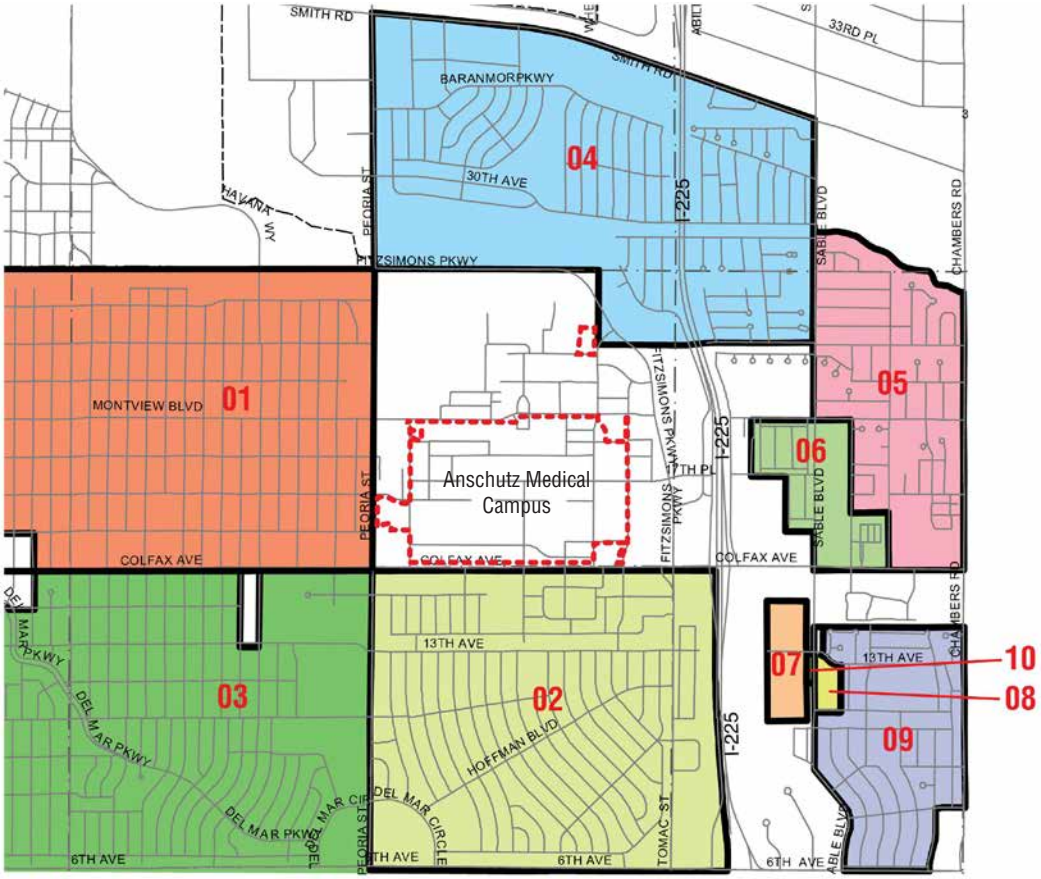


Figure II.4 - City of Aurora Context



Aurora Neighborhood Organizations

01	Northwest Aurora Neighborhood Organization	06	Hillcrest Village Homeowners Association
02	Hoffman Heights/Jewell Heights Neighborhood Organization	07	The Meadows
03	Del Mar Parkway Neighborhood Organization	08	Summerfield Villas Townhome Association
04	Morris Heights Improvement Association	09	Chambers Heights Homeowners Association
05	Sable/Altura/Chambers Neighborhood Organization	10	Veronica Acres Homeowners Association

--------- Anschutz Medical Campus boundary

Figure II.5 - City of Aurora Neighborhood Organizations

The Anschutz Medical Campus has a variety of neighbors within the former army facility that include the in-development VAMC along the east; FRA, UPI, CoA Police Station, and the Pauls Development to the north; and the State of Colorado's Veteran Home, Center for Dependency, Addiction and Rehabilitation (CeDAR), and General's Park to the west.

Northwestern Aurora was once the city's government and commercial center, with Colfax Avenue as its main street. As a result, the area has densely developed neighborhoods with a traditional urban grid of streets and pedestrian-scaled residential blocks. The area is home to long-standing neighborhood organizations and associations, which include the Northwest Aurora Neighborhood Organization west of Peoria Street; Hoffman Heights/Jewell Heights Neighborhood Organization south of Colfax Avenue; Del Mar Parkway Neighborhood Organization to the southwest; Morris Heights Improvement Association north of Sand Creek; and Sable/Altura/Chambers Neighborhood Organization, Hillcrest Village Homeowners Association, The Meadows, Summerfield Villas Townhome Association, Chambers Heights Homeowners Association, and Veronica Acres Homeowners Association east of I-225.

As shown in this southward view, the Anschutz Medical Campus is bounded on all four sides by established residential neighborhoods, including Hoffman Heights and Jewell Heights to the south of Colfax Avenue (running right to left just beyond the hospital towers).

B. Economic Impacts

The most recent campus economic report, titled *Economic Contributions of the Anschutz Medical Campus* by Sammons/Dutton LLC (2011), outlined the contributions made to the Colorado economy by the Anschutz Medical Campus and the affiliated UPI for the fiscal year ending June 30, 2010. Several key facts listed in the report were:

- CU Anschutz and UPI had a total state economic impact of $2.05 billion through direct campus expenditures, including payroll, operations, and student spending plus indirect effects. For every $1.00 in direct expense by CU Anschutz, there was up to an additional $1.04 in purchased goods and services in Colorado.
- Direct campus employment of 8,112 jobs (June 2010) created nearly 9,700 additional jobs for a total employment impact of nearly 17,800 jobs in Colorado. On average, each faculty and staff position at CU Anschutz and UPI supported another 1.19 additional jobs in the state.
- There was a total payroll impact of $1.15 billion in Colorado based on $718 million in direct wages, salaries, and benefits. For every $1.00 in compensation paid to employees, there was up to $0.60 in additional income provided to the state.
- In 2010, the annual operating revenue for CU Anschutz and UPI was in excess of $1 billion. Revenue from clinical health services represented 35 percent of the total, and federal grants and contracts accounted for 25 percent. Meanwhile, state-appropriated resources in FY 2010, excluding one-time state fiscal stabilization funds, contributed 4.3 percent of total revenue.
- Spending and jobs by adjacent clinical partners also supplemented the economic impact to the state of Colorado. The combined contributions of CU Anschutz, UPI, UCH, and CHCO supported up to 36,000 jobs for a total state economic impact of more than $4.5 billion. (Economic contributions of the in-construction VAMC are not included in these calculations.)

Since the 2011 Sammons/Dutton LLC study, the university's 2012 budget has exceeded $1.2 billion, which includes $64 million (5 percent) in state general financing, $73 million (6 percent) in tuition and fees, $413 million (34 percent) in grants and contracts, $180 million (15 percent) in self-funded programs, and $494 million (40 percent) in clinical income.

Commencement.

II.4 GROWTH ASSUMPTIONS AND TRENDS

A. Population Growth

The headcount population of CU Anschutz in fall 2012 totaled 12,860 persons, which includes all faculty, staff (central services and administration), professional research assistants (PRAs), medical residents, and students. When combined with UCH and CHCO, the total headcount population in 2012 was 21,224. Over the 10-year master planning period, this total headcount population is expected to grow by 47 percent to over 30,000 people. In addition, the Anschutz Medical Campus entities are visited annually by over 1.4 million outpatients, and UCH and CHCO have over 41,000 annual inpatient admissions.

Students and faculty gather on the Art Walk.

Financial Planning - CU Anschutz Headcount Projections
University of Colorado Anschutz Medical Campus
Office of Institutional Research and Effectiveness, September 2012 (Rev. July 16, 2013)

Description	*2011–2012 Actual*	*2021–2022 Projected*	*Headcount Increase*	*Annual % Increase*
Faculty	3,836	4,641	805	2.1%
Staff	2,549	3,033	484	1.9%
Professional Research Assistants (PRAs)	1,336	1,617	281	2.1%
Residents	1,010	1,263	253	2.5%
Students	4,129	5,443	1,314	3.2%
Total	12,860	15,997	3,137	2.4%

Figure II.6 - CU Anschutz Headcount Projections

B. Space Needs

In 2012, CU Anschutz utilized a total of 2,045,167 assignable square feet (ASF) within facilities owned and leased by the university. The leased space includes 122,575 ASF of space in the UPI building, Leprino, Gary Pavilion, and other buildings in close proximity to the campus. Although the university leases additional facilities beyond the campus, only those leased spaces proximate to the university were included in the space needs analysis.

To properly address the amount of CU Anschutz building space needed in the 10-year planning horizon, a space needs analysis was conducted using space inventory data provided by the university's Office of Administration and Finance for FY 2011–2012. For current programs, future 10-year space need was calculated to be +406,274 ASF, which represents +19.9 percent of new space to accommodate future growth, expansion, and development. This forecast includes +133,268 ASF for non-research space and +273,006 ASF for new research space to help meet all university demand, such as for growing academic, research, and clinical programs, as well as for administrative, facilities, and support services uses. The 406,274 total ASF of space needed translates to approximately 650,000 GSF of space need.

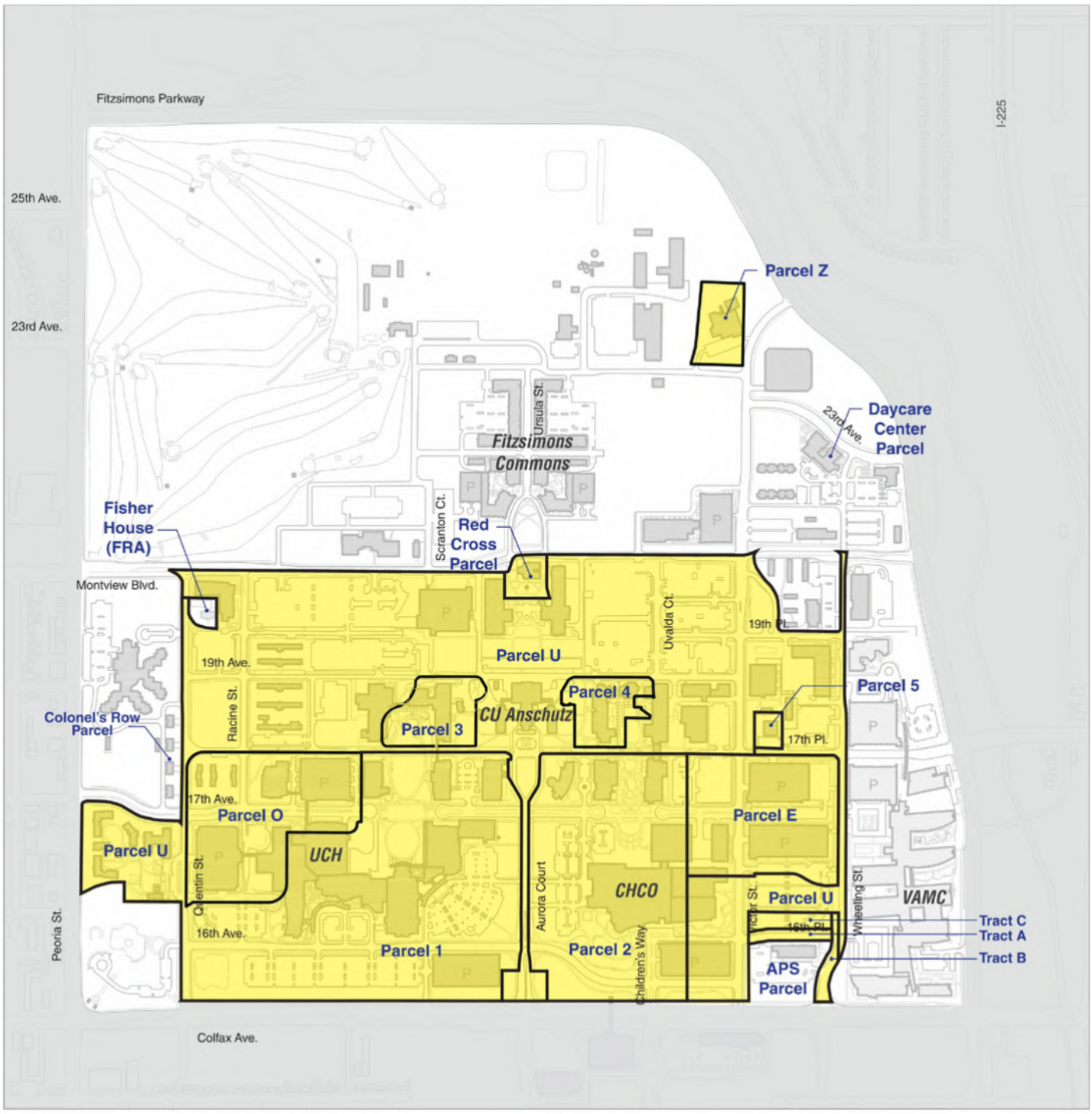
In addition, the two hospitals have a projected combined 10-year space need of 2,565,485 GSF. UCH identified a need for over 2 million GSF, and CHCO projected 458,693 GSF of expansion.

Chapter IV of this report describes in detail the methodology used in the calculations for the CU Anschutz Space Needs and Utilization Analysis. The following table (Figure II.7) is a summary of the current university space and projected need over the 10-year master plan period.

University Space Inventory Summary
University of Colorado Anschutz Medical Campus
Fall 2012

Description - Space Inventory	*2011–2012 Actual Assignable SF*	*2021–2022 Projected Assignable SF*	*Increase/ Decrease Assignable SF*	*Growth % Increase/ Decrease*
All Research/Clinical Space/Support	1,067,209	1,340,215	273,006	25.6%
Academic/Administrative/Other	977,958	1,111,226	133,268	13.6%
Overall Space Inventory Total	2,045,167	2,451,441	406,274	19.9%

Figure II.7 - Summary - Campus Space Inventory and Future Space Projections



Parcels 1, 2, 3, 4, 5	Deed Restrictions Ending 5-12-2028		Anschutz Medical Campus properties
Parcel U	Deed Restrictions Ending 12-12-2030		Outparcels not affiliated with the Anschutz Medical Campus
Parcel Z	Deed Restrictions Ending 7-17-2031		
Red Cross Parcel	No Restrictions on Use, but Restrictions on Development		
Parcels E, O, APS, Daycare Center, Colonel's Row	No Restrictions on Use or Development		

0 500'

Figure II.8 - Anschutz Medical Campus Conveyance Map

II.5 REGULATORY FRAMEWORK

A. Land Ownership and Conveyance

CONVEYANCE

The U.S. Army announced in 1995 the planned closure of the FAMG, a 578-acre site in Aurora, Colorado. In collaboration, UCHSC and CoA actively pursued the adaptive reuse of this property, which included property conveyance at no cost to either entity from the DOE, Department of Justice (DOJ), and Department of Interior (DOI). The CU BOR quickly approved a study of the Fitzsimons site that confirmed its feasibility for university programs, and the BOR subsequently initiated the acquisition process.

The FRA was created to conform to the Department of the Army's BRAC property acquisition process, which requires a body be established to organize and oversee the transition and redevelopment of former military properties. UCHSC worked with the FRA to prepare coordinated development plans and to request 217 acres of land for the university. The remainder of the original 578 acres was conveyed to, and/or purchased by, various institutions and entities through the U.S. Army and DOE, DOJ, and DOI.

The UCHSC first moved to the Fitzsimons site in May of 1997, when it leased space in the main hospital, Building 500, for administrative uses. Within months, CU also submitted an Application for Public Benefit Transfer of Surplus-Federal Real Property for Educational Purposes to the United States to the DOE for 192.9 acres of land and buildings located on the property. As a public higher-education entity, the university could acquire the land at no cost if its use would be to further an educational mission for the good and benefit of Colorado citizens. The DOE approved the request, and 87.56 acres of the 192.9-acre total were made available for early conveyance. This included Parcels 1, 2, 3, 4, and 5 (see Figure II.8), with deeds dated 1998. These areas currently comprise parts of UCH and CHCO, Research 1 North, Education 1, and Building 610.

In 2000, the DOE approved an additional 105.31-acre conveyance as a part of a Lease in Furtherance of Public Benefit Conveyance (LIFPBC). This property, known as Parcel U, can be seen in Figure II.8. Parcel U included a consolidation of former Parcels U, X, and W, as well as Building 618 and Building 500, with associated property. The acquisition of Parcel U completed the conveyance of all 192.3 acres originally requested by UCHSC.

U.S. DOE conveyed Parcel Z to UCHSC in 2001. The 2.97-acre outparcel is located in the northern portion of the site, near the U.S. Army Reserve Center. At the time of conveyance, the addition of Parcel Z brought the campus to a total 195.84 acres. Today, Parcel Z houses the university's Perinatal Research Facility.

Other smaller property conveyances included the Red Cross and Aurora Public Schools (APS) Parcels. The 1.43-acre Red Cross Parcel was originally sold to the FRA by the U.S. Army as a part of a federal economic development conveyance. The FRA conveyed this property to CU in 2004 through a quitclaim deed. The U.S. Army transferred land referred to as the APS Parcels to the DOE, which were then conveyed to APS. Some APS Parcels were in turn purchased by CHCO. CHCO subsequently conveyed 16th Place from Victor Street to Wheeling Street and 2.23 acres of APS property north of 16th Place to CU to facilitate the realignment of Wheeling Street.

The FRA conveyed an additional 30.93 acres of land to CU in 2004 and 2005. Similar to the Red Cross Parcel, the FRA purchased this property (Parcels E and O) from the U.S. Army under a federal economic development conveyance. Acquisition of Parcels E and O brought the Anschutz Medical Campus to 226.77 acres. With the addition of 3.66 acres from the Red Cross and APS Parcels, the Anschutz Medical Campus reached just over 230 acres—its current size.

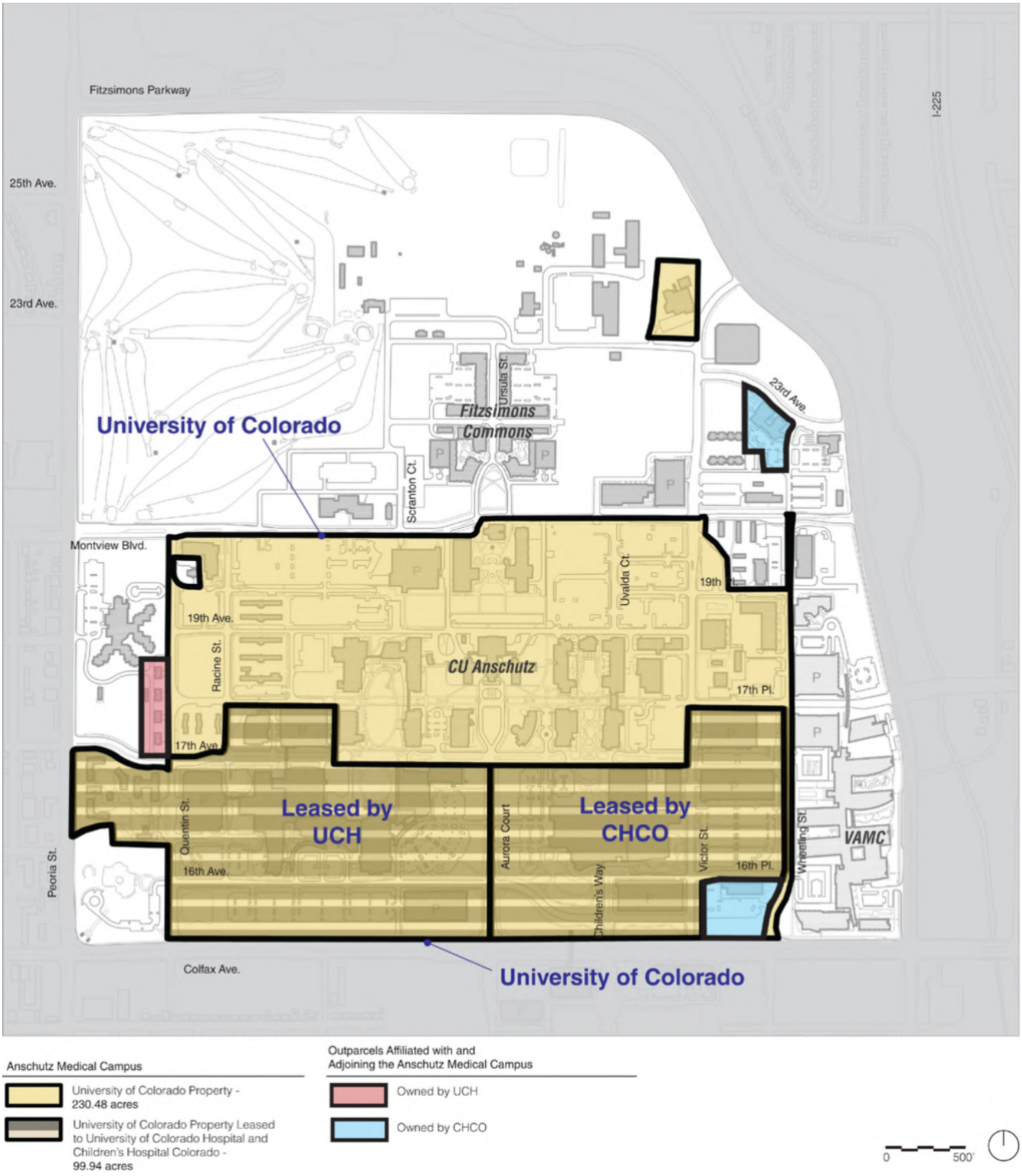


Figure II.9 - Anschutz Medical Campus Ownership and Leases

LAND OWNERSHIP

The 230-acre Anschutz Medical Campus is owned by CU. Outside the CU property, UCH and CHCO both own outparcels either adjacent to the CU lands or within the larger Site-Wide area. UCH owns a 2.1-acre outparcel known as Colonel's Row, and CHCO owns both a 2.8-acre outparcel known as the Children's Dental Clinic and the Fitzsimons Early Learning Center outparcel.

All property within the Anschutz Medical Campus, whether occupied by CU Anschutz or leased by UCH (57.6 acres) or CHCO (42.34 acres), is subject to planning and design coordination, review, and advisement by the CU BOR and its DRB. Properties owned outright by the hospitals do not require CU review.

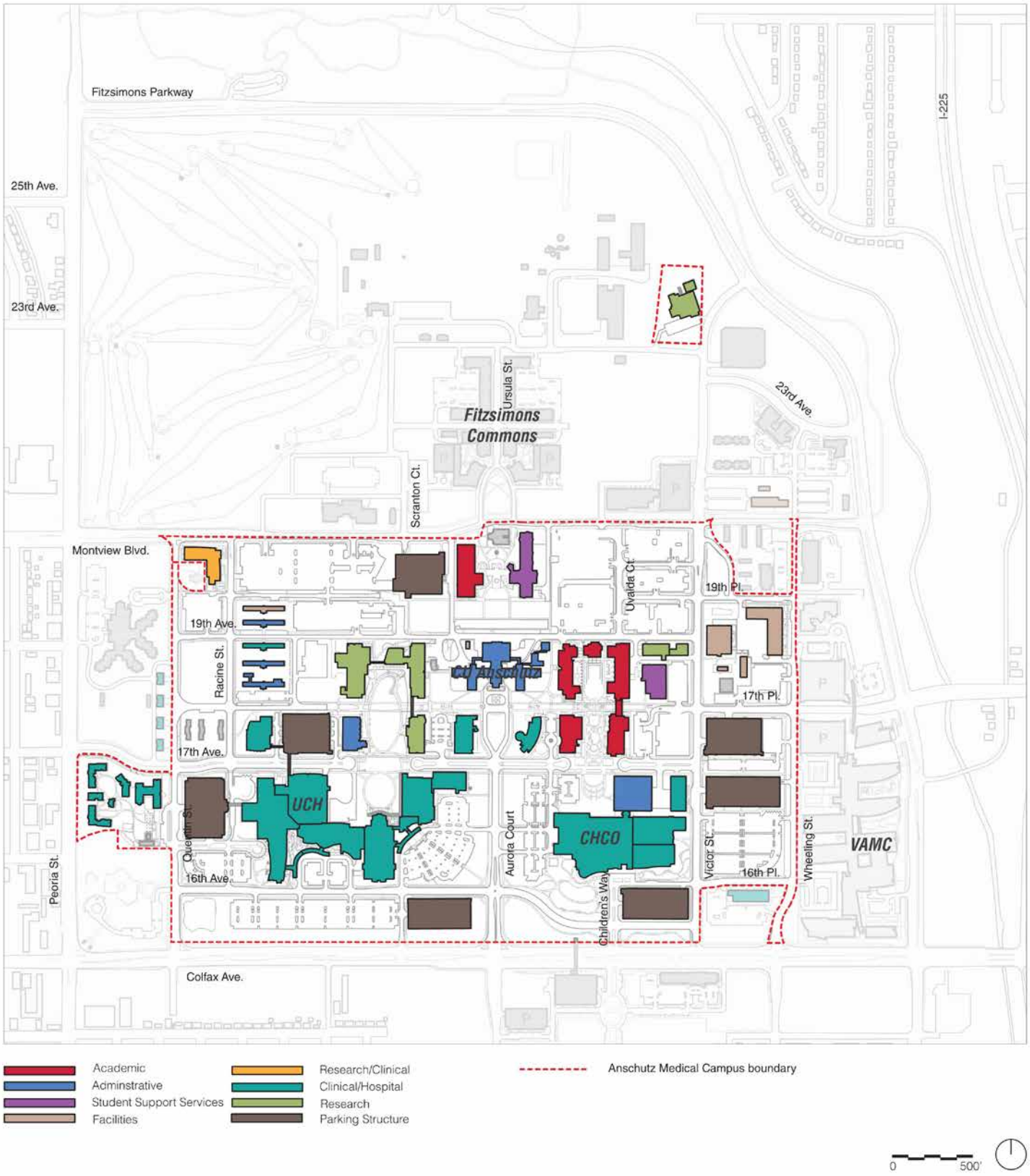


Figure II.10 - Predominate Building Use (>60% of Total Use)

B. Land Use

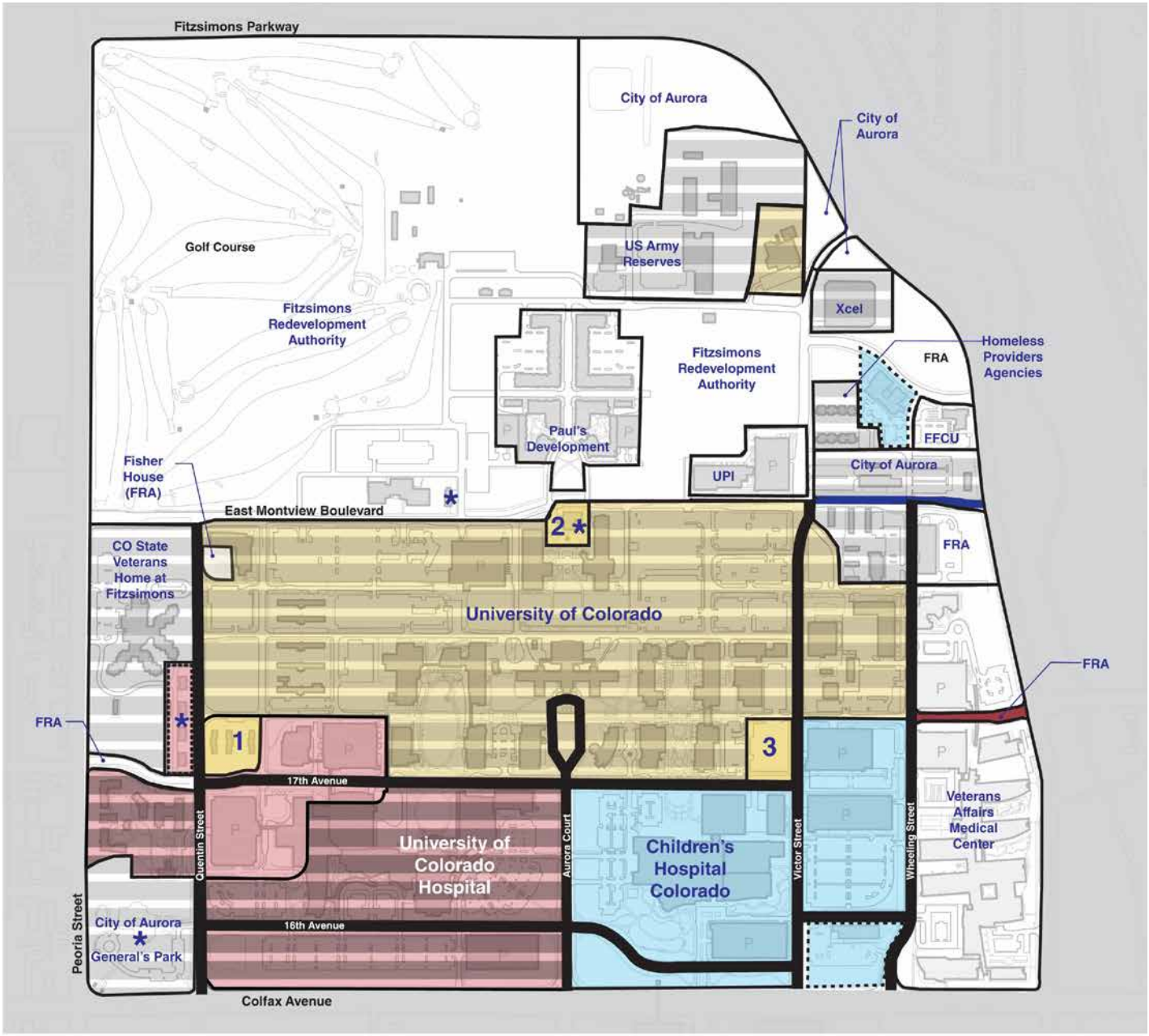
Property use controls greatly influence a campus's physical form, whether they are self-imposed or defined by host government land-use policies. The land-use patterns of the current Anschutz Medical Campus are directly linked to use restrictions outlined in property conveyance covenants. Figure II.10 shows the predominate building use for all Anschutz Medical Campus buildings, all of which further an educational mission.

Although CU has greatly benefited from the various land conveyances, the associated use restraints have curbed its ability to explore some of the creative and innovative research, academic, and clinical partnerships that are rapidly becoming the new norm for 21st-century AHCs, such as hybrid translational research environments where university and private researchers would work side by side within a CU building.

As a result, the few unrestricted properties within the Anschutz Medical Campus boundary, shown in Figure II.11, are highly valued as opportunities for unique, inventive facilities.

Children's Hospital Colorado.

Red Cross Building.



Anschutz Medical Campus Properties

- 1,2 — CU Anschutz - No Restrictions on Development
- 3 — CU Anschutz - No Restrictions on Use/Restrictions on Development
- CU Anschutz - Restricted*
- CU Anschutz - Trunk Roads
- UCH (Leased from CU Anschutz) - No Restrictions
- UCH (Leased from CU Anschutz) - Restricted*
- CHCO (Leased from CU Anschutz) - No Restrictions

** Note: See "Property Conveyance Guide," Appendix VII.2, for additional information.*

Non-Anschutz Medical Campus Properties

- No Restrictions
- Restrictions on Use*
- CHCO-Owned Property - No Restrictions
- UCH-Owned Property - No Restrictions
- Roadways with Restrictions on Development* (Utility Right-of-Way)
- Roadways with Restrictions on Use* (Law Enforcement/Public Safety)
- * — Development Per Historic Preservation Guidelines

Figure II.11 - Controlling Interests and Development Restrictions

RESTRICTED PARCELS

The DOE Public Benefit Conveyances (PBC) required that property transferred to CU be restricted to educational uses. As a result, the majority of the properties that make up the Anschutz Medical Campus can only be developed in furtherance of educational goals such as academic, research, clinical, and administrative and support uses. These restrictions are written into parcel deeds as binding, and failure to develop in accordance with the restrictions can result in reversion of property back to the federal government.

However, these restrictions are temporary and scheduled to expire 30 years after conveyance; several use restrictions will expire in 2028, 2029, and 2031. The specific DOE restricted properties include Parcel 1, the northern part of Parcel 2 (Education 2 South, Nighthorse Campbell Native Health Building, and School of Dental Medicine), Parcels 3, 4, 5, portions of Parcel U (north of 17th Avenue, all of the CeDAR property, and property north of Colfax Avenue and west of Aurora Court), and the entirety of Parcel Z. Restricted properties are indicated with gray stripes in Figure II.11.

UNRESTRICTED PARCELS

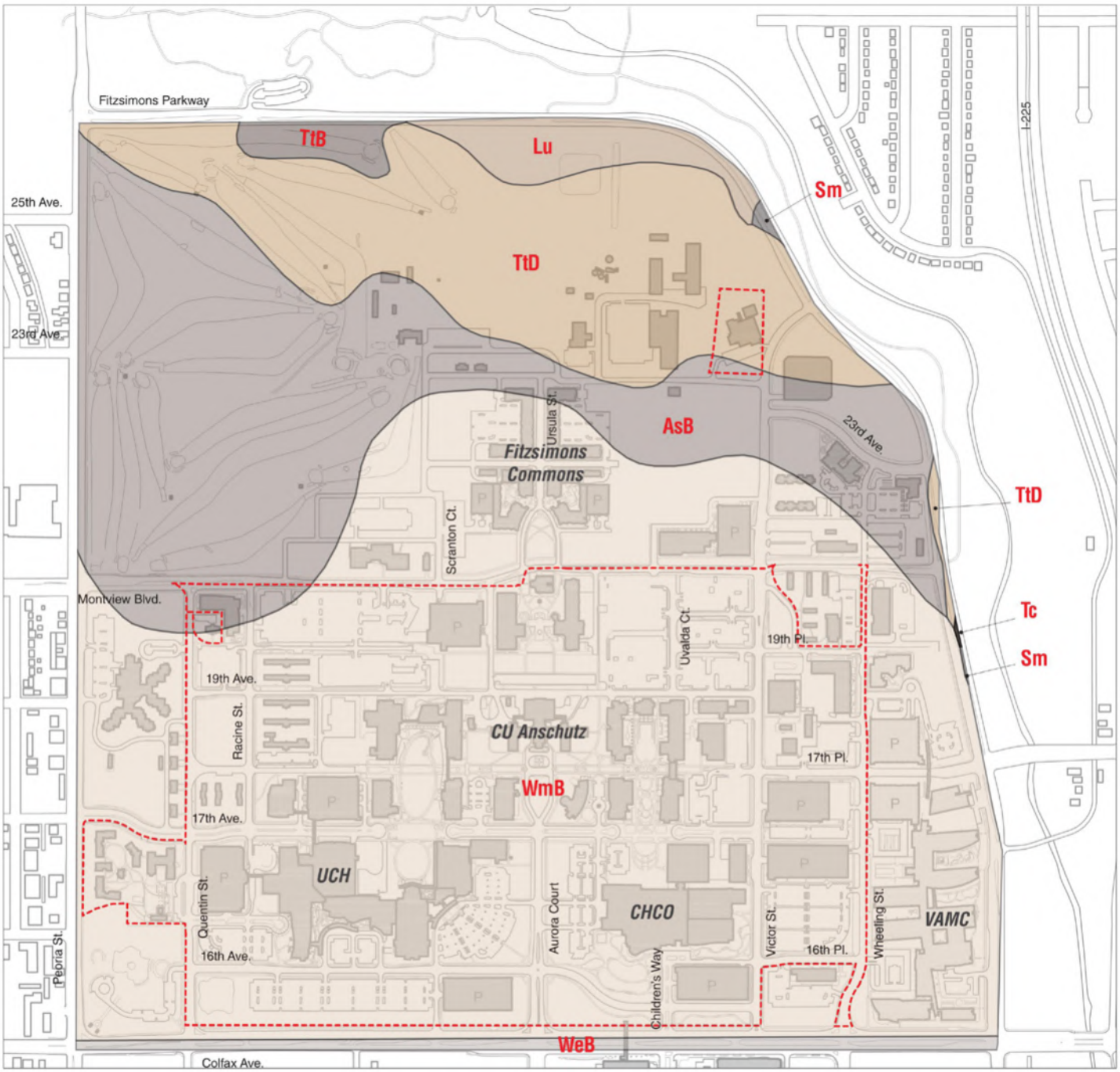
Some CU properties were leased for 99-year terms to UCH and CHCO. CU leased Parcel 2, south of 17th Avenue, to CHCO after the hospital paid DOE fair market value for the property to abrogate use restrictions. However, CHCO is still committed to develop the property in a way that supports the university's clinical mission. Other unrestricted properties within Anschutz Medical Campus include Parcels E and O and the Red Cross Parcel.

CHCO controls Parcel E (14.6 acres), which is located east of Parcel 2, south of 17th Place, west of Wheeling Street, and north of Parcel U. The FRA purchased Parcel O (31 acres), which is located east of Quentin Street and south of 17th Place, from the U.S. Army under a federal economic development conveyance. The FRA conveyed both parcels to CU, and part of Parcel O was leased to UCH. Today, this site includes the Leprino Building, UCH Parking Garage, Anschutz Staff Parking Garage, and part of the Anschutz Inpatient Tower. CU owns the remainder of Parcel O, identified as Property 1 in Figure II.11, and has no use restrictions.

Parcel E was also an unrestricted property the FRA conveyed to the university. Later, it was partially leased to CHCO through a 99-year lease agreement. Currently, this site includes the Kempe Center and two CHCO staff parking garages. CU Anschutz has control over a small part of the unrestricted parcel, which lies west of Victor Street, north of 17th Avenue, and east of Education 2 South. Identified as Property 3 in Figure II.11, the site is another key CU development property.

Acquired in 2004 from the FRA, the 1.43-acre Red Cross Parcel, identified as Property 2 in Figure II.11, is the third and final CU Anschutz key development property. However, it is subject to development within historic preservation guidelines and coordination with the FRA and the Aurora Historic Preservation Commission regarding structural renovation or demolition.

Additional conveyance, lease, and use information can be found in the Property Conveyance Guide, April 15, 2013, in Appendix VII.2.



Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AsB	Ascalon sandy loam, 1 to 3 percent slopes	122.6	21.0%
Lu	Loamy alluvial land	10.3	1.8%
Sm	Sandy alluvial land	0.4	0.1%
Tc	Terrace escarpments	0.1	0.0%
TtB	Truckton loamy sand, 0 to 3 percent slopes	4.5	0.8%
TtD	Truckton loamy sand, 3 to 9 percent slopes	78.7	13.4%
WmB	Weld loam, 1 to 3 percent slopes	360.8	61.7%
WeB	Weld silt loam, 0 to 3 percent slopes	7.7	1.3%
Totals for Area of Interest		585.0	100.0%

Anschutz Medical Campus boundary

0 500'

Figure II.12 - Soils

II.6 NATURAL SYSTEMS

A. Soils

The soil map for the Anschutz Medical Campus and Site-Wide area shows the area's soil series, the classification most used in local surveys. A soil series consists of soils that have similar profiles but different textures in the surface layer. Soils of one series have similar horizons in thickness and arrangement but can differ in surface texture, slope, and stoniness. A soil series is divided into phases that indicate features such as percent slope.

A general survey of soils can suggest an area's suitable land uses and guide management of watersheds and wildlife areas or plans for recreation and development.

Per the USDA Natural Resources Conservation Service Web Soil Survey, Anschutz Medical Campus and Site-Wide area consist of the following soil series (1 percent or greater):

- 21.0 percent Ascalon sandy loam
- 1.8 percent Loamy alluvial land
- 14.2 percent Truckton loamy sand
- 61.7 percent Weld loam
- 1.3 percent Weld silt loam

These soils largely fall into the Hydrologic Soil Groups B and C and feature well-drained soils and depth to water table of more than 80 inches.

SOIL SERIES

Ascalon series is well-drained in nearly level to moderately sloping soil on uplands. These soils were formed in loamy material containing sand and gravel with moderate permeability. Characteristics of Ascalon sandy loam (AsB) at 1–3 percent slopes:

- Slow to medium surface runoff; slight to moderate water erosion hazard
- Severe hazard of soil blowing in unprotected areas
- Suitability as a source of:
  - Topsoil: fair to poor
  - Sand and gravel: poor
  - Road fill: good to fair
  - Irrigation: moderate to high water capacity
- Foundation limitations: slight to moderate, low to moderate shrink/swell potential

Loamy alluvial land is generally well-drained in moderately sloping drainageways subject to flooding. These soils formed in areas of silty deposits containing layers of loam, clay loam, and silt loam deposited unevenly on the surface by floodwaters. This series has low to moderate permeability on slopes of 0–3 percent. Characteristics of loamy alluvial land (Lu) at 0–3 percent slopes:

- Medium surface runoff; severe water erosion hazard
- Suitability as a source of:
  - Topsoil: fair to poor (upper 10 inches)
  - Sand and gravel stratified with silt: poor
  - Road fill: fair to poor
  - Irrigation: moderate water capacity
- Foundation limitations: severe, subject to flooding, low to moderate shrink/swell potential

Truckton loamy sand is generally well-drained to excessively drained in nearly level to moderately sloping soils on uplands and stream channels. These soils formed in wind-worked sandy material containing loamy sand with rapid permeability. Characteristics of truckton (TtB) at 0–3 percent and 3–9 percent slopes:

- Slow surface runoff; slight water erosion hazard
- Severe hazard of soil blowing in unprotected areas
- Suitability as a source of:
  - Topsoil: poor to fair
  - Sand and gravel: fair source for sand, no gravel
  - Road fill: good
  - Irrigation: low to moderate water capacity
- Foundation limitations: slight

Weld loam is generally well-drained in nearly level uplands. These soils formed in wind-worked loamy materials with slow permeability. Characteristics of weld loam series (WmB) at 0–3 percent slopes:

- Medium surface runoff; moderate to severe water erosion hazard
- Severe hazard of soil blowing in unprotected areas with below normal rainfall
- Suitability as a source of:
  - Topsoil: generally poor (top 6 inches good)
  - Sand and gravel: unsuited
  - Road Fill: poor to fair
  - Irrigation: moderate intake rate with good available water capacity
- Foundation limitations: slight

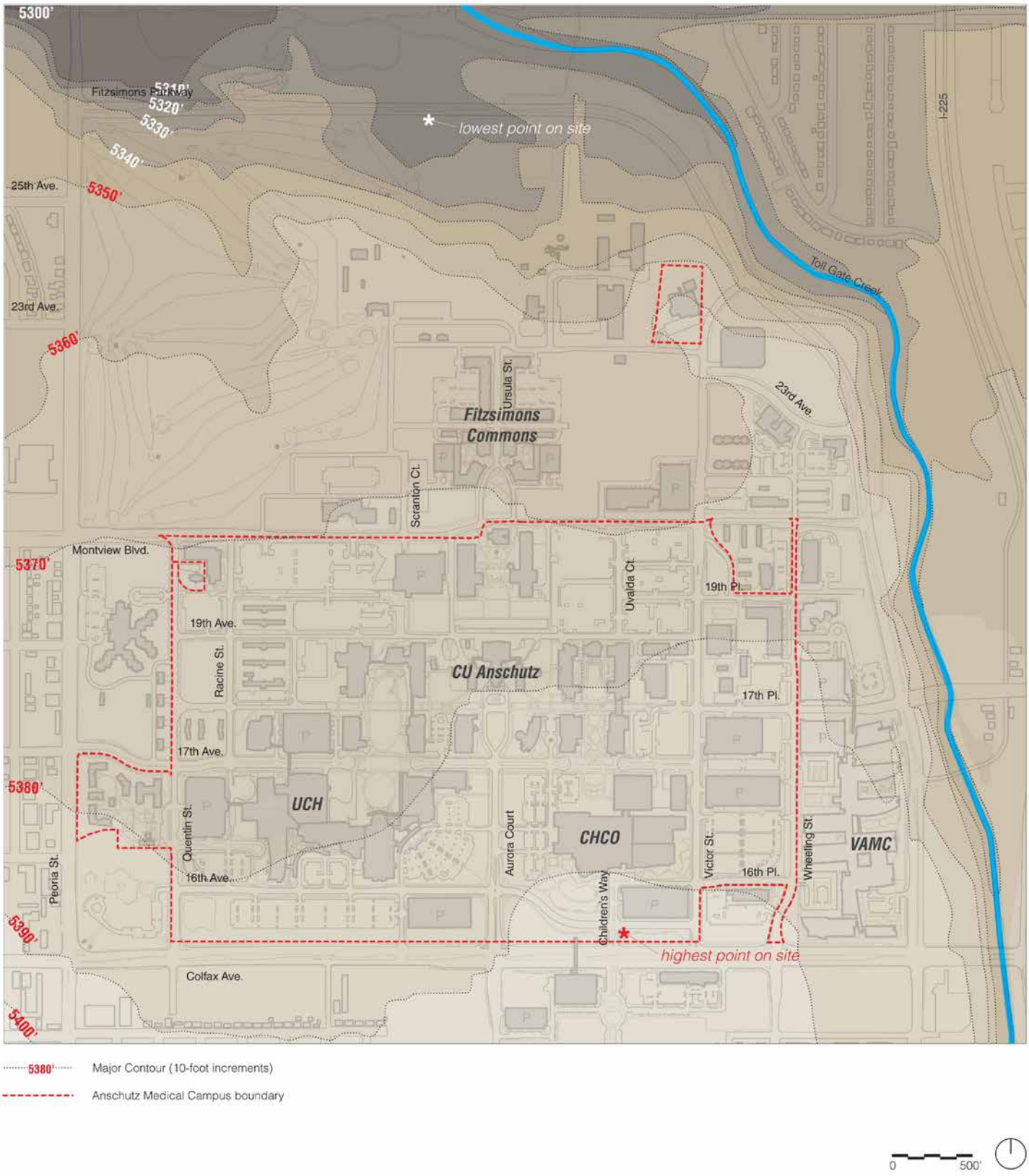


Figure II.13 - Topography

B. Topography

The Anschutz Medical Campus and surrounding Site-Wide area are extremely flat, particularly in the east-west direction. Even in the steeper north-south direction the site slopes a minimal 1 percent. Drainage on the site is toward Sand and Toll Gate Creeks. The highest area is on the southern half of the CHCO precinct, at 5,400 feet above sea level. The lowest elevation on the site, at 5,320 feet, is on FRA property just south of Fitzsimons Parkway between the proposed alignments of Ursula Street and Scranton Street. Elevations north of the Site-Wide area continue to decrease to a nadir in Sand Creek, and the steepest slopes in the square mile area exist adjacent to Sand and Toll Gate Creeks.

Topography of the Anschutz Medical Campus is flatter than that of the Site-Wide area and ranges only 30 feet in elevation, from 5,370 feet along Montview Boulevard to 5,400 feet at CHCO. As the site's slope is minimal, topography imposes no development limitations on the Anschutz Medical Campus.

The topography in the CoA ranges from a high point of 6,229 feet above sea level southwest of the Aurora Reservoir to a low point of 5,285 feet at the Sand Creek Water Reclamation Plant, just three quarters of a mile northwest of the campus.

Sand Creek Park is home to some of the Site-Wide area's most hilly terrain.

At 5,400 feet, the Healing Garden at CHCO is one of the highest areas on the campus.

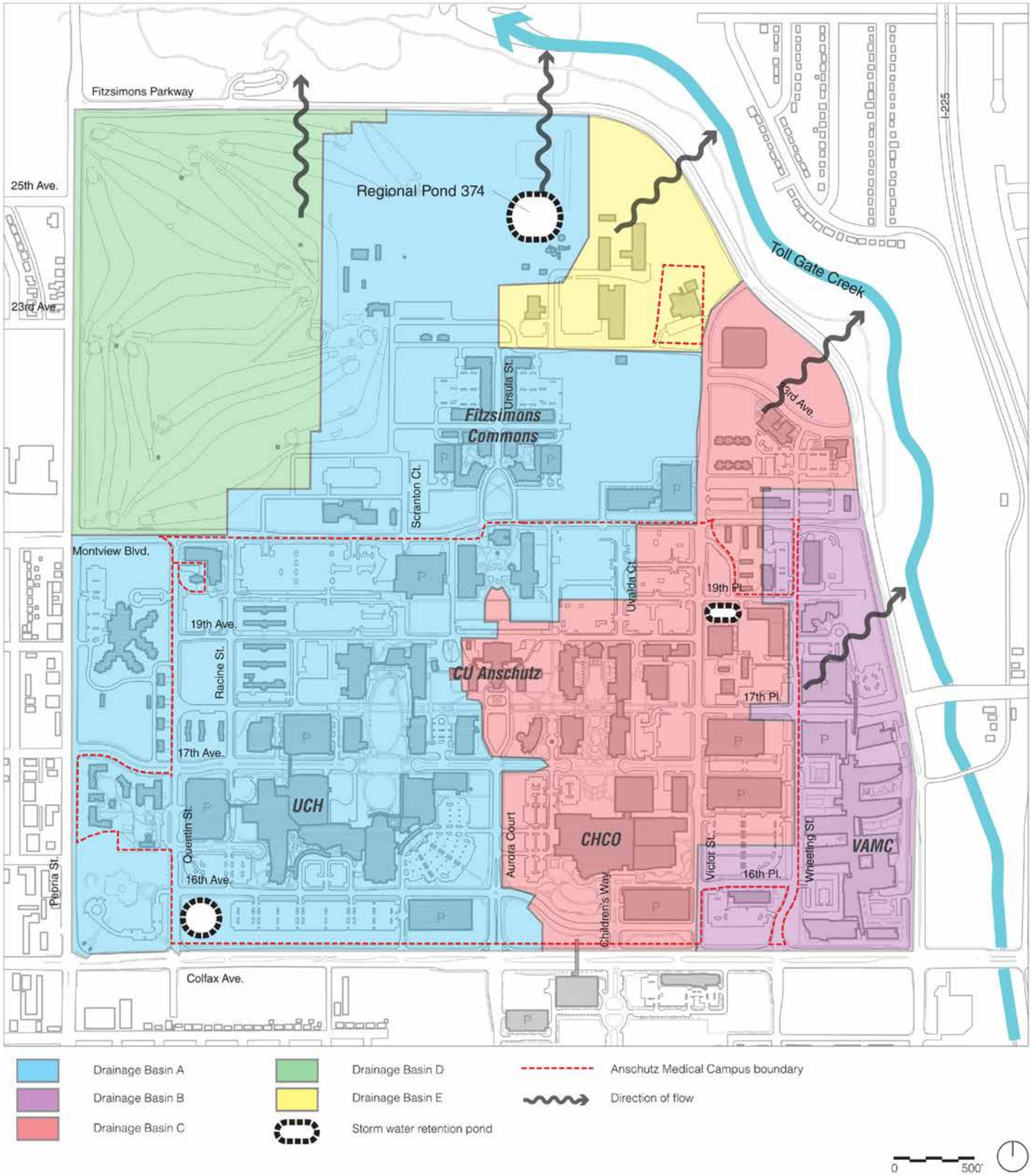


Figure II.14 - Major Drainage Basins

C. Hydrology

Storm water runoff from the Anschutz Medical Campus is divided between Master Basin A and Master Basin C (see Figure II.14). Runoff within Master Basin A (in the western portion of the campus) is collected in the existing underground storm sewer system and routed north to Regional Pond 374 for detention and water-quality treatment, after which it is ultimately discharged into Sand Creek. Runoff within Master Basin C (in the eastern portion of the campus) is collected in the existing underground storm sewer system, routed northeast to the Pond 8 Water Quality Structure, and discharged into Toll Gate Creek without detention.

There is minimal on-site storm water detention and quality treatment on the campus; most is handled in the regional facility, Pond 374, located south of Fitzsimons Parkway just east of the proposed Ursula Street alignment. See Section II.10.F for more information on storm water systems.

Retention pond north of CUP as seen from 19th Place and Victor Street.

Retention pond north of CUP looking west from Campus Services.

Retention pond at Quentin Street and Colfax Avenue.

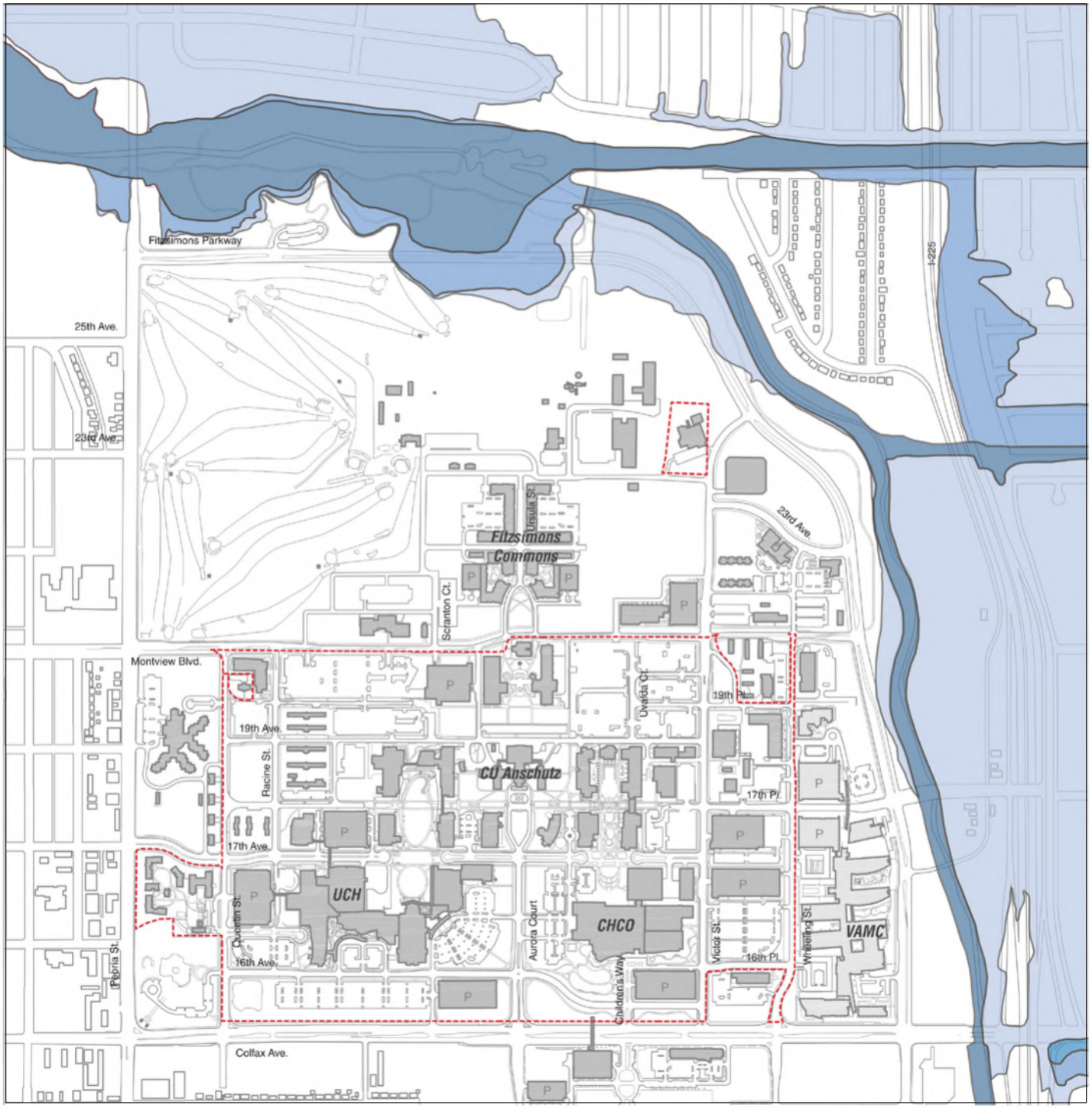


Figure II.15 - Flood Map (FEMA - 2010)

D. FEMA

Per the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Number 08005C0039K, revised December 17, 2010, the identified flood hazards impede only the northernmost portion of the campus, including the Sand Creek Park area and extending south across Fitzsimons Parkway. Other areas identified as having a chance of flooding include surrounding Toll Gate Creek to the east of campus. This flood boundary reaches but does not extend westward beyond Fitzsimons Parkway between Montview Boulevard and Colfax Avenue.

Detention ponds in Sand Creek hold excess capacity for special flood events.

Winter snowstorm on the Anschutz Medical Campus.

E. Climate

CU Anschutz is situated east of the Front Range of the Rocky Mountains. This semiarid climate receives about 16 inches of precipitation annually and boasts over 300 sunny days per year. Though the weather is highly changeable, the low humidity makes for a pleasant environment to be out-of-doors for much of the year. The high altitude (approximately 5,380 feet above sea level) makes the sun intense in the summer but allows for many warm afternoons in the winter. In summer, shading strategies are effective at cooling due to the combination of high altitude and low humidity. Prevailing winds are most frequently from the southwest, but the highest winds on the site tend to come from the north. The Front Range is home to high wind events with gusts over 100 miles per hour.

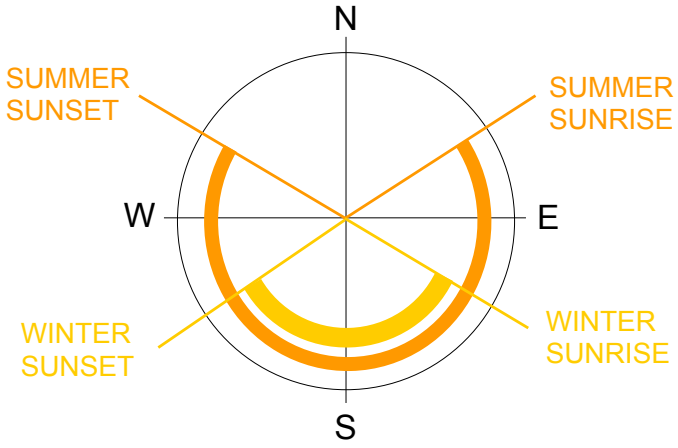


Figure II.17 - Degree of Sunrise and Sunset at Solstice

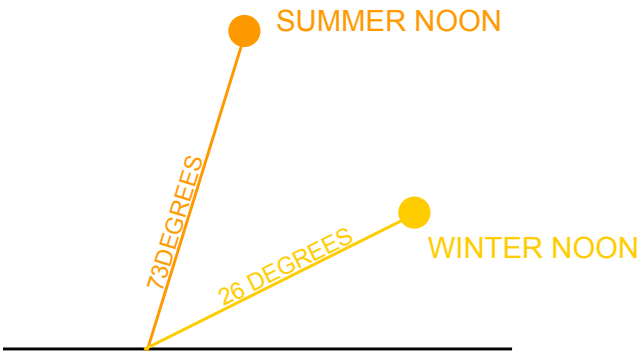


Figure II.18 - Sun Angle above Horizon at Solstice

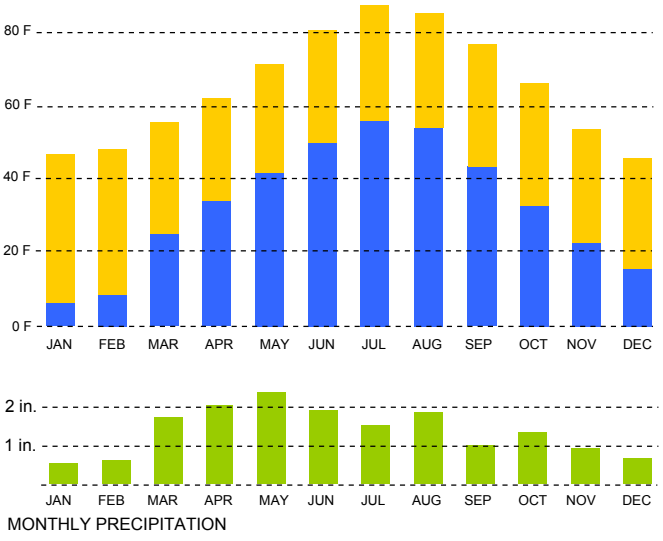


Figure II.16 - Monthly Average High/Low Temperatures and Precipitation

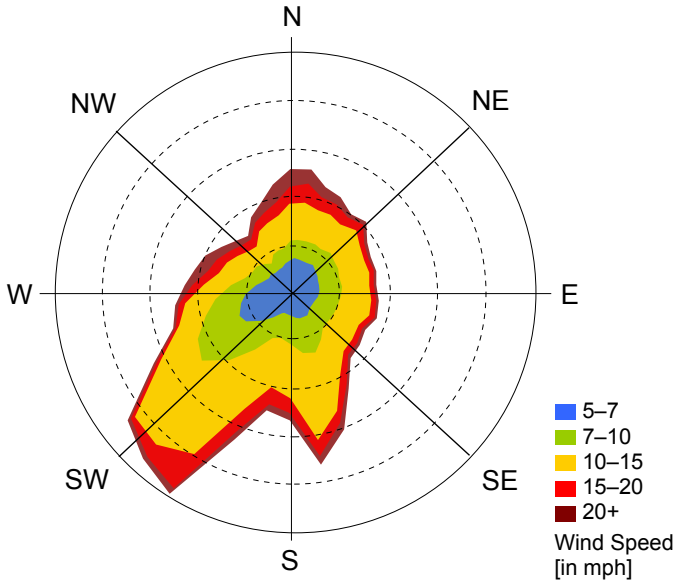


Figure II.19 - Prevailing Winds

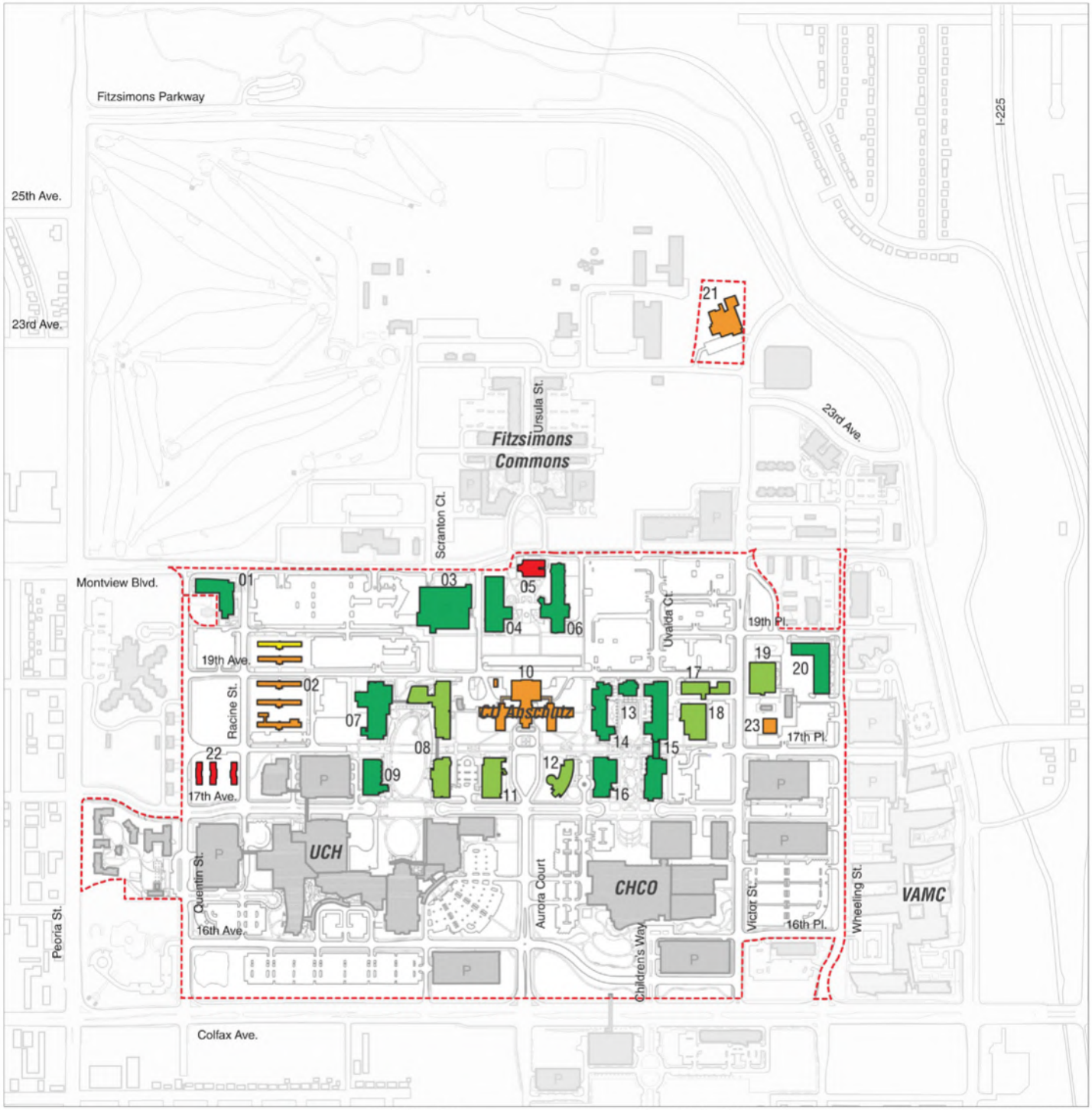


Figure II.20 - Facility Condition Index Overview

II.7 FACILITIES CONDITION ASSESSMENT

CU Anschutz submits a Controlled Maintenance (CM) request to the state of Colorado each year. The Office of the State Architect/State Buildings Programs (SBP) visits the university each summer to review CM needs and the status of ongoing CM projects. The state provides CM funding to address the building deficiencies based on most critical needs and availability of funds for academic or generally funded buildings. Full CM application instructions can be found at www.colorado.gov/cs/Satellite/DPA-EO/DEO/1251570153256.

The Facility Condition Index (FCI) helps recommend what magnitude of repair is needed for a particular building. Components evaluated include foundation, skin, floors, roof, ceilings, interior partitions, windows, doors, heating, ventilating, cooling, plumbing, conveying, and safety. Each system is evaluated and rated based against its new or original condition. If a part of the building has a deficiency, it is assigned a reduction value. The goal of the SBP is to keep buildings at an FCI of 80 percent or better. The large majority of the university's buildings are above the 80 percent FCI rating and serve the campus mission and function.

The FCI can suggest routine or minor maintenance, major replacement and upgrade, or demolition based on the status of the building. Mathematically, the FCI is calculated as:

(Total Renewal Cost / Current Replacement Value) x 100% = 100% – FCI

The formula compares the maintenance cost to the replacement cost, and the lower the FCI, the more economical building replacement becomes. To demonstrate with Building 500, the Total Renewal Cost—the cost needed to maintain, repair, and eliminate the deficiencies of the building—is $44,473,623. The Current Replacement Value—the amount it would cost to completely replace the building—is $143,463,300. Therefore:

($44,473,623 / $143,463,300) x 100% = 100% - 31% = 69% = FCI

An FCI of 69 percent suggests that Building 500 needs substantial remodeling and maintenance. This is reflected in the five-year CM plan that proposes heating, ventilation, and air-conditioning (HVAC) improvements and window replacements for Building 500. At CU Anschutz, all new construction projects built since 2007 have an FCI of over 90 percent and therefore require only routine maintenance. At the other end of the spectrum, the Red Cross Building has an FCI of 25 percent and is a candidate for demolition.

400 Series Buildings date from the army era are showing signs of age and score low on the FCI.

Research buildings are only 10 years old and score high on the FCI.

Facility Condition Index (FCI)
University of Colorado Anschutz Medical Campus
November 2012

Building Name (6)	*Current Replacement Value (CRV)*	*Actual FCI*	*Target FCI*
Anschutz Medical Campus - General Funded			
Building 400	$6,266,200	69%	80%
Building 401	$4,531,200	69%	80%
Building 402	$4,526,400	64%	80%
Building 406	$3,897,000	66%	80%
University Police	$3,901,800	71%	80%
Building 500	$143,463,300	69%	85%
Red Cross Building	$5,563,350	25%	
Fire Station (5)	$965,800		
Building 533	$1,016,000	69%	85%
Building 534	$659,800	66%	85%
Building 610 (5)	$1,392,000		
Environmental Health & Safety	$6,406,524	89%	90%
Barbara Davis Center	$35,956,937	89%	90%
PASCAL	$10,334,485	89%	90%
Research 1 - North	$169,143,577	89%	90%
Research 1 - South	$139,219,605	89%	90%
Education 1 (4)	$40,064,581		
Education 2 - North (4)	$43,899,048		
Education 2 - South (4)	$31,441,824		
Health Sciences Library (4)	$37,187,074		
Fulginiti Center for Bioethics & Humanities (4)	$8,245,692		
Academic Office 1 (4)	$40,640,045		
Campus Services (4)	$20,206,615		
Research 2 (4)	$254,824,283		
School of Pharmacy Building (4)	$59,600,111		
Health & Wellness Center (4)	$30,350,182		
Subtotal General Funded	$1,103,703,433		
Anschutz Medical Campus - Auxiliary Funded			
Perinatal Research Facility (1)	$9,651,200	65%	85%
Perinatal Research Facility Modular East	$602,100		
Perinatal Research Facility Modular East	$75,450		
Nighthorse Campbell Native Health Building (1)	$15,621,505	89%	90%
Central Utility Plant (2)	$61,735,439	86%	90%
School of Dental Medicine Building (1)	$40,193,478		
Henderson Parking Garage (2)	$26,945,619		
Subtotal Auxiliary Funded	$154,824,791		
Campus Infrastructure (3)	$83,791,231	87%	90%
Total	$1,342,319,455		

(1) SB-202 building
(2) Enterprise that is self-supporting from cash sales of services and not general funded activities
(3) Campus Infrastructure Project (multiphase) includes site prep/demo, storm/sanitary/water, electrical, steam & chilled water distribution
(4) Structures built within the last 10 years are not yet eligible for state Controlled Maintenance funding.
(5) Temporary structures are not intended to house university programs.
(6) The 700 Series Buildings are inactive and are not included in the above.

Figure II.21 - Facility Condition Index - University of Colorado Anschutz Medical Campus

Figure II.21 shows the current replacement value for each of the university buildings. FCI values are indicated for structures currently eligible for CM funding.

Figure II.22 shows the functional use and date that the facility was constructed. The majority of the buildings have been built on campus since 2004, when the facilities were relocated to the current site from the 9th Avenue and Colorado Boulevard campus.

Figure II.23 shows the gross area of each building in square feet.

The Barbara Davis Center for Childhood Diabetes is predominately a clinical use building.

The Nighthorse Campbell Native Health Building was built in 2002 and supports educational, office, and clinical uses.

The Fulginiti Pavilion for Bioethics and Humanities has 19,475 GSF and hosts specialized auditorium seating and conference space.

Facility Use and Age
University of Colorado Anschutz Medical Campus
November 2012

Building Name (4)	*Occupancy Type*	*Date Built*	*Date Acquired*
Anschutz Medical Campus - General Funded			
Building 400	Office/Lab	1944	2000
Building 401	Office	1943	2000
Building 402	Office	1943	2000
Building 406	Office	1944	2000
University Police	Office	1944	2000
Building 500	Office	1941	2000
Red Cross Building	Vacant	1918	2004
Fire Station	Office	1942	2000
Building 533	Office	1985	2000
Building 534	Office	1993	2000
Building 610	Storage	1983	1998
Environmental Health & Safety	Lab/Office	2004	
Barbara Davis Center	Lab/Education	2005	
PASCAL	Storage	2001	
Research 1 - North	Lab/Education	2004	
Research 1 - South	Lab/Education	2004	
Education 1	Lab/Education	2007	
Education 2 - North	Lab/Education	2007	
Education 2 - South	Lab/Education	2007	
Health Sciences Library	Library	2007	
Fulginiti Center for Bioethics & Humanities	Conference	2007	
Academic Office 1	Office	2007	
Campus Services	Office	2007	
Research 2	Lab/Education	2008	
School of Pharmacy Building	Lab/Education	2011	
Health & Wellness Center	Ed/Off/Lab/Gym	2012	
Anschutz Medical Campus - Auxiliary Funded			
Perinatal Research Facility (1)	Lab/Education	1980	
Perinatal Research Facility Modular East	Lab/Education		
Perinatal Research Facility Modular East	Lab/Education		
Nighthorse Campbell Native Health Building (1)	Ed/Off/Clinical	2002	
Central Utility Plant (2)	Physical Plant	2002	
School of Dental Medicine Building (1)	Lab/Ed/Clinic	2005	
Henderson Parking Garage (2)	Parking	2007	
Campus Infrastructure (3)	Physical Plant	2002	

Occupancy Types	
Office	Physical Plant/Utility
Research/Lab	Garage/Shop
Education/Auditorium/Conference	Parking Structure
Hospital/Clinical	Vacant
Library/Archives	Storage

(1) SB-202 building
(2) Enterprise that is self-supporting from cash sales of services and not general funded activities
(3) Campus Infrastructure Project (multiphase) includes site prep/demo, storm/sanitary/water, electrical, steam & chilled water distribution
(4) The 700 Series Buildings are inactive and are not included in the above.

Figure II.22 - Facility Use and Age - University of Colorado Anschutz Medical Campus

Facility Gross Square Footage
University of Colorado Anschutz Medical Campus
November 2012

Building Name (4)	*Academic GSF*	*Non-Academic GSF*	*Vacant/Not Utilized GSF*	*Total GSF*
Anschutz Medical Campus - General Funded				
Building 400	31,331			
Building 401	22,656			
Building 402	22,632			
Building 406	19,485			
University Police	19,509			
Building 500	479,660			
Red Cross Building			13,176	
Fire Station	4,829			
Building 533	5,080			
Building 534	3,299			
Building 610	6,960			
Environmental Health & Safety	21,002			
Barbara Davis Center	112,646			
PASCAL	28,906			
Research 1 - North	344,703			
Research 1 - South	283,720			
Education 1	115,251			
Education 2 - North	160,454			
Education 2 - South	114,922			
Health Sciences Library	113,005			
Fulginiti Center for Bioethics & Humanities	19,475			
Academic Office 1	204,974			
Campus Services	68,333			
Research 2	479,085			
School of Pharmacy Building	171,416			
Health & Wellness Center	95,141			
Subtotal General Funded	2,948,474		13,176	2,961,650
Anschutz Medical Campus - Auxiliary Funded				
Perinatal Research Facility	24,128			
Perinatal Research Facility Modular West	4,014			
Perinatal Research Facility Modular East	503			
Nighthorse Campbell Native Health Bldg (1)	45,396			
Central Utility Plant (2)		82,156		
School of Dental Medicine Building (1)	116,060			
Henderson Parking Garage (2)		495,499		
Subtotal Auxiliary Funded	190,101	577,655		767,756
Campus Infrastructure (3)		-		
Total	3,131,615	577,655	13,176	3,729,406

(1) SB-202 building
(2) Enterprise that is self-supporting from cash sales of services and not general funded activities
(3) Campus Infrastructure Project (multiphase) includes site prep/demo, storm/sanitary/water, electrical, steam & chilled water distribution
(4) The 700 Series Buildings are inactive and are not included in the above.

Figure II.23 - Facility Gross Square Footage - University of Colorado Anschutz Medical Campus

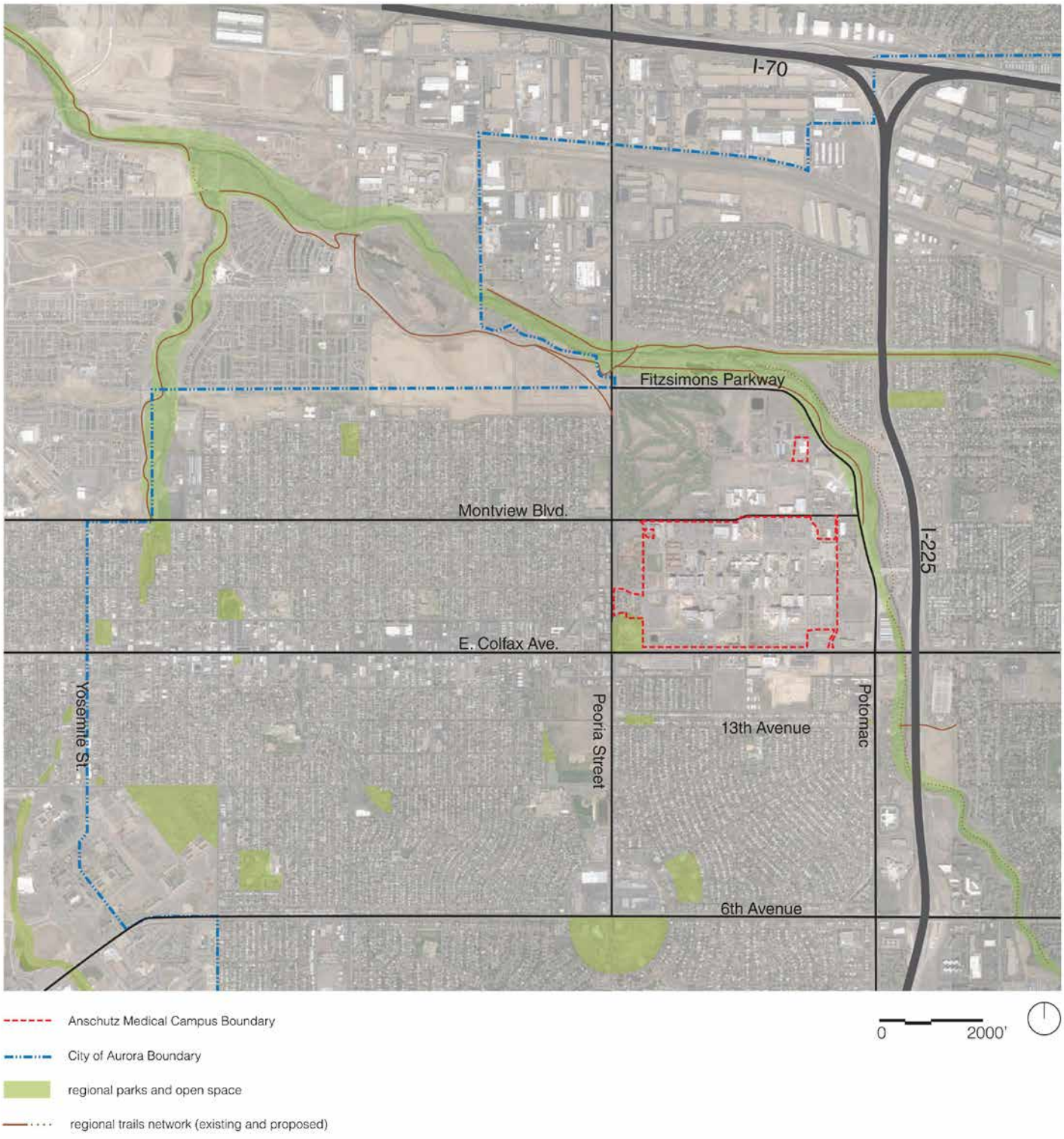


Figure II.24 - Regional Access

II.8 CIRCULATION SYSTEMS

A. Circulation Network: Regional, Local, Internal

REGIONAL ACCESS

The Anschutz Medical Campus lies in the eastern portion of the Denver metropolitan area. I-225 provides regional access to the campus along its east side. I-70 is located 1.5 miles north of the campus, which serves it via a direct connection at Peoria Street. The Peoria Street access from I-70 is slated to be improved soon with the construction of its overpass across the Union Pacific Railroad and Smith Road, a crossing that can currently cause severe congestion when a long freight train passes.

Access to I-225 was recently enhanced with a connection to 17th Place as an extension of the I-225/ Colfax Avenue interchange. Until this improvement was complete, Colfax Avenue was the sole source of access to/from I-225, and with a heavy orientation of campus traffic to/from the south via I-225, Colfax Avenue is regularly congested during peak hours. The 17th Place interchange connection has alleviated some congestion, and more relief is anticipated once 17th Place west of Fitzsimons Parkway is reopened (VAMC construction has this roadway closed at the time of this writing).

Aurora Court is an important point of access to the campus, both symbolically and in terms of traffic volumes.

CAMPUS ACCESS

The campus is effectively closed off from the north due to the golf course and Sand Creek, and the adjoining residential areas beyond. Similarly, campus access is closed off from the east due to Toll Gate Creek; 17th Place is the sole means of heading east, but this roadway only provides regional access to I-225 and extends no farther. Other than local trips oriented up Potomac Street, campus and Site-Wide trips with an easterly or northerly orientation are relegated to use Colfax Avenue or Peoria Street, respectively.

Local access to the south of the campus is somewhat better, although it too is limited. Potomac Street is the only roadway extending south from Colfax Avenue that provides more than one mile of continuity. Peoria Street extends only a mile south to Sixth Avenue (albeit Del Mar Circle allows one to continue farther south along Peoria). All other roadways that lead south from Colfax Avenue simply end in residential areas and do not provide good access to the campus.

Local access to the west is more plentiful. Colfax Avenue, 17th Avenue, and Montview Boulevard provide continuity to Colorado Boulevard in Denver and beyond. Further, other roadways (which do not directly penetrate into the Site-Wide area) also extend west from Peoria Street, namely 16th Avenue, 19th Avenue, 23rd Avenue, and 25th Avenue. Future plans include the eventual connection of Martin Luther King Boulevard from the Stapleton area, connecting with Peoria Street directly west of Fitzsimons Parkway.

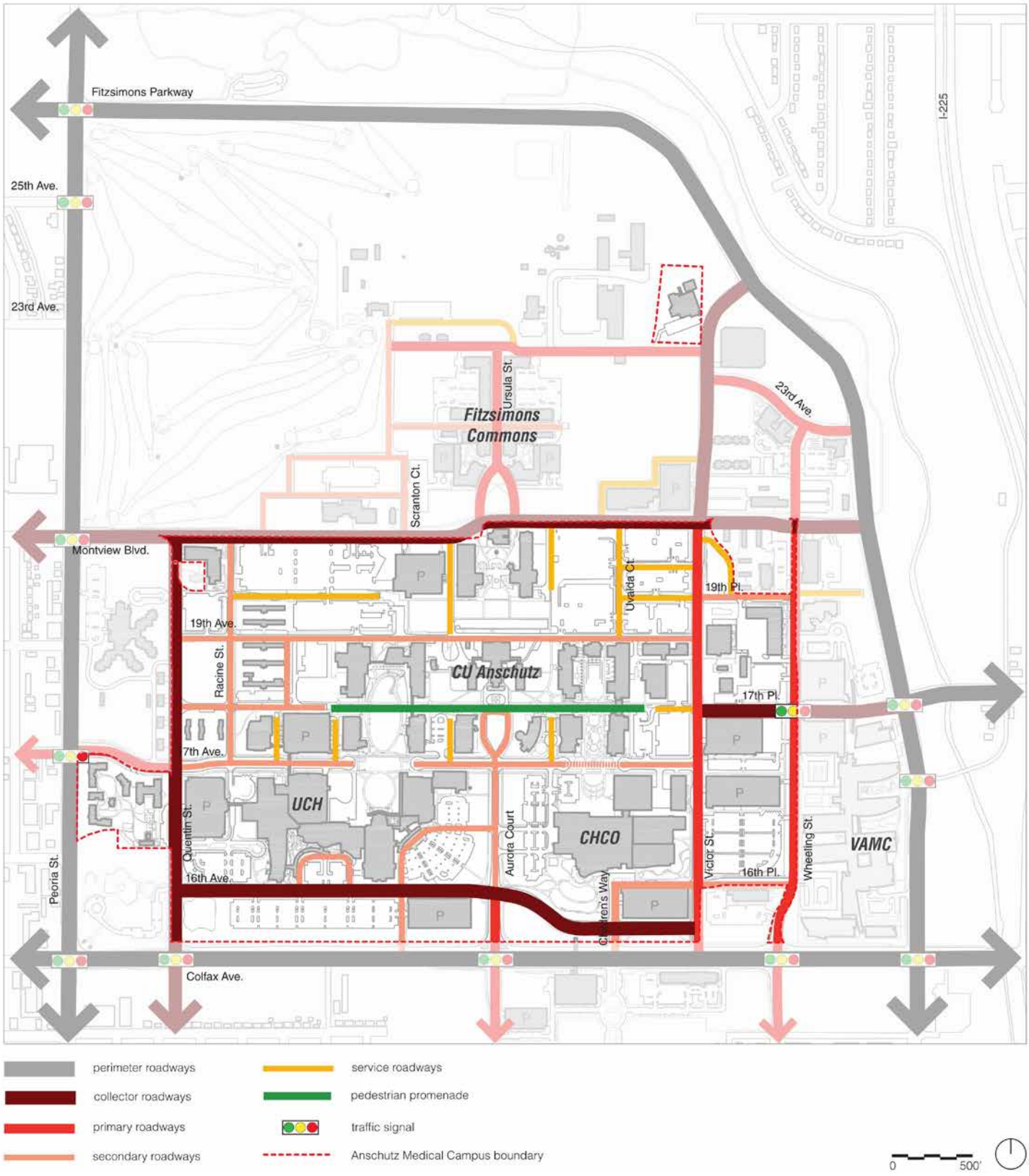


Figure II.25 - Existing Roadway Network

Although access to/from the west is most plentiful, this cardinal direction is hardly a major pattern for trips to/from the campus. Based on collected traffic data counts, the predominant movement to/from the campus is oriented regionally around I-225 South. Approximately 15 to 20 percent of all campus trips go to or come from I-225 South. The recent completion of the 17th Place interchange connection is critical to serving this major movement orientation.

Roadways most heavily used to access the campus are those serving the heavy patterns to/from the southeast (primarily I-225 South). These include Fitzsimons Parkway north of Colfax Avenue, Wheeling Street, Aurora Court (which becomes Ursula Street south of Colfax Avenue), and 17th Place, which provides a direct connection to I-225. These four roadways collectively serve approximately one-half of all traffic that enters and exits the campus on a daily basis. This includes trips delivered via I-225 South, I-225 North, Colfax Avenue East, Potomac Street South, Xanadu Street South, and Ursula Street South.

Seventeenth Avenue is currently discontinuous for automobile traffic, except for authorized vehicles and bikes. Service vehicles can access buildings on the north side of 17th Avenue.

INTERNAL ROADWAYS

The existing roadway system within the campus has evolved under the framework of a loop road concept. Under this premise, users access peripheral primary parking lots and structures from the loop road and reach their final destination on foot. The core of the current campus is pedestrian-oriented under this concept. The problematic loop road concept creates some access and wayfinding challenges and exacerbates congestion in some areas.

The loop road is comprised of four roadways, which include Quentin Street, 16th Avenue, Victor Street, and Montview Boulevard. Seventeenth Place, which serves as the center of the campus core, is restricted to pedestrian and bicycle activity only. Seventeenth Avenue, one-half block south of 17th Place, is discontinuous for automobile traffic except for authorized vehicles and bicycles. The section of 17th Avenue between the School of Dental Medicine Building and Education 2 was opened to traffic in 2012 across a wide, raised pedestrian crossing. Nineteenth Avenue, one-half block north of 17th Place, is continuous, but it experiences significant pedestrian crossing activity, since parking is north of this road and many destinations are to its south. Several raised crosswalks have been installed along 19th Avenue to help calm traffic given the high level of pedestrian activity.

Victor Street, the east leg of the loop road, also experiences significant pedestrian crossing activity. This is primarily due to the significant amount of CHCO staff parking provided on the east side of Victor Street, while the actual hospital and related medical facilities are located on the west side. This road too has been "calmed" with treatments to raise driver awareness of pedestrian presence.

Sixteenth Avenue, running just north of the southern edge of the campus, also serves a significant amount of parking, primarily associated with UCH. It too is hampered by pedestrian crossing activity due to parking and facilities located on opposite sides of a busy roadway.

Montview Boulevard is the only east-west roadway that extends the entire width of the Site-Wide area. As a result, this roadway serves campus-related trips as well as non-campus trips that simply pass through the campus, some of which make use of the new 17th Place interchange connection to I-225. At the edges of the campus near Fitzsimons Parkway and Peoria Street, Montview Boulevard is wider to include multiple travel lanes. This is consistent with long-term planning of the roadway in which two blocks at both the east and the west ends would be multi-lane, and the section between these two points would be limited to two through lanes and a center left turn lane.

B. Service Activity

Many of the larger facilities at the campus require regular service vehicle access for maintenance and delivery. Understanding these locations and the key roadways involved in serving these types of vehicles is important in planning the future of the campus, as these roadways should continue to serve in this function and accommodate this type of traffic. There are several service areas of note associated with the larger facilities; each is described below.

- UCH has service receiving areas along 17th Avenue. Vehicles access these from the Quentin Street/17th Avenue intersection and make use of 17th Avenue to Peoria Street or Quentin Street to Colfax Avenue, depending on their direction.
- CHCO also has a service receiving area along 17th Avenue. These vehicles enter via the 17th Avenue/ Victor Street intersection and make use of Victor Street, 16th Avenue, 17th Place, or Wheeling Street, depending on their direction.
- VAMC, under construction, is planned to have a service area with access from Wheeling Street.

Seventeenth Avenue also provides service access to buildings along its north side including the Barbara Davis Center, Nighthorse Campbell Building, and the School of Dental Medicine Building.

Nineteenth Avenue also provides service access to adjacent facilities, most notably Research 1 North, Research 2, Building 500, and Education 1 and Education 2 North. The service area for Education 1 is constrained in size such that parked delivery trucks protrude into the roadway.

Figure II.26 - Existing RTD Network

C. Transit

Six fixed transit routes provide access to the Site-Wide area, all of which are provided by RTD. Some fixed-route services provide peak-hour service only. Additionally, CU provides a campus-to-campus shuttle between the Anschutz Medical Campus and the Denver Campus. An internal demand-response courtesy shuttle is also provided for the Anschutz Medical Campus. A map of existing transit routes that provide service to the campus can be found in Figure II.26.

REGIONAL TRANSPORTATION DISTRICT ROUTE DESCRIPTIONS

RTD operates six routes as part of its larger transit service network to provide access to and from the site. The routes that currently serve the campus are Route 15, Route 15L, Route 20, Route 89, Route 121, and Route DM.

Route 15 - East Colfax Avenue

Route 15 provides service along East Colfax Avenue between the Auraria Higher Education Center (AHEC) in downtown Denver east to 17th Avenue and Chambers Road in Aurora. The major activity centers along the route include AHEC, National Jewish, Anschutz Medical Campus, residential areas, retail, and dining. The route has 15 major stops, including several that deviate from Colfax Avenue into the campus and provide direct access to Building 500. The route operates 24 hours per day, service is frequent, and headways vary by day of week and time of day. Not all trips travel the entire route distance, which is important when considering service frequencies to the Anschutz Medical Campus. Service along the Route 15 to Anschutz Medical Campus is available on select routes and runs approximately every 30 minutes during AM and PM peak hours.

Route 15L - East Colfax Limited

Route 15L is a limited route that provides service along a more extensive portion of East Colfax Avenue. The route begins at 15th Street and Curtis Street in downtown Denver and travels east to Tower Road and Colfax Avenue in Aurora. The route makes stops at Market Street Station, Civic Center Station, National Jewish, and select trips service the Town Center of Aurora and the Aurora Municipal Center. The 15L operates every 10 to 15 minutes during the day and every 30 minutes during the evening. This route does not deviate from Colfax Avenue to Building 500 but has numerous stops on Colfax that provide access to the Anschutz Medical Campus.

The Route 15 picks up a passenger at the East 17th Place and Aurora Court stop.

Route 20 - 20th Avenue

Route 20 provides service from the National Renewable Energy Laboratory (NREL) in Golden and runs east along 20th Avenue, 17th Avenue, 23rd Avenue, and Montview Boulevard and terminates at the Anschutz Medical Campus. The major activity centers along the route are NREL, Denver West Marriott, AHEC, Union Station, Presbyterian and St. Joseph Hospitals, Denver Zoo, City Park, Denver Museum of Nature and Science, and the Anschutz Medical Campus. This route terminates at the Anschutz Medical Campus and deviates into the campus with a stop at Building 500. It runs every 15 minutes during AM and PM peak hours, every 30 minutes early morning, evening, and midday, and hourly from 8:00 PM to 11:00 PM. The extension of the route to NREL only operates on weekdays, and the route modification on weekends provides service from West 17th Avenue and Federal Boulevard east to the Anschutz Medical Campus. Saturday service runs from 5:00 AM to 11:00 PM, providing 30-minute service all day with hourly service in the early morning and late evening hours. Sunday service begins at 6:00 AM and runs until 11:00 PM, with 30-minute service all day until hourly service begins at 8:00 PM.

Route 89 - Stapleton

Route 89 is relatively new and provides service from the Stapleton Park-n-Ride at East 36th Avenue and Ulster Street to the Anschutz Medical Campus, with stops at East 29th Drive and Havana Street as well as at Montview Boulevard and Peoria Street. This route enters the campus via Montview Boulevard and provides stops along Quentin Street and 16th Avenue. This route does not provide service to Building 500 via Aurora Court, but rather turns south at 16th Avenue and Aurora Court and then west on Colfax Avenue. Service is only available on weekdays beginning at 5:52 AM and runs every 30 minutes until 10:00 PM.

RTD Bus Stop Boarding and Alighting Data
Anschutz Medical Campus
May 2013

Bus Stop	*Routes Served*	*Total Daily Boardings*	*Total Daily Alightings*	*Total Daily Boardings & Alightings*
East 17th Place & Aurora Court	15, 20, DM	135	195	330
East 16th Avenue & Aurora Court (Eastbound)	20, 89	150	108	258
Aurora Court & East 17th Avenue (Northbound)	15, 20, 89	117	110	227
Quentin Street & 17th Place (Northbound)	20, 89, 121	41	42	83
Colfax Avenue & Aurora Court (Westbound)	15, 15L, 89	66	12	78
Quentin Street & 19th Place (Northbound)	20, 89, 121, DM	53	23	76
Quentin Street & 16th Avenue (Southbound)	20, 121	27	48	75
Colfax Avenue & Vaughn Street (Westbound)	15, DM	31	44	75
Quentin Street & 19th Place (Southbound)	20, 89, 121	26	40	66
Quentin Street & 17th Place (Southbound)	20, 89, 121	26	36	62
Daily Totals		672	658	1330

Figure II.27 - RTD Bus Stop Boarding and Alighting Data

Route 121 - Peoria Street

Route 121 provides north-south service from the Montbello Park-n-Ride south to Nine Mile Station with service to the Ulster Street and Tufts Avenue Transfer Center in the Denver Tech Center. The route runs south along Peoria Street from the Montbello Park-n-Ride with deviations from Peoria Street onto Smith Road and Sable Boulevard, and onto Quentin Street from Montview Boulevard to Colfax Avenue, providing access to the Anschutz Medical Campus. The route then continues south on Peoria Street to Nine Mile Station and the Ulster Street and Tufts Avenue Transfer Center. Service is frequent, with headways varying by day of week and time of day.

Route DM - Boulder/Anschutz Campus

Route DM is a regional route that provides service from Boulder to the Anschutz Medical Campus. The DM provides six AM trips and six PM trips to accommodate commuters. The route begins at the Boulder Transit Center, making stops at RTD Park-n-Ride facilities along the route, including Table Mesa Park-n-Ride, U.S. 36 & McCaslin Park-n-Ride, and the U.S. 36 & Westminster Center Park-n-Ride. The DM currently accesses the campus utilizing slightly modified routes for the AM and PM peak periods. Peak morning trips run every 30 minutes with the first bus departing Boulder at 5:21 AM and the last trip departing Boulder at 7:43 AM. Afternoon trips run every 30 minutes, with the first bus departing the Site-Wide area at 3:47 PM and the final trip leaving at 6:12 PM. Major DM stops around the Site-Wide area are located at East Colfax Avenue and Fitzsimons Parkway, Building 500, and at the Health and Wellness Center at Quentin Street and East 19th Place.

As a way to evaluate existing transit usage within the Site-Wide area, boarding and alighting data was reviewed for stops that are located within the campus and those likely to be utilized for campus access along the perimeter of the site. Based on current development, it is not surprising that the top three busiest stops are those closest to Building 500 and those that service the existing hospital facilities. Figure II.27 illustrates the top 10 busiest stops, the routes served by each stop, and the associated boarding and alighting data.

D. University Transportation Services

CU provides transportation services both internally and externally. The university offers a campus-to-campus shuttle that provides service between the Anschutz Medical Campus, VAMC, National Jewish Health Center, and downtown Denver. Additionally, the university provides an internal demand-response courtesy shuttle that transports staff, students, and visitors around the campus.

CAMPUS-TO-CAMPUS SHUTTLE

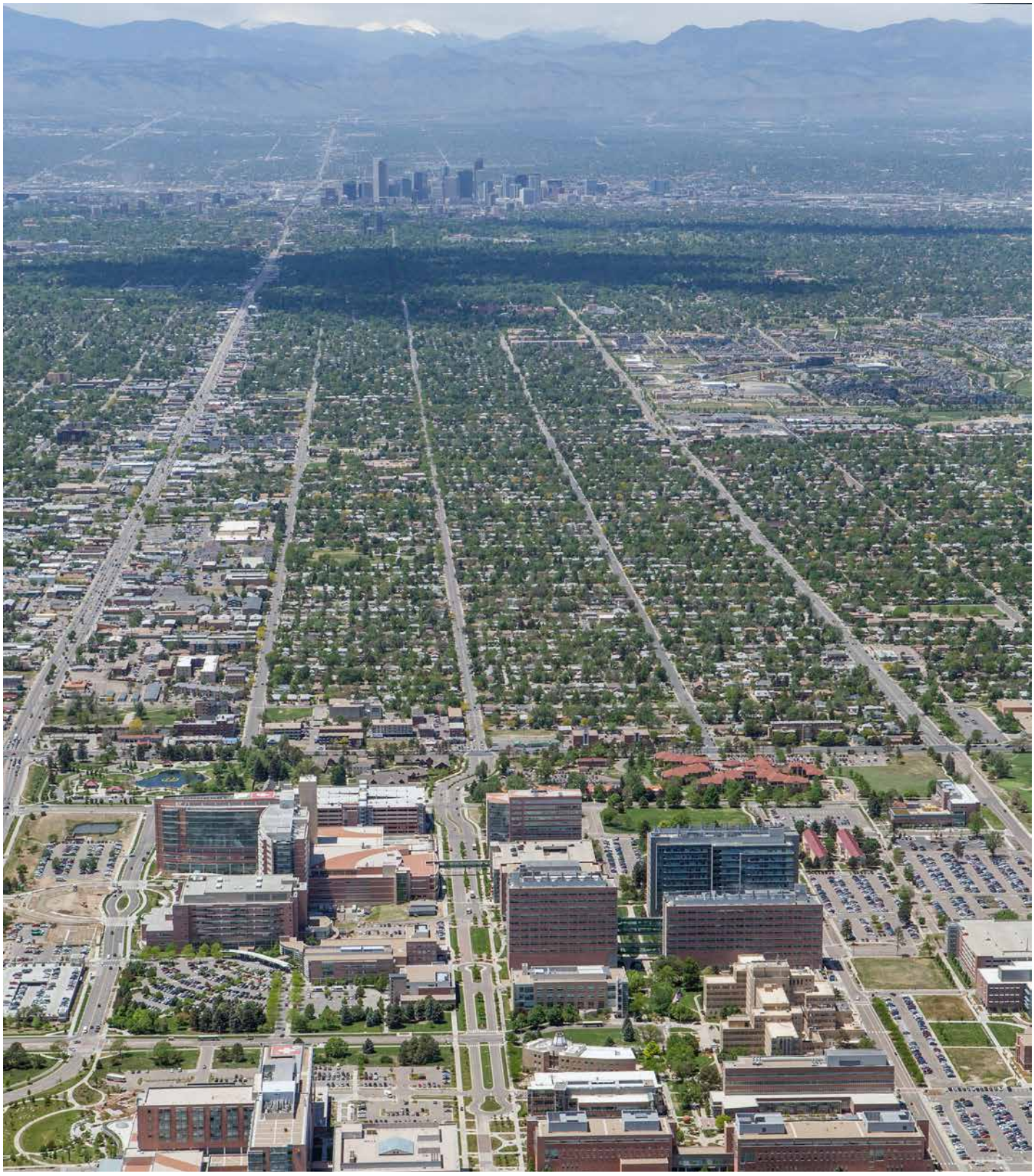
University of Colorado Denver | Anschutz Medical Campus provides direct service between metro campuses including the Anschutz Medical Campus, VA Medical Center at 10th Avenue and Clermont Street in Denver, National Jewish Health Center near Colfax Avenue and Garfield Street, and the Lawrence Street Center on the Denver Campus. The service is free to faculty, staff, students, and employees of facilities served on the route. At CU Anschutz, the service stops at the front of Building 500. Shuttle buses arrive and depart the Anschutz Medical Campus every hour. Ridership on this service averages 40 to 50 riders per day.

COURTESY SHUTTLE

The three entities operate courtesy shuttles within the Anschutz Medical Campus, referred to as the Campus Circulator Service. This service operates from 7:30 AM to 5:00 PM Monday through Friday. The service transports individuals internally (when requested) via small electric cart vehicles. This is a demand-response system that serves the core area bounded by Montview Boulevard, Colfax Avenue, Wheeling Street, and Quentin Street. Ridership varies depending on activity.

The campus-to-campus shuttle waits for passengers at a sheltered stop in front of Building 500.

The courtesy shuttle stops in the Education Commons.



Shown looking west, Colfax Avenue (left side of photo) links the campus to downtown Denver (upper middle of photo) and the foothills beyond.

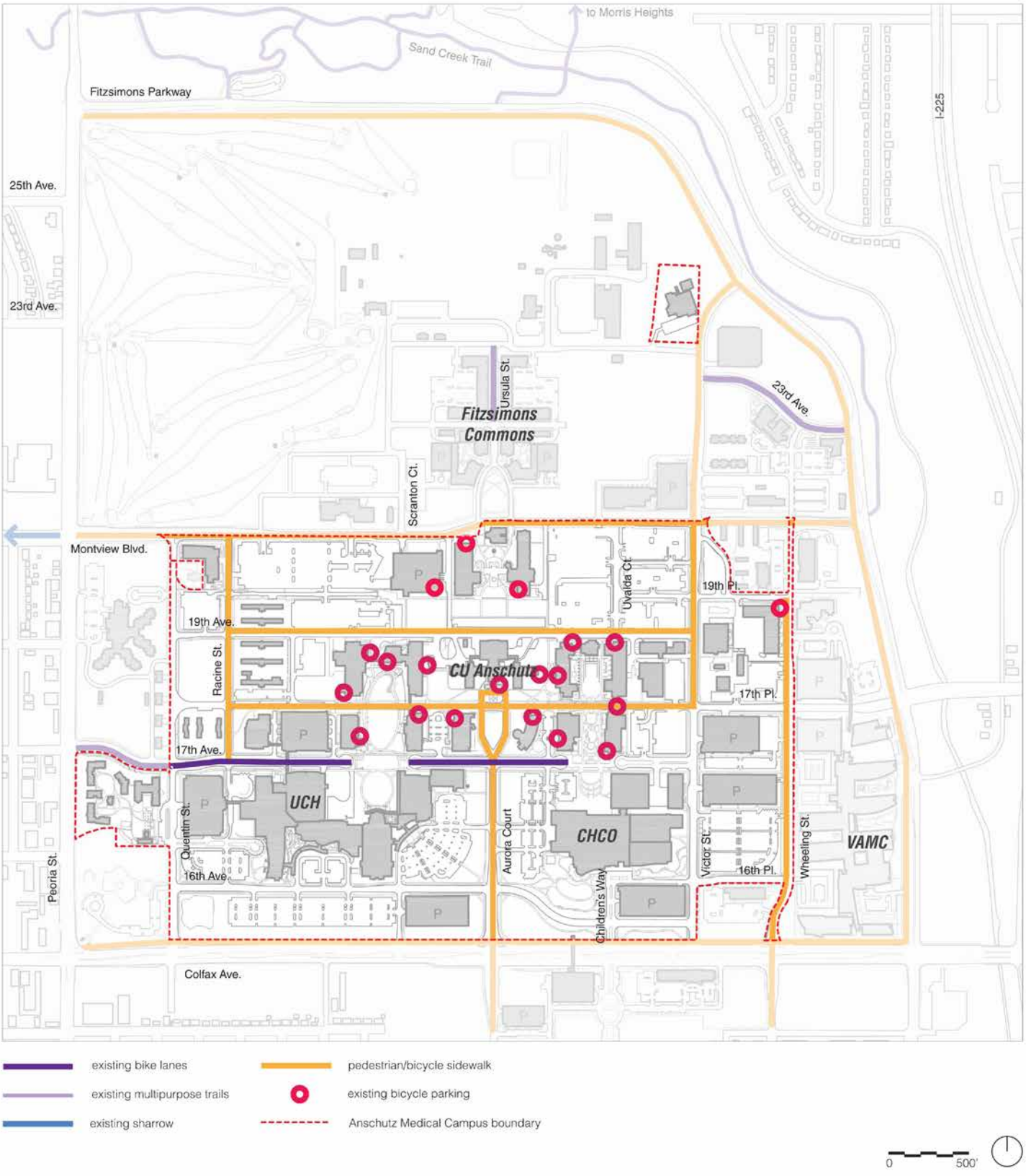


Figure II.28 - Existing Bicycle Network

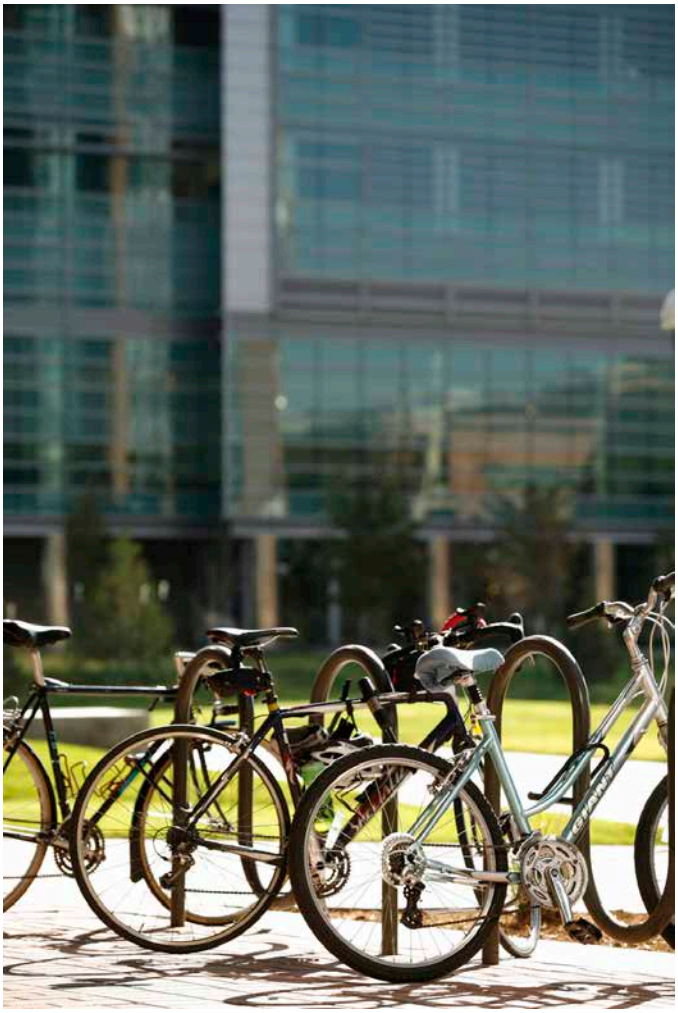
E. Bicycles

Bicycle accommodations along campus roads are relatively few. The only campus street that contains bicycle accommodations is 17th Avenue. Otherwise, bicycles typically ride along unmarked roadways or on sidewalks throughout the campus. Twenty bicycle parking racks are provided throughout the campus, 10 of which are located between 17th Place and 19th Avenue. Select parking structures contain bicycle lockers.

Dedicated CoA bicycle facilities that provide campus connections include:

- Montview Boulevard to the west. "Sharrow" lane striping has been added to Montview Boulevard, conveying the need for motorists to share the lanes with bicyclists. Montview Boulevard west of the Aurora/Denver border features a dedicated bike lane.
- Seventeenth Avenue to the west. CoA has dedicated this roadway as a signed bike route.
- Ursula Street to the south. CoA has dedicated this roadway as a signed bike route that connects to 13th Avenue. At 13th Place, Ursula Street is discontinuous as an automobile roadway, but a trail continues to 13th Avenue, which is also designated as a signed bike route.
- Various connections from the Sand Creek and Toll Gate Creek trail system at:
  - Montview Boulevard/Fitzsimons Parkway intersection
  - Victor Street/Fitzsimons Parkway intersection
  - Fitzsimons Parkway/future Ursula Street intersection
  - Fitzsimons Parkway/future Racine Street intersection

Figure II.28 graphically presents the existing bicycle system for the campus.



Bike racks see consistent use in the Research Commons.

Cyclists lock their bikes east of Research 1 North.

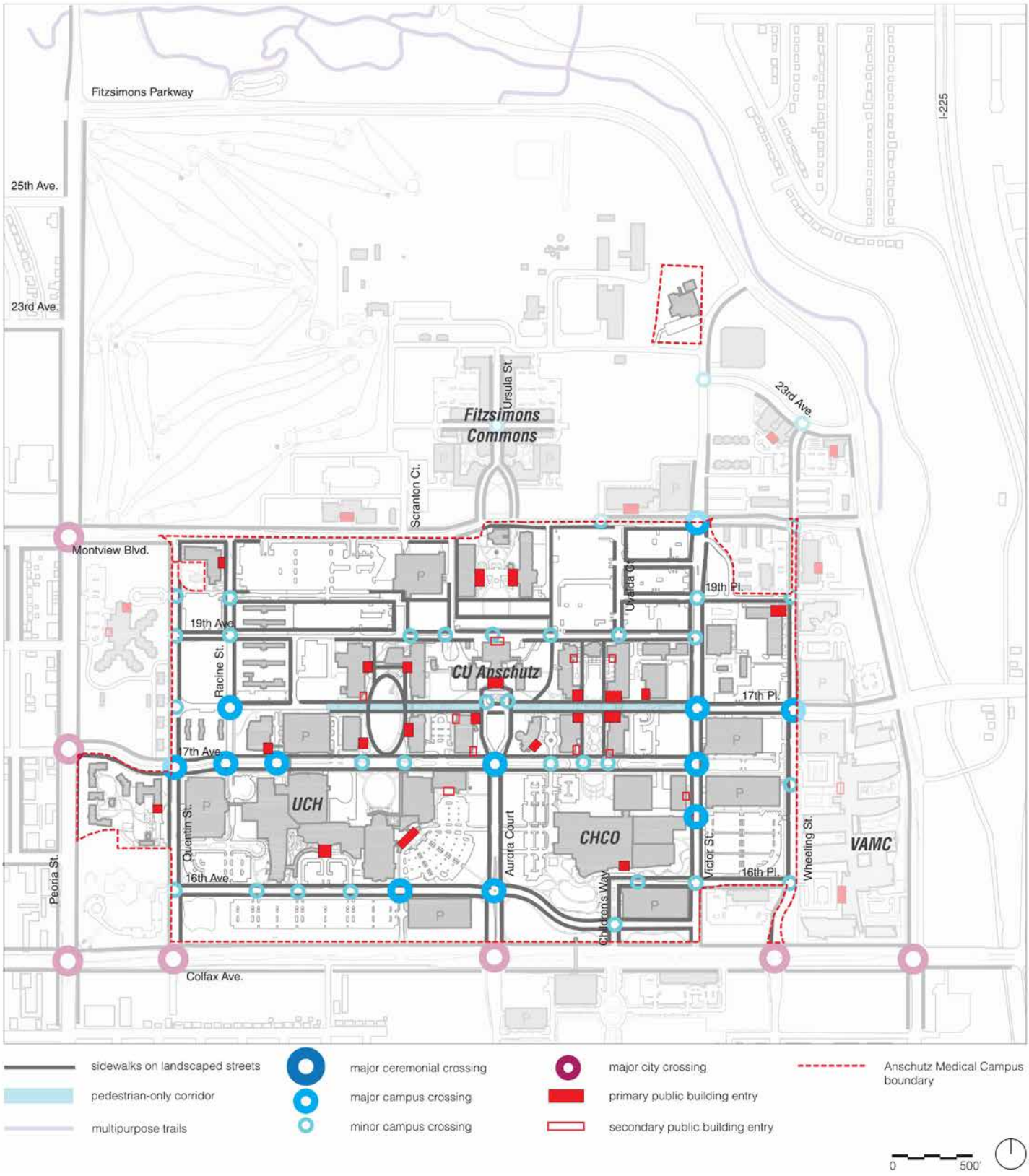


Figure II.29 - Existing Pedestrian Network

F. Pedestrians

Many campus roadways provide sidewalk accommodations; some are detached and wide while others are narrower and/or attached. Further, pedestrian-only zones and plazas have been established along 17th Place in the center of the campus core, some of which help establish an urban place-making amenity for campus users. Skywalks are also provided between several adjacent buildings to enhance pedestrian connectivity. A pedestrian overpass on Colfax Avenue connecting to the Fitzsimons Village development is also provided to users.

Some internal roadways lack sidewalk accommodations. Sections are missing along roadways where construction is currently taking place (such as the VAMC), and some past construction did not replace sidewalk facilities. Roadways along which sections of sidewalk are missing include:

- Montview Boulevard
- 19th Avenue
  - Along the rear of Building 500
  - West of Research 2, where pedestrians often walk within the travel lane
- Fitzsimons Parkway north of Montview Boulevard. Sections of sidewalk exist south of Montview Boulevard along the west side of roadway

There are several campus roadways that experience significant pedestrian crossing activity. Although traffic-calming measures like speed tables, special pavement materials, and bump-outs have been introduced to alleviate pedestrian/automobile conflicts, significant areas remain unsafe for pedestrians. Critical areas include:

VICTOR STREET BETWEEN 16TH AVENUE AND 17TH PLACE

Significant pedestrian activity occurs because parking structures are located on the east side, and associated CHCO is on the west. Signing and pavement marking have been added to alleviate this conflict.

19TH AVENUE BETWEEN VICTOR STREET AND SCRANTON STREET

Pedestrian activity crossing this stretch of road is caused by the parking provided on the north side and the campus core being on the south. Raised crosswalks have been installed along 19th Avenue to help alleviate some of this conflict.

16TH AVENUE IN FRONT OF UCH

Similar to the above two areas, this area of pedestrian/automobile conflict is due to parking being located on the opposite side of the roadway (south) from the facility it serves (north). Some calming measures have been implemented, including all-way stop intersections and a raised oval-sized median area that forces some curvature along the roadway.

A network of sidewalks in the Education Commons provides great pedestrian connectivity.

An improved pedestrian network will decrease instances of jaywalking on the campus.

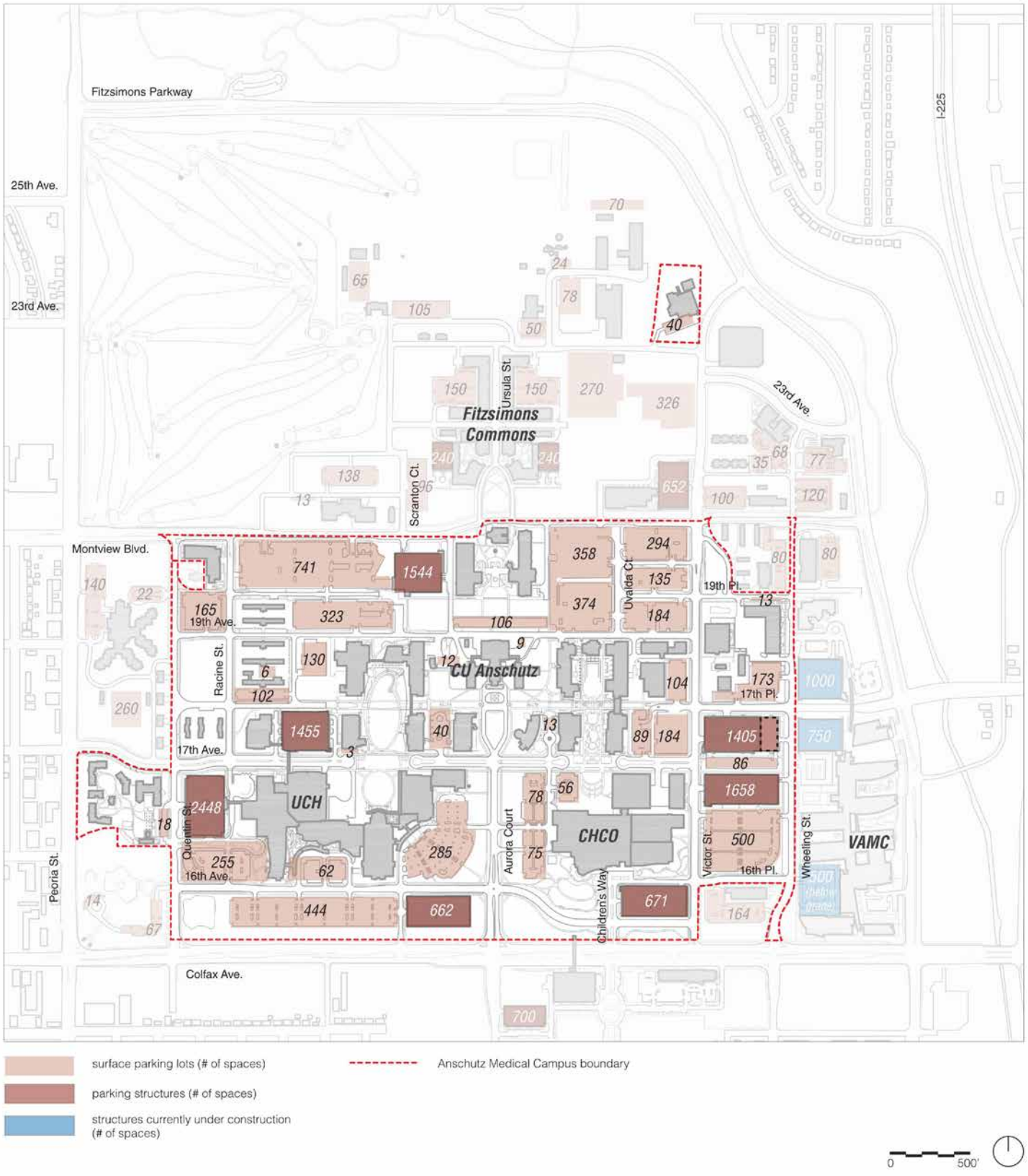


Figure II.30 - Existing Parking

II.9 PARKING SYSTEMS

A. Type and Ownership

Currently, the three entities on the Anschutz Medical Campus are primarily concerned with developing their own parking resources and meeting individual parking needs. For example, UCH recently constructed a new visitor parking garage on the southeast corner of their site and a new 2,470-space employee garage off Quentin Street. Within the last few years, CHCO completed one new employee garage and one garage expansion on the northeast corner of their site.

Similarly, parking rates and policies are set separately by the individual institutions. These policies cover a range of options, including pay parking with gated controls at CHCO, kiosk and gated parking at CU Anschutz, and free parking without gates or controls at UCH in the visitor lots and garage. Monthly parking rates also vary by entity and reflect different institutional philosophies regarding how much the cost of monthly parking should or should not be subsidized for employees and staff.

Though not a part of the campuswide plan, several adjacent sites such as UPI, FRA, and VAMC are discussed in this section of the report in order to get a more complete picture of possible parking solutions. These solutions may include some shared parking opportunities on adjacent properties within the Site-Wide area north of the campus.

Various policies related to parking management and parking pricing mean that there is currently little coordinated effort to address parking demand through alternative approaches, such as reducing single-occupancy vehicle trips to and from the campus. One of the goals of the master plan is to explore options to address future parking infrastructure needs in a more sustainable and coordinated manner.

Figure II.30 shows the current location of parking lots and garages for the university, UCH, and CHCO. In total, roughly 14,730 parking spaces are available on the Anschutz Medical Campus. A more detailed breakdown of this figure is provided in the next section. For a breakdown of parking counts by parking facility, see Appendix VII.3.

This aerial photograph shows surface parking lots flanked by the Henderson (left) and Leprino (right) parking garages.

Campuswide Parking Capacity and Estimated Utilization
Anschutz Medical Campus

Parking Lot/Area (1)	*Estimated Spaces Available*	*Owner*	*Intended User*	*Estimated Occupancy (March 2013)*	*Recommended Spaces (2)*	*Estimated Percent of Capacity*	*Estimated Effective Surplus*	*Assumptions*
CU Anschutz								
CU Anschutz (3)	1,160	CU Anschutz	Visitor	950	1,010	82%	150	(4)
CU Anschutz	3,950	CU Anschutz	Permit	3,520	3,700	89%	250	(5)
Off-Site (FRA, etc) + Event	-	-	Student/ Employee	250	270	-	-270	
Subtotal CU Anschutz	5,110			4,720	4,980	92%	130	
University of Colorado Hospital								
University of Colorado Hospital	1,350	UCH	Patient/ Visitor/Valet	1,190	1,370	88%	-20	(6)
University of Colorado Hospital	1,410	UCH	Leprino Garage	1,100	1,160	78%	250	(6)
University of Colorado Hospital	2,470	UCH	Employee Garage	1,340	1,410	54%	1,060	(7)
Subtotal UCH	5,230			3,630	3,940	69%	1,290	
Children's Hospital Colorado								
Children's Hospital Colorado	1,330	CHCO	Patient/ Visitor/Valet	1,010	1,160	76%	170	(8)
Children's Hospital Colorado	3,060	CHCO	Employee	2,300	2,420	75%	640	
Subtotal CHCO	4,390			3,310	3,580	75%	810	
Total	14,730			11,660	12,500	79%	2,230	

(1) Parking conditions on the Anschutz Medical Campus can be highly variable depending on the day, time, weather conditions, recent construction activity, etc. All figures in the table have been rounded and represent the estimated supply. and
(2) Recommended Spaces takes into account existing demand for parking plus an adjustment for Effective Supply. Effective Supply refers to the usable parking supply within each system after factoring in a cushion of spaces that is typically recommended to allow for proper circulation, temporary loss of spaces (due to minor construction), etc.
(3) Inventories for CU Anschutz are provided by the client and include roughly 280 new surface lot/overflow spaces that have been added since the start of the master planning process.
(4) Occupancies for CU Anschutz are estimated based on data collected by the parking operator over the course of 2012 and indicate typical usage on a peak day during the peak month (February or March).
(5) Permit spaces include all gated lots plus the majority of the Henderson Garage (less roughly 200 spaces in the Garage that are assumed to be used by visitors).
(6) Based on survey data collected by Walker Parking Consultants in August 2012 and adjusted for estimated design day.
(7) Occupancies for the new UCH garage are unknown at this time as the garage has only been open for several months. Walker assumes that the garage is currently accommodating off-site employees who were previously using the Henderson garage and the remote lot south of Colfax Avenue, plus 200 employees formerly parked in Leprino. (Occupancies may be higher than shown if other user groups from Leprino have been relocated to this garage.)
(8) Based on survey data collected by Walker Parking Consultants in August 2012 and adjusted for design day. May not reflect the demand for spaces that have been leased to the VA during the construction of the new VA Medical Center.
Note that excess garage capacity at both CHCO and UCH is intended to support projected needs. Both hospitals have recently expanded and will be increasing both employment and patient/visitor volumes over the next five to eight years.

Figure II.31 - Campuswide Parking Capacity and Estimated Utilization

B. Capacity

As with other parking systems, the actual supply of parking spaces on the Anschutz Medical Campus is not always a fixed number. Inventories can vary significantly depending on construction activity, the use of temporary parking lots, and relatively low-cost activities such as realignment or restriping of existing parking areas. For example, recent construction activity on the new bed tower at UCH meant that the inventory of available parking changed significantly over the course of the master planning process. Also at CU Anschutz, at least one new lot has been paved and made available for visitor parking since initial analysis was begun. Similarly, parking demand analysis takes into account some variable factors such as overflow parking usage. For example, some students and employees may park illegally north of Montview Boulevard out of convenience or to avoid paying for parking, though these spaces are not currently counted toward the campuswide inventory.

Figure II.31 shows a snapshot of parking inventories for each campus entity and estimated usage as of March 2013. The total parking inventory for the campus is estimated to be 14,730 spaces. The usable parking inventory for the campus is estimated to be 12,500 spaces after accounting for effective supply reductions. Effective supply is a calculation used to determine parking capacity after allowing for proper circulation within the system (see Figure II.31, footnote 2).

Based on several past parking studies and some field data collected by Walker Parking Consultants, it is estimated that the Anschutz Medical Campus likely has a usable surplus of roughly 2,230 parking spaces at current conditions during a typical peak month. This figure includes surplus parking capacity that is currently available at the two hospital campuses.

March was used for peak month analysis as it tends to be one of the busier times for class schedules and hospital patient activity.

Based on conversations with CU Anschutz parking staff, it is clear that special events held on campus can also have a large impact on the design day need for parking spaces. Some reasonable assumptions have been made to account for that factor.

The Leprino Garage on 17th Avenue boasts first-floor retail uses as well as 1,410 parking spaces.

C. Parking Management

The three entities on the Anschutz Medical Campus manage their own parking systems in terms of setting policies, allocating permits, and collecting fees. Third-party vendors are used for some services such as valet parking at UCH and CHCO, managing the visitor garage at CHCO, and managing enforcement and revenue collections for CU Anschutz.

The campus entities support alternative modes of transportation by offering carpool programs, free or discounted EcoPasses, and/or limited golf cart shuttle service for visitors who may have to park far away or have problems walking to their destination. However, these programs are not coordinated between or implemented at all three institutions.

The Anschutz Medical Campus as a whole does have an active transportation management association (TMA). However, as it is currently administered, the TMA does not oversee any transportation policies that apply to all three entities.

A brief discussion of current parking rates and policies for CU Anschutz, UCH, and CHCO follows this section.

CU ANSCHUTZ MEDICAL CAMPUS

Visitor parking is accommodated in a number of lots throughout the university campus. Visitors pay for parking at kiosks using pay-and-display meters and display the receipt on the vehicle dashboard. Daily parking fees are as follows:

- $1.00 per hour up to the daily max
- $5.00 daily max
- $1.00 flat rate on weekends and evenings after 5:00 PM

CU Anschutz charges various rates for an assigned permit in one of the gated employee and commuter student lots. Monthly parking fees are as follows:

- Students:
  - Student monthly: $36/month
  - Reserved parking: $75/month
  - Carpool: $36/month
  - Short-term weekly parking (1–8 weeks): $10/week
- Staff/Faculty
  - Part time (less than 20 hours/week): $36/month
  - Carpool: $36/month
  - Classified staff: $57/month
  - Faculty/professional exempt: $57/month
  - Non-university affiliates: $57/month
  - Reserved parking: $75/month
  - Short-term weekly parking (1–8 weeks): $15/week

CU Anschutz offers free reciprocal parking access for permit holders who have a parking pass at a different CU campus at Boulder, Denver, or Colorado Springs. Students and faculty/staff can also purchase an EcoPass for a fee of $37.50 per month (or pay a higher fee for both the EcoPass and a reserved or unreserved parking permit).

CU Anschutz parking policies are also applied to any spaces on university property that are leased to other entities.

UNIVERSITY OF COLORADO HOSPITAL

UCH currently offers free visitor, patient, and valet parking for all hospital visitors. Paid monthly parking is reserved for employees in either the Leprino Garage or the new employee garage.

Management of the system is handled mostly by providing separate visitor and employee-only parking resources. The southeast patient/visitor garage, for example, is used only for visitor self-park and valet. Likewise, the main hospital lot and the lot in front of Rocky Mountain Lions Eye Institute (RMLEI) are signed for visitor and patient parking only.

Monthly UCH employee permit rates were recently increased to $65 per month for garage parking. UCH does not currently participate in the EcoPass program.

Today, surface parking spaces fill the lot in front of the Anschutz Inpatient Pavilion at UCH.

CHILDREN'S HOSPITAL COLORADO

Information on CHCO parking policies was collected from the hospital's website and includes the following:

- Patients, families, and visitors may park 24 hours a day in the South Parking Garage, just south of the main entrance to the hospital.
- As of January 2013, all visitor/patient parking within the south garage is free of charge. Previously, CHCO required that all visitors validate their parking tickets at the hospital information desk or pay a $3 flat rate for garage parking. This flat rate is no longer being collected.
- For patients and families receiving emergency services, there are clearly identified lots west of the Emergency Department entrance.
- Additional visitor parking is located on the east end of the CHCO site for the Behavioral Health Sciences services and Kempe Center in the Gary Pavilion.
- CHCO also offers RV parking for families of inpatients staying for a minimum of five days.

Much of the campus's parking need is met with surface parking.

Monthly permit parking at CHCO is $14 per month, and most permit holders are assigned to one of the two employee garages east of the hospital. The $14 rate is the lowest monthly rate currently offered by any entity on the Anschutz Medical Campus.

D. Proposed Role of the Transportation Management Association

During the master planning process, several workshops were held with campus and Site-Wide stakeholders to discuss future parking demand projections and possible strategies to address this demand.

Parking management was considered on a Site-Wide scale rather than at the campus level to allow for greater opportunities for inter-institutional parking space leases and partnerships. For example, a new surface lot on UPI property north of Montview Boulevard will provide 300 parking spaces for university users. A Site-Wide TMA would also be able to collaborate with the CoA, for example, if it wanted to build a garage near the campus.

Site-Wide parking management options were evaluated ranging from no policy changes to the implementation of a full Site-Wide parking authority. A summary of the discussion points is shown on the following page in Figure II.32.

Based on input received from the stakeholders, the consensus was to consider pursuing a Site-Wide area transportation management association rather than an autonomous authority. This option includes an expanded role for the TMA in managing future campus and Site-Wide parking resources.

It is envisioned that the TMA (if supported by the various campus entities) could become an effective tool for addressing future parking issues for the university and for the campus as a whole. Some of the more important functions for the TMA would be as follows:

- Operate as an exchange where surplus parking capacity at one institution can be by leased to other entities
- Potentially address mid-range parking needs through shared-use agreements for off-site parking options (including the FRA, RTD Park-n-Rides, future CoA garage(s),and/or other potential sites)
- Actively promote transportation alternatives, such as RTD's EcoPass, for the entire campus in order to reduce single occupancy vehicular trips
- Manage and promote the parking shuttle to make the best use of existing and future parking resources
- As much as possible, discuss with various campus entities the possibility of setting more-uniform parking permit policies and fees based on a zone-based pricing model

These concepts will be discussed in detail in Chapter VI when evaluating future parking needs for specific development projects. In addition, Chapter V of this report outlines some specific recommendations that the campus may want to consider in order to strengthen the role of the TMA in future parking development.

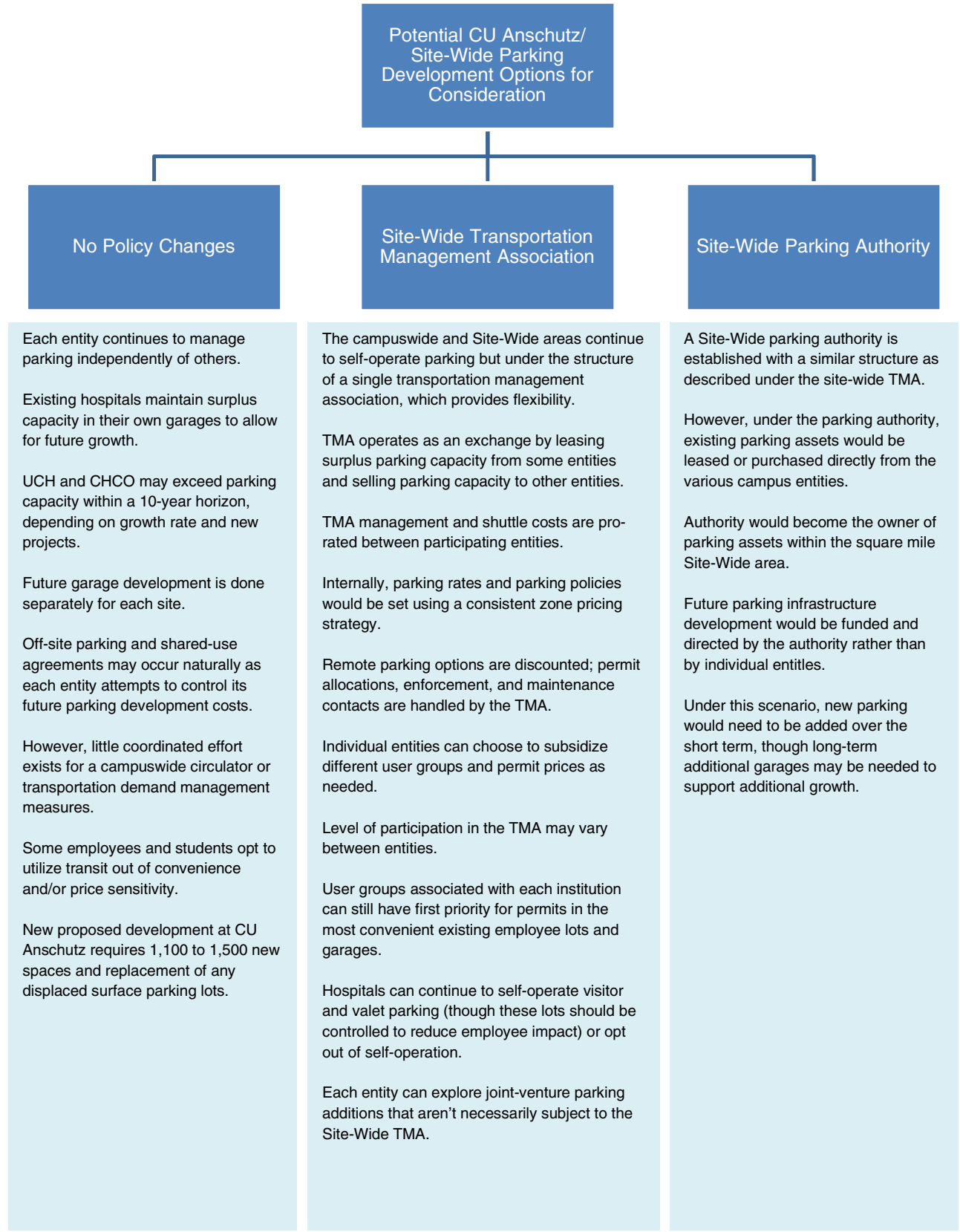


Figure II.32 - Parking Development Options

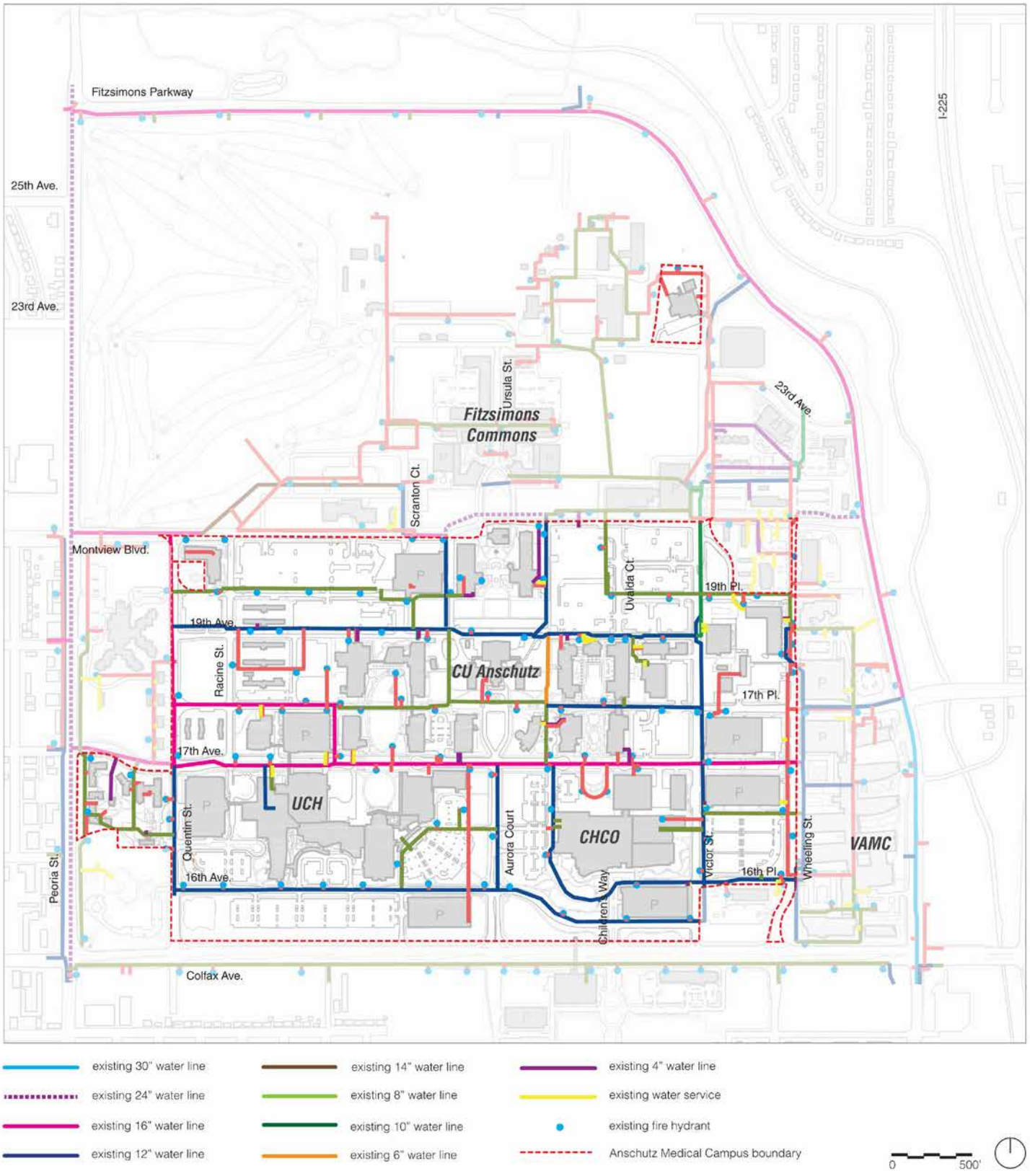


Figure II.33 - Existing Utilities - Water

II.10 UTILITY SYSTEMS

A. Water

The existing potable water network located on the Anschutz Medical Campus is part of a larger interconnected network that extends beyond the campus boundary. This network of water mains serves the entire campus as well as all the surrounding stakeholders. It is primarily owned and operated by Aurora Water. Aurora Water has access to these facilities through easements granted by the university. The interconnected nature of the water line provides for better redundancy and water quality. The Anschutz Medical Campus depends on water lines outside of its boundary, and, likewise, the surrounding stakeholders rely on water lines on campus.

The existing Anschutz Medical Campus water infrastructure consists of the following, based on discussion with Anschutz Medical Campus staff and campus utility plans by Borstad Consulting Services, LLC dated April 2009:

- A 24-inch PVC main in East Montview Boulevard from Wheeling Street to Fitzsimons Parkway is outside of the CU Anschutz Medical Campus boundary. However, the campus relies on this line for adequate capacity within the campus from the northeast.
- The 12-inch PVC main in 17th Place from Wheeling Street to Fitzsimons Parkway is being replaced with a 16-inch main during current VAMC construction. The 12-inch main within 17th Place that is being replaced with a 16-inch main during the current VAMC construction and a 24-inch line within East Montview Boulevard are fed from the 30-inch main in Fitzsimons Parkway to the east and provide water service to the Anschutz Medical Campus from the east.
- A 12-inch CIP main along Wheeling Street from East 17th Place to East 19th Place transitions to an 8-inch main from East 19th Place to Montview Boulevard. Both of these mains are located outside the existing Wheeling Street roadway and are being relocated to accommodate the proposed roadway cross section and utility layout with the current VAMC construction.
- A 30-inch steel main in Fitzsimons Parkway from East Colfax Avenue to East 17th Place and a 24-inch steel main from East 17th Place to East Montview Boulevard also provide adequate water service to the Anschutz Medical Campus from the east.
- A 16-inch water main connects to the existing 24-inch water main at the intersection of Peoria Street and 17th Avenue and at the intersection of Peoria Street and Montview Boulevard one block west of the Anschutz Medical Campus boundary, providing the campus water service from the west.

These mains directly feed numerous fire hydrant laterals and facilities and additional water loops with sizes ranging from 6 inches to 16 inches that serve additional facilities and hydrants throughout the campus.

Per the Infrastructure Utility Assessment Report, dated May 17, 2006, many of these mains are undersized and constructed with outdated materials that were not considered for the long-term redevelopment of the campus, and the existing water system is not sized to facilitate the needs of future development and cannot support the increased demands for future development.

Per discussions with CU Anschutz facilities staff, the water line infrastructure has been upgraded and reconstructed since the May 17, 2006 Infrastructure Utility Assessment Report to be adequately sized and provide capacity to support the facilities' needs. Future development will require further water analysis on a case-by-case basis.

Per the Infrastructure Master Plan, dated October 11, 2001, the Anschutz Medical Campus water demands at full build-out are outlined in Figure II.34.

Campus Water Demands at Full Build-Out in Millions of Gallons Per Day (MGD)
Anschutz Medical Campus and Site-Wide Study Area
October 2001

Average Daily Demand (MGD)	*Maximum Daily Demand (MGD) (1)*	*Peak Hourly Demand (MGD) (2)*
3.88	10.86	17.45

(1) The Maximum Daily Demand is 2.8 times the average daily demand per discussions with the City of Aurora.
(2) The Peak Hourly Demand is approximately 4.5 times the average daily demand per discussions with the City of Aurora.

Figure II.34 - Campus Water Demand

Pipe installation south of the CUP.

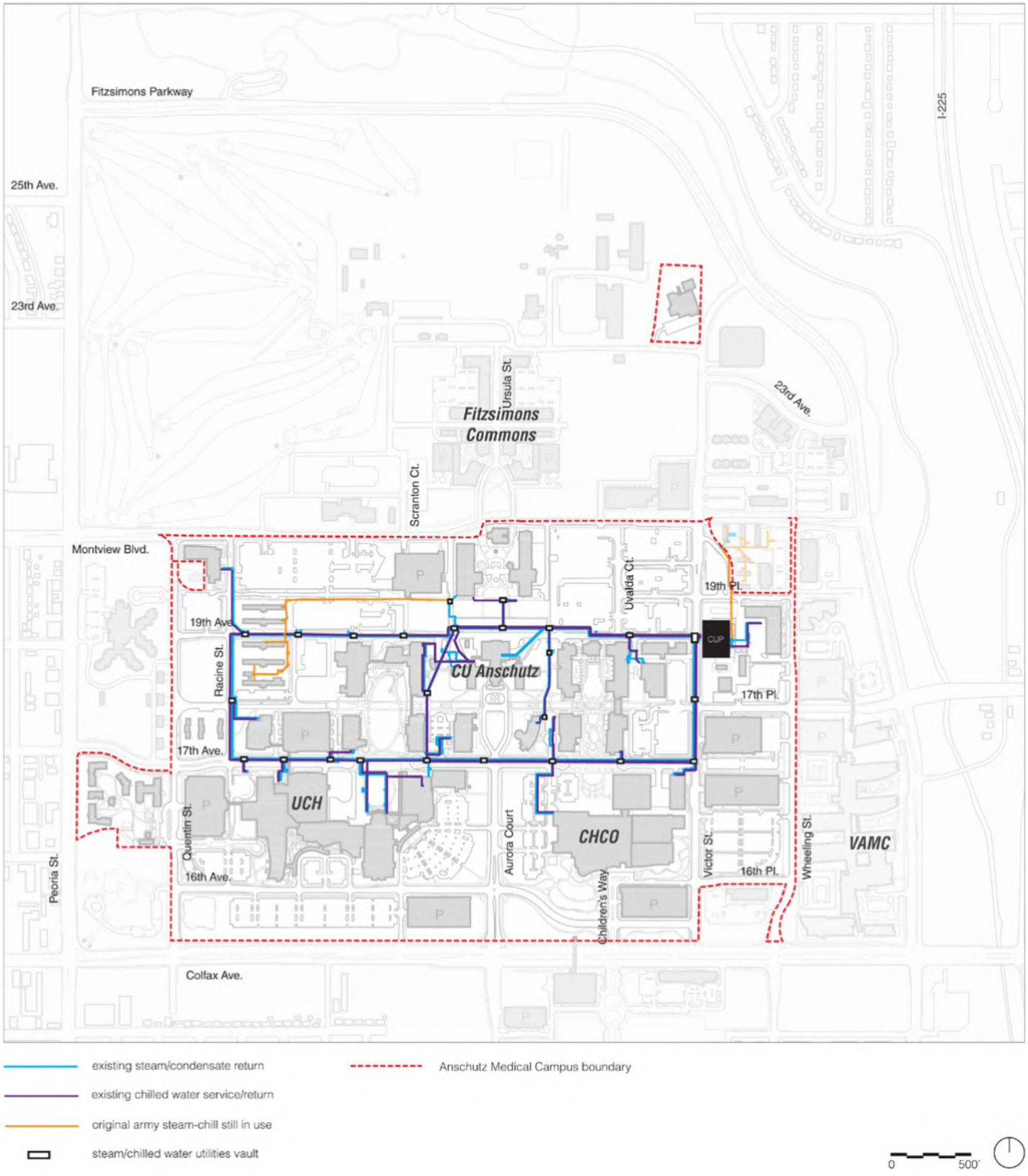


Figure II.35 - Steam and Chilled Water - Existing

B. Steam/Chilled Water and Gas

INTRODUCTION

The current Anschutz Medical Campus demand, production capacity, and piping distribution system for steam and chilled water are covered in this section. Only natural gas at the Central Utility Plant (CUP) is discussed, and it is used there as fuel for steam boilers.

CAMPUS DEMAND FOR STEAM AND CHILLED WATER

Figure II.36, Building and CUP Peak Steam and Chilled Water Demand - Actual, on the following page lists the peak demand for steam and chilled water recorded for all the buildings on campus that are connected to the campus piping network. These data are from metered values obtained since each building was constructed and are updated annually. The table culminates with values for peak steam and chilled water generation at the CUP. The peak values at the CUP as of the end of 2012 for steam generation are 228,000 pounds of steam per hour (pph) and 10,300 tons of chilled water cooling (CHW). These numbers are the basis for future steam and chilled water demand at the CUP.

Installation of steam, condensate return, and chilled water lines in vault 11.

CAMPUS UTILITY DISTRIBUTION SYSTEMS

Steam

The current steam and associated condensate piping network consists of buried piping connecting a series of vaults. The network is contained within the Anschutz Medical Campus boundary and comprises an autonomous campus system. As shown in Figure II.35, the piping network forms a rectangular loop beginning and ending at the CUP and follows a route approximately along North Victor Street, East 17th Avenue, North Racine Street, and East 19th Avenue. There is a branch running east of Research 1 North and Research 1 South that connects the two major east/west runs. The piping along the entire loop consists of a 20-inch high pressure steam main and an 8-inch low pressure condensate pipe. Smaller pipes branch off the main pipes to connect buildings.

Chilled Water

The current chilled water piping network follows the same route and passes through the same vaults as the steam piping system, forming a similarly autonomous campus system. There are two chilled water piping loops originating at the CUP, called the inner (eastern) and outer (western) loops. Along the entire route for each loop, there is a 20-inch supply pipe and a 20-inch return pipe. Where the outer loops overlaps the inner loop, on the east side of campus, there are four chilled water pipes running alongside one another. Smaller pipes branch off the main pipes to connect buildings.

Building and CUP Peak Steam and Chilled Water Demand - Actual
Anschutz Medical Campus
2012

Building				
Name	*Total Size (GSF)*	*Vault Connection*	*Peak CHW Demand (Tons)*	*Peak Steam Usage (PPH)*
Academic Office 1 (2)	204,974	V13	520	4,875
Anschutz Inpatient 1st Phase (2)	275,000	V14	900	18,850
Anschutz Inpatient Base Expansion (2)	274,205	V12B	907	11,050
Anschutz Inpatient Tower Fit-Up (2)	200,000	V14	666	8,125
Anschutz Cancer Center (2)	120,000	V14	0	4,875
Anschutz Outpatient (2)	400,000	V14	0	16,250
Rocky Mountian Lions Eye Institute (2)	80,000	V14, V15	0	3,185
Barbara Davis Center (2)	112,000	V15	280	3,965
Building 500 (2)	478,211	V3, V5	750	14,105
Fulginiti Ctr Bioethics & Humanities (2)	19,475	V3.05	33	390
Central Utility Plant	80,000	N/A	163	-
Education 1A (2)	21,960	V6	81	800
Education 1B (2)	115,251	V3.05	208	1,918
Education 2 & AOE (2)	275,376	V18	520	4,875
Environmental Health & Safety (2)	13,646	V2	60	345
Environmental Health & Safety 2 (2)	7,356	V2	11	104
Campus Services (2)	68,333	East of CUP	91	1,138
PASCAL (2)	18,456	V2	0	462
Health Sciences Library (2)	113,005	V4.1	213	2,015
Leprino Building & Parking (2)	320,705	V11	583	5,529
Nighthorse Campbell Native Health (2)	45,396	V3.2	65	1,300
School of Dental Medicine Building (2)	95,448	V17	239	3,445
Research 1 - North & South (2)	606,463	V6	2,200	40,300
Research 2 (2)	506,000	V8	1,800	27,300
Children's Hospital Colorado (2)	837,110	V17	2,093	33,484
CHCO Outpatient Clinic (2)	192,094	V17	427	6,861
CHCO Office Building (3)	287,956	V17	523	8,218
CHCO East Pavilion Building (3)	150,000	V19	273	4,295
Temp. Reuse (Campus Police Bldgs) (2)	122,331	V5	0	1,586
Temp. Reuse (Aurora Police Bldgs) (2)	78,212	East of CUP	0	1,014
School of Pharmacy Building (2)	175,000	V4.1 CHW, V5.1 Steam	583	7,850
Health & Wellness Center (2)	95,000	V10	190	1,900
Anschutz Cancer Center Expansion (2)	30,000	V14	135	1,579
Rocky Mtn. Lions Eye Inst. Expansion (2)	10,000	V14, V15	45	526
CHCO Bed Tower 2, Phase 1 (2)	226,000	V19	646	9,040
Totals Through 2012	6,654,963		15,205	251,554

End of 2012 - Actual Peak Campus Demand (1)	
Steam (PPH)	*CHW (tons)*
228,000	10,300

(1) Peak campus demand for CHW tons has been adjusted from building tons (15F Delta-T) to CUP tons required (16F Delta-T). These values start with the peak value recorded through the end of 2012 and add predicted values for future dates.
(2) Ken Neeper Master Spreadsheet - CUP and Elec Load Projections 10-3-08_From Neeper 2-2010.xls
(3) Estimated building breakdown based on Ken Neeper Master Spreadsheet. Square feet divided based on footprint comparison, loads extracted from square-foot ratios.

Figure II.36 - Steam and Chilled Water Demand - Actual

CENTRAL UTILITY PLANT

Boilers

There are currently six boilers in the CUP generating steam at a pressure of 125 pounds per square inch gauge (psig). There are four boilers rated at 60,000 pph, one at 30,000 pph, and one at 90,000 pph. The boilers are configured in an N+1 arrangement, meaning that they are sized to provide the projected steam peak demand, even if one is not operating. This results in a current total peak steam production capacity of 270,000 pph (excluding the 90,000 pph unit). Figure II.37 shows the demand for steam on the campus from 2009–2012 correlated with the number of boilers in the CUP.

CUP.

CUP Boiler Capacity - Existing
Anschutz Medical Campus
2012

Year	*Boiler Tag*	*Peak Generation Capacity (PPH)*	*Fixed Firm Capacity (PPH) (1)*	*Expected Peak Demand (PPH)*	*Comments*
	B-1	60,000			Original Boiler
	B-2	60,000			Original Boiler
	B-3	60,000			Original Boiler
	B-4	60,000			Original Boiler
	B-5	30,000			Original Boiler
2009		270,000	210,000	212,000	Actual Measured Peak Demand
2010		270,000	210,000	212,000	Peak Demand Exceeds FFC
2011		270,000	210,000	223,855	Peak Demand Exceeds FFC
	B-6	90,000			Install New Boiler (Expansion III)
2012		360,000	270,000	228,000	Actual Measured Peak Demand

(1) Definition of Fixed Firm Capacity: Capacity of remaining boilers in case the largest boiler fails.

Figure II.37 - CUP Boiler Capacity - Existing

Chillers

By the end of 2013, there will be nine chillers housed in the CUP. There are two chillers rated at 1,200 tons of cooling, two at 2,000 tons, and five at 2,200 tons. The chillers are configured in an N+1 arrangement, meaning that they are sized to provide the projected chilled water demand, even if one is not operating. This results in a current total peak chilled water production capacity of 15,200 tons (excluding one 2,200-ton unit). Figure II.38 shows the existing demand for chilled water on the campus correlated with the number of chillers in the CUP.

Figure II.38 also shows that chilled water demand on the campus has actually dropped from the year 2009 to 2012 by about 2,000 tons. This has occurred even though there has been great campus growth during that period. The reduction is primarily due to an aggressive campaign for energy conservation in the Research 1 building and incorporation of energy-conserving features in new buildings.

Chillers at the CUP.

CUP Chiller Capacity - Existing
Anschutz Medical Campus
2012

Year	*Chiller Tag*	*Peak Generation Capacity (Tons)*	*Fixed Firm Capacity (Tons) (1)*	*Expected Peak Demand (Tons)*	*Comments*
	CH-1	1,200			Original Chiller
	CH-2	1,200			Original Chiller
	CH-3	2,000			Expansion 1 Chiller
	CH-4	2,000			Expansion 1 Chiller
	CH-6	2,200			Expansion 2 Chiller
	CH-7	2,200			Expansion 2 Chiller
	CH-8	2,200			Expansion 2 Chiller
	CH-9	2,200			Expansion 2 Chiller
2009		15,200	13,000	12,000	Actual Measured Peak Demand
2010		15,200	13,000	12,000	Okay
2011		15,200	13,000	10,820	Actual Measured Peak Demand
2012		15,200	13,000	10,300	Actual Measured Peak Demand
	CH-5	2,200			Expansion 4 Chiller

(1) Definition of Fixed Firm Capacity: Capacity of remaining chillers in case the largest chiller fails.

Figure II.38 - CUP Chiller Capacity - Existing

Fuel oil tanks located south of the CUP.

Natural Gas

A six-inch high pressure gas line from Xcel Energy is located at the south exterior side of the CUP. From there it is metered, and the pressure is reduced to 20 psig before it enters the building.

C. Electrical

INTRODUCTION

A review of the Anschutz Medical Campus medium-voltage electrical distribution system determined existing conditions of electrical equipment and system infrastructure.

This section identifies the conditions, capacities, limitations, and deficiencies of the medium voltage primary distribution system in general and the specific equipment providing electrical service to buildings on campus. The study focuses on the main switchgear, located south of the CUP, and the main medium-voltage switchgear in the CUP. The system is evaluated for capacity and expandability for the Anschutz Medical Campus's future needs based on data from each entity and existing conditions.

The evaluation of equipment and systems and the development of feasible alternatives includes the following approach and analysis methods:

- Perform review of existing Xcel Energy equipment, campus distribution systems, and other site utilities.
- Review existing drawings, nameplate information, and load data provided by CU Anschutz staff.
- Conduct meetings with CU Anschutz personnel and Xcel Energy.
- Perform necessary calculations to determine existing and projected feeder and switchgear loads.

CAMPUS PRIMARY ELECTRICAL DISTRIBUTION

Existing CU Anschutz and UCH Medium-Voltage System Overview

The existing CU Anschutz and UCH medium-voltage systems are currently fed by Xcel Energy through the Fitzsimons Substation Banks 1 and 2 as well as the East Substation Bank 1. The service is conveyed through multiple independent feeder paths. Each feeder path consists of Xcel Energy's off-site infrastructure as well as switches and feeder components on campus.

Xcel Energy has recently modified their infrastructure to increase capacity and reliability. Modifications include bringing an additional feed from the Fitzsimons Substation Bank 2 to Campus Bus B as well as other reconnection modifications. Physical installation is now complete.

- Feeder circuit 1515 originates at the Fitzsimons Substation Bank 2 and routes to ATO Bus-1A (CU Anschutz) and to ATO Bus-2A (UCH).
- Xcel Feeder circuit 1577 originates at the East Substation Bank 1 and routes to ATO Bus-1A (CU Anschutz).
- Xcel Feeder circuit 1513 originates at the Fitzsimons Substation Bank 1 and routes to ATO Bus 2A (UCH).
- Xcel Feeder circuit 1510 originates at the Fitzsimons Substation Bank 1 and routes to non-ATO Bus B (CU Anschutz).
- Xcel Feeder circuit 1519 originates at the Fitzsimons Substation Bank 2 and routes to non-ATO Bus B (Anschutz).

Existing CHCO Medium-Voltage System Overview

- Xcel Feeder circuit 1517 originates at the Fitzsimons Substation Bank 2 and routes to the CHCO distribution system.
- Xcel Feeder Circuit 1573 originates at the East Substation Bank 2 and routes to the CHCO distribution system.

This information is provided to quantify all Xcel feeders to campus. Evaluation of CHCO is not part of this report.

Xcel Feeder Ampacity

Feeders to each of the campus switchgear systems go through Xcel Energy PMH switches located near the CUP. The Xcel Energy feeders between Xcel service switchgear and campus switchgear systems have ampacity as described in Figure II.39.

Xcel Feeder Ampacity
Anschutz Medical Campus and Site-Wide Study Area
2012

Xcel Feeder Number	*Size*	*Feeder Ampacity (1)*	*Substation*	*Load*
1510	1000 MCM CU	690	Fitz Bank 1	Non-ATO Bus B
1519	1000 MCM CU	690	Fitz Bank 2	Non-ATO Bus B (New Feed)
1515	1000 MCM CU	690	Fitz Bank 2	ATO Bus-1A and ATO Bus-2A
1577	1000 MCM CU	690	East Sub Bank 1	ATO Bus-1A
1517	1000 MCM CU	690	Fitz Bank 2	CHCO
1573	1000 MCM CU	690	East Sub Bank 2	CHCO
1513	1000 MCM CU	690	Fitz Bank 1	ATO Bus-2A

(1) Based on NEC Table 310,60(c)(77) for MV-105, 15kV Cable in Ductbank.

Figure II.39 - Xcel Feeder Ampacity

Campus Switchgear Capacity

Bus 1A, Bus 2A, and Bus B ratings are shown in the tabulation below (Figure II.40). This tabulation also shows information indicating the maximum demand for each of the three switchgear buses.

Figure II.40, shows that each of the switchgear assemblies on campus has significant spare bus capacity that will be adequate for servicing the campus's growth over the next 10 years.

Campus Switchgear Bus Capacity
Anschutz Medical Campus
Summer 2011

Bus	*Load*	*Bus Amps*	*Peak Demand/Date*	*% Load (1)*
ATO Bus 1A	CU Anschutz	1200	9.23 MW 7/2011	38.2%
ATO Bus 2A	UCH	1200	5.63 MW 7/2011	23.3%
Non-ATO Bus B	CU Anschutz	2000	11.58 MW 6/2010	28.8%

(1) At assumed power factor of .88 lagging.

Figure II.40 - Campus Switchgear Bus Capacity

Xcel Feeder Capacity

Although the CU Anschutz switchgear buses and breakers have significant capacity for expansion, the load that each switchgear can service is currently limited to the capacity of the Xcel feeder and associated PMH switch feeding that switchgear. Currently, each switchgear feed is limited by two significant factors. First, each of the incoming cables from Xcel to each switchgear is only rated for 690 amperes, and this presumes that the duct bank enclosing the feeders is appropriately designed to limit mutual heating between conductors and other banks. Further study is necessary to make this determination. Secondly, each feed to the campus switchgear currently comes through Xcel-owned PMH switches. These Xcel switches are currently located just west of Building 610, along Victor Street. Depending on the age and configuration of these switches, the maximum capacity that can be handled by a PMH switch way is 650 amperes. Currently, no feed to any campus switchgear can exceed 650 amperes.

Present load on Bus B, the non-ATO bus that ultimately feeds the CUP, is a total of 11.6 megawatts when both sides of the bus are added together. Assuming a campus power factor of 0.88, this translates into 577 amperes, or 89 percent of Xcel's feeder capacity. Bus B has a tie breaker between the two sides of the bus. This tie breaker is intended to allow both sides of the bus to be fed from a single feeder in the event that one of the two Xcel feeders to the bus fails. At this point, if any load is added to either side of Bus B, one Xcel feeder will no longer be able to provide backup power for a failed feeder. Thus, in the event of an Xcel feeder failure to Bus B, plant operators will need to identify loads that can be shed to bring the bus load to within the capability of Xcel's remaining feeder. This presents a significant concern, as the CUP provides necessary heating and chilled water for many campus facilities, including some with medical or research missions that depend heavily on continuous utility service.

Bus 1A presents similar concerns. Because Bus 1A is a full ATO bus, the total load on both sides cannot exceed the rating of either feeder. At present, this total load is approximately 71 percent of either Xcel feeder rating. This provides only 29 percent growth capacity to accommodate new campus buildings.

Bus 2A feeders that serve UCH are in better shape at 43 percent of the Xcel feeder capacity.

Xcel does not currently provide pad-mounted switchgear in excess of a 650 ampere rating. Thus, to exceed 650 amperes, Xcel will likely need to provide a freestanding outdoor full-height switchgear assembly for each of the feeders. The switchgear will most likely be rated for 1200 amperes. This piece of switchgear will be large and quite expensive. Compounding the size issue, two line-ups of switchgear will be required for each feeder as both the preferred and alternate feeds for each ATO system will need to be provided.

Xcel Energy Fitzsimons Substation.

CAMPUS MEDIUM-VOLTAGE ELECTRICAL DISTRIBUTION SYSTEM

The existing 15kV main distribution outdoor switchgear was installed in 2000, and it is housed in a weatherproof walk-in enclosure. The equipment was manufactured by Square D. Circuit breaker control power is provided via a battery system consisting of a DC charger and battery rack.

The metal-clad switchgear walk-in enclosure sits over a cable vault with multiple levels of cable tray for conveyance of distribution circuits to the breaker cubicles located in the switchgear line-up. The breakers are accessible from the interior aisle of the structure. The cable termination bussing is accessible from outdoor cubicle doors.

Switchgear Bus 1A and Bus 2A are each rated 1200 amperes, 15kV, 36 KAIC, 750 MVA. Main and tie breakers are rated 1200 amperes.

Switchgear Bus B is rated 2000 amps, 15kV, 36 KAIC, 750 MVA. Main and tie breakers are rated 2000 amperes.

Each circuit breaker is supervised by a Schweitzer Electric Laboratories (SEL) multifunction protective relay. Exact relay types and current transformer ratios vary.

Bus 1A has two spare breaker cubicles rated at 1200 amps each.

Bus 2A has no spare breaker cubicles and two future cubicles rated at 1200 amps each.

Bus B has 8 spare breaker cubicles rated at 1200 amps each.

High-voltage area north of Building 500.

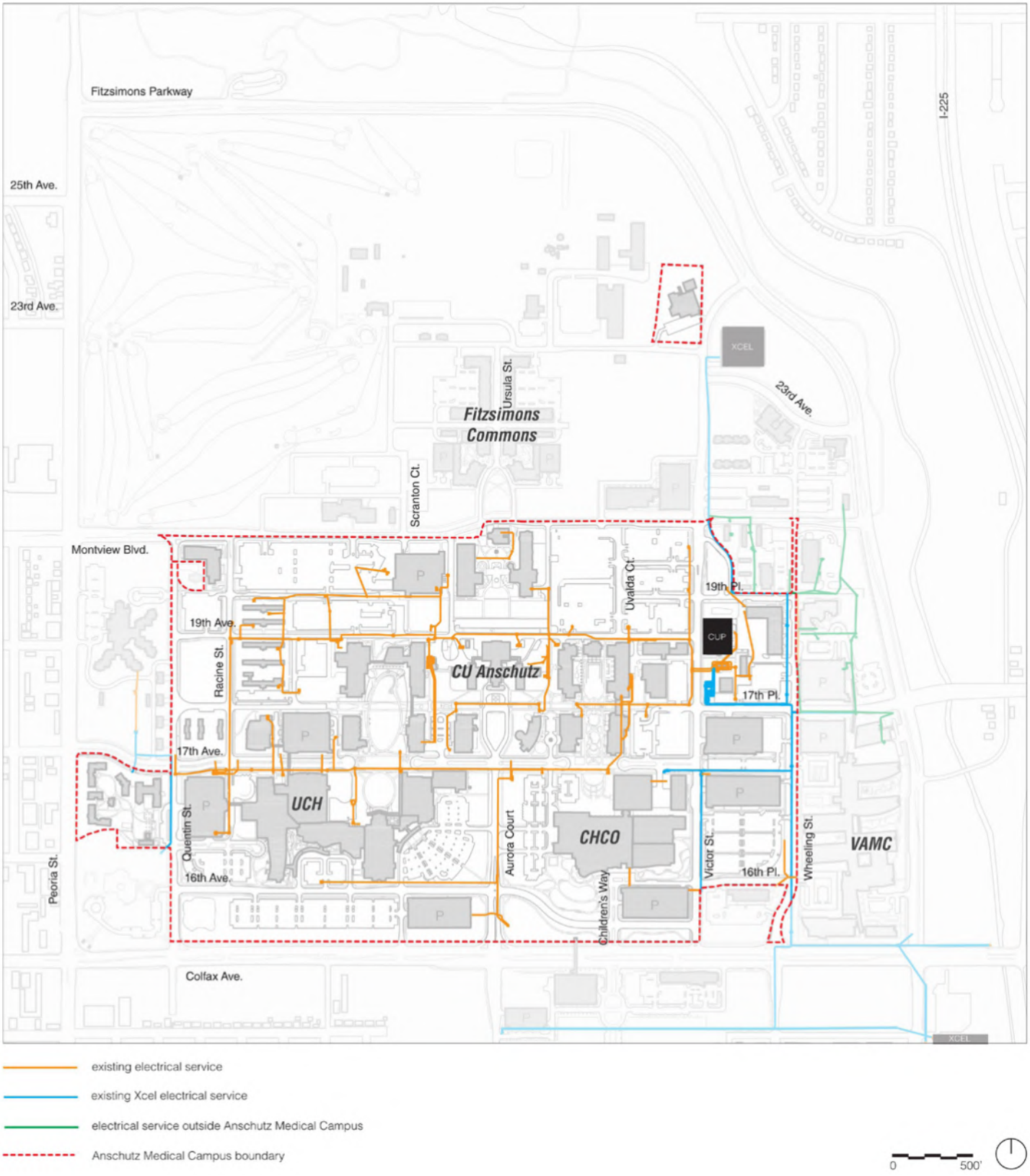


Figure II.41 - Electrical System - Existing

CAMPUS DUCT BANK AND VAULT SYSTEM

The power distribution for the 15kV circuitry consists of concrete-encased conduit duct banks. Refer to Figure II.41 for a general arrangement of the campus duct bank system. Minor discrepancies between Figure II.41 and the description below will require field verification to resolve. The distribution is accomplished via two separate systems, referred to as the North System and the South System.

North System

The North System duct bank originates at the main 15kV switchgear (ATO) and routes west to manhole (MH) #13. The circuits that loop feed through the North System are 1A-1, 1A-2, 1A-3, and B-3. The empty conduits that exist are eight five-inch conduits. This configuration continues north to MH #14, west along 19th Avenue through MH #15, and to MH #16. Continuing west along 19th Avenue from MH #16 to MH #17, the duct bank empty conduits are reduced to four four-inch conduits. From MH #17, a new duct bank consisting of 10 empty four-inch conduits routes north to MH #17X. Loop feeder B-3 loops through MH #17X and returns to MH #17. The duct bank containing loop feeders 1A-1, 1A-2, and 1A-3 continues to the west to MH #18. This duct bank contains six empty four-inch conduits. From MH #18 to MH #19, loop feeders 1A-1 and 1A-3 continue from MH #19 to MH #20. This duct bank contains 12 empty four-inch conduits. From MH #20 loop feeder 1A-3 continues to MH #21. This duct bank contains 14 empty four-inch conduits. From MH #21 to MH #22, a duct bank continues to the west containing 16 four-inch empty conduits. Eight four-inch conduits route from MH #22 to four pad-mount switches for future loads.

South System

The South System originates at the main 15kV switchgear (ATO) and routes west to MH #1. The circuits that loop through in the South System are 2A-1, 2A-2, 2A-3, 2A-3B, and 2B. There are six empty five-inch conduits. This condition continues west to MH #1. The same looped circuits and empty conduits continue to the south along Victor Street to MH #2, continuing to the west from MH #2 to manholes MH #3 and MH #4. From MH #4 the six empty conduits and looped circuits route to the south to MH #5. At MH #5 the duct bank downsizes to 12 five-inch conduits. Two of the 12 are empty. Circuits 2A-1, 2A-2, 2A-3-A, 2A-3-B, and 2B continue to the west through manholes MH #6 and MH #7. From MH #7 the empty conduits increase to four. Circuits 2A-2, 2A-3-A, 2A-3-B, and 2B continue to MH #8. From MH #8, routing to the west, the four empty conduits continue. Circuits 2A-2, 2A-3A, 2A-3-B, and 2B continue through MH #8 to MH #9. The four empty conduits continue routing to the west to MH #10. From MH #10 through MH #12, circuits 2A-3A, 2A-3-B, and 2B route to the west. The four empty conduits continue to MH #12. From MH #12, 12 empty five-inch conduits route west to MH #13. From MH #13, six empty five-inch conduits reroute to the south along Quentin Street through MH #13.1 and extend to East 16th Avenue, where they are capped for future extension.

Summary of Medium-Voltage Distribution System Raceway Systems

The north duct bank has the spare conduit capacity to accommodate two looped circuits that would originate from the ATO. The limiting factor is the four spare conduits between MH #16 and MH #17.

The south duct bank has the spare conduit capacity to accommodate one looped circuit that would originate from the ATO. The limiting factor is the two spare conduits between MH #5 and MH #6.

CAMPUS MEDIUM-VOLTAGE SYSTEM DEFICIENCIES

Switchgear Buses 1A, 2A, and B are in good physical condition, and, at 13 years of age, are still serviceable and expandable. All three systems should provide many years of continued service.

The two main breakers in ATO Bus 1A and in ATO Bus 2A are currently fed from different Xcel substations. In both cases, one breaker is fed from the Fitzsimons Substation and one breaker is fed from the East Substation. This provides good protection from the possibility of a total Xcel substation failure. Bus B, which feeds the CUP, is a non-ATO system. Feeds have recently been upgraded such that a different feed serves each side of the bus. However, the two feeds that feed the main breakers in Bus B both emanate from the Xcel Fitzsimons Substation. The two feeds are derived from different transformer banks within the Xcel substation, so reliability is still excellent. However, the complete loss of Xcel's Fitzsimons Substation, or a segment of the transmission line that feeds it, would result in the shutdown of all buildings fed from the non-ATO Bus B, and the resultant shutdown of all steam and chilled water provided by the CUP.

As discussed above, the capacity of the Xcel feeders to all three campus ATO switchgears are limited presently to 650 amperes. Bus B is very near the maximum capability of the Xcel feeder in the event that one feed to Bus B is unavailable or has failed. Bus 1A is also heavily loaded in the event of a feeder failure. Bus 2A is more moderately loaded and has some room for expansion. Discussions with Xcel on how to mitigate these problems should continue.

CUP FEEDERS

Feeders from Bus B to CUP main–tie–main switchgear consist of two per phase 500 MCM, 15kV copper conductors, which results in a feeder ampacity of 1000 amperes. The maximum demand on the CUP switchgear is 8.42 MW. At an assumed power factor of .88 lagging, this would be 9.57 MVA. This equates to approximately 419 amperes. Thus, the feeder is loaded to approximately 42 percent, which leaves adequate feeder capacity for future expansion for the next 10 years.

15kV main distribution outdoor switchgear.

CUP Switchgear Capacity

The CUP switchgear is rated for 1200 amperes. Both main breakers and the tie breaker are rated for 1200 amperes. With a present load of 419 amperes, the switchgear is loaded to approximately 35 percent. Thus, there is significant spare capacity in the CUP switchgear to meet the campus needs for the next 10 years.

Each circuit breaker is supervised by a SEL multi-function protective relay. Exact relay types and current transformer ratios vary.

CUP Switchgear Configuration

The CUP switchgear is a freestanding indoor assembly installed in 2001 and 2006. The switchgear was manufactured by GE in 2001 and Eaton in 2006. Circuit breaker control power is provided via a battery system consisting of DC charger and battery rack. Switchgear buses are rated for 1200 amperes, 15kV, 36kA, 750 MVA.

D. Technology

INTRODUCTION

The Office of Information Technology (OIT) provides information technology (IT) at CU Anschutz. The IT master plan describes three major elements of information technology: infrastructure, interconnectivity, and data access.

INFRASTRUCTURE

The IT infrastructure at CU Anschutz provides wired and wireless networking, collaborative systems such as email and shared calendaring, telecommunications, and a distributed antenna system. These systems are distributed to campus customers by the OIT-designed and administered outside plant (OSP). Figure II.42 below shows the campus OSP backbone in yellow and how it weaves the campus buildings together.

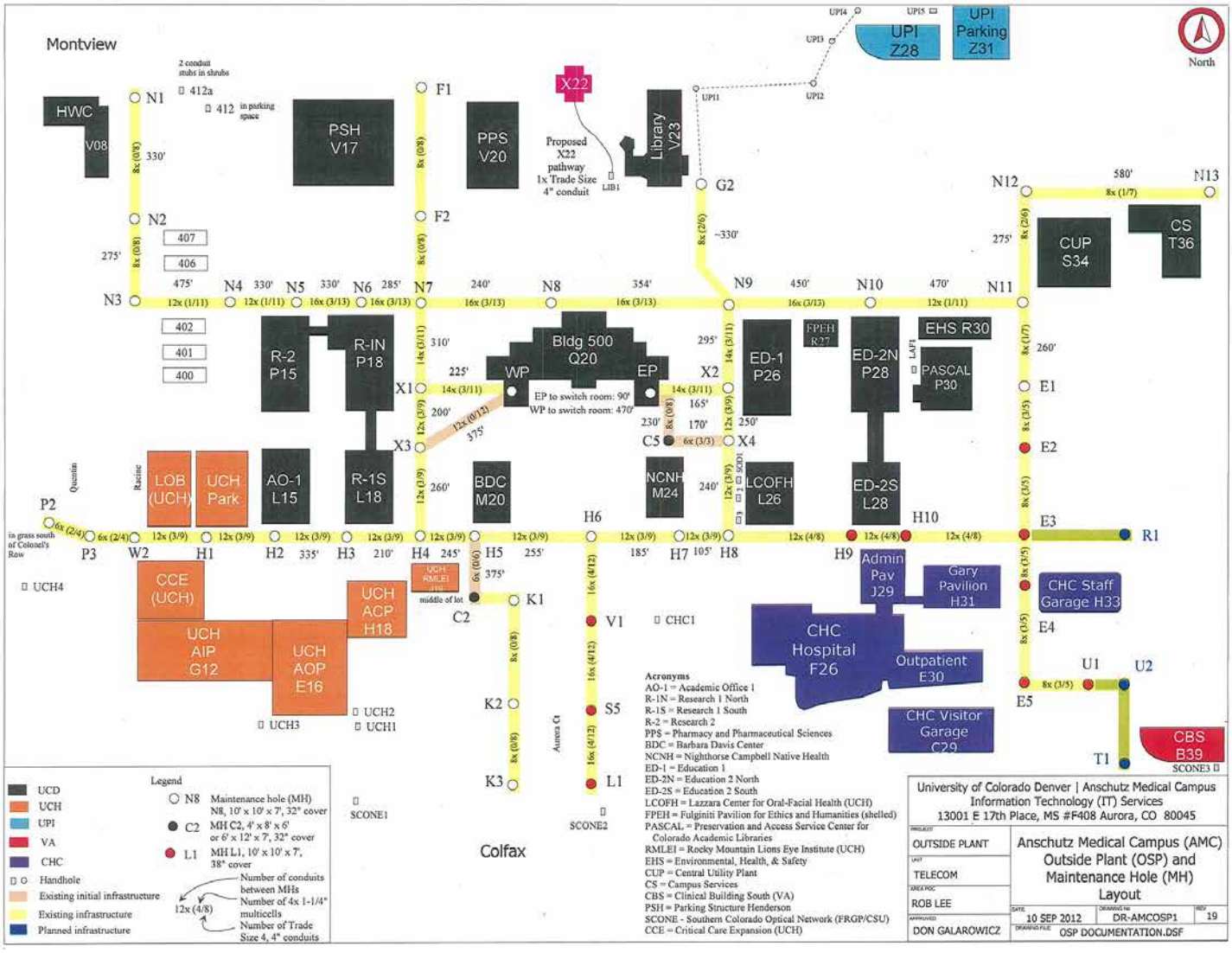


Figure II.42 - Campus IT Infrastructure

NETWORKING

The university provides Cisco-supported networking in both the wired and wireless environments. The wired network offers full duplex 100 Mb/s to the desktop, 1 Gb/s to the networking core, and up to 200 Mb/s to the Internet. To enhance research networking, OIT is building a 100 Gb/s high-speed network to CU-Boulder.

OIT runs over 1,000 switches and 1,000 wireless access points at CU Anschutz. These systems provide anytime, anywhere access to the university's computing environment.

Future OIT plans call for implementing 1 Gb/s connectivity to the desktop, with 10 Gb/s building connectivity to the core network as shown in Figure II.43. OIT plans also include upgrading our wireless access points to support the next-generation high-speed standards.

COLLABORATIVE SYSTEMS

OIT provides Microsoft Exchange email and groupware such as shared calendars at CU Anschutz. These systems are currently hosted on campus. A future enhancement will move these systems into the cloud, providing almost unlimited accessibility.

TELECOMMUNICATIONS

OIT supports over 8,000 telephones. About 95 percent are time division multiplex (TDM) phones and about 5 percent are Voice over IP (VoIP) phones. Our plans are to replace the TDM phones with VoIP technology. This migration to VoIP allows us to reduce the number of systems we operate, since the TDM system is a stand-alone, private network. The new VoIP phones will operate on the existing high-speed data network. This movement to VoIP also allows us to offer integrated voice, data, and video services.

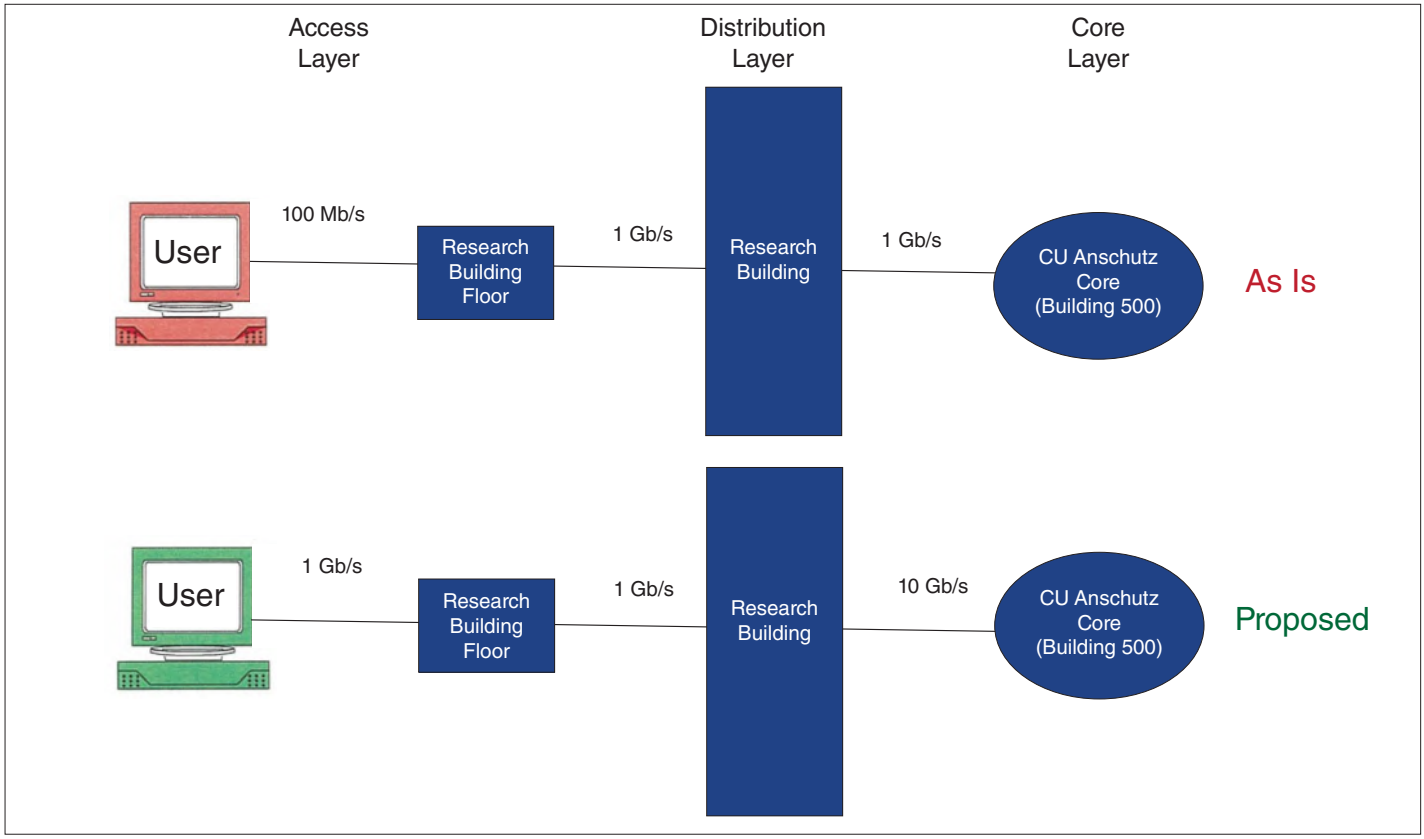


Figure II.43 - Proposed Research Network Connectivity Improvements

DISTRIBUTED ANTENNA SYSTEM

OIT operates a distributed antenna system at CU Anschutz called the campus distributed antenna system (CDAS). CDAS provides a way for cell phone and mobile radio services to access the interiors of our modern buildings, which are unfriendly to radio frequency sources. Figure II.44 shows the university's CDAS coverage.

CDAS supports these carriers and radio-based services: AT&T, T-Mobile, Sprint, Verizon, USA Mobility pagers, and public safety radios.

Future improvements to CDAS include adding buildings to the coverage footprint and adding support for long-term evolution (LTE) 700 MHz services.

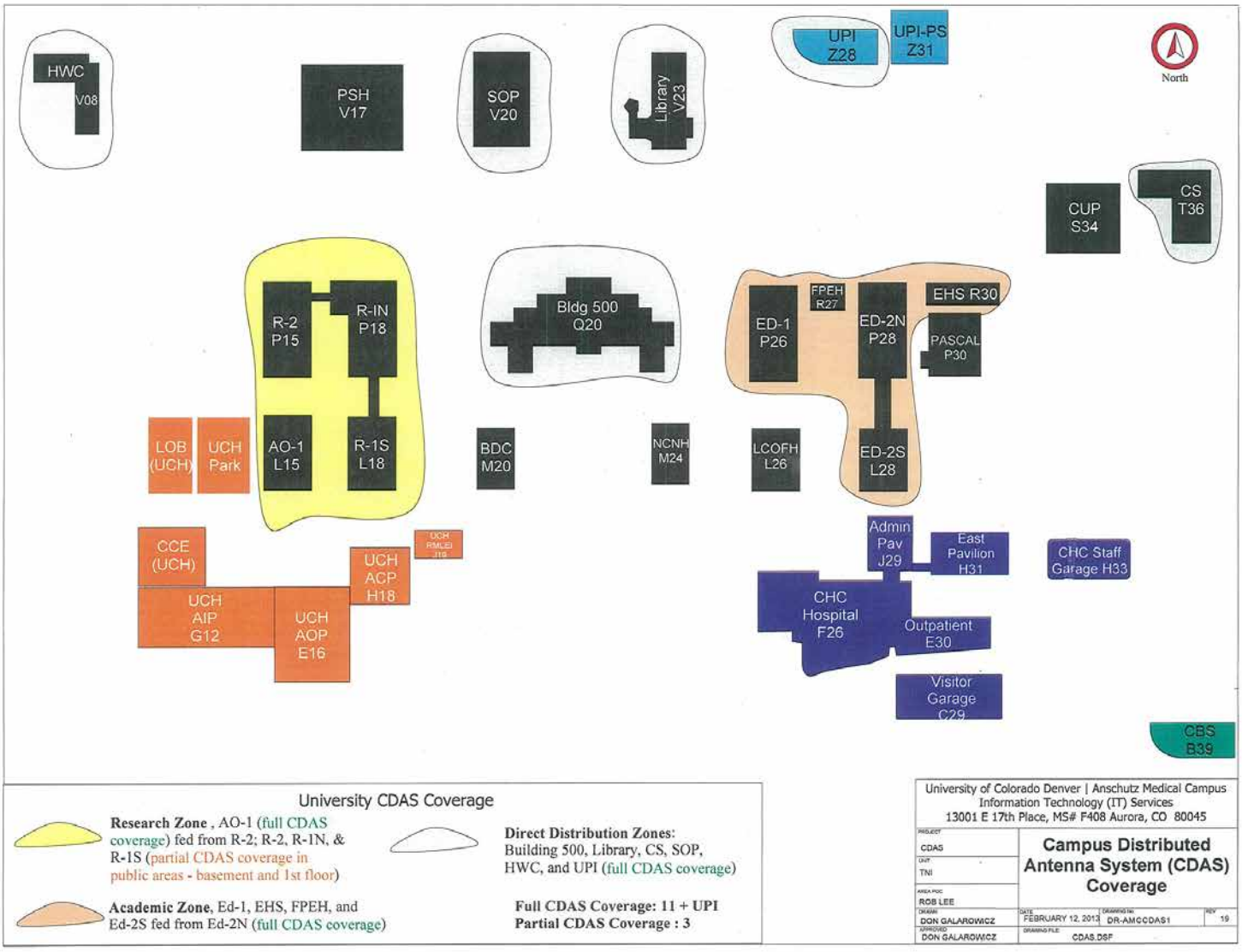


Figure II.44 - Campus Distributed Antenna System (CDAS) Coverage

INTERCONNECTIVITY

OIT provides nearly seamless connectivity to a variety of counterparts. OIT provides high-speed connectivity to CU-Boulder and University of Colorado Colorado Springs (UCCS) via the four-campus fiber. OIT created the Affiliate Network at CU Anschutz to provide high-speed connectivity to our health care affiliates including the UCH, CHCO, UPI, National Jewish Hospital, the VAMC, and Denver Health Hospital. Finally, we have developed connectivity with the other higher-education entities located at AHEC, including Metropolitan State University of Denver and the Community College of Denver. These connections are fast, reliable, available, and maintainable.

Future enhancements to our affiliate connectivity may include 100 Gb/s connectivity, federated authentication, shared resources, and shared services. These enhancements would increase OIT efficiency and improve the effectiveness of the CU system.

DATA ACCESS

OIT runs three data centers on the university's two campuses. The 1,700-square-foot North Classroom data center was upgraded in 2010 and is currently being renovated to add capacity. The 1,000-square-foot Communications Center Annex (CCA) at CU Anschutz was built in 2010 to replace the 500-square-foot Production Server Room, which was nonscalable and antiquated. The CCA was designed and constructed via modern standards such as ANSI/BICSI 002-2011, Data Center Design and Implementation Best Practices and TIA-942-A, Telecommunications Infrastructure Standard for Data Centers. The university will run out of data center space in the coming years as it moves into research computing support.

SUMMARY

OIT offers effective infrastructure, interconnectivity, and data access. Our future plans call for improving efficiency and enhancing reliability, availability, and maintainability in the information technology systems administered at CU Anschutz.

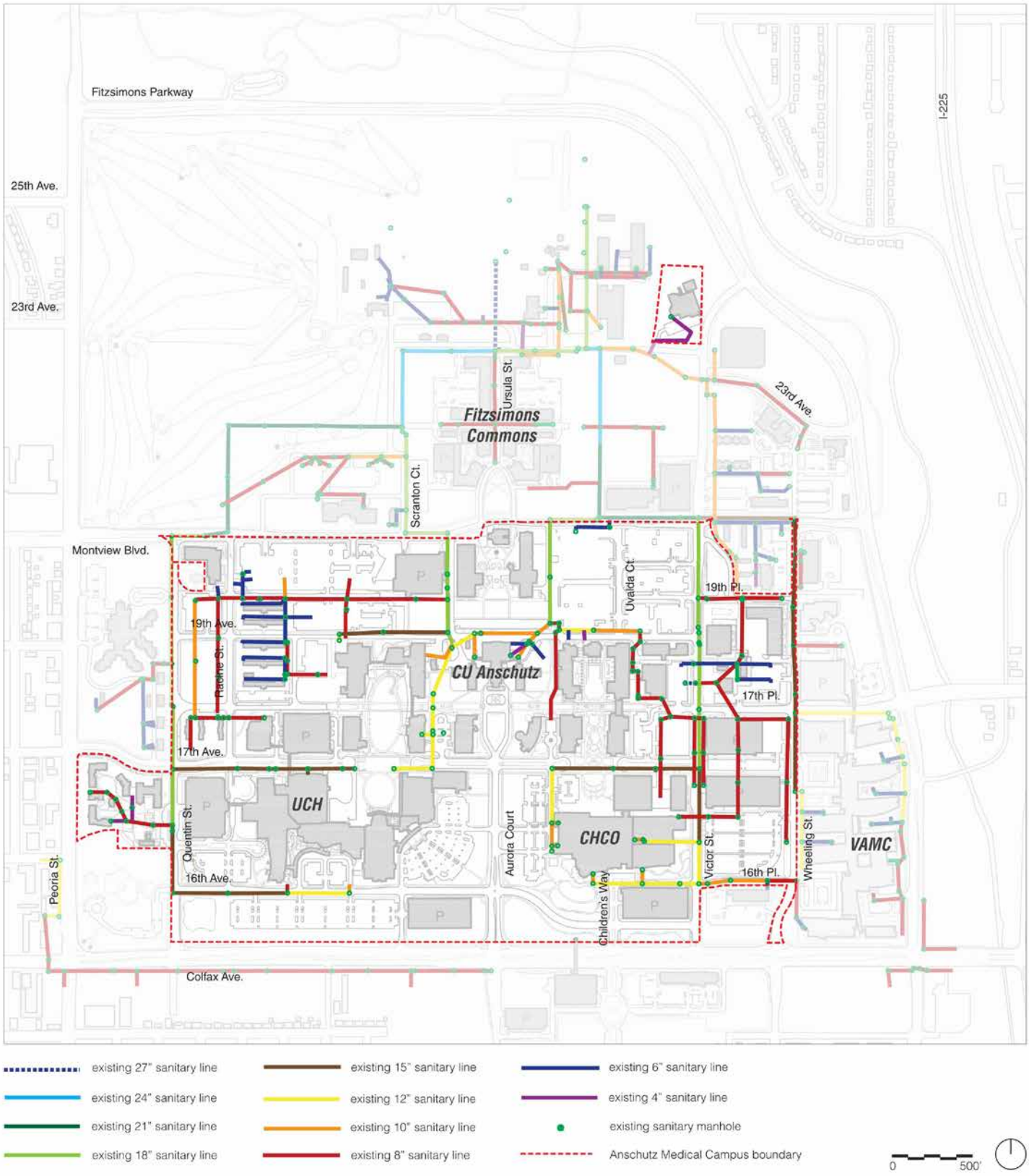


Figure II.45 - Existing Utilities - Sanitary Sewer

E. Municipal Utilities - Sanitary Sewer

The existing potable sanitary sewer network located on the Anschutz Medical Campus is part of a larger network that extends beyond the campus boundary. This network of sanitary sewer mains serves the entire campus as well as all the surrounding stakeholders. It is primarily owned and operated by Aurora Water. Aurora Water has access to these facilities through easements granted by the university. The sanitary sewer network generally flows from the south to the north, where it crosses Fitzsimons Parkway. The Anschutz Medical Campus depends on sanitary sewer mains north of their boundary and, likewise, the surrounding stakeholders rely on sanitary mains on campus.

In accordance with the Infrastructure Utility Assessment Report dated May 17, 2006, the Anschutz Medical Campus is situated within Sanitary Sewer Basins D and E as delineated by the Fitzsimons Infrastructure Master Plan (FIMP) by Matrix Design Group, dated March 2004.

Historically, the existing sanitary sewer system conveyed all Anschutz Medical Campus sanitary sewer flows to a wastewater treatment plant in the northern portion of the site now owned by the U.S. Army Reserve. The U.S. Army Corps of Engineers decommissioned the wastewater treatment plant in 1998. Now, a majority of the campus wastewater flows through a series of 8- to 30-inch sanitary mains that cross Fitzsimons Parkway and connect to the 42-inch interceptor line, which runs east-west along the north side of Sand Creek and outfalls to the Metro Wastewater Reclamation District Treatment Plant.

In order to support the ongoing development at CU Anschutz, CU constructed sanitary sewer mains ranging from 10 to 24 inches in diameter in Victor Street and Ursula Street in accordance with the FIMP. The flows from these mains combine at a flow equalization structure in East 23rd Avenue east of Ursula Street.

Per the Colorado Science + Technology Park at Fitzsimons Infrastructure Master Plan dated August 2007, the park's full build-out wastewater flow is 4.12 MGD. Per the FIMP dated March 2004, the full Site-Wide area build-out wastewater flow is 14.47 MGD.

Discussions with CoA and CU Anschutz confirmed that the improvements to the sanitary sewer system on campus are adequate for most of the master planned development.

Most sanitary mains on the campus are owned and operated by the CoA water department. All new development on campus that ties into the system must be analyzed and approved by CoA prior to connection. Figure V.31 in Chapter V identifies several areas where mains still need improvement.

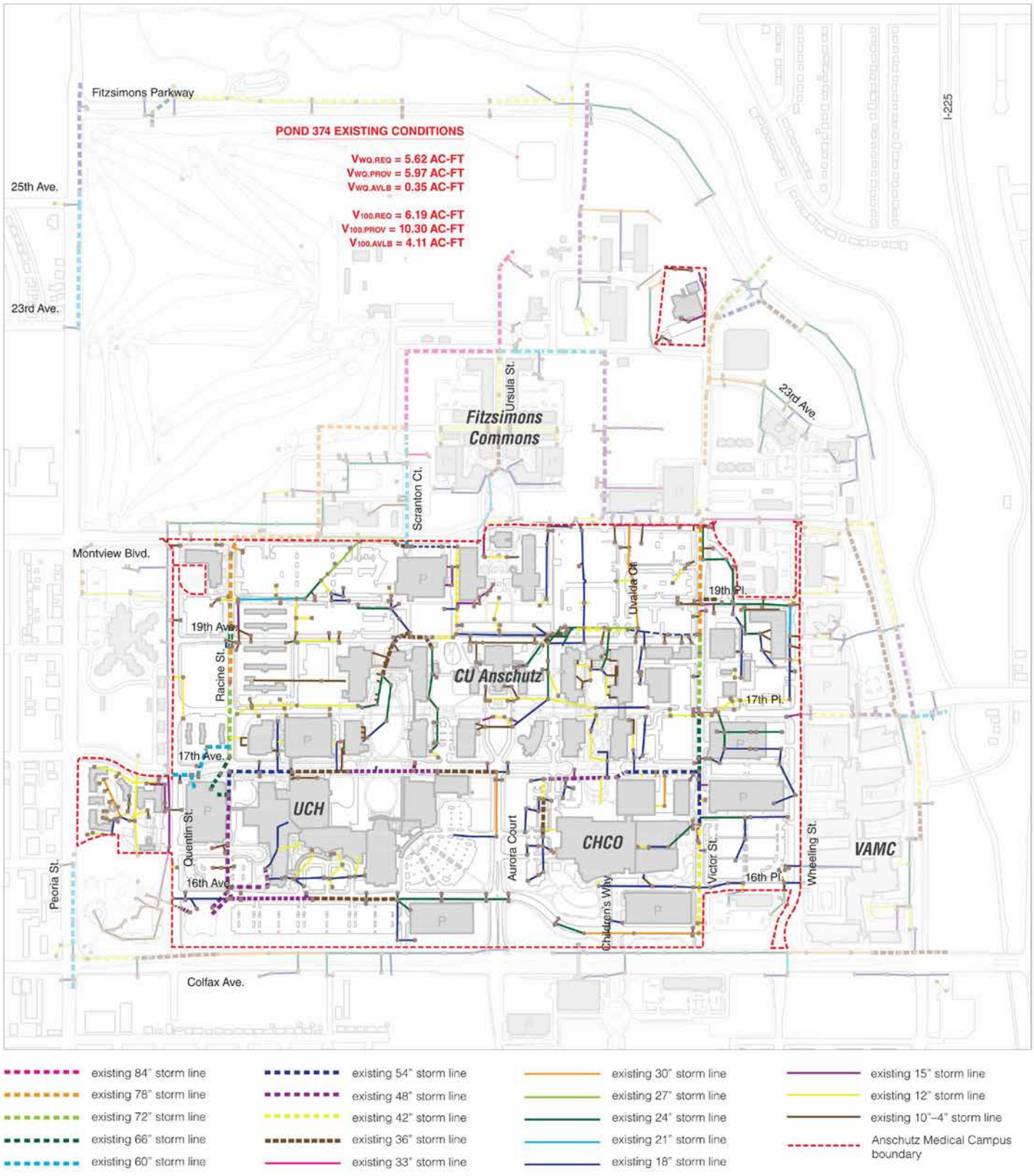


Figure II.46 - Existing Utilities - Storm Water

F. Storm Water

The existing storm sewer network located on the Anschutz Medical Campus is part of a larger network that extends beyond the campus boundary. This network of storm sewers serves the entire campus as well as all the surrounding stakeholders. It is primarily owned and operated by Aurora Water. Aurora Water has access to these facilities through easements granted by the university. The storm sewer network generally flows from the south to the north, where it crosses Fitzsimons Parkway. The Anschutz Medical Campus depends on the storm sewer network north of their boundary and, likewise, the surrounding stakeholders rely on the storm sewer network on campus.

The existing storm sewer infrastructure on the Anschutz Medical Campus consists of the following, based on discussion with Anschutz Medical Campus personnel and campus utility plans by Borstad Consulting Services, LLC dated April 2009:

- A 72-inch main in Racine Street runs through the site from the south and east in Montview Boulevard, collecting runoff from the Health and Wellness Center, Fisher House, Parade Grounds, and Monte Vista and Aspen parking lots, ultimately discharging into Regional Pond 374.
- A 42-inch main in Scranton Court north of Montview Boulevard carries runoff from the Breckenridge and Cheyenne Wells parking lots, Henderson Parking Garage, the University Police, Research 1 North, Research 1 South, Research 2, Academic Office 1, Barbara Davis Center for Childhood Diabetes, School of Pharmacy Building, and Buildings 400, 401, 402, and 406, ultimately discharging into Regional Pond 374.
- A 30-inch sewer in Ursula Street at Montview Boulevard collects runoff from the Red Cross facility and nearby surroundings, ultimately discharging into Regional Pond 374. Although the 30-inch main is outside the limits of the Anschutz Medical Campus, the campus relies on the main line to convey flows off the campus.
- A 48-inch main in Ursula Street at Montview Boulevard collects runoff from the Health Sciences Library and Evergreen parking lot, ultimately discharging into Regional Pond 374. Although the 48-inch main is outside the limits of the Anschutz Medical Campus, the campus relies on the main line to convey flows off the campus.
- A 78-inch main in Victor Street runs through the site from the south, collecting runoff from Building 500, Nighthorse Campbell Native Health Building, School of Dental Medicine, Building Education 1, Education 2 North, Education 2 South, Fulginiti Center for Bioethics and Humanities, Preservation and Access Service Center for Colorado Academic Libraries (PASCAL), Environmental Health & Safety (EH&S), CUP, Building 610, and Campus Services facilities, as well as the Frisco, Leadville, Durango, Georgetown, Julesburg, and Kiowa parking lots and surrounding roadways and open space. A portion of the runoff is treated in the Master Basin C underground water-quality detention facility, and all runoff is ultimately discharged into Toll Gate Creek near the intersection of Victor Street and Fitzsimons Parkway.
- A 60-inch main in 17th Place collects runoff from the VAMC and nearby surroundings, ultimately discharging into Toll Gate Creek.

Pipes for the storm sewer system are laid out and ready to be installed.

The existing drainage system is organized in the following ways:

- Storm water runoff from the Anschutz Medical Campus is divided between Master Basin A and Master Basin C (see Figure II.14: Major Drainage Basins). Runoff within Master Basin A (in the western portion of the campus) is collected in the existing underground storm sewer system and routed north to Regional Pond 374 for detention and water-quality treatment, after which it is ultimately discharged into Sand Creek.
- Runoff within Master Basin C (in the eastern portion of the campus) is collected in the existing underground storm sewer system, routed northeast to the Pond 8 Water Quality Structure, and discharged into Toll Gate Creek without detention.
- There is minimal on-site storm water detention and quality treatment on the campus; most is handled in the regional facility, Pond 374, located south of Fitzsimons Parkway just east of the proposed Ursula Street alignment.

FRA golf course irrigation pond west of Regional Pond 374.

Water quality treatment infrastructure at Pond 374.

Interim Regional Detention Pond 374 Summary
Anschutz Medical Campus and Site-Wide Study Area
October 2001

WQ Volume Provided (ac-ft)	*100-Year Volume Provided (ac-ft)*	*WQ Volume Required (ac-ft)*	*100-Year Volume Required (ac-ft)*	*WQ Volume Available (ac-ft)*	*100-Year Volume Available (ac-ft)*
5.97	10.30	5.62	6.19	0.35	4.11

Figure II.47 - Interim Regional Detention Pond 374 Summary

Master Basin A

Pond 374 is currently constructed to the following interim condition:

- The ultimate condition of Pond 374, as detailed in the Ursula Street Drainage Outfall plans and report (CoA #204193), is designed to manage water-quality volume and 100-year runoff rates for the entire tributary area at build-out condition. Any future developments on the Anschutz Medical Campus that exceed the capacity of existing Pond 374 will require the expansion of the pond.
- The Basin A existing drainage outfall north of Montview Boulevard is designed to provide adequate capacity for the full 100-year storm event in anticipation of master plan developments. Localized storm drainage infrastructure, along with regional detention and water-quality improvements, is required to support planned building developments. Each new building must control its own storm water runoff and treat the water quality of the runoff, regardless of previous land use and site imperviousness.
- The calculated 100-year flow for Master Basin A given master plan conditions is 477 cubic feet per second (cfs).

Master Basin B

- Mechanical filtration devices are proposed for treatment of Wheeling Street between Montview Boulevard and Colfax Avenue.
- A 60-inch storm sewer outfalls runoff from Master Basin A to Toll Gate Creek near the intersection of 17th Place and Fitzsimons Parkway
- No detention is provided for Master Basin B.

Master Basin C

- A regional underground water-quality facility, sometimes referred to as Pond 8 Water Quality Structure (CoA #207161), treats runoff from Basin C at the corner of Victor Street and Fitzsimons Parkway. Pond 8 has a water-quality control volume of 4.13 acre-feet.
- Runoff from Master Basin C is ultimately discharged through a 78-inch outfall into Toll Gate Creek.
- Detention has been waived for Master Basin C. The underground system provides water-quality treatment only.
- The calculated 100-year flow for Master Basin C given master plan conditions is 477 cfs.

Master Basin D

- A 72-inch storm sewer outfalls runoff from Master Basin D to Sand Creek to the north.

Master Basin E

- A 48-inch storm sewer with riprap outfalls runoff from Master Basin E to Toll Gate Creek. Low flows are routed into a water-quality pond in Sand Creek Park.
- The basin is governed by the U.S. Army Reserve, and no detention is provided or proposed.

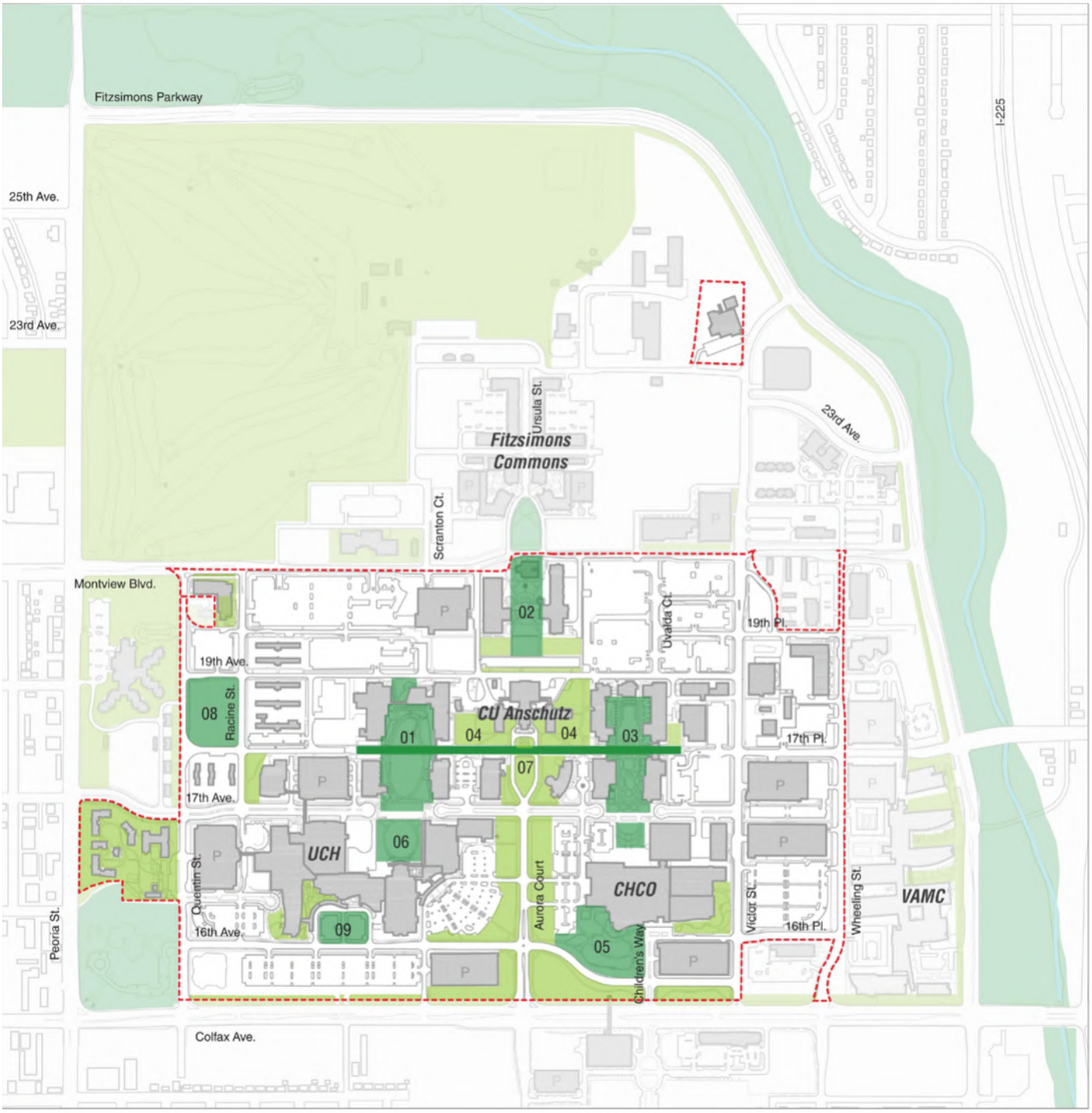


Figure II.48 - Open Space - Existing and Under Construction

II.11 OPEN SPACE

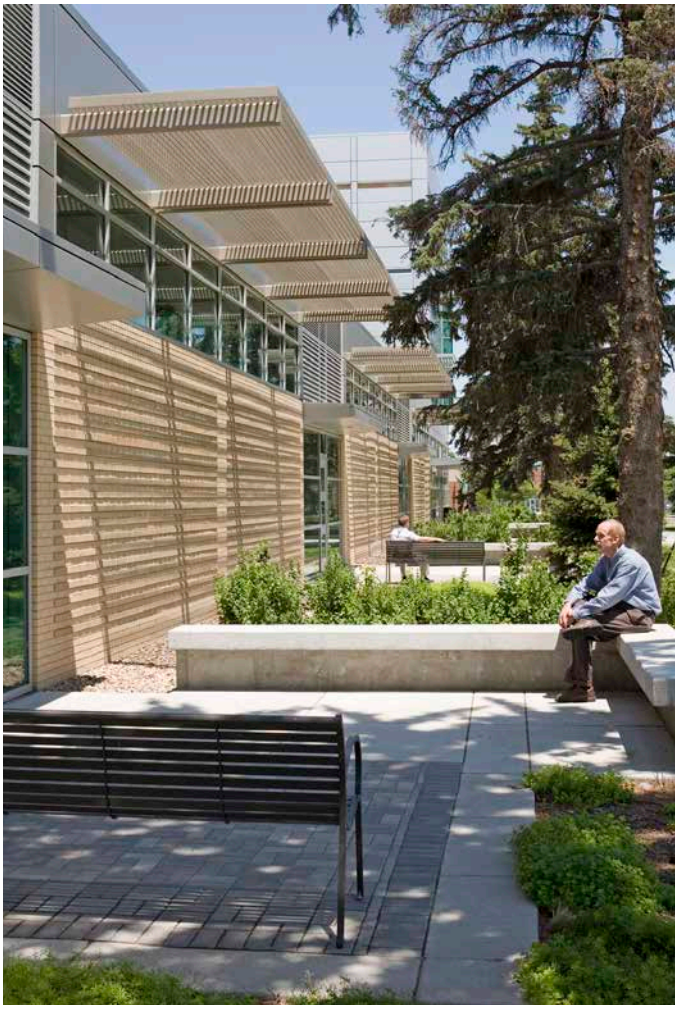
The Anschutz Medical Campus has several significant open spaces that contribute to campus place-making, and such iconic places as the Education Commons and Bonfils Circle are memorable landmarks that assert the campus's identity. These help to organize the campus, create wayfinding landmarks, and provide social gathering places as well as venues for important ceremonial occasions like graduation. The major open spaces are knit together by streets with storm water management features and pedestrian walkways that connect the formal open spaces to the broader network of natural landscape and open space.

The CU Anschutz Design and Development Guidelines provide detailed recommendations for open space on campus including materials, lighting, and site furnishings that enhance the character and experience of these spaces.

Students enjoy a game of volleyball on the Education Commons.

The Research Commons.

The Education Commons is organized around a central quadrangle.



Courtyard adjacent to the Campus Services building.

A. Typology

A wide variety of outdoor spaces play different roles in how people move through campus and where they stop to spend time. Size, proportions, function, materials, and landscape characterize these areas. Below are the definitions from the Design and Development Guidelines for the primary open-space types referred to in the master plan:

QUADRANGLE

Quadrangles are large-scale courtyards framed by several buildings arranged rectilinearly. They are gathering spaces of heavy and frequent use. The Education and Research Commons stand as the major organizing elements for the Academic Village Character District. They constitute a symbolic landscape that clearly states, This is a traditional American educational campus. They often serve as ceremonial spaces on campus, both formal and informal in nature. They are the pedestrian crossroads. As such, quadrangles express and facilitate the collegiality of the university environment. They are designed for walking, waiting, playing, and gathering.

COURTYARD

A courtyard is an area wholly or partially surrounded by walls or buildings. Landscaping within courtyards is intended to complement surrounding buildings and programs. In larger courtyard spaces, formal landscaping might be used around the perimeter of the space to reduce the overall feeling of scale. When buildings do not provide adequate enclosure, formal plantings can be used to reinforce a sense of order and provide further definition to the space. Informal landscaping presents the flexibility to respond to programmatic needs.

PLAZA

A plaza is an open public space used for community gatherings and commonly found in the heart of a traditional urban district or town. Most plazas are hardscapes suitable for open markets, music concerts, political rallies, and other events that require firm ground. Being centrally located, plazas are usually surrounded by small shops, restaurants, and civic buildings. At their center is often a fountain, well, monument, or statue. A variety of activities can occur within a single plaza if the space is large enough to accommodate them and a hierarchy of uses is well defined. Clear definition of subspaces can be accomplished through plantings, seating, elevation changes, or other landscape elements.

FORECOURT

Forecourts are paved areas—far lesser in scale than plazas—existing at building entrances or at the intersections of major pathways and providing focus to the pedestrian experience. The design of forecourts should be appropriately scaled for their intended activity and associated structure—sheltering trees or shrubs located close together to provide quiet areas, open areas for larger gatherings, and benches in areas for resting and talking in small groups.

PARK

Parks are natural preserves available for unstructured recreation. They are generally independent of surrounding building frontages. Their landscape consists of paths and trails, meadows, bodies of water, woodland, and open shelters, all naturalistically disposed.

Green space flanks Aurora Court to preserve the historic viewshed to Building 500.

The Health Sciences Library and Pharmacy buildings form an open-space plaza.

CHCO's healing garden provides a place for quiet contemplation and reflection.

The Art Walk on 17th Place is an important linear promenade linking the Research and Education Commons.

COMMONS | SQUARE

Squares or commons are open spaces available for unstructured recreation and civic purposes. A square is spatially defined by building frontages. Its landscape consists of paths, lawn, and trees, formally disposed. They are typically located at the intersection of important thoroughfares.

GARDEN

A garden is a planned outdoor space set aside for the display, cultivation, and enjoyment of plants and other forms of nature. They may include patio areas, tables, benches, fountains, etc. Healing gardens are found throughout the campus, providing places for quiet contemplation and reflection within serene and calming environments. Plantings should have seasonal interest with a variety of scales and plant materials. Xeriscape gardens use local, native plants that do not require irrigation or extensive use of other resources while still providing the benefits of a garden environment.

PROMENADE

Linear corridors dedicated to pedestrians link critical destinations within the campus environment.

Building 500 (upper left) and forecourt at Aurora Court.

B. Character and Quality

Outdoor spaces are multifunctional and offer many benefits. Most important on a university campus, they support the culture of informal meeting and collaborative exchange of ideas. Even in the face of all available communication technology, there is no substitute for meeting in person and providing space for unintended encounters within an intellectual community.

On a hospital campus, outdoor spaces support health and wellness and promote healing. For everyone who works on or visits the campus, the system of pedestrian-friendly spaces and routes allows exercise and recreation to be integrated into daily activities. The connection to the outdoors also helps patients and their families deal with the stress of medical treatments.

Outdoor spaces support a variety of sustainable design initiatives including storm water management, mitigation of heat island effect, and providing natural habitat within the campus. Good design of outdoor spaces should respond to the local climate issues including the sun, wind, and rain, creating spaces that welcome interaction through all four seasons. Recognition of the arid climate in Colorado should encourage the selection of water-efficient plant species.

Outdoor spaces and routes should be fully accessible, allow access to the buildings on campus, and the sidewalks and intersections should connect the campus to the adjacent city and public transportation options.

C. Campus Coverage

The original master plan concept was based on a site density of 40 percent building footprint, 30 percent paved roads, plazas, and walkways, and 30 percent permeable landscape area. This general guideline continues to hold as a good measure in comparison to successful, completed areas of campus. This does not reflect true density in the sense of square footage of building space or number of people, since it does not provide guidance on the number of stories in each building. In Chapter V of this master plan, four different Character Districts are identified, and the coverage of each reflects adjustments to the 40 percent-30 percent-30 percent split to reflect the different qualities of space associated with different parts of campus. For example, the area around the Education Commons has a higher percentage of permeable landscape to reflect the large quads.

The original 1998 facilities master plan for CU Anschutz included the following ratio guidelines for building to impervious pavement to open space for development over the entire 230-acre site:

- Buildings: 40% max.
- Pavement: 30% max.
- Open Space: 30% min.

Existing 2012 conditions, within the context of defined Character Districts, present a snapshot of site development to date, as shown in Figure II.49.

Campus Coverage - 2012 Existing Conditions
Anschutz Medical Campus
2012

Character District	*Total Area*	*Buildings*	*B%*	*Pavement*	*P%*	*Open Space*	*OS%*
C1 | Academic Village	2,198,800	395,784	18%	747,592	34%	1,055,424	48%
C2 | Urban Campus	3,309,800	364,078	11%	1,787,292	54%	1,158,430	35%
C3 | Hospital District	4,353,600	1,044,864	24%	1,654,368	38%	1,654,368	38%
C4 | Special	236,086	37,773	16%	49,578	21%	148,734	63%
Total Area	10,098,286	1,804,726		4,238,830		4,016,956	
Percentage Totals			18%		42%		40%

Figure II.49 - Campus Coverage - 2012 Existing Conditions

While conditions indicate significant overdevelopment of impervious pavement, the overall ratio of open space to impervious coverage (building and impervious pavement) is presently well below 1998 requirements.

Campus Coverage - 1998 and 2012 Requirements
Anschutz Medical Campus
2012

Type	*1998 Requirements*	*2012 Existing Conditions*
Impervious Coverage	70% max.	60%
Open Space	30% min.	40%

Figure II.50 - Campus Coverage - 1998 and 2012 Requirements

The relatively high quantity of existing impervious pavement is primarily found within the C2 | Urban Campus district and is characteristic of the vast areas of surface parking lots currently being maintained as land banks for future development. As these parcels are developed in the future, ratios of paved areas should decrease as building areas increase.

If the campus were to continue to grow in accordance with the 1998, 40-30-30 ratio guidelines, site coverage in the Character Districts would develop as indicated in Figure II.51.

As evidenced by these figures, both the Academic Village and Hospital District would require significant reductions in their existing impervious pavement areas in order to meet 1998 requirements. Reductions of such magnitude, particularly in the Hospital District, with its heavy reliance upon surface lots to meet patient parking needs, do not appear feasible. Reductions in paved areas in the Academic Village are similarly unlikely without the removal of existing public access clinics from the district.

In line with the form-based zoning approach of the 2012 Facilities Master Plan, it becomes apparent that a more appropriate site strategy would be to allocate coverage ratios unique to each Character District, rather than applying campuswide ratios as originally planned. By doing so, specific developmental patterns can be matched with programmatic functions best suited for each existing district.

The Character District-specific ratios in Figure II.52 have been defined for future build-out. These newly established ratios will limited growth within the Academic Village while still allowing for new infill developments along 17th Avenue. Development within the Urban Campus is proposed to be of a much higher density, consistent with the character envisioned for this district. The percentage of allowable building coverage within the Hospital District remains unchanged with a small increase in allowable pavement added to accommodate existing conditions and 10-year projections.

2040 Projections in Accordance with Existing Coverage Guidelines
Anschutz Medical Campus
2012

Character District	*Δ Building (GSF)*	*Δ Pavement (SF)*	*Δ Open Space (SF)*
C1 | Academic Village	483,736	-87,952	-395,784
C2 | Urban Campus	959,842	-794,352	-165,490
C3 | Hospital District	696,576	-348,288	-348,288

Figure II.51 - Campus Coverage - 1998 and 2012 Requirements

Campus Coverage - 2040 Projections
Anschutz Medical Campus
2012

Character District	*Total Area*	*Buildings*	*B%*	*Pavement*	*P%*	*Open Space*	*OS%*
C1 | Academic Village	2,198,800	659,641	30%	769,580	35%	769,580	35%
C2 | Urban Campus	3,309,800	1,489,410	45%	1,158,430	35%	661,960	20%
C3 | Hospital District	4,353,600	1,741,440	40%	1,741,440	40%	870,720	20%
C4 | Special	236,086	37,773	16%	49,578	21%	148,734	63%
Total Area	10,098,286	3,928,264		3,719,028		2,450,994	
Percentage Totals			~40%		~35%		~25%

Figure II.52 - Campus Coverage - 2040 Projections

Within this new system of district-specific ratios, Character Districts are projected to develop as indicated in Figure II.53.

2040 Projections in Accordance with New Character District-Specific Coverage Guidelines
Anschutz Medical Campus
2012

Character District	*Δ Building (GSF)*	*Δ Pavement (SF)*	*Δ Open Space (SF)*
C1 | Academic Village	263,856	21,988	-285,844
C2 | Urban Campus	1,125,332	628,862	-496,470
C3 | Hospital District	696,576	87,072	-783,648

Figure II.53 - 2040 Projections in Accordance with New Character District-Specific Coverage Guidelines

While these revised site coverage ratios will not have a substantive impact upon storm water drainage capacities within the 2012 Facilities Master Plan's 10-year time horizon, they will most likely impact site hydrology over the next 25 years or more. For this reason, a comprehensive Storm Water Drainage Master Plan will need to be developed in the near future to study the impacts of these new site coverage ratios and a system-wide solution developed within the context of the greater square mile site. Onsite stormwater retention and treatment strategies are encouraged for all new developments on campus regardless of the district in which they may occur.

III. VISION

III. VISIONING FRAMEWORK

III.1 OVERVIEW

A ***vision*** is a clear and succinct description of what an institution and its community should look like after it successfully implements its goals and achieves its full potential. It must be the people's expression of what they want their campus to be—a preferred future.

The visioning stage in this facilities master planning process allowed participants to think broadly about the future of their institutional environment and its relationship to its partners, neighbors, and the larger metropolitan region. Visioning occurred in a series of

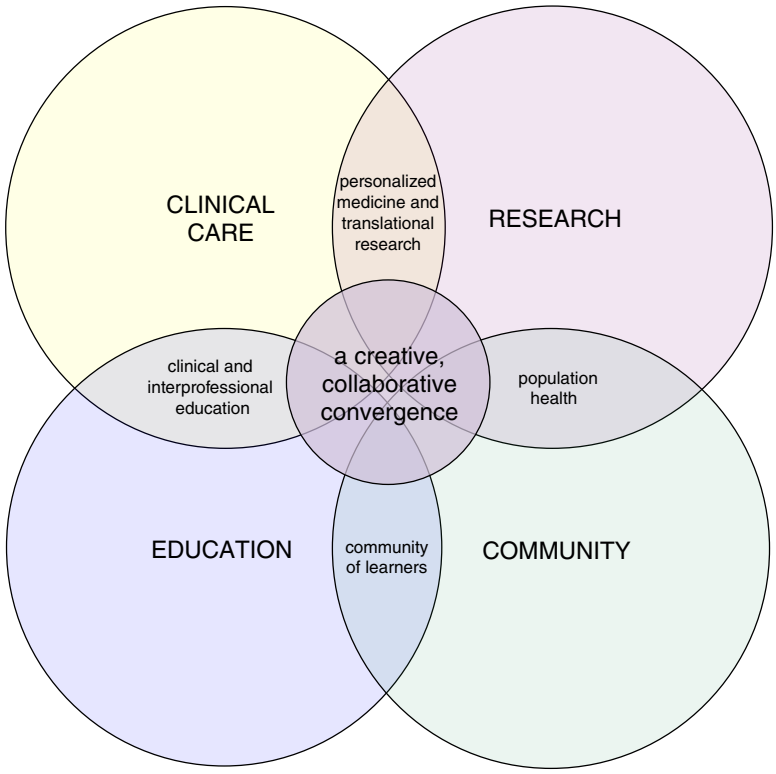


Figure III.1 - Visioning Framework

The Research Commons unites education and research as a common cause on the Anschutz Medical Campus.

workshops, meetings, and open forums that culminated in the creation and adoption of the Anschutz Medical Campus Visioning Framework. Interwoven in the framework are ideas for a comprehensive live, learn, work, play environment for the campus community.

To achieve the university's mission and vision established in the Strategic Plan 2008–2020, CU Anschutz should provide state-of-the-art research, academic, and clinical facilities; manage and utilize space efficiently; provide first-in-class learning, discovery, and working environments; and plan for and effectively manage future growth. Extensive stakeholder engagement and consensus-building have established ambitious goals and principles that support a shared physical vision for the campus that will allow CU Anschutz, UCH, and CHCO to realize their respective strategic plans.

The Visioning Framework of the Anschutz Medical Campus 2012 Facilities Master Plan is intended to guide, influence, and clarify all campuswide physical planning and design decision making.

A challenging yet achievable vision embodies the tension between what an organization wants and what it can have …

Peter Sage, The Fifth Discipline

To that end, the following Visioning Framework for the Anschutz Medical Campus establishes an overarching physical vision for the campus for 2022 and beyond, which includes:

- Aspirational ***goals*** that are broad concepts to which one aims and are by definition difficult to achieve. They serve as beacons for direction.
- Guiding ***planning principles*** that direct us toward achieving our goals. Principles state clear intent and values to be embraced in planning and development.
- Assessment ***criteria*** that are metrics by which planning and development strategies and solutions are evaluated relative to realizing goals and remaining consistent with our planning principles.

III.2 VISION

In 2022, the Anschutz Medical Campus is a premier, globally recognized academic, research, and clinical center of excellence that attracts top-notch faculty, students, and staff from throughout the world. The attractive, lively, and bright campus environment is designed to maximize opportunities for collaboration, creativity, and discovery; promote health and wellness; create a distinct sense of place; and enrich the experience of all users, visitors, and partners.

The vision is consistent with the campus's current collaborative efforts toward creating a 21st-century AHC with advanced and innovative programs, services, and facilities that make Anschutz Medical Campus a global destination of choice.

The university, UCH, and CHCO all understand that a world-class campus needs strong public and private partners and affiliates and a healthy and vibrant host community to attract and retain the best and brightest health science students, academics, and professionals. Working with its neighbors, the Anschutz Medical Campus helped to shape a vision for the larger community of which it is a central constituent. The resulting community vision is:

In 2022, the "Health Sciences City" is one of the region's most exciting, vibrant, and successful cultural, business, and residential areas—a destination of first choice for Coloradans. Anchoring the community is the state's largest and most prestigious academic, research, and clinical health center, with nationally ranked hospitals and the prominent University of Colorado Anschutz Medical Campus. The successful collaboration of the area's many stakeholders has been leveraged to create jobs, attract businesses that serve the neighborhood and region, foster bioscience and biotechnology entrepreneurship, and enhance the health and wellness of the community's residents, workers, students, and visitors.

An aerial view of the campus shows its physical connection to downtown Denver (upper left) and the Rocky Mountain region.

III.3 GOALS, PRINCIPLES, AND CRITERIA

A. Goal: Innovation

Our distinguished identity is founded on our acclaimed collaborative culture of creativity, originality, innovation, and entrepreneurship. We will enhance and build upon our unique physical environment to strengthen our identity and support a global health care destination of first choice that offers premier clinical programs; highly ranked professional schools, colleges, and centers; a vibrant, dynamic, and productive biomedical research enterprise; and an exciting, flourishing, and engaged host community.

Innovative research facilities like this neurology lab support the growth of a premier academic and clinical environment.

PRINCIPLES

- Create campus and Site-Wide opportunities—both indoor and outdoor—for integration, convergence, and collaboration between institutions, entities, schools, colleges, community and business partners, and their missions.
- Create enhanced opportunities for greater interaction and collaboration among schools, colleges, and centers.
- Create hybrid, multiuse facilities that enable inter-disciplinary, interprofessional, and interinstitutional teamwork, cooperation, and advancement.
- Create a campus physical environment that is attractive, memorable, sustainable, and embodies our innovative identity.
- Create an exciting and lively community through a wide variety of activities and amenities—available 24/7—that enhance the quality of life of Site-Wide and campus users and visitors.
- Create first-rate infrastructure, utility, information technology, and support services that enable continuous innovation within the planning horizon and beyond.

CRITERIA

- Develop dense building clusters that encourage interaction, collaboration, and shared resources though physical proximity and easy access.
- Land use “districts” should minimize or eliminate single-function silos and encourage mixed-use, multifunction development.
- Develop amenities that facilitate convergence—cafes, atriums, commons, and restaurants—in key campus and Site-Wide locations to maximize planned and impromptu meeting opportunities.
- Plan and design the Site-Wide public realm to function as an integrated and attractive system that reinforces identity and facilitates wayfinding.
- Identify open spaces that could serve as individual precinct gathering/convergence spaces and support the Site-Wide area’s open-space system.
- Plan, configure, and develop the Site-Wide public realm to incorporate smart, innovative, and high-performance sustainability elements.
- Provide and manage campus and Site-Wide parking through a collaborative and inventive system that reduces parking demand and private auto trips within the core environment.

B. Goal: Connectivity

Our advanced, shared infrastructure, resources, and services will give rise to a highly efficient and integrated physical environment that supports and adds connectivity to the missions and strategic plans of all stakeholder entities. Through development of safe, intuitive, and universal access into and throughout the campus, we will enhance user experience and promote a collaborative, engaged community of learners, educators, researchers, entrepreneurs, and health care providers.

Physical campus connectivity as typified in the research complex will support a collaborative and engaged community.

PRINCIPLES

- Create an environment "without borders" that is physically and symbolically integrated Site-Wide, with its host community, and with the larger city, region, and state.
- Create roadway, pedestrian, bike, trail, and transportation networks that interconnect the campus, Site-Wide area, and surrounding community.
- Create campus and Site-Wide connectivity through a cohesive network of memorable, multifunctional open spaces that orient users to the campus and facilitate interaction.
- Create a comprehensive, advanced information technology system that maximizes opportunities for interaction and connectivity between Site-Wide educators, researchers, and clinical practitioners and their state, national, and global peers.
- Create a campus and Site-Wide association that implements and manages shared resources.
- Create a patient- and visitor-friendly environment that is welcoming, understandable, and notable.

CRITERIA

- Locate patient and visitor parking and shuttle stops adjacent to key destinations such as clinics and support functions.
- Enhance existing roadways and develop new roadways into and throughout the campus and Site-Wide area to maximize access and reduce congestion.
- Redesign "roadways-as-barriers" (Colfax Avenue, Peoria Street, and Montview Boulevard) into streets that facilitate safe pedestrian movement.
- Design streets to accommodate and balance the needs of all modes of movement and also serve as attractive, essential open-space corridors.
- Locate a multi-modal transit station within the Site-Wide area that creates greater connectivity between light rail and all other forms of circulation and transit.
- Physically and symbolically connect university and hospital facilities to enhance interaction and ease of movement.
- Develop public realm open space to integrate the environment and create a variety of activities and interactions in memorable landscapes.

C. Goal: Stewardship

We will successfully collaborate with local, regional, state, and national public, private, and nonprofit partners to improve the health, wellness, and quality of life of our students, faculty, staff, patients, and community partners. Our enduring commitment to good stewardship will result in a more economically, socially, and environmentally sustainable community.

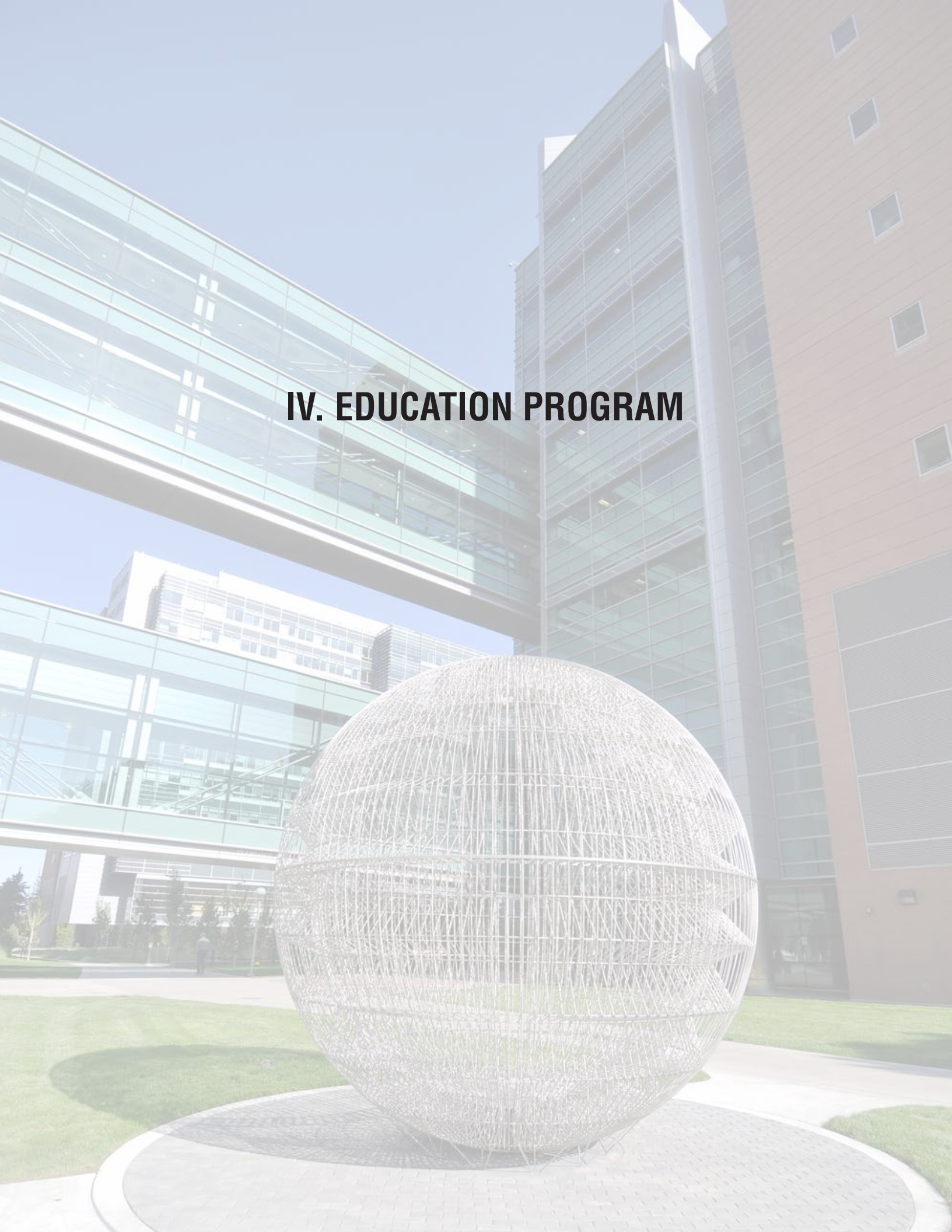
Students provide community services through wellness programs like Colorado SmileMakers.

PRINCIPLES

- Create smart growth strategies to ensure that the campus and Site-Wide stakeholders have sufficient land to accommodate their missions and strategic plans for short- and long-term expansion.
- Create strategies to ensure that the environmental, social, and economic sustainability commitments of the campus and Site-Wide stakeholders can be realized.
- Create a high-performance built environment—landscapes, public realm, parking, and buildings—that reduces energy use and storm water outflow from the campus and Site-Wide area.
- Create a comprehensive Site-Wide shuttle system with a fleet of alternative-fuel vehicles that encourages use of alternative modes of transportation to campus, reduce intra-campus personal auto trips, and encourage use of satellite parking.
- Create more opportunities in which campus and Site-Wide services can be provided to the host community.
- Create a parking management strategy that promotes "right-sized" campus and Site-Wide satellite surface and structured parking options that are environmentally, financially, and socially sustainable.

CRITERIA

- The built environment—existing and new—should incorporate universal accessibility.
- Open spaces should be developed to provide passive or active recreation and serve as components of a comprehensive storm water management system.
- The comprehensive public realm open-space system should incorporate health and wellness amenities.
- Avoid or minimize environmental impacts within the existing and new built environment.
- Incorporate information technology into infrastructure, utilities, and parking management systems to achieve greater efficiency.
- Design streets to reduce vehicle speeds and increase pedestrian safety.
- Where possible, develop alternative renewable energy resources.
- Land banks should serve a short-term sustainability function, such as a Site-Wide area tree nursery, urban farm, or a site for renewable energy generation.



IV. EDUCATION PROGRAM

IV. EDUCATION PROGRAM

IV.1 OVERVIEW

In 2012, the Anschutz Medical Campus had just over 9.6 million GSF in total between the CU Anschutz, UCH, and CHCO facilities. Of this total, the university occupies just over 3.8 million GSF located in 33 buildings, including one parking garage and some leased facilities. Many of the buildings have been constructed since 1999, and some remain from the former FAMG and are used by the university.

College of Nursing students look on at a doctor's demonstration.

SCHOOLS AND COLLEGES

Located at the university are six schools and colleges plus some components of Central Services and Administration that serve the university. The remaining components of the Central Services and Administration are located at CU's Denver Campus, located in downtown Denver, Colorado, approximately nine miles west of CU Anschutz. The six schools and colleges located at CU Anschutz are:

- School of Medicine (SOM)
- School of Dental Medicine (SDM)
- College of Nursing (CON)
- Skaggs School of Pharmacy and Pharmaceutical Sciences (SOP)
- Colorado School of Public Health (SPH)
- Graduate School (GS)

The following is a brief overview for each of the six schools and colleges with a listing of their programs and degrees offered at CU Anschutz.

SCHOOL OF MEDICINE

SOM offers programs recognized nationally and internationally for excellence in education, research, patient care, and community service. SOM offers degree and post-graduate education programs for medical students, residents, and fellows, PhD scientists, physical therapists, and physician assistants. SOM's MD program is accredited by the Liaison Committee on Medical Education, and its faculty members serve as clinical experts and physicians at UCH, CHCO, National Jewish Health, Denver Health Medical Center, and the VAMC. SOM faculty rank 10th among public medical schools in the country for federal research grants and contracts and 26th among all public and private medical schools, according to the Blue Ridge Institute for Medical Research.

Five faculty are members of the National Academy of Sciences, and 11 are in the Institute of Medicine. SOM's internationally recognized faculty offer exceptional clinical care, especially in surgery and the treatment of cancer, diabetes, and heart disease. In the 2013 *U.S. News & World Report* ranking of medical schools, these SOM specialties were ranked in the top 10: family medicine #3; pediatrics #5, and rural medicine #8.

Students at SOM collectively donate thousands of hours of community service every year, volunteering at free clinics for the homeless and poor. The Colorado Rural Health Scholars program attracts high school juniors from across the state for a three-week on-campus experience that inspires many to pursue medical careers.

Program Degrees

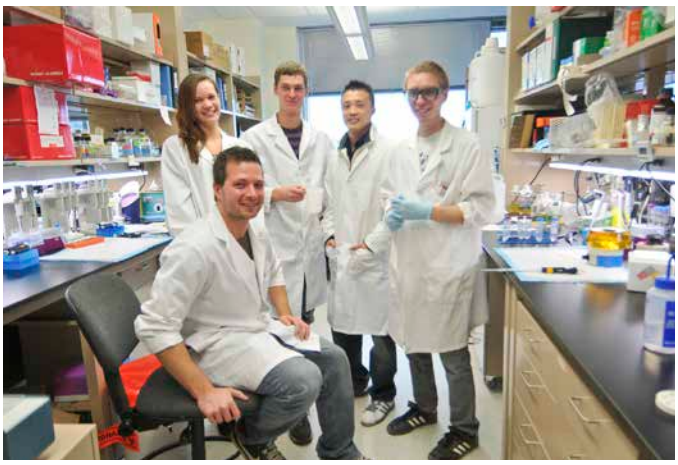
- MD - Medicine
- MSTP - Combined MD/PhD
- DPT - Physical Therapy
- MPAS - Master of Physician Assistant Studies
- MS - Genetic Counseling

Degrees Offered Through the Graduate School

- MSMHA - Master of Science in Modern Human Anatomy
- MSCS - Clinical Science

PhD

- Biochemistry and Molecular Genetics
- Structural Biology and Biophysics
- Cancer Biology
- Cell Biology
- Stem Cells and Development
- Reproductive Sciences
- Clinical Science
- Computational Bioscience
- Human Medical Genetics
- Immunology
- Microbiology
- Molecular Biology
- Neuroscience
- Pharmacology
- Physiology and Biophysics



Students of the School of Medicine work in a neurology lab.

SCHOOL OF DENTAL MEDICINE

Today, this research-intensive, comprehensive dental school increases access to innovative education programs, life-improving research, and excellent clinical care programs that enhance oral and systemic health. SDM is home to a DDS program, an international dental program, a general practice residency, and advanced dental education (residency) programs in periodontics and orthodontics in which enrollees may obtain postdoctoral master's degrees. In addition, SDM is a collaborative partner in the pediatric dental residency offered at CHCO.

The school's academic programs are among the most selective in the nation, and its student body is 400 strong. The education programs offered are evidence based, interprofessional, and teach students to treat patients of all ages as members of a health care team. In 2013, SDM received the ADEA Gies Award for Innovation in recognition of its comprehensive inter-professional curriculum. The school's collaborative research programs have focus areas in cancer biology, craniofacial developmental biology, and dental materials and bioengineering. The dental scientists collaborate with the CU Cancer Center, SOM, and the CU-Boulder College of Engineering on funded research projects. This collaborative research ranks CU Denver 10th in overall funding from the National Institute of Dental and Craniofacial Research. SDM has a long commitment to increasing access to care for disadvantaged populations.

SDM's community-based education program serves as a national model for service learning in dental education. Students provide care in clinics around the state as well as from the school's Mobile Dental Clinic. Rural and global health tracks are available for student participation. The educational programs of the SDM are nationally recognized for their quality and are accredited by the American Dental Association.

Program Degrees

- DDS - Doctor of Dental Surgery
- MSD - Master of Science in Dentistry, awarded to Periodontics and Orthodontics residency program graduates

School of Dental Medicine students get hands-on experience.

COLLEGE OF NURSING

CON enrolls close to 1,000 students. Founded in 1898, the college began Colorado's first baccalaureate program and has offered graduate education since 1950. The baccalaureate curriculum prepares transformational nurse clinicians who promote excellence in patient safety and quality health care through inquiry, reflection, and accountability. The college recently partnered with Community College of Aurora to create an integrated pathway program to increase access for community college students to the undergraduate program, the first such program in Colorado. The master's program educates advanced practice nurses, specialists in health care informatics, and nursing leadership health systems, and administers a graduate-level post-master's certificate program.

The college established the first nurse practitioner and first school nurse programs in the United States. The Doctor of Nursing Practice (DNP) program educates nurses for the highest level of nursing practice and is the terminal clinical degree in nursing. Graduates are clinical leaders who design models of health care delivery, evaluate clinical outcomes, identify and manage health care needs of populations, and use technology and information to transform health care systems. The research doctoral program (PhD) creates knowledge for reflective, theory-guided, and research-based nursing practice. The innovative, distance-accessible curriculum educates nurse scientists to lead research in health care delivery systems and biobehavioral science.

U.S. News & World Report (2013) has ranked CON's master of science program in the top 15 for the past eight years. Other programs also received national ranking in 2013: The pediatric nurse practitioner specialty ranked 5th, nursing-midwifery ranked 13th, and nurse practitioner-family nursing ranked 16th.

CON has a more than 30-year history of providing distance education, especially serving the citizens of Colorado. The registered nurse (RN) to nursing bachelor of science degree, health care informatics, and innovation in leadership and administration in nursing and health care systems (i-LEAD) master's specialty options can be completed completely online. The college has three endowed chairs and three endowed professorships. Eighteen fellows of the American Academy of Nursing hold faculty appointments in CON, and 10 faculty are in one or more other specialty and practice societies. CON is accredited by the Commission on Collegiate Nursing Education and the Higher Learning Commission of NCA. The nurse midwifery master's specialty is further accredited by the American College of Nurse Midwives, Division of Accreditation.

Program Degrees

- BS - Nursing
- DNP - Doctor of Nursing Practice

Postmaster's Certificates

- Pediatric Acute Care Nurse Practitioner
- Adult-Gerontology Acute Care Nurse Practitioner
- Certificates available in most MS specialty options listed below

Degrees Offered Through the Graduate School

MS - Nursing

- Adult-Gerontology Nurse Practitioner
- Adult-Gerontology Clinical Nurse Specialist
- Family Nurse Practitioner
- Family Psychiatric Mental Health Nurse Practitioner
- Health Care Informatics
- Nurse Midwifery
- Nursing Leadership and Health Care Systems
- Pediatric Nurse Practitioner
- Women's Health Care Nurse Practitioner

PhD

- Nursing

SKAGGS SCHOOL OF PHARMACY AND PHARMACEUTICAL SCIENCES

SOP is one of the top-ranked pharmacy schools in the nation, enrolling more than 900 professional and graduate students through both on-campus and distance-degree programs. Committed to pharmaceutical education, research, and patient care, the school educates students in the properties of medicinal agents, the biology of disease, the pharmacological and toxicological actions of drugs, and the current best practices for clinical and therapeutic uses of drugs. Students engage in experiential learning at sites across Colorado. The Distance Degrees and Programs Office provides doctor of pharmacy degree education and continuing professional development for working pharmacists in Colorado and throughout the United States and Canada.

SOP is consistently ranked in the top tier of U.S. pharmacy schools for federal research funding, and the school's internationally renowned faculty conduct pioneering basic, translational, and clinical research in a variety of scientific fields such as pharmaceutical biotechnology, biophysics, drug discovery, pharmacokinetics, pharmacogenomics, molecular toxicology, clinical therapeutics, and health outcomes. Specialized focus areas include cancer, diabetes, cardiovascular disease, neurological disease, infectious diseases, HIV/AIDS, and critical care medicine. The school has garnered numerous milestones with the National Institutes of Health (NIH) and elsewhere:

- Ranked in the top 25 U.S. pharmacy schools by *U.S. News & World Report* (2013)
- Seventh in the nation for total NIH funding according to the American Association of Colleges of Pharmacy
- Eighth out of 129 schools of pharmacy in the nation for sponsored research funding
- Ninth in the nation for NIH funding per principal investigator

An $11 million gift from The ALSAM Foundation enabled the construction of a clinical and research facility. The school was renamed the Skaggs School of Pharmacy and Pharmaceutical Sciences upon completion of the building in 2011.

Pharmacy postgraduate training offers residencies in general pharmacy practice, ambulatory care-family medicine, critical care, and oncology and fellowship programs in critical care/infectious diseases and neurology. All residencies are accredited by the American Society of Health-System Pharmacists. The school is accredited by the Accreditation Council for Pharmacy Education (ACPE).

Program Degrees

- PharmD - Pharmacy

Degrees Offered Through the Graduate School

PhD

- Pharmaceutical Sciences
- Toxicology
- Pharmaceutical Outcomes Research

School of Pharmacy students learn about the current best practices for clinical and therapeutic use of drugs.

COLORADO SCHOOL OF PUBLIC HEALTH

SPH is the first school of its kind in the Rocky Mountain West. SPH attracts top-tier faculty and students from across the country and provides a vital contribution toward ensuring the region's health and well-being. Collaboratively formed by CU, Colorado State University (CSU), and the University of Northern Colorado, SPH is the only collaborative school of public health west of the Mississippi River. SPH enrolls nearly 400 graduate students in 15 public health academic and professional programs. Educational programs expose students to challenging curricula, practical methods, and innovative instruction.

Outside the classroom, SPH students work with faculty in national and international settings to integrate service learning and translate research to improve the health of people and their communities. After graduating, many SPH alumni join the growing field of health professionals trained in Colorado and placed throughout the world. Alumni include published authors, international malaria and HIV/AIDS researchers, health agency administrators, and faculty at leading medical campuses across the U.S..

Faculty at SPH are nationally recognized experts in a variety of fields, including biostatistics and clinical trials, diabetes prevention and control, injury control, genetic epidemiology, risk assessment, environmental health, maternal and child health, nutrition in schools, health services research, health equity, health education, and many other health-related specialties. SPH is also home to several local and national centers including:

- Centers for American Indian and Alaskan Native Health
- Center for Global Health
- Center for Public Health Practice
- Colorado Injury Control Research Center (CSU)
- High Plains Intermountain Center for Aquiculture Health and Safety (CSU)
- Latino/a Research and Policy Center
- Mountain and Plains Education and Research Center, funded by the National Institute of Occupational Health and Safety
- Rocky Mountain Prevention Research Center, funded by the Centers for Disease Control and Prevention

Working collaboratively with Colorado's academic institutions, future professionals, and leading researchers, SPH is an example of Colorado's continued commitment to ensuring all people and communities are healthy and their environment sustainable.

Program Degrees

MPH
- Animals, People, and the Environment
- Applied Biostatistics
- Community and Behavioral Health
- Community Health Education
- Environmental and Occupational Health
- Epidemiology
- Global Health and Health Disparities
- Health Services Research
- Health Systems, Management, and Policy
- Health and Exercise Science
- Health Communication
- Maternal and Child Health
- Physical Activity and Healthy Lifestyle
- Public Health Nutrition

MS
- Biostatistics
- Epidemiology

PhD
- Biostatistics
- Epidemiology
- Health Services Research

DrPH
- Community and Behavioral Health
- Epidemiology
- Residency Programs
- General Preventive Medicine
- Occupational and Environmental Medicine

Dual/Joint Degree
- MPH/DVM
- MPH/MD
- MPH/MURP

Certificate
- Public Health Science
- Global Public Health

GRADUATE SCHOOL

The university's GS encompasses programs on both the CU Denver and CU Anschutz Campuses. At the GS at CU Anschutz, students learn to expand the frontiers of human health and disease in more than a dozen basic scientific, analytical, clinical, and nursing disciplines. GS's emphasis on pairing a student with a mentor assures a distinctive learning experience. Graduate study is a historic strength of the Denver Campus, where graduate programs are offered in seven schools and colleges and serve more than a thousand working and full-time students. The constituent academic units of the University of Colorado Denver | Anschutz Medical Campus GS currently include the following degree-granting programs:

A College of Nursing class takes advantage of a large shared general-use classroom in Education 2.

Program Degrees

MS

- Bioengineering (joint program with CU Denver)
- Biostatistics
- Epidemiology
- Genetic Counseling
- Health Services Research, Policy, and Administration
- Modern Human Anatomy
- Nursing

MSCS

- Clinical Science

PhD

- Bioengineering (joint program with CU Denver)
- Biostatistics
- Cancer Biology
- Cell Biology, Stem Cells, and Development
- Clinical Science
- Computational Bioscience
- Epidemiology
- Health Services Research
- Human Medical Genetics
- Immunology
- Microbiology
- Molecular Biology
- Neuroscience
- Nursing
- Pharmaceutical Sciences
- Pharmacology
- Physiology
- Rehabilitation Science
- Structural Biology and Biochemistry
- Toxicology

IV.2 SPACE GOALS FOR THE EDUCATION PROGRAMS

As the Anschutz Medical Campus pursues its vision, the built environment and infrastructure will need to grow and develop, as will the relationship of built space to place that makes the campus unique. As recommended in this facilities master plan, this growing collection of buildings should strengthen its organization around central elements that help identify buildings in the pursuit of education, research, and clinical care. This strength should derive from clear and identifiable relationships that support the high quality of work, education, and life that distinguishes the campus. Interaction patterns, opportunities for exploration, and respect for the environment should all contribute to this plan of buildings, pathways, vistas, and gathering areas.

The goal of the campus master plan is to identify the growth patterns of physical systems that can be strengthened through simplification, organization, or elaboration. Expanding the area of the pedestrian campus while simplifying roadway passages for easy wayfinding is one key element of the plan. Growing the organization of research, educational, and clinical facilities for collaboration opportunities is yet another element. And a third is the strengthening of community through the shared opportunities of personal and professional interaction, collaboration, and study.

Adding just over 650k GSF of new built space on campus as identified in this facilities master plan is a challenging undertaking, even over a 10-year time period, especially when considering all the systems of circulation, arrival and departure, and internal functions that need to be properly planned and coordinated. The plan includes concepts for developing multidisciplinary biomedical facilities, a vision for academic health care delivery, and the growth of professional schools and multipurpose learning environments. The Anschutz Medical Campus 2012 Facilities Master Plan is designed to accommodate future needs in a way that is thoughtful, that uses the university's limited land effectively, and that creates a safe, attractive, and sustainable campus and neighboring urban community.

Goals of the master plan include strengthening systems of wayfinding, collaboration, and community like those that exist on the Art Walk.

Academic Office 1.

CU Anschutz's 33 buildings, parking structures, and leased facilities total just over 3.7 million GSF. A list and brief description of each building currently utilized by the university at CU Anschutz follows.

ACADEMIC OFFICE 1

The Academic Office 1 facility is sited immediately south of the Research 2 complex. The building mainly provides faculty offices and support spaces primarily for use by the SOM and GS. The project was completed in October 2007.

Barbara Davis Center for Childhood Diabetes.

THE BARBARA DAVIS CENTER

The Barbara Davis Center for Childhood Diabetes is the largest diabetes and endocrine care research and training program in the Colorado community. The project involved the construction of a new 70,535 ASF facility. The final project phase was completed in December 2006.

Building 406.

THE 400 SERIES BUILDINGS

Buildings 400, 401, 402, 406, and 407 (also called the University Police building) are facilities formerly used by the army as part of the FAMG. These buildings were identified as having potential to house university programs and currently are used by the University Police, SOM, SPH, CU Foundation, and Central Services and Administration. The 400 Series Buildings together comprise just over 70,000 ASF of space and were constructed in the 1940s.

Building 500.

Building 610.

Campus Services Building.

BUILDING 500 AND BUILDING 533 AND 534 ANNEX

Building 500 is the main iconic structure at CU Anschutz and was originally constructed as the Fitzsimons Army Hospital in 1941. At the time, it was the largest structure in the state of Colorado. Upon closure of the army hospital in 1999, the university occupied the building and has since remodeled portions of the facility to house offices and support space for Central Services AND Administration, SOM, SPH, Academic and Student Affairs, CU Foundation, and the Eisenhower Museum on the eighth floor. The main data center and OIT staff offices for CU Anschutz are housed in Building 500, along with some leased space for UCH Information Systems and Psychiatry Outpatient Services. Directly adjacent to Building 500 are Building 533 and 534 Annexes, which house research equipment and offices.

BUILDING 610

Building 610 is a one-story structure built in 1983 and currently used for campus support and temporary storage. Building 610 is planned to be demolished in the future to make better use of its property site. The site has been reviewed and is considered a good visual gateway entrance into the university campus. A future larger development on this site will help enhance the arrival experience to the university from 17th Place.

CAMPUS SERVICES BUILDING

The Campus Services Building houses facility operations and support services for CU Anschutz. It includes maintenance shops such as painting, carpentry, and mechanical works as well as offices for the various facilities departments and staff. The 42,000 ASF facility was completed in July 2007.

Central Utility Plant.

CENTRAL UTILITY PLANT

The CUP was officially completed in May of 2003. The facility was planned to allow expansions, as additional steam and chilled water service are required for the occupants of new buildings and expansion structures. An additional phase to increase the campus chilled water capacity was completed in October 2004. A second phase expansion for increased chilled water capacity to support the CUP-funded buildings was completed June 2007.

Education 1.

EDUCATION 1

The Education 1 facility, completed in 2007, includes space for multipurpose classrooms, lecture halls, specialized instructional and computer laboratories, student community space, program space for the Center for Advancing Professional Excellence (CAPE), and skills laboratories for programs in nursing, physical therapy, and pharmacy. The facility is located directly east of Building 500 on the Education Commons.

Education 2 North.

EDUCATION 2 NORTH AND SOUTH (INCLUDING EDUCATION BRIDGE)

This facility consists of two five-story structures that provide education space on the lower two floors and faculty offices on the upper floors, and they are connected by the education bridge. The two facilities provide over 172,000 ASF of space for academic education, consisting of classrooms of various sizes, lecture halls, computer stations, small group learning rooms, and student community space. The facility also provides 65,000 ASF for faculty offices. The facility is located east of the Education 1 facility and forms the eastern boundary of the Education Commons. The buildings were completed in August 2007.

Environmental Health and Safety.

Fire Station.

Fulginiti Center for Bioethics and Humanities.

ENVIRONMENTAL HEALTH AND SAFETY

The building houses the offices, support space, labs, and waste facilities for the Environmental Health and Safety (EH&S) department. This building is required to support the existing and growing CU Anschutz research programs, teaching educational labs, and facilities operations. The building has had several phases of expansion; the most recent addition was completed in 2007.

FIRE STATION

The original fire station constructed in 1942 for the FAMG no longer functions in this capacity for the university, but the University Police and Facilities Management use it for other facility support purposes. As part of this facilities master plan, the building will be demolished to accommodate the realignment of Uvalda Street to create a stronger connection between FRA and the Anschutz Medical Campus.

FULGINITI CENTER FOR BIOETHICS AND HUMANITIES

The Fulginiti pavilion was constructed for the Center for Bioethics and Humanities. This facility provides 9,850 ASF for exhibition, meeting, seminar, and program office space. The building was completed in early 2009. The building is sited at the north end of the Education Commons between the Education 1 and Education 2 buildings.

Health and Wellness Center.

HEALTH AND WELLNESS CENTER

This innovative facility is the newest building at CU Anschutz and provides a unique combination of research space and health and wellness programs. The building provides an exercise facility and wellness center for university employees and the public to increase their awareness of positive health through new programs and innovation. Participants are often involved in research projects that they have volunteered to join as part of their own health and wellness education. This building is over 95,000 GSF and is located on the west side of campus at the corner of Montview Boulevard and Racine Street. The building was completed in early 2012.

Health Sciences Library.

HEALTH SCIENCES LIBRARY

This facility provides state-of-the-art library services to CU Anschutz and allows the university to provide technology and information services to meet the evolving needs of Colorado for education, research, patient care, community service, and economic development. The campus library consists of 76,972 ASF of collection, study, and computer access and administration space. It is located on a prominent site to the north side of Building 500. The project was completed in October 2007.

Henderson Parking Garage.

HENDERSON PARKING GARAGE

The university completed construction of its first parking structure to complement and help reduce the amount of surface parking. The structure consists of seven levels, including one level partially below grade, to accommodate a total of 1,540 vehicles. The project was completed in September 2007.

Nighthorse Campbell Native Health Building.

PASCAL.

Perinatal Research Facility.

NIGHTHORSE CAMPBELL NATIVE HEALTH BUILDING

The Nighthorse Campbell Native Health Center, with 24,195 ASF, houses the Division of American Indian and Alaska Native programs. The two-phased building project was completed in May 2002 and was one of the first newly constructed buildings at CU Anschutz.

PRESERVATION AND ACCESS SERVICE CENTER FOR COLORADO ACADEMIC LIBRARIES (PASCAL)

This 15,156 ASF central library storage facility, named PASCAL, was completed in January 2001. The state-of-the-art library storage facility provides climate-controlled housing for materials in the library collections of CU Denver, CU-Boulder, and the University of Denver. An expansion of 11,350 square feet was completed in 2009.

PERINATAL RESEARCH FACILITY

The Perinatal Research Facility is located in the northeast corner of the campus on the north side of Montview Boulevard. The building includes research laboratories, environmental chambers, and office space with a total of over 17,000 ASF. Two modular buildings support the Perinatal Research Facility. The original building was completed in January 2002.

Skaggs Pharmacy and Pharmaceutical Sciences Building.

SKAGGS PHARMACY AND PHARMACEUTICAL SCIENCES BUILDING

The construction of the new 171,000 GSF building for SOP was completed in 2011. This facility houses research laboratories, laboratory support, faculty and administrative offices for SOP.

Red Cross Building.

RED CROSS BUILDING

This historic building, built in 1918 is located on the north side of Building 500, between the Health Sciences Library and the Skaggs Pharmacy and Pharmaceutical Sciences Building. It is currently vacant and not able to be occupied due to environmental conditions. Although this building has been investigated for reuse, prohibitive environmental cleanup and new building systems needed to bring it up to current building code compliance are not economically feasible.

Research 1 (North and South Towers).

RESEARCH 1 (NORTH AND SOUTH TOWERS)

Completed in 2004, this research building complex was the first comprehensive research presence for CU Anschutz on the former FAMG. The complex consists of two buildings located on the Research Commons, which is directly west and southwest of Building 500. Included in the Research 1 facilities are wet and dry research laboratories, core laboratories, lab support space (including space for linear equipment), researcher and program offices, conference rooms, a central vivarium, auditoriums, and building support space. Including both towers (North and South), this is the largest building at CU Anschutz with a combined 628,000 GSF.

Research 2.

School of Dental Medicine Building.

A 700 Series Building.

RESEARCH 2

As the second major research building complex, Research 2 provides 479,000 GSF of additional space for the research enterprise on the Research Commons at the Anschutz Medical Campus. The project was completed in June 2008 and is located directly west of the Research 1 North Tower.

SCHOOL OF DENTAL MEDICINE BUILDING

The School of Dental Medicine Building is a 116,000 GSF facility located between the Nighthorse Campbell Native Health Building and the Education 2 South complex. It houses the clinical programs of the SDM, including a large amount of space for dental operatories for general dentistry, oral surgery, emergency dentistry, pediatric dentistry, and orthodontia. Other building occupancies include offices for the dean of the School of Dentistry and faculty offices. Since opening in August 2005, the facility has been fully occupied. SDM recently completed an addition on the fourth floor of 13,000 GSF to house 50 dental operatories, offices, and other clinical support functions. This addition was completed in 2010.

THE 700 SERIES BUILDINGS

Buildings known as the 700 Series (M06, M07, M08) are not considered part of the inventory or GSF calculations. These former FAMG buildings are now vacated, boarded up, and all utilities to the buildings have been terminated. These buildings are no longer usable and are scheduled for demolition during this master plan period.

The cumulative existing space inventory from the facilities listed above was used as the base year (2011–2012) ASF used by the university to help determine the future space needs analysis listed in Section IV.5 of this report. The following table (Figure IV.1) shows the official facility GSF of the 33 buildings utilized on the CU Anschutz Medical Campus, not including leased facilities.

Official Facility Gross Square Footage (Not Including Leased Facilities)
University of Colorado Anschutz Medical Campus
August 2012

Building Name	*Bldg. Tag*	*Address (1)*	*GSF*	*Note/Source*
Academic Office 1	L15	12631 E. 17th Avenue	204,974	Per Building Code Plans
Barbara Davis Center	M20	1775 N. Aurora Court	112,646	Per Building Code Plans
Building 400	Q09	12469 E. 17th Place	31,331	Army - Includes 3 additions
Building 401	R09	1784 Racine Street	22,656	Army
Building 402	S09	12474 E. 19th Avenue	22,632	Army
Building 406	T09	12477 E. 19th Avenue	19,485	Army
Building 500	Q20	13001 E. 17th Place	479,660	Geographic Info. System - Incl. GSF of 2 emergency generator structures NW of 500. GSF of 500 is 478,211. S21 GSF is 974. S21A GSF is 475.
Building 533	R24	13001 E. 17th Place	5,080	Army
Building 534	S25	13001 E. 17th Place	3,299	Army
Building 610	Q34	13309 E. 17th Place	6,960	Army
Campus Services	T36	1945 N. Wheeling Street	68,333	Per Building Code Plans
Central Utility Plant	S34	13350 E. 19th Avenue	82,156	Per Building Code Plans
Education 1	P26	13070 E. 19th Avenue	115,251	Per Building Code Plans
Education 2 - North	P28	13120 E. 19th Avenue	160,454	Per Building Code Plans - Combined with L28, GSF is 275,376
Education 2 - South	L28	13121 E.17th Avenue	114,922	Per Building Code Plans - Incl. bridge - combined with P28, GSF is 275,376
Environmental Health & Safety	R30, R31	13178 E. 19th Avenue	21,002	Per Building Code Plans - Combined GSF - R30 is 13,646. R31 is 7,356 GSF.
Fire Station	X28	1997 Uvalda Court	4,829	Army
Fulginiti Center	R27	13080 E.19th Avenue	19,475	Per Building Code Plans
Health and Wellness Ctr	V08	12348 E. Montview Blvd	95,141	Per Building Code Plans
Health Sciences Library	V23	12950 E. Montview Blvd	113,005	Per Building Code Plans
Henderson Parking Garage	V17	12706 E. Montview Blvd	495,499	Per Building Code Plans - 1540 spaces
Nighthorse Campbell Native Health Building	M24	13055 E. 17th Avenue	45,396	Per Building Code Plans
PASCAL	P30	13188 E. 19th Avenue	28,906	Per Building Code Plans - Includes addition
Perinatal Research Facility	AK32	13243 E. 23rd Avenue	24,128	Per Bldg. Code Plans - Incl. 2001 addition
Perinatal Research Facility Modular East	AL32B	-	4,014	Field Measurement
Perinatal Research Facility Modular West	AL32A	-	503	Field Measurement
School of Pharmacy Bldg	V20	12850 E. Montview Blvd	171,416	Per Building Code Plans
Red Cross Building	X22	12862 E. Montview Blvd	13,176	Army
Research 1 - North	P18	12800 E. 19th Avenue	344,703	Per Building Code Plans - Incl. auditorium & generator building - combined with L18, GSF is 628,423
Research 1 - South	L18	12801 E. 17th Avenue	283,720	Per Building Code Plans - Combined with P18 the GSF is 628,423
Research 2	P15	12700 E. 19th Avenue	479,085	Per Building Code Plans
School of Dental Medicine Bldg	L26	13065 E. 17th Avenue	116,060	Per Bldg. Code Plans - Incl. 2011 expansion
University Police	U09	12454 E. 19th Place	19,509	Army
Building Count	33	Total GSF	3,729,406	

(1) All addresses are in Aurora, CO 80045. The 700 Series Buildings are inactive and are not included in the above.

Figure IV.1 - Anschutz Medical Campus Building Inventory - Official Facility Gross Square Footage

CAMPUS FACILITIES INVENTORY BY UNIT

The allocation of ASF across the campus for the six schools and colleges and Central Services and Administration is listed in the following table (Figure IV.2) and shows the total space and the portion of research space allocated to each.

As shown on Figure IV.2, SOM occupies the majority of university space, with SOP second. It should be noted that the space listed for the GS is their administrative office and support space. Since each of the graduates is enrolled in one of the respective schools/colleges, space is provided in that school/college for their academics, support, and services need.

The following sections of this report will reference the existing university ASF of 2,045,167 for overall total space and the 1,067,209 ASF for total research space that currently exists at CU Anschutz.

University Space Inventory by School
University of Colorado Anschutz Medical Campus
Finance Space Inventory System 2011–2012

Description - Space Inventory	*2011–2012 Actual Assignable SF*	*2011–2012 Research Space Actual Assignable SF*
Academic and Student Affairs	247,872	-
Administration	396,870	-
School of Medicine	1,137,087	938,112
School of Dental Medicine	78,266	14,244
College of Nursing	29,026	8,746
School of Pharmacy	93,891	55,496
Colorado School of Public Health	59,266	50,611
Graduate School (1)	2,889	-
Overall Space Inventory Total	2,045,167	1,067,209

(1) The Graduate School ASF listed above is only administrative space for the school since their students are enrolled in the programs of one of the five schools or colleges.

Figure IV.2 - University Space Inventory by School

IV.3 CLASSROOM UTILIZATION

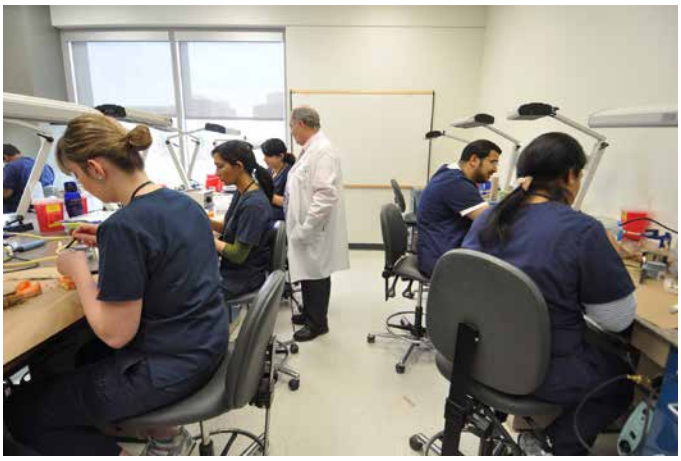
With the move of UCHSC from the 9th Avenue and Colorado Boulevard location to the new campus in Aurora, most of the university's existing academic programs were relocated to the CU Anschutz Medical Campus in January 2007. That milestone marked the completion of Education 1 and Education 2 North and South facilities. The majority of the educational learning at the university takes place in the Education 1 and 2 buildings. A planning principle from the 1998 facilities master plan was to develop shared general-use classrooms when possible to facilitate efficient scheduling and to locate them in shared academic facilities to encourage interdisciplinary education opportunities.

Shared general-use classrooms on the campus include 200-seat lecture halls, 75–80-seat lecture halls, and flat floor classrooms with reconfigurable furniture with capacities between 30 and 60 seats. There is also a 600-seat lecture hall, numerous 10–12-seat seminar rooms that are more often used as informal group study areas, and 16-seat multipurpose classrooms and teaching laboratories that are suited to specific courses, primarily in SOM. Additional group study rooms were also constructed in the Health Sciences Library. First priority for general classroom spaces is to accommodate scheduled instruction. However, once scheduled instruction is properly allocated, these rooms are used for other non–regularly scheduled activities, guest lectures, training seminars, continuing education, and other purposes.

Specific schools operate clinical skills laboratories. The teaching laboratories are made up of a wide variety of specialized spaces for instructional learning and include gross anatomy laboratory, nursing skills laboratory, physical therapy skills laboratory, pharmacy skills laboratory, simulation skills laboratory, a dental medicine skills laboratory, and the CAPE program.

In addition to these facilities, there are other meeting, study, and conference rooms located among numerous university departments on campus. Teaching may periodically occur in these spaces, but the primary purpose is not to hold scheduled classes or courses in these rooms.

In planning the academic buildings on the new campus, the university was to incorporate student community areas in the building projects that would provide both additional study space as well as daily collaborative interaction space. These types of spaces have proven to be useful and instrumental in learning activities and interaction in the student/faculty experiences at CU Anschutz. The Education 1 and 2 buildings have been successful in meeting this principle.



Students learn in a specialized teaching laboratory.

Students fill a 200-seat lecture hall.

The programming phase of this analysis studied current and projected utilization and the impact of student enrollment growth on general-use classrooms and teaching laboratories.

The shared general-use classrooms are currently functioning at a combined utilization rate of 48 percent for academic uses on a Monday–Friday 8 AM to 5 PM basis. Utilization by room type varies from 45 percent to 54 percent. When including the non-academic uses that occur in these classrooms along with the academic schedule, current combined shared general-use classroom utilization increases to 61 percent. University classroom utilization data does not currently allow for comparisons of actual class sizes related to room capacity in which these classes are scheduled. To better maximize the utilization of the general classroom spaces, it is recommended that the university incorporate software to track and analyze these metrics. This would allow the university to better accommodate and properly plan facilities for the increasing student enrollment.

Enrollment is projected to increase by more than 30 percent over the next 10 years. Program analysis conducted for this facilities master plan assumed a 15 percent increase at Year 5. Applying the enrollment projections to current utilization data, in five years the utilization will increase to 55 percent for academic classroom use and to 71 percent for all uses (academic and non-academic). In 10 years, the utilization is projected to increase to 62 percent for academic use and to 80 percent for all uses in the Monday–Friday 8 AM to 5 PM time period.

The table below (Figure IV.3) displays the current and projected utilization of the shared general-use classrooms described above.

Unknown factors could potentially affect future classroom utilization, like the increased use of distance learning. There is a trend of students viewing lectures on their personal computers in other environments and coming to academic facilities for group discussion purposes and laboratory experiences. There are also recognized opportunities for repurposing some academic spaces for classrooms. Another unknown factor is the degree to which enrollment growth may occur at sites other than the CU Anschutz Medical Campus such as UCCS, where SOM is establishing a satellite location along with the expansion of UCH affiliates and partners.

Current and Projected Utilization of Shared General-Use Classrooms
University of Colorado Anschutz Medical Campus
Fall 2012

	Current Utilization (1)		*5-Year Utilization (2)*		*10-Year Utilization (3)*	
Classroom Type	*Academic*	*Total*	*Academic*	*Total*	*Academic*	*Total*
200-Seat Lecture Hall	45%	54%	52%	63%	59%	71%
75–80-Seat Lecture Hall	44%	59%	51%	69%	57%	77%
60-Seat Classroom	54%	72%	62%	83%	70%	94%
30-Seat Classroom	49%	55%	56%	63%	64%	71%
All Classroom Types	48%	61%	55%	71%	62%	80%

(1) Current Usage Based on Spring 2012 Data
(2) 5-Year Enrollment Growth Assumed at 15.3%
(3) 10-Year Enrollment Growth Assumed at 31.8%

Figure IV.3 - Current and Projected Utilization of Shared General-Use Classrooms

Some underutilized spaces may be considered for adaptive reuse for academic purposes, which could reduce classroom utilization results. Possible spaces may include lightly used student community areas and unused library stack space due to the decreasing need for hard texts. There is also the possibility of scheduling non-academic uses to meeting rooms in other facilities to allow for more scheduling flexibility of academic courses as enrollment grows.

The overall space programming exercise concluded that there is no immediate need to add shared general-use classroom space in the next several years, although utilization data and other trends and opportunities as identified will bear monitoring, especially toward the middle of the 10-year planning horizon. As class sizes increase, the university will need to plan for future classroom spaces to accommodate full cohort sizes. It is estimated that several of the 200-seat classroom spaces will need to accommodate as many as 220-student cohort sizes by the end of this planning period. It is also noted that the 10-year projected academic use rate is 62 percent, which is busy but not unreasonable, whereas the combined academic and non-academic use rate may climb to a very busy 80 percent. Utilization above 80 percent typically indicates scheduling difficulties and challenges for appropriate room prep and setup functions, indicating additional space may be needed.

Specialized clinical skills laboratories may need to be expanded on an individual basis. The areas that demand the most growth are the simulation labs. There is a further opportunity to collaborate among the programs through simulation offered by CON, CAPE, and UCH's Wells Center. Relocation of the nursing simulation center would also allow for expansion of the adjacent gross anatomy laboratory and minimally invasive surgery suite. Some square footage for expansion of specialized academic space is projected in the program square footage section of this report in recognition of these needs.

IV.4 ENROLLMENT AND POPULATION PROJECTIONS

In the academic year 2011–2012 the total headcount at CU Anschutz including faculty, staff (Central Services and Administration), residents, and students was 12,860. Figure IV.4 shows the five population categories separated by school/college: faculty, staff, PRAs, medical residents, and students. The table also shows the total anticipated increase in headcount over the 10-year master plan period with a new projection in 2022 of 15,997 people. This overall increase of 3,137 in headcount represents an annual growth of approximately 2.4 percent. The annual growth of students is estimated at 3.2 percent per year for a total increase of 1,314 student headcount over the planning period.

CU Anschutz students gather in informal study spaces.

Headcount Detail
University of Colorado Anschutz Medical Campus
Office of Institutional Research and Effectiveness, Rev. 7/16/2013

Description	2011–2012 Actual	2021–2022 Projected	Increase	
			Total #	Annual %
Faculty				
Central Services & Administration (1)	30	36	6	2.0%
School of Medicine	3,077	3,723	646	2.1%
School of Dental Medicine	139	168	29	2.1%
College of Nursing	183	222	39	2.1%
Skaggs School of Pharmacy	221	267	46	2.1%
Colorado School of Public Health	143	173	30	2.1%
College of Engineering and Applied Science	31	38	7	2.3%
Graduate School	12	14	2	1.7%
Subtotal Faculty	**3,836**	**4,641**	**805**	**2.1%**
Staff				
Central Services & Administration (1)	731	870	139	1.9%
School of Medicine	1,338	1,592	254	1.9%
School of Dental Medicine	166	197	31	1.9%
College of Nursing	76	90	14	1.8%
Skaggs School of Pharmacy	103	123	20	1.9%
Colorado School of Public Health	111	132	21	1.9%
College of Engineering and Applied Science	4	5	1	1.9%
Graduate School	20	24	4	1.9%
Subtotal Staff	**2,549**	**3,033**	**484**	**1.9%**
Professional Research Assistants (PRA)				
Central Services & Administration (1)	17	21	4	2.1%
School of Medicine	1,168	1,413	245	2.1%
School of Dental Medicine	12	15	3	2.1%
College of Nursing	5	6	1	2.1%
Skaggs School of Pharmacy	16	19	3	2.1%
Colorado School of Public Health	112	136	24	2.1%
College of Engineering and Applied Science	6	7	1	2.1%
Graduate School				0.0%
Subtotal PRA	**1,336**	**1,617**	**281**	**2.1%**
Residents	**1,010**	**1,263**	**253**	**2.5%**
Subtotal Residents	**1,010**	**1,263**	**253**	**2.5%**
Students				
School of Medicine (2)	1,349	1,703	354	2.6%
Affiliated with Graduate School	*333*			
School of Dental Medicine	363	458	95	2.6%
Affiliated with Graduate School	*0*			
College of Nursing	977	1,075	98	1.0%
Affiliated with Graduate School	*371*			
Skaggs School of Pharmacy	908	973	65	0.7%
Affiliated with Graduate School	*55*			
Colorado School of Public Health (3)	493	1,015	522	10.6%
Affiliated with Graduate School	*69*			
College of Engineering and Applied Science (4)	39	219	180	46.2%
Affiliated with Graduate School	*39*			
Subtotal Students	**4,129**	**5,443**	**1,314**	**3.2%**
Subtotal Affiliated with Graduate School	***867***			
Total	**12,860**	**15,997**	**3,137**	**2.4%**

(1) Includes Health Sciences Library and College of Liberal Arts and Sciences
(2) Includes Anesthesiology Graduate Students
(3) Includes Biomedical Informatics Graduate Students
(4) Includes Bioengineering Graduate Students, projection includes 3rd & 4th year undergraduates starting Fall 2015

Figure IV.4 - Headcount Detail

IV.5 FUTURE SPACE NEEDS

To determine future space needs on the campus, the existing space was first documented as a base file. The source of the inventory data that was utilized in the facilities master plan is the 2011–2012 Web-space, which is a facilities space inventory system maintained by the university finance office. The space needs analysis projection utilized a current campus space total of 2,045,167 ASF. This total includes 122,575 ASF of leased program space located in the UPI Building, Leprino Building, Bioscience East, and Gary Pavilion. The university leases a total of 236,244 ASF, but only those facilities proximate to the CU Anschutz Medical Campus were included in the space needs analysis.

A. Space Projection for Current Programs

For current university programs, the space needs analysis projection for 2022 indicates an additional 406,274 ASF (650K GSF) of space needed to accommodate future growth and development during the 10-year master plan period. This represents an increase of 19.9 percent for current program expansion/development. This incremental need includes an estimated increase in research space of 273,006 ASF (25.6 percent) and an increase of 133,268 ASF (13.6 percent) space to meet non-research program growth for academic, clinical, and administrative support programs. Figure IV.5 shows the existing ASF and future growth projections along with the anticipated growth percentage.

When analyzed by space type, the additional 406,274 ASF needed over the 10-year master plan breaks down into space categories as shown in Figure IV.6 along with the percentage of growth in each.

University Space Inventory Summary
University of Colorado Anschutz Medical Campus
Fall 2012

Description - Space Inventory	*2011–2012 Actual Assignable SF*	*2021–2022 Projected Assignable SF*	*Increase/ Decrease Assignable SF*	*Growth % Increase/ Decrease*
All Research/Clinical Space/Support	1,067,209	1,340,215	273,006	25.6%
Academic/Administrative/Other	977,958	1,111,226	133,268	13.6%
Overall Space Inventory Total	2,045,167	2,451,441	406,274	19.9%

Figure IV.5 - Campus Space Inventory Summary

10-Year Space Projection Increment by ASF by Space Type
University of Colorado Anschutz Medical Campus
Spring 2012

Description - Space Inventory	*Estimated Increase in Assignable SF*	*Growth % of Increase*
Classroom/Laboratory/Service Space	19,170	13.4%
Library/Study/Media Production/Service	4,818	5.5%
Office/Office Service Space	160,124	23.0%
Conference Room/Conf Service Space	12,657	14.2%
Research Lab/Research Support/Service	162,518	24.8%
Animal Facilities/Support Services	16,943	20.7%
Assembly/Food/Lounge/Merchandising	7,561	13.8%
Central Computer/Telcom/Central Service	8,653	9.9%
Clinical Space/Service	12,625	19.6%
Building Services/Central Utility/Service	674	0.8%
Other/Renovation/PE/Recreation Space	531	9.7%
10-Year Space Need Increase Total	406,274	19.9%

Figure IV.6 - 10-Year Space Projection Increment by ASF by Space Type

B. Research Space

The total amount of university space allocated to wet and dry research in 2011–2012 was 1,067,209 ASF. That year, the total research expenditures as allocated in the general ledger were over $405 million not including financial aid. Over the 10-year master plan period, the research expenditures are expected to increase by $95 million. To accommodate this increase in funding and growth, an additional 273,006 ASF of research space is needed. This projection for increased funding was developed using the Facilities and Administration (F&A) model provided by the university Finance Office and applying the following estimates:

- Estimates for growth in federal on-campus research based on projected future NIH funding trends. The growth projections are: 0 percent for years 2012–2013 and 2013–2014, 1.5 percent for year 2014–2015, 2 percent for year 2015–2016, and 3 percent for year 2016–2017 and beyond.
- Estimates for growth in federal off-campus and private research based on historical funding patterns and on projected future funding trends. The growth projections are:
  - Federal off-campus: 2 percent all years
  - Private: 5 percent all years
- June 2012 Research Productivity Study: Each year the university Finance Office conducts a review of the total research space in comparison to the total research funding to develop productivity measurements. Each college and school is reviewed and provided a report of its research space allocation of wet and dry laboratory productivities. In 2011–2012 a small surplus of space was identified in the Research Productivity Study based upon the proposed implementation of a productivity target utilizing $330/ASF for ‘wet’ research and $500/ASF for ‘dry’ research space. The university has not yet determined how much of the surplus space might be captured for use to help increase the efficiency of existing research space allocations. Further analysis is taking place to better understand how a productivity metric can be applied and tracked.

C. Non-Research Academic/Clinical/ Administrative Support Space

The university currently has 977,958 ASF of non-research academic, clinical, and administrative support space. In general, an overall growth projection of +20 percent (+2 percent/year) was used in the analysis for the non-research program space, excluding centralized classrooms and instructional laboratories.

The classroom and instructional laboratory space projection included an overall increase of 19,169 ASF (13.4 percent) in instructional space, from 143,359 ASF to a total of 162,528 ASF. This increase will accommodate the anticipated university needs for expanded centralized simulation and instructional laboratory needs as identified for the end of the planning horizon.

The programming analysis concluded that there is no immediate need to add shared general-use classroom square footage during the next several years. However, utilization data and other trends and opportunities will require monitoring toward the end of the second half of the 10-year period and are likely to necessitate planning for future classroom development at that time. There is an immediate need for additional small group study rooms and teaching lab space for medical students and future third- and fourth-year bioengineering students who will be matriculating on campus in fall 2015. The following section will describe these future needs in more detail.

In summary, the 10-year space projection of +406,273 ASF is shown in the following Figure IV.7, Future Space Projections by Space Type.

Future Space Projections by Space Type
University of Colorado Anschutz Medical Campus
Fall 2012

Description - Space Inventory	*Year 2011–2012 Actual Assignable SF*	*Estimated Increase in Assignable SF*	*Year 2021–2022 Projected Assignable SF*	*Growth % Increase/ Decrease*
Classroom/Laboratory/Service Space	143,358	19,170	162,528	13.4%
Library/Study/Media Production/Service	86,937	4,818	91,755	5.5%
Office/Office Service Space	696,797	160,124	856,921	23.0%
Conference Room/Conf Service Space	89,021	12,657	101,678	14.2%
Research Lab/Research Support/Service	655,305	162,518	817,823	24.8%
Animal Facilities/Support Services	82,017	16,943	98,960	20.7%
Assembly/Food/Lounge/Merchandising	54,635	7,561	62,196	13.8%
Central Computer/Telcom/Central Service	87,444	8,653	96,097	9.9%
Clinical Space/Service	64,477	12,625	77,102	19.6%
Building Services/Central Utility/Service	79,726	674	80,400	0.8%
Other/Renovation/PE/Recreation	5,450	531	5,981	9.7%
Total	2,045,167	406,274	2,451,441	19.9%

Figure IV.7 - Future Space Projections by Space Type

D. New Program Initiative Space Needs

Several new initiatives and growth of existing programs drive immediate space needs on campus. The following items will require immediate proper planning to meet the space demands.

- The medical student cohort size is planned to increase from its current 160 to 184 students. Additional teaching lab space is required to accommodate this growth, as the current SOM teaching labs in Research 1 are too few and inappropriately sized to accommodate the new cohort quantity. Additional space in the gross anatomy labs will also be needed to accommodate 184 students. To replace the existing Research 1 SOM first-floor teaching labs and properly accommodate the new cohort size, approximately 27,000 GSF of new lab space would be needed. Constructing this new space near the academic quad would be preferable. The existing Research 1 SOM first-floor teaching labs would then be converted to accommodate growth in research programs.
- The new academic Bioengineering Program was approved in September of 2012. This interdisciplinary program spans both CU Denver campuses for the bachelor of science degree. Students in the bioengineering program will spend the first two years on the Denver Campus and then their 3rd and 4th years on the CU Anschutz Medical Campus. The first cohort of 3rd-year students will arrive on the CU Anschutz campus in August of 2015. This program requires approximately 30,000 GSF of educational and support space to address its academic needs. The future Bioscience 2 building is being planned immediately north of the Henderson Parking Garage along East Montview Boulevard to address this immediate space need. The space to be allocated to the Bioengineering Program in Bioscience 2 will include classrooms, teaching labs, open labs, faculty and staff offices, and other required support spaces for this growing program.
- The emerging field of biomedical informatics is rapidly growing at CU Anschutz and, in conjunction with UCH and CHCO, a joint effort is needed to address space needs for this program. A space centrally located equidistant between the university, UCH, and CHCO would be ideal, but approximately 10,000 GSF will be needed in the near future to address this emerging field of study/research. The next building project on the campus should consider including this program in the building to meet its space needs.
- Many research programs utilize opportunities to collaborate in team-based delivery models. As more focus is placed on clinical translational research, space will be needed to accommodate growth. The fields of genomics, stem cell research, and biomedical informatics will continue to grow and need appropriate space on campus. Space in Bioscience 2, a 120,000 GSF facility may provide opportunities for the university to accommodate more translational development of clinical research initiatives. Along with the new bioengineering program, several university entities like Clinimmune Labs and iC42 Clinical Research and Development might be considered potential tenants. As new initiatives are identified and as translational research increases, this building will provide spaces that are collaborative in nature and help foster the move toward team-based delivery models that have become quite successful.

A class at SPH.

- Properly designed and constructed data center space is required to address the growing need to support campus programs, individual computational servers, and overall IT services for the campus. The current data center is located in Building 500 and was installed to support the university as it was constructed. Currently operating in less than ideal space, the data center has minimal space for growth and lacks the proper utility services required for system redundancy to meet the institution's large computing demands. New data center space is currently being investigated for potential solutions. Due to the high construction cost of data center space, the economy of scale of combining data center efforts between CU Anschutz and UCH could have a cost reduction benefit. This specific project will be further analyzed during the Programming Phase to determine specific space need requirements, but is estimated to be over 28,000 GSF for the university's portion of the data center and IT support office functions.
- Imaging is a critical area of research, clinical, and strategic growth for SOM and its programs. The continuing growth in demand and research applicability for imaging equipment requires additional space, can be better coordinated in a single, centralized site, and would benefit from being located near the existing vivarium spaces. A central imaging center would benefit research programs, researchers, and research subjects, and the west side of Research 2 is currently being investigated as a potential location. The Colorado Translational Research Imaging Center (CTRIC) would house animal and human research imaging equipment and its estimated size would be approximately 48,000 GSF to meet growing need.
- New centers and the growth of existing centers at the university will continue to evolve. Growth of existing centers can happen rapidly, and their needs for spaces will continue to be monitored so the university can provide facilities to meet their goals and aspirations. As new building projects are planned, incorporation of centers may be appropriate for consideration in the new facility if the location, program, and building type warrant a good fit.

The program initiatives listed will be further analyzed as the master plan study continues, and each new building will be reviewed for potential program/occupant opportunities to meet the academic and research need commitments of the university. Additional partnerships in other locations will also be analyzed to determine the space and programmatic needs on the campus, as well as additional space need for more clinical programs and their support networks on and off campus. Space needs for each of these future commitments will be analyzed with each new project and reviewed within the context of this master plan for optimal fit and configuration on the campus.

Imaging is critical for School of Medicine faculty and students.

Radiology imaging.

E. Emerging Trends

As new facilities are planned to address university expansion and development on the campus, the following emerging trends should be reviewed and incorporated into each program plan when applicable.

COLLABORATION

Creating collaborative learning environments in academic and research buildings helps build a stronger relationship between the learner and others (student and instructor/researcher) that reaches beyond the classroom or laboratory. Spaces that are conducive to fostering these types of interaction and collaboration are important to incorporate into buildings. Building program plans should review and potentially include the following:

- Comfortable gathering spaces with moveable seating in close proximity to teaching rooms (classrooms and laboratories). Non-programmed spaces are often oversized niche areas just outside teaching spaces or hallways, or are adjacent to main circulation areas where dialogue can take place. These spaces also help build community between disciplines and can show shared interest between professionals and students. Informal, comfortable gathering spaces are often successful near bustling activity areas in a building where interested parties can easily move from the main flow of circulation to an informal area to continue a conversation one on one or with multiple people.
- Technology-supported informal spaces. Appropriate, small, adaptable, accessible settings in a variety of sizes should be provided to allow for team or solo student work. These spaces should be available 24/7 and have a high level of connectivity for group projects or student project work. Incorporating whiteboards, flat screen panels, and interactive media that is IT-supported for the students to display or share projects helps develop social interaction and enhance the learning experience. These spaces can be designed as small group study rooms or be adjacent to building circulation areas that are easily accessible and convenient to use. It is best to have these spaces designed around patterns of student and faculty interaction. Crossroads in buildings are great places to incorporate these types of spaces to encourage serendipitous interactions and places to linger.
- Multifunctional space with moveable furniture and high levels of audiovisual/IT infrastructure. Environments for active learning (simulation) that incorporate media and IT infrastructure to enhance virtual learning can be positive environments for interprofessional exploration and lifelong learning. These spaces create blended learning that can be activated anytime and broadcast anywhere, which facilitates online, virtual face-to-face interaction in a hybrid instructional setting.

TEAM SCIENCE

Scientific collaboration on research projects and team-based approaches are becoming necessary to solve complex issues that are out of the grasp of an independent researcher. Modern technology, video conferencing, and real-time data transfer have allowed collaborative research to take place between many disciplines in a collaborative effort. A report recently prepared by Leadership for Innovation in Team Science (LITeS) mentions several physical building recommendations that will help promote the team science concept at CU Anschutz. Space and physical environment recommendations listed in the report are:

- Spatial proximity of team member offices and laboratories to encourage frequent contact
- Availability of comfortable meeting areas for group discussion and brainstorming
- Access to distraction-free workspaces for tasks requiring concentration and/or confidentiality
- Physical environments that support members' efforts to regulate interpersonal privacy and accessibility to others

The integrated approach of team science and building spaces that can help promote this collaborative environment should be reviewed as part of any building physical layout or design for meeting rooms, lab space, and other communal spaces. Appropriate building spaces that support these efforts should be planned into the building program plans. For more information, refer to the original Promoting Team Science at University of Colorado Denver report dated April 5, 2013.

SIMULATION

Simulation has rapidly enhanced the learning process and allowed for better training/retention of learned concepts. By implementing the simulation of a real-life event or creating active learning environments with simulated on-the-job training, students and instructors are able to improve the quality of learning as well as foster more interprofessional exploration between disciplines. Creating academic and research environments that embrace simulation will lead the future of the learning experience on university campuses. Simulation centers are emerging as a collaborative environment for interprofessional learning that is well beyond just a single discipline of study.

TECHNOLOGY

Technology has allowed information to be available at all times. Designing spaces to utilize and help support the learning environment with available technology is a key component to students' learning experience and the level of knowledge they will acquire. However, spaces should be viewed as a venue for lifelong learning and should incorporate an environment that can be used by the student of today but also as an evolving place to showcase new methods, procedures, and practices that are leading the way in health sciences and wellness.

F. Other Program Assumptions

Other planning assumptions that guide the program and space projection development include:

STAFFING

For space program analysis, the following percentages of growth were used in the analysis for faculty and staff.

- Projected faculty headcount growth (10-year): +1,071 (+21 percent), from 5,157 to 6,228
- Projected staff headcount growth (10-year): +499 (+19 percent), from 2,596 to 3,095

For a detailed breakdown of the faculty and staffing headcount projections over the master plan, see Section IV.4, Enrollment and Population Projections.

ENROLLMENT

For this future space program analysis, the following growth in student enrollments was utilized.

- Projected enrollment headcount increase (10-year): +1,314 (+32 percent), from 4,129 to 5,443

For a detailed breakdown of the student enrollment growth by school/college, see Section IV.4, Enrollment and Population Projections.

NO-GROWTH ELEMENTS

There are certain types of university space that do not require growth and will continue to function during this planning period. For the future program analysis, these items were excluded from the projected growth analysis. The no-growth program elements total 261,570 ASF and include:

- Health Sciences Library and PASCAL (97,763 ASF)
- Building mail center space (various) (3,188 ASF)
- Campus leases to other institutions (UCH/audit/benefits/etc.) (38,587 ASF)
- Building maintenance space (various) – excluding campus services facility (16,557 ASF)
- EH&S building space (various) – excluding EH&S facility and Building 401 (2,851 ASF)
- Building Service/Mechanical/Circulation/Central Plant (various) (82,034 ASF)
- Building environmental service space (various) (17,757 ASF)

The university space inventory includes 122,000 ASF of leased space in facilities proximate to CU Anschutz and National Jewish Hospital SOM Immunology. Although no additional lease space was figured into the future space needs analysis, it is anticipated that the university will continue to lease space and potentially increase the amount of nearby leased space to help address immediate and appropriate space needs as programs start, develop, and continue to grow.

SPACE/FACILITIES

The buildings known as the Series 400 buildings (400, 401, 402, 406, and 407) will continue to be utilized over this master plan period (2012–2022). However, these facilities are not comparable to the state and functionality of modern buidings. Toward the end of this 10-year planning period, studies should be conducted to determine their usefulness and the best option for the university.

The perinatal research program will remain in the current Perinatal Research Facility location northeast of the Anschutz Medical Campus.

It is anticipated that over the 10-year master plan period, the university will maintain its current lease inventory of 236,000 ASF. However, as each lease expires, the associated program space of each lease should be reviewed to determine if a more applicable function and location in a future project would be a better option for the university.

Friends congratulate one another on commencement day.

V. PHYSICAL PLAN

V. PHYSICAL PLAN

V.1 OVERVIEW

Over an eight-year period, the current Anschutz Medical Campus physical environment was developed swiftly and successfully based on the planning and financial strategies established in the 1998 and 2002 facilities master plans for the then new UCHSC. Both plans have served the campus well, as evidenced by the rapid construction of facilities well ahead of the original schedule and the robust growth in programs and services at CU Anschutz, UCH, and CHCO.

Notwithstanding these successes, the current campus configuration has resulted in unintended drawbacks that need to be addressed in the Anschutz Medical Campus 2012 Facilities Master Plan. Foremost among them are the physical and symbolic "silos" that essentially separate academic, clinical, and research functions and hinder full attainment of the goals of collaboration and connectivity.

The overall form and character of the campus was based on the concept of a "campus in the prairie," with distinct buildings within and/or shaping regionally inspired landscapes. This strategy represented a clear rejection of the highly urban and compact former 9th Avenue and Colorado Boulevard campus. While scenic, the large open spaces are reminiscent of a traditional academic campus and do not reflect the functional needs of present-day AHCs. In spite of this, the 2012 plan does not propose to jettison these scenic environments but, rather, tries to achieve a balance between needed functional proximity and connectivity and the campus's unique sense of place.

Scenarios deal with two worlds: the world of facts and the world of perceptions. They explore the facts but they aim at perceptions inside the head of decision makers. The purpose is to gather and transform information of strategic importance into fresh perceptions.

Pierre Wack, 1985

The previous plans were focused on strategies to build facilities as rapidly as possible so that programs with established space needs could be quickly relocated and housed. However, many of the new buildings are no longer state-of-art facilities, and they require renovations and/or expansions to meet rapidly advancing trends in health science facility design. Today and into the foreseeable future, the entities of the Anschutz Medical Campus are faced with a dynamic and evolving health care, research, academic, and funding environment that requires extreme flexibility and creativity—and partnership—to meet and anticipate needs. Accordingly, the facilities master plan proposes highly flexible planning strategies to achieve its goals, rather than the conventional product that neatly delineates an idyllic campus and its ultimate development capacity

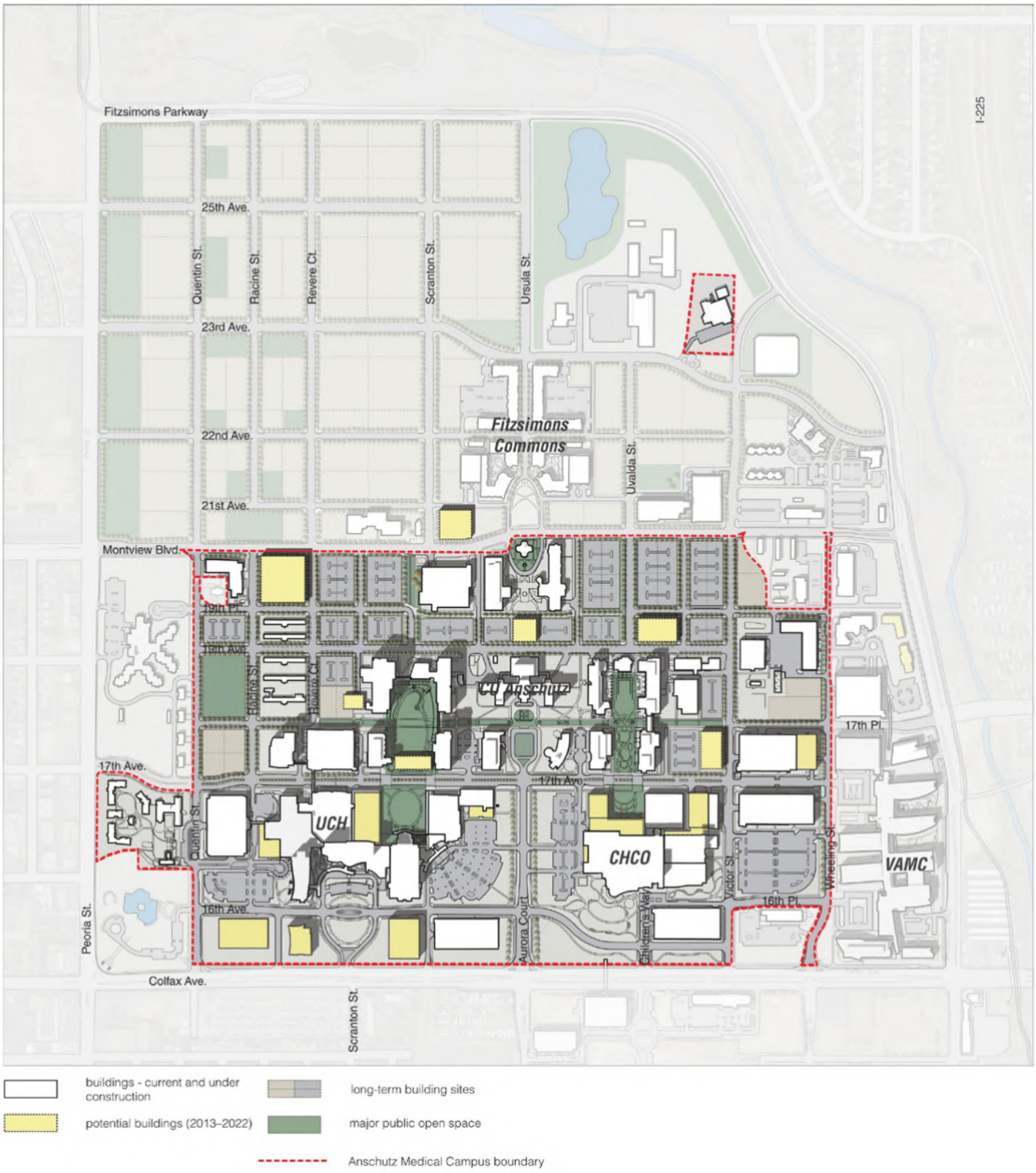


Figure V.1 - Illustrative Master Plan

with building footprints and landscapes of undetermined use. In support of the campus stewardship goal, a flexible plan will more readily adapt to changing technologies and ultimately foster development that is environmentally and economically more sustainable.

To create an adaptive plan that can accommodate the unexpected and changing conditions and priorities of the campus, the process explored a variety of planning scenario options that dealt with campus issues both big and small. Planning through scenario exploration allows for learning about the future by understanding the nature and impact of the most uncertain and important driving forces affecting the campus. Through an iterative group process that encouraged knowledge exchange, stakeholders developed a deeper understanding of the central issues facing the Anschutz Medical Campus. Specific needs and criteria changed; some became less important, and others became more so.

A logical outgrowth of this scenario exploration process was the decision to discard traditional land-use planning that emphasizes distinct use zones and to create instead a focused framework for development based on achieving a desired campus character, quality, and form regardless of use. The framework emphasized the following relationships: buildings in relation to each other; form, scale, and mass of block development; and the types and scale of the streets and open spaces that comprise the public realm.

Four distinct concepts emerged from the planning process:

- **Connectivity** to the larger urban context: Develop the streets as the public realm, make them pedestrian friendly, and connect to city streets at perimeter. Make strong connections across Montview Boulevard to visually and symbolically unify the university and the FRA. Make the campus a part of the city rather than an enclave within the city. The goal of connectivity translates easily to the realm of planning—physical connections help to create connections between institutions, departments, and individuals that promote innovation in teaching, research, and clinical services.
- An understanding of the development patterns unique to established **campus districts**: Based on an analysis of the development typologies ranging from hospital “superblocks” to the adjacent Academic Village, define the unique form and character of each Character District within the campus.
- **Density goals** in relation to each of these districts: Develop a target percentage of building footprint, paved area, and landscape area for each part of the campus. In addition to supporting the goal of connectivity, increased density promotes stewardship in a couple of important ways. Most importantly, it preserves land for further expansion. In addition, density also helps strengthen the pedestrian environment, reducing the amount of vehicle transportation needed within the campus. This idea of increasing density and creating a more urban environment is consistent with the CoA’s vision of northwest Aurora as a hub of business, education, and health care, and an economic engine of the city.
- Defining the framework as a set of **fixed and flexible systems**: The plan works to preserve flexibility to accommodate rapidly changing programs within existing and future buildings sites while laying out a framework of fixed infrastructure to support future development. The fixed framework includes the streets and circulation, utilities (water sewer, etc.), and the system of major open green spaces. The flexible elements include developable areas for future building and parking sites. This distinction of fixed and flexible systems is intended to provide the infrastructure for innovation, preserving the flexibility to develop innovative responses to future opportunities.

All the propositions in this plan communicate intended character, scale, and nature of areas of the physical campus. However, they have been developed to encourage individual and unique future solutions that respond to the needs of projects, priorities, and programs at the time of development.

The framework for future campus development is predicated upon an understanding of the physical and operational features unique to a variety of existing character districts and to their future developmental goals. District-specific guidelines have been developed to build upon the existing strengths and established developmental patterns of each district, reflecting the appropriate scale, image, functionality, and integration of buildings with open spaces. The 2012 Facilities Master Plan makes strong recommendations for a denser, more urban, and walkable environment. The proposed built character of future development should create more-integrated pedestrian areas in order to connect Anschutz Medical Campus programs to neighboring uses.

The primary conceptual departure of the 2012 Facilities Master Plan from the previous plans is recognition that the Anschutz Medical Campus does not exist in isolation, but it is embedded within a larger urban context. This plan recognizes, and builds upon, the urban conditions that will envelop and shape the Anschutz Medical Campus.

All recommendations in the facilities master plan are examined in greater detail in the Design and Development Guidelines, included in full in Appendix VII.7. Each document is a companion to the other, and they should be reviewed and implemented as complementary documents.

Proposals herein have resulted from a broad, inclusive process that enlisted the input of campus leadership, academic and student leaders, Site-Wide stakeholders, neighborhood community members, and the university planning team. All elements of the physical plan have been developed and vetted in multiple workshops over a period of five months with the input noted above.

Workshop breakout sessions covered topics including urban design and transportation planning.

V.2 CONCEPT EXPLORATION

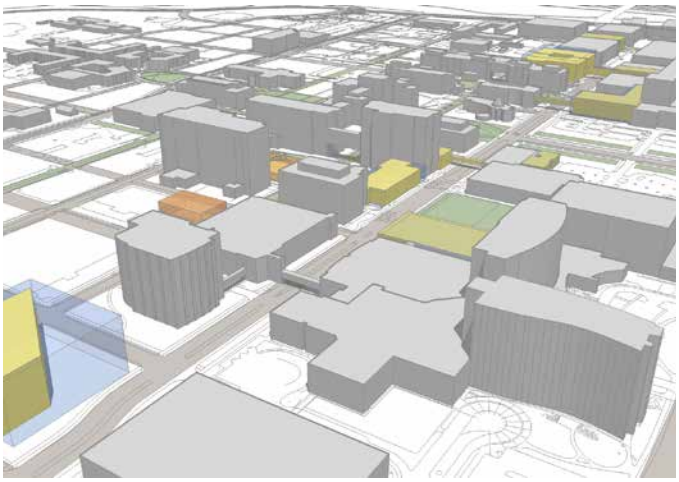
This section summarizes the process that the planning team went through with the stakeholders. Many of the ideas in this section did not survive through into the final plan, but this is intended to provide perspective on how the team arrived at the final plan elements.

The initial steps in the process consisted of workshop sessions with the task forces where small breakout groups brainstormed on specific topics such as parking, open space, streets, transportation, academic, clinical, and research. The groups included participants from all university schools and departments, UCH, CHCO, and partner stakeholders. The small groups presented their recommendations to the full group for discussion and refinement. Some of the key initial ideas that emerged from these workshops included developing a “downtown core” supported by pedestrian boulevards on Scranton Street and Uvalda Street, and expanding and connecting the green space network with pedestrian promenades and streets with integrated storm water management landscapes. The Scranton Street and Uvalda Street greenways support a primary goal of the master plan: to increase connectivity across Montview Boulevard. Conceptualizing 17th Avenue as the campus’s new “main street” provides an east-west complement to the greenways.

From the transportation session, the attitude toward shuttles moved away from big circulator loops to more direct back-and-forth shuttles focused on connecting high-demand campus destinations. From the initial development of the project vision, it was clear that the master plan would move away from a model of individual institutions and functions toward more inter-professional shared spaces and functions. This led to a mixed-use planning strategy that generally increases the density and connectivity within the Anschutz Medical Campus.

Analysis of the existing campus showed three major development typologies on campus: the superblock utilized by the hospitals, the quadrangle with surrounding buildings employed in core academic and research areas, and the urban fabric found on some remaining infill parcels. Analysis revealed that previous development followed these patterns in response to specific functional needs such as for the hospitals to have internal connections and close proximity to large areas of building square footage under, seemingly, one roof. The university core is organized around the two primary quadrangles, consistent with the academic tradition. The analysis raised important questions about the nature of the remaining infill space and its relationship to adjacent partner facilities such as VAMC, FRA, and CoA.

Traditional campus and community planning is largely based on defining the types of uses—i.e., academic, retail, residential—allowed within specific defined zones. The need for flexibility, interconnectivity, multidisciplinary space, and the ability to respond to a rapidly changing field makes use-based methods unproductive to planning future growth on campus. Discussions within the planning team led to the investigation of an alternative model based on form and character. This model looks to define campus zones not by use or ownership, but rather by the physical character and form of distinctly different parts of the campus. As the idea of these zones, or Character Districts, evolved, the definition developed to encourage strong relationships between buildings and their context. Each district would have standards for the interaction between streets and buildings in terms of scale, massing, form, and frontage areas to attempt to create a predictable character for the public realm. An appropriate mix of uses is encouraged, as is the prioritization of civic spaces. By acknowledging the benefits inherent in a variety of organizational frameworks, specific development patterns can be matched with evolving programmatic functions best suited for each.



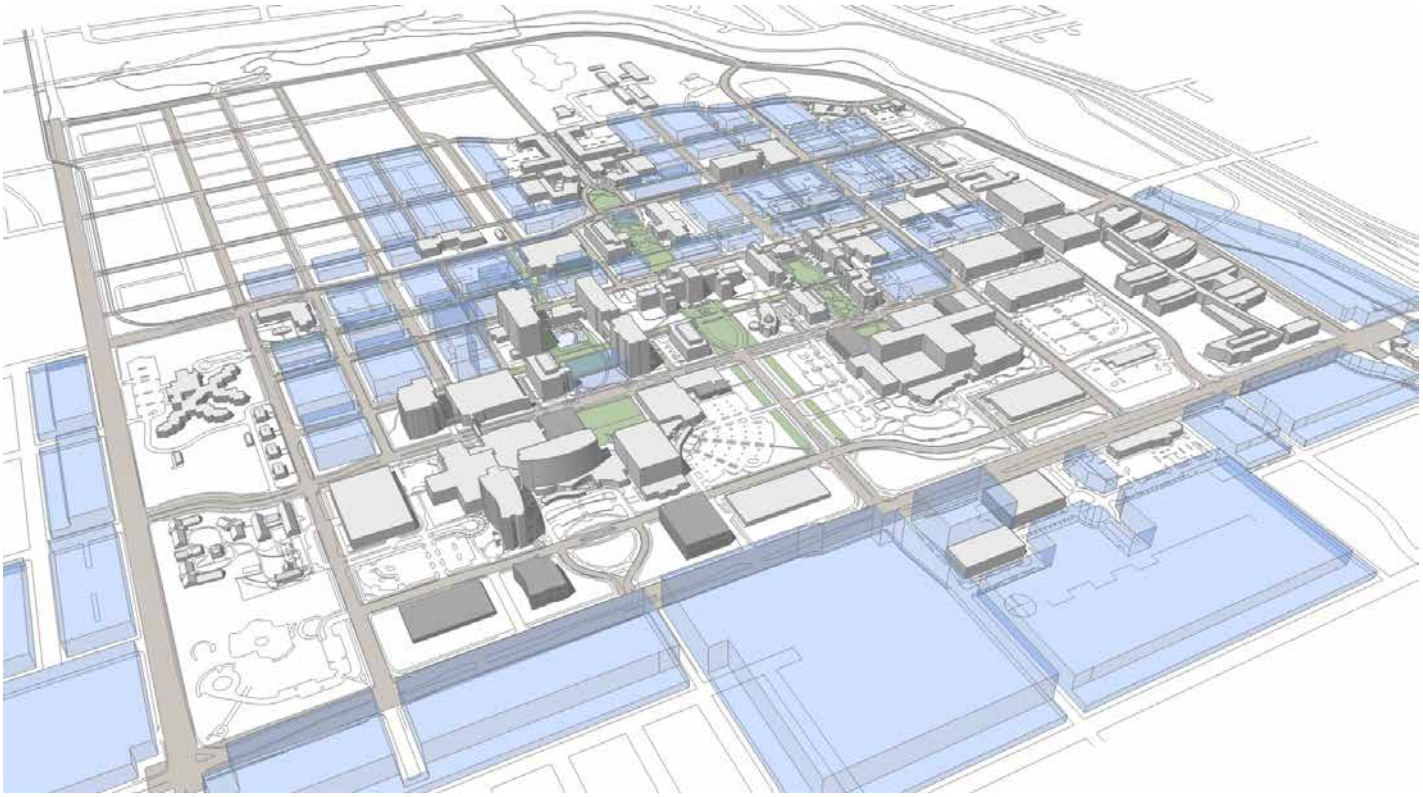
Massing study of potential development along 17th Avenue, looking east.

Massing study of expansion of the western side of campus, view to the east.

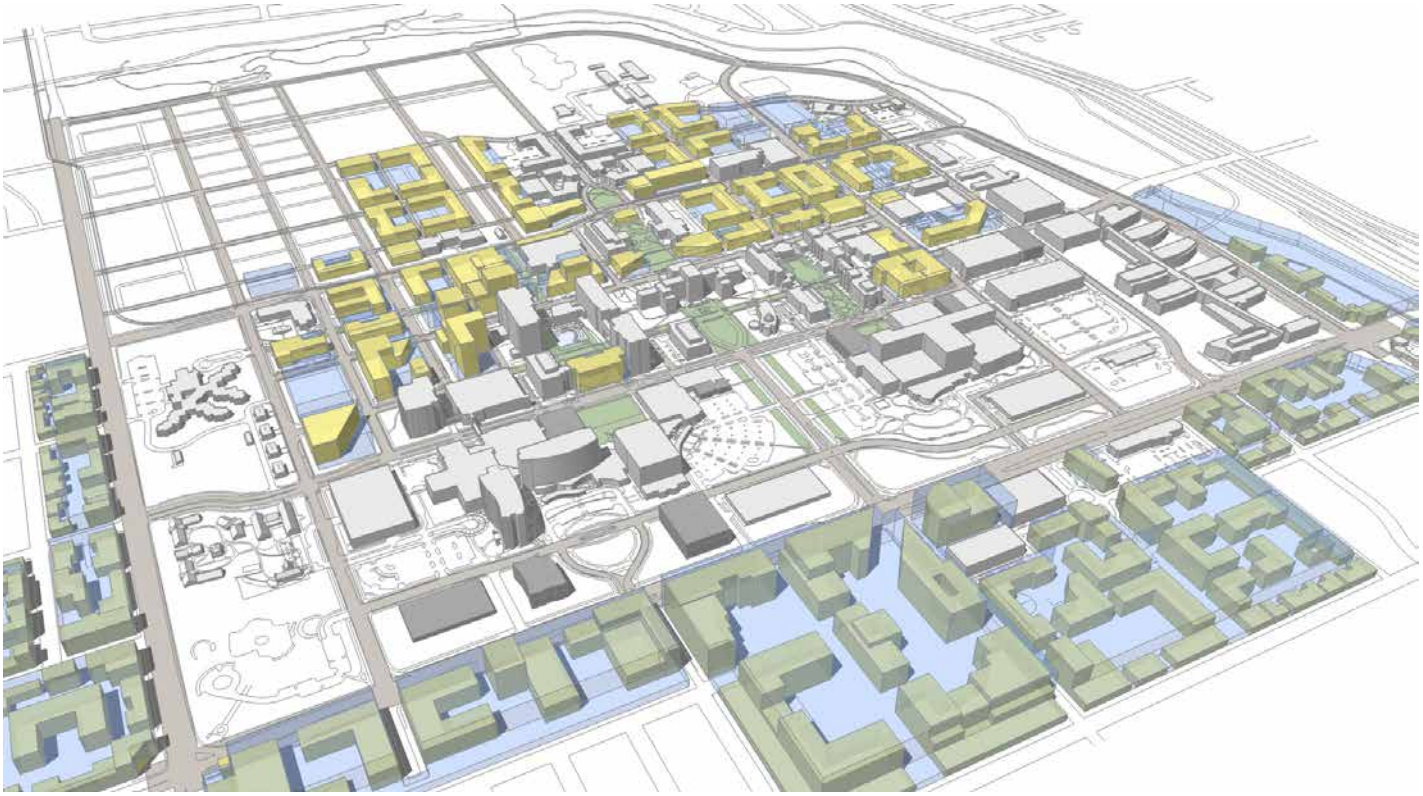
Character study of a pedestrian promenade.

During the next step in the process, the planning team pursued a number of studies focusing on the campus area north of 19th Avenue and south of Montview Boulevard to evaluate the density, public space, and pedestrian connectivity in both the north-south and east-west directions. There was significant discussion about preventing Montview Boulevard from becoming a barrier between the university and the translational research, commercial, and housing components of the FRA, and looking for active ways to connect the two districts. The Planning Committee reached consensus that future university development should have an urban street grid model to integrate with the FRA and surrounding city. The idea of developing strong pedestrian north-south streets with additional landscape along Scranton Street and Uvalda Street to connect the Education and Research Commons north to the FRA gained traction, as did the idea of creating a pedestrian-only greenway along 19th Place.

Though this plan is not tasked with establishing facility footprints for the campus at full build-out, the planners did generate building massing studies as part of the planning process to test the viability of developable sites and envelopes. These studies were also a helpful way to consider the relative percentages of building footprint, paved open space, and landscaped open space in comparison to existing parts of campus and the adjacent city. The percentage of water-permeable open space has implications for the regional storm water management system, and the new recommendation stays within the overall density defined by the original master plan in order to control the impact on those systems.



Massing study of the university and surrounding CoA redevelopment areas showing development envelopes, looking north.



Massing study of the university and surrounding CoA redevelopment areas showing hypothetical building massing within the development envelopes, looking north.

Different areas within the campus have distinct massing issues; infill along 17th Avenue and the need for large buildings to accommodate future research needs in the northwest quadrant of campus were studied in greater detail. These studies validated the massing and density assumptions developed to model future utility demands and confirmed the viability of a highly flexible approach to future building projects. The massing studies are also a valuable tool to evaluate the campus livability of various strategies; they illustrate the experience of higher density, pedestrian-oriented streets balanced with green open spaces.

After completing the massing studies, focus shifted to developing standards for the public realm that would enhance the experience for pedestrians, accommodate bicycle routes, and control the impact of vehicle traffic. The public realm includes the street, street landscapes, sidewalks, civic spaces, as well as the major public green spaces already in place on campus. The ideas that emerged from the street section studies include:

- Focus on an active ground plane with pedestrian space and ground-floor public destinations in adjacent buildings.
- Develop a street section approach consistent with the FRA design guidelines while addressing the unique needs of the campus.
- Create complete streets that balance the needs of all modes of circulation.
- Accommodate increased pedestrian and bike access safely and attractively on all new and renovated streets.

The resulting street section documentation is included in this master plan in Section V.5.A Circulation; full details of street furnishings, paving, lighting, and landscape can be found in the CU Anschutz Design and Development Guidelines in Appendix VII.7.

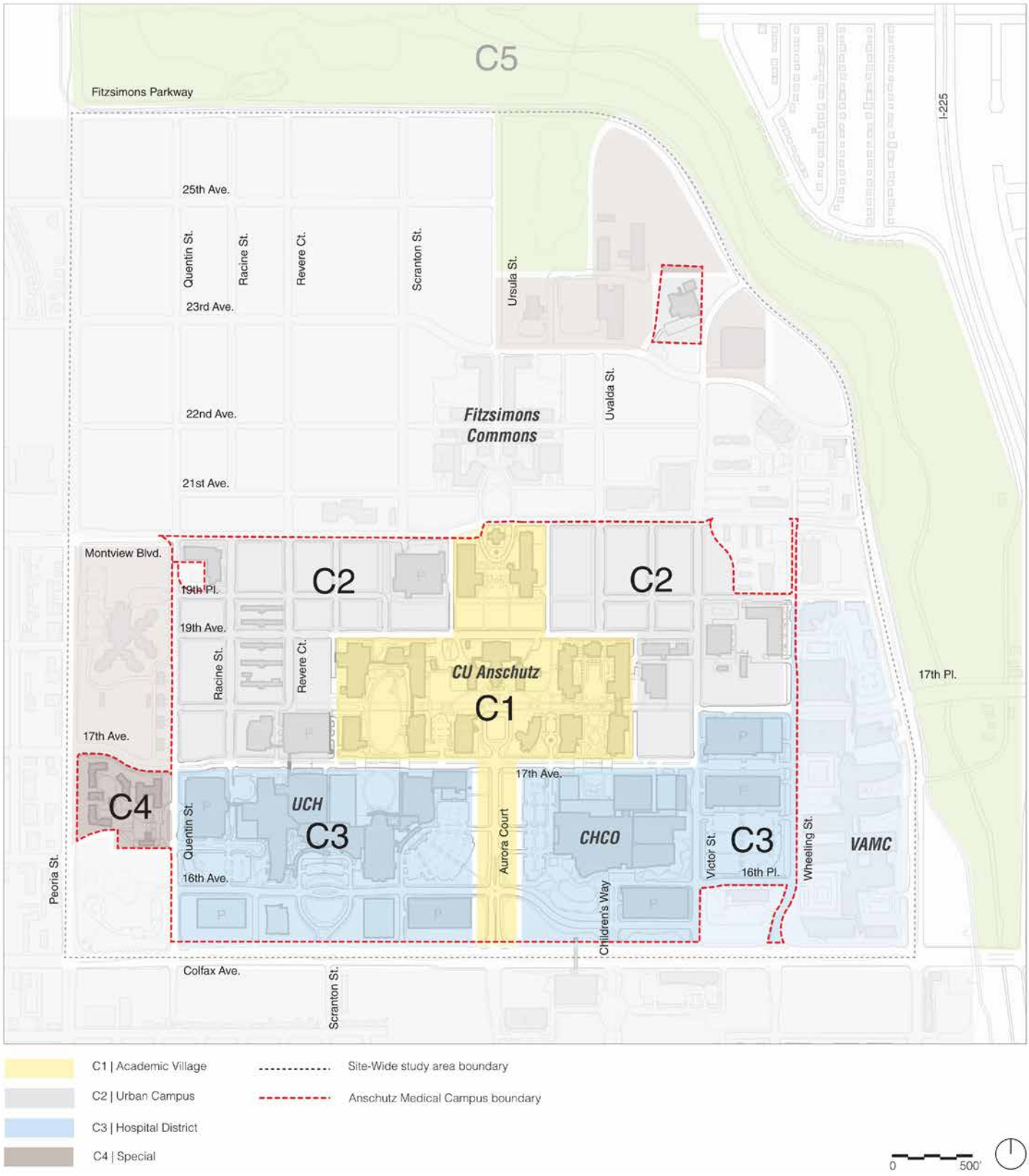


Figure V.2 - Character Districts

V.3 FINAL FRAMEWORK PLAN

As mentioned in Chapter II of this document, the original physical framework for the redevelopment of the FAMG was predicated upon the creation of individual districts within the 230-acre campus for research, education and clinical facilities. The campus was to be organized around the concept of planned open spaces and groupings of buildings with one unifying image or character. It was critical to achieve this quality of development as early as possible in order to facilitate the move from 9th Avenue and Colorado Boulevard and to establish a cohesive physical identity for the Anschutz Medical Campus as a national and international center for excellence in teaching, clinical care, and research. The continued success of this initial endeavor has been unprecedented.

Over time, these initially planned zones have established their own unique patterns of development based upon the pragmatic requirements inherent to their individual programmatic needs and goals. The hospitals have developed in such a way as to accommodate large, interconnected structures set back from lot lines to allow for the substantial parking requirements of visiting patients. The educational district has taken on a collegiate formal arrangement, with buildings delineating discrete campus quadrangles as centers for civic gathering. Other areas on campus have developed with more of an urban typology of higher densities and mixtures of uses, with streetscapes and plazas constituting their major civic spaces.

The “urban transect” diagram in Figure V.3 presents a simplified landscape of the different types of space that can be found on campus. It compares existing development typologies to highlight differences in developmental patterns and the relationship between building and open space.

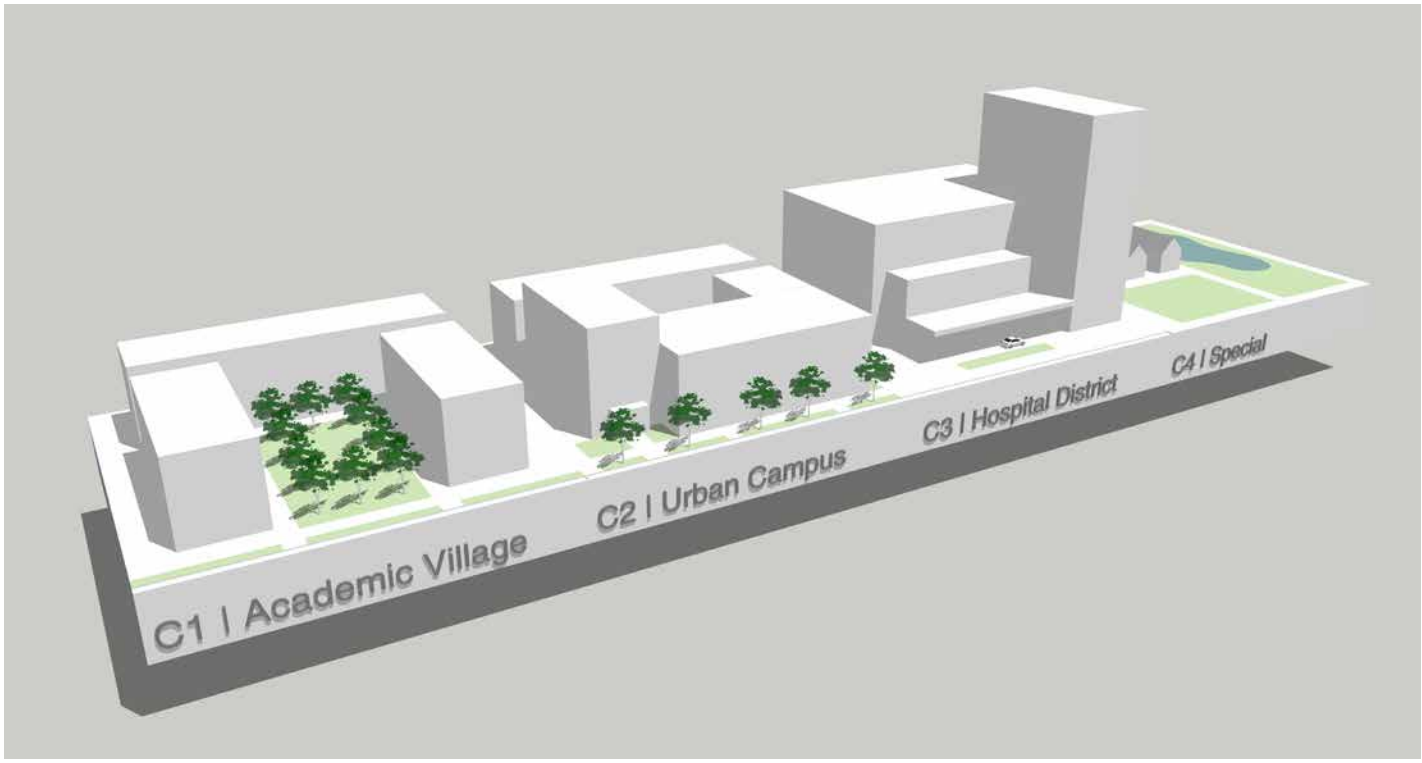


Figure V.3 - Urban Transect

C1 | Academic Village.

C2 | Urban Campus.

A. Form/Character Districts

The framework for future campus development is predicated upon an understanding of the physical and operational features unique to a variety of existing Character Districts and to their future developmental goals. District-specific guidelines have been developed to help designers build upon the existing strengths and established development patterns of each, reflecting the appropriate scale, image, functionality, and integration of buildings and open spaces. This facilities master plan organizes the Anschutz Medical Campus within the context of four Character Districts, each with its own unique goals, recommendations, and organizational structure. The four Character Districts are:

- C1 | Academic Village
- C2 | Urban Campus
- C3 | Hospital District
- C4 | Special

Less emphasis is put on building and land usage. Instead, planning efforts are devoted to encouraging strong relationships between buildings and their context. The interaction between streets and buildings in terms of scale, massing, form, and frontage areas attempts to create a predictable character for the public realm. An appropriate mix of uses is encouraged along with the prioritization of civic spaces. By acknowledging the benefits inherent in a variety of organizational frameworks, specific development patterns can be matched with programmatic functions best suited for each other.

INDIVIDUAL DISTRICT DEFINITIONS

C1 | Academic Village

The Academic Village portion of the site has been organized in accordance with traditional campus planning concepts and is home to some of its most successful and memorable spaces. It is a fully walkable and sociable environment within a superblock structure. Buildings delineate cohesive civic spaces rather than being experienced as isolated objects unto themselves.

C2 | Urban Campus

With medium-density mixed-use buildings within a hierarchical network of streets and plazas, this district is characterized by wide sidewalks, steady street tree planting, and buildings set close to the sidewalks. It is a fully walkable environment with a balance of pedestrian and vehicular activity.

The Urban Campus presents a unifying framework that ties together developments on the north and south sides of Montview Boulevard as well as with the greater surrounding community.

C3 | Hospital District

Much larger than a traditional city block with greater building setbacks, these zones are typically bounded by widely spaced, high-speed arterial or circulating routes rather than by local streets. They allow for the development of large, interconnected mega-structures.

C4 | Special

The Special districts accommodate existing special-use functions such as CeDAR along Peoria Street.

For greater detail on the Character District definitions, refer to the CU Anschutz Medical Campus Design and Development Guidelines.

C3 | Hospital District.

C4 | Special.

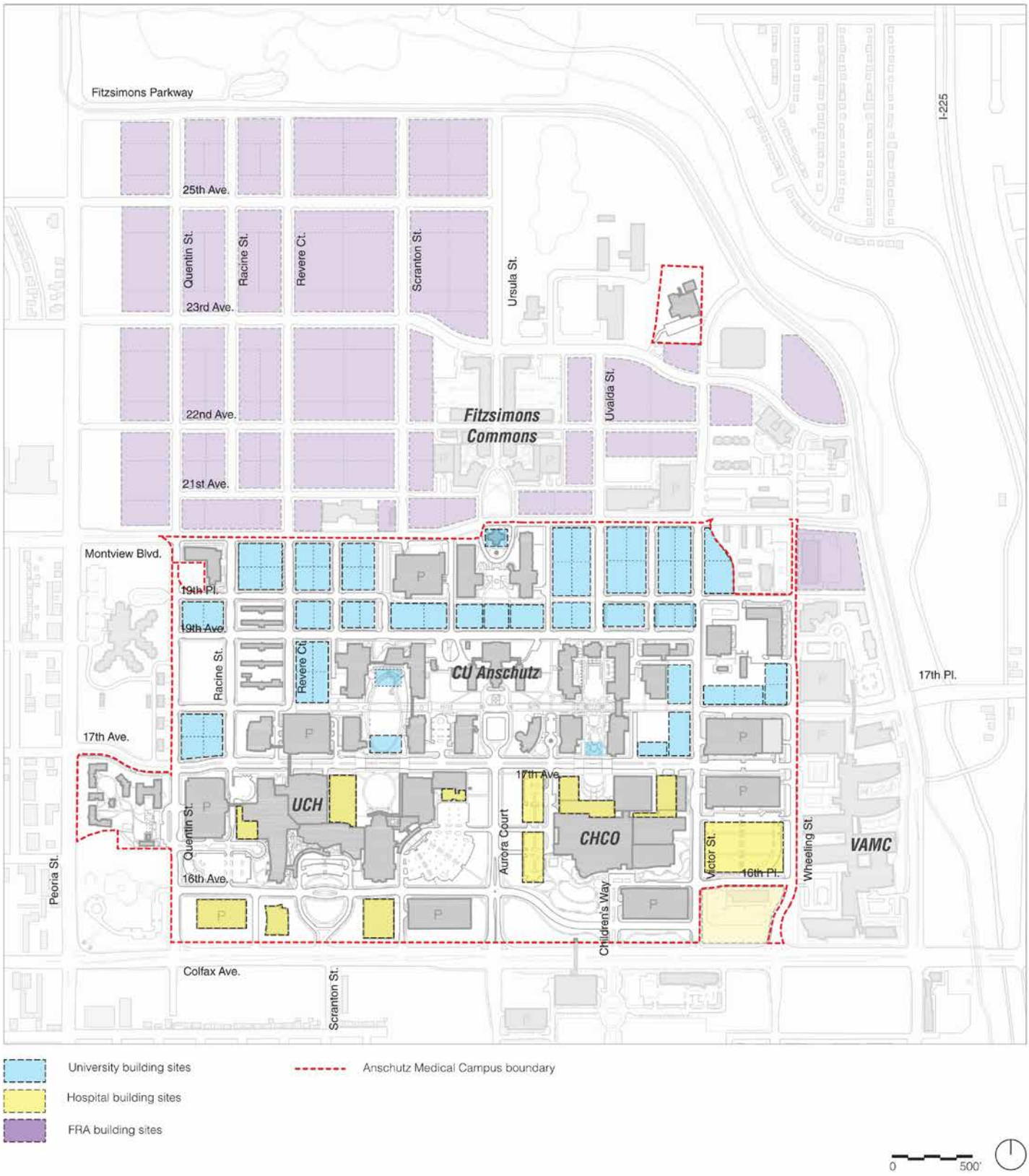


Figure V.4 - Potential Full Build-Out Sites

V.4 FLEXIBLE SITE DEVELOPMENT ELEMENTS

INTRODUCTION

During the planning process, the team looked at a variety of strategies to deal with the largely unknown nature of future development within the Anschutz Medical Campus. Actual growth on campus has varied from past planning; it has been slower than projected in areas like the FRA and faster than projected at, most notably, the hospitals. To allow for such unpredictability, the plan recommends a high degree of flexibility to accommodate the changing nature of health care, education, and research. In order to foster flexibility, fixed systems should be in place to support new projects as they come online. Thus, the master plan is broken down into "fixed" and "flexible" systems.

Fixed systems, which include roadways, pedestrian and bicycle accommodations, utilities, and significant public open spaces, comprise the bones of the campus. The fixed systems determine the layout of developable blocks (as shown in Figure V.4), upon which buildings or parking structures could develop in any number of ways to deftly accommodate shifting programmatic needs and funding sources.

This plan defines the flexible elements as those occurring within the buildings sites, including buildings, parking, individual project landscape and open space, and local storm water components. Future projects should be evaluated in accordance with site selection criteria provided in the Design and Development Guidelines. Program—the type of use that will occupy a particular space i.e. academic, clinical, retail—may not determine a project's form; each new development should be guided by the nature of its Character District to support flexibility, predictable organization, and memorable campus character.

FIXED INFRASTRUCTURE ELEMENTS:

- ***Roadways*** *(street sections including sidewalks; streetscape; tree lawns; parking, bike, and drive lanes)*
- ***Utilities*** *(in-ground utilities including water, sanitary, electrical, and steam/chilled water)*
- ***Storm Water*** *(both in-ground and surface conveyance, retention, and treatment)*
- ***Service Access*** *(building service access off tertiary streets)*

FLEXIBLE SITE ELEMENTS:

- ***Individual building sites*** *(street frontage, primary building entrances, setbacks, percentage site coverage, building height, and program)*
- ***Individual site landscapes*** *(paved areas and permeable landscape areas)*
- ***On-site parking***

Figure V.5 - Fixed Versus Flexible Development Area

This flexible strategy evolves from the goal of innovation that guided the facilities master plan. The campus entities have found that collaboration across institutions and fields drives innovation. This flexible future project site strategy is intended to encourage new buildings and parking facilities that support integration, collaboration, and convergence. This includes not only interdisciplinary programs, but also the integration of common spaces such as cafes and restaurants that facilitate informal collaboration that can lead to innovation.

INDIVIDUAL SITE LANDSCAPES

Public open spaces that help organize the campus are presented as fixed projects in Section V.5, but within each individual building site, open space is part of the flexible system. The Design and Development Guidelines offer direction on frontage, setbacks, and percentage of site coverage of permeable landscape in each Character District. How these guidelines are fulfilled, however, will vary substantially depending on specific programmatic drivers and site opportunities. Plazas, forecourts, and courtyards may all be incorporated depending on the proposed uses for the building, orientation, and connection to related parts of the campus. Environmental sustainability will be a consideration in the landscape design within individual sites, and incorporating best storm water management practices will help disperse the load on the storm water system. Solar orientation should be addressed to provide outdoor spaces that can be warmed by the sun in the winter and shaded during the warmest parts of the summer.

INDIVIDUAL BUILDING SITES

Future building sites are defined in relationship to the roadways. New buildings are encouraged to extend out to the edges of the site to help define the street and bring public ground-floor functions close to the sidewalk to reinforce the idea of a vibrant pedestrian environment. Primary building entrances and lobbies should face onto significant pedestrian streets and acknowledge programmatic desire lines that connect new buildings to existing facilities. Buildings within campus are expected to be in the four- to six-story range, which provides an efficient use of available land while keeping the construction cost below the high-rise code definition. Height exceptions outside this range will be studied by future design teams in conjunction with the client institution, recognizing that certain programs such as research may require structure greater than six stories in height. The programmatic use of the building will not be determined by traditional functional zoning, but more by logical programmatic adjacencies to existing facilities and parcel ownership. Future projects are increasing likely to be joint ventures among various campus stakeholders, capitalizing on opportunities for collaboration; a far greater mixture of uses is envisioned in the programming of all future developments.

Similar to future building needs, future parking can be accommodated within the armature of the roadway and utility networks. Flexible building sites can be used for parking lots and structures within the limitations illustrated in Figure V.5. These proposed limitations are intended to preserve the character and livability of the core campus by thoughtfully locating parking that is accessible without being intrusive.

A. Planned and Proposed Projects

This section contains a list of the specific anticipated new building projects and a brief description of each. Projected program needs and the infrastructure to support the buildings drive these projects.

BUILDING PROJECTS

Bioscience 2 Building

This project is intended to address space needs for Clinimmune and iC42, which are two bioscience incubator companies that currently lease space from the FRA, and the new Bioengineering Program that will have third- and fourth-year undergraduate students located at CU Anschutz. This 120,000 GSF building will likely house office, production laboratories, research, and expansion space for Clinimmune and iC42. Also located in this building will be bioengineering educational program spaces like classrooms, teaching labs, open labs, support spaces, and faculty offices. The building may have some additional space capacity for lease by other private third parties.

The existing Bioscience Park Center currently houses incubator companies like those that could occupy Bioscience 2.

Interdisciplinary Building Phase I

The new Interdisciplinary Building Phase I will address the immediate need for clinical faculty offices for those faculty members who are dedicated more than 50 percent to the university but also work at UCH or CHCO. Space will also be provided for the growing Biomedical Informatics program. A new data center will replace the small, obsolete server room in Building 500, a building originally commissioned in 1941. This new data center will provide the university with reliable, available, and maintainable computing services that are scalable to meet the increasing campus computing demand. The building will also house data center staff offices. To accommodate future expansion of the data center, additional space will be constructed adjacent to the main data center but used as office space until the expansion of the server room is needed.

The new data center will replace the existing 17-year-old, 500 ASF server room in Building 500. The existing server room is small, energy inefficient, and unreliable. The new data center will support four critical university activities: education, research, health care services, and administration functions. Using modern data center design standards such as TIA-942-A and ANSI/BICSI 002-2011, a well-designed and implemented data center will provide the engineered systems needed to create reliable and maintainable computing services for the campus-computing environment.

Colorado Translational Research Imaging Center (CTRIC)

CTRIC will house all animal and human research imaging equipment at CU Anschutz in a two-story structure of 48,000 GSF. Imaging is a critical area of research, clinical, and strategic growth for SOM and its programs. The continuing growth in demand and research applicability for this equipment requires additional space and can be better coordinated in a single site. The project will benefit research programs, researchers, and research subjects. This building structure will most likely serve as a transition and connection building between Research 2 and the future Interdisciplinary Building Phase 2.

Interdisciplinary Building Phase II

The campus anticipates research dollars will grow by $95 million over the 10-year master plan period. Once the research productivity metric has been met to better utilize the existing lab space on campus, new research labs will be needed to accommodate continued growth. This building would house various research efforts along with the required administrative support functions. Interdisciplinary Building Phase II is anticipated to be over 300,000 GSF to meet these needs and would be located to the west side of the existing Research 2 building. The current scheme would have the CTRIC building designed as a connector building between Research 2 and this Interdisciplinary Building Phase II. It is also anticipated that this building would have either a bridge or internal connection paths to UCH to help facilitate the ease of connection/collaboration between hospital and university researchers.

Education 3 Academic Building

This project will address the growing need for spaces that support the learning mission of the university. This building would be located near the existing Education Commons and would be four stories tall for a total GSF of 89,762. This project will address the growing need for a central simulation center for use by all schools, faculty offices for those members who are more than 50 percent dedicated to CU Anschutz, SOM teaching labs to accommodate a growing cohort size from 160 to 184 by FY 2017, and academic classrooms/service space to address the overall university student enrollment increase.

Vivarium Expansion (Underground)

It is estimated that the university will need an additional 27,342 GSF of vivarium expansion during the next 10 years. The space need is proposed as an expansion to existing below-grade facilities that would span the research quad space between Research 1 North and Research 2. A subsurface tunnel would be constructed along the proposed facility's south side to connect the Research 1 North and Research 2 vivariums. The existing basement-level connection to the future CTRIC imaging building would also be incorporated as a connector to this vivarium expansion.

Auxiliary Services Building

The University Police are currently located in Building 400, which serves their needs but is quickly becoming inadequate to meet the growing demand for their services. Building 400 has been remodeled multiple times to accommodate its occupants but will most likely become an obsolete building toward the end of this master plan. To better accommodate the University Police and Parking Services, space would be constructed along one or two sides of the new Parking Structure 2 facility or the existing Henderson Garage. This will allow vehicle parking and a central location for the police in updated facilities that are better designed to meet the protocol and functions required by modern police departments. Mechanical ventilation and other code requirements will need to be considered in the development of this project.

This structure is not anticipated until the end of the 10-year master plan period and is estimated to be 32,000 GSF to accommodate full future need.

The Interdisciplinary Building Phase 2 could be located on the west side of Research 2, a site that's currently a parking lot.

The vivarium expansion is slated to be designed underground, below the northern half of the Research Commons.

Interprofessional Commons

As the university experiences continued growth, space is needed to accommodate the students, faculty, and staff from a service standpoint. Most student services are currently located in Building 500 in smaller, discrete spaces. A new Interprofessional Commons would house the student bookstore; central food service; offices for student organizations; meeting spaces for students, faculty, and staff; and computer commons and study lounge space. It is anticipated that this building would be 80,000 GSF to be comparable to the university's peer institutions. To continue attracting top-tier students, the university needs to have amenities and facilities that meet or exceed those of other comparable institutions. It is anticipated that with future enrollment growth, this building will be required on the campus toward the end of the 10-year master plan period.

PROPOSED PARKING PROJECTS

This section contains two specific parking-related projects proposed for the 10-year planning period and a brief description of each.

Parking Structure 2

A new multi-level parking structure is planned to meet the on-campus parking deficit. Toward the end of the master plan period, it is estimated that a parking structure large enough to hold more than 1,500 vehicles will be needed. This parking structure would likely be designed in a similar style to the Henderson Parking Garage, which was constructed in 2007. The exact location is to be determined, and the selected site will dictate the number of floor levels needed.

Temporary Parking Lot (Uvalda Street and 22nd Avenue)

A temporary gravel lot on the northeast corner of Uvalda Street and 22nd Avenue with approximately 300 spaces will provide short-term parking flexibility.

Parking Structure 2 would likely be designed in a similar style to the Henderson Parking Garage.

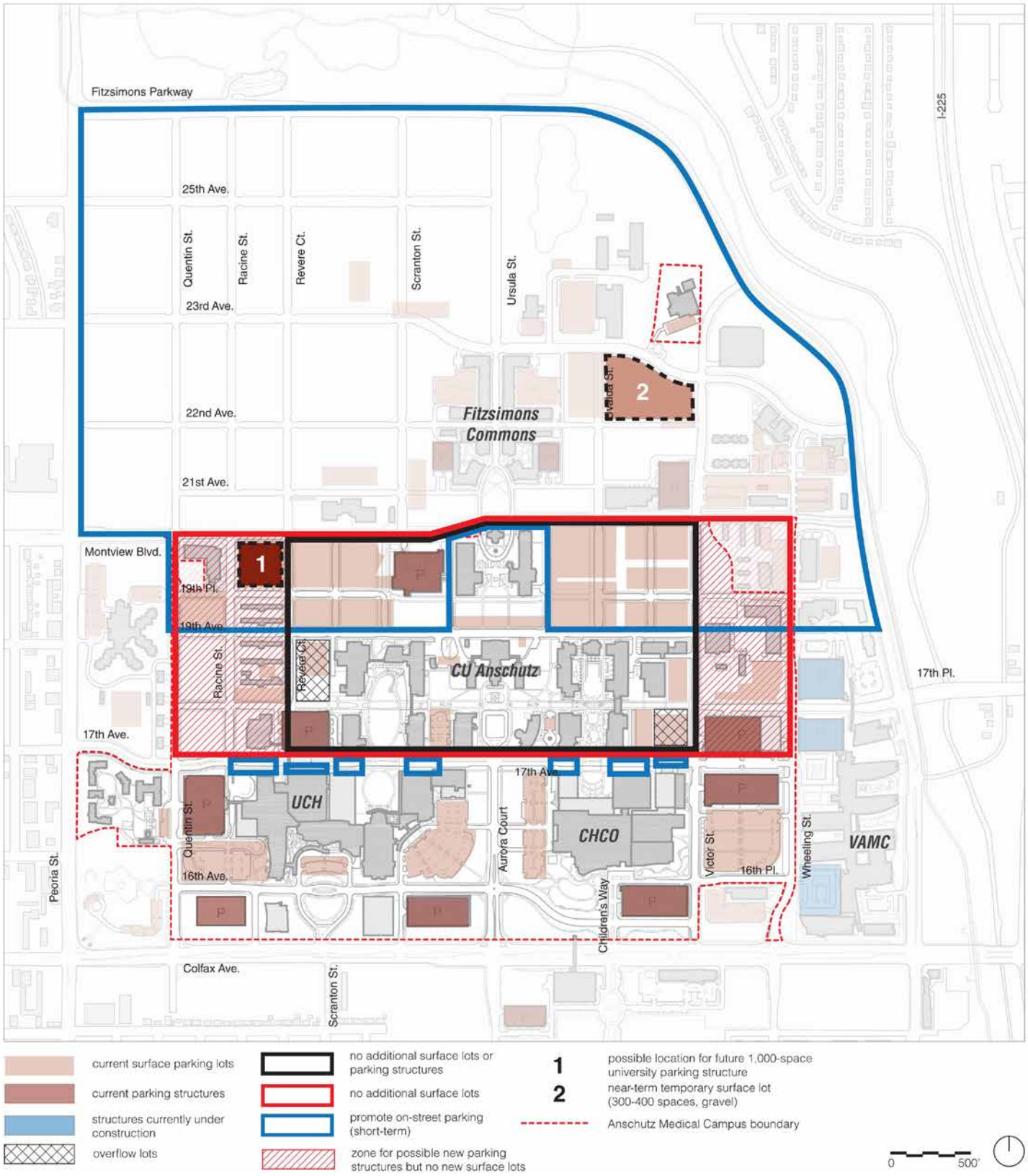


Figure V.6 - Parking Proposals

B. Parking

FUTURE PARKING DEMAND PROJECTIONS

The Anschutz Medical Campus is currently supported by a mix of structured parking garages and surface parking lots. UCH and CHCO have both added new garages within the last eight years and now provide a large percentage of their total parking inventory within these structures. CU Anschutz currently has only one garage (Henderson), with 1,540 spaces. This garage provides spaces for monthly permit holders and several hundred visitor stalls. The remaining parking inventory on the university campus is surface parking, with many of these lots located within the core area of the campus as indicated in Figure V.6.

As the campus develops, it is the university's intention to use existing surface parking lots as "land banks" for eventual development for new buildings including classrooms, research facilities, offices, etc. As this development occurs, much of the surface parking on the university campus will likely need to be replaced by garages, and should be moved outward toward the campus periphery in order to reduce the traffic impacts to the core campus. This relocation of parking will also encourage a higher density of university-related uses in the center of the campus and continue the trend toward a denser and more pedestrian-friendly environment. Garage sites at off-campus locations (such as the FRA site) may also be considered as a possibility, and would be developed in conjunction with a future shuttle system to make them more convenient for future student and employee permit holders.

To arrive at a campuswide projection of future parking needs, Walker Parking Consultants evaluated 10-year growth scenarios for the three campus entities: CU Anschutz, UCH, and CHCO.

Unlike other development types where parking demand can be calculated based on square footage, universities and hospitals tend to be highly variable in the amount of parking needed for each individual building. Instead, projections of future parking demand are calculated on a campuswide basis using a projection of future population growth for all user groups, including employees, patients, and visitors.

Specific 10-year population growth projections were evaluated for the university based on assumptions provided for the CU Anschutz campus. For the two hospitals, Walker evaluated findings from two prior parking demand studies that were completed in 2009 for CHCO and in 2010 for UCH.

Figure V.7 shows a summary of the projected parking demand for each entity based on these 10-year projections.

It is assumed that UCH will be adding a second visitor parking garage to their campus at some point over the next 10 years to address projected deficits. The existing patient/visitor garage at UCH is roughly 600 spaces. It is assumed that the second visitor garage would be developed at roughly the same size, in the southeast corner of campus.

CHCO also has the ability to add more parking spaces by expanding their newest employee parking garage. However, based on Walker's earlier analysis (from 2009) this need is not likely to occur prior to 2022 unless bed capacity is increased at a faster rate than previously assumed. In the interim, some excess capacity may be available at CHCO and could be leased (on a short-term basis) to other entities such as the university and/or the future VA Medical Center.

For CU Anschutz, no new structured or surface parking facilities are anticipated for the central area of campus. This central area is defined as the blocks located between 17th Avenue and Montview Boulevard and between Revere Street and Victor Street, as indicated in Figure V.6. In keeping with the objective for increased campus density, the university is considering adding future garages, but garages are preferred on blocks located just outside the central area.

In addition, the master plan assumes the addition of roughly 240 on-street metered parking spaces along many of the core streets at CU Anschutz, with an emphasis on street parking along 17th Avenue. Building footprints shown on the master plan are expected to displace roughly 130 surface parking spaces.

To address the 10-year growth projections for CU Anschutz, the university is now evaluating several sites as possible options for new surface and structured parking. These sites include:

- A temporary surface lot of approximately 300 spaces east of Uvalda Street and north of 22nd Avenue
- A new three- or four-bay garage south of Montview Boulevard between Racine Street and Revere Street

Projected Campuswide Parking Needs (10-Year Plan)
Anschutz Medical Campus
May 2013

Institution	*Estimated Spaces*	*Current Recommended Spaces*	*Current Surplus/ Deficit*	*Estimated 10-Year Demand*	*Projected Surplus/ Deficit*	*Assumption*
CU Anschutz	5,110	4,980	130	6,400	-1,290	(1)
University of Colorado Hospital	5,230	3,940	1,290	6,000	-770	(2)
Children's Hospital Colorado	4,390	3,580	810	3,800	590	(2)
Total	14,730	12,500	2,230	16,200	-1,470	

(1) Future demand for CU Anschutz per growth analysis.
(2) Projections updated based on previous parking needs studies completed for these campuses. CHCO assumes added growth from 100 new beds in 10-year period (per Walker report from July 2009). UCH growth projections per February 2010 report.

Figure V.7 - Projected Campuswide Parking Needs (10-Year Plan)

The two new facilities combined are expected to add between 1,200 and 1,300 net new parking spaces to the CU Anschutz campus and help address the projected 10-year needs. Other off-site alternatives, including lease arrangements, are still being considered as possible opportunities for shared-use parking to address the 10-year and longer-term parking needs.

A summary of the projected 10-year parking supply and demand for the campuswide area can be seen in Figure V.8.

Altogether, the campuswide projections show a small surplus of parking, though most of the projected excess capacity is in the CHCO employee garages.

Over the next 10 years, it is envisioned that the TMA could take on an increased role in helping to manage permit parkers who are assigned to various garages and also to help form agreements between entities to help make the best use of facilities that have surplus parking available.

CHCO does not need the additional capacity immediately, and it is envisioned that the TMA could be a net benefit to all three institutions as it would provide some flexibility to each institution in terms of when and how much additional parking infrastructure must be built on site.

10-Year Campus Parking Needs with New Development
Anschutz Medical Campus
May 2013

Institution	*Estimated Spaces*	*Current Recommended Spaces*	*Current Surplus/ Deficit*	*Estimated 10-Year Demand*	*Projected Surplus/ Deficit*	*Assumption*
CU Anschutz	**5,110**	**4,890**	**130**	**6,400**	**-1,290**	
Parking Displaced by Buildings	-130				-130	(1)
On-Street Spaces Core Campus	240				240	(2)
Proposed CU Anschutz Garage	1,000				1,000	(5)
Temporary Surface Lot	300				300	
Subtotal CU Anschutz					120	
University of Colorado Hospital	**5,230**	**3,940**	**1,290**	**6,000**	**-770**	
Possible Future Visitor Garage	600				600	(3)
Subtotal UCH					-170	
Children's Hospital Colorado	**4,390**	**3,580**	**810**	**3,800**	**590**	**(4)**
Subtotal CHCO					590	
Total	16,740	12,500	2,230	16,200	540	

(1) Projected displacement from possible 10-year building sites. Future development may displace all or some of the Ignacio lot and Cheyenne Wells lot. Julesburg lot and Purgatory lot are also possible sites for the 10-year plan.
(2) Additional street spaces added to the academic campus core
(3) We assume the development of a second 600-space visitor parking garage at UCH to address projected deficits for this campus.
(4) CHCO is not projected to need additional parking capacity prior to 2022. It is assumed that under the TMA, CHCO may be willing to lease parking back to the other entities for overflow employee needs.
(5) This analysis assumes the development of a new garage that will add roughly 1,000 additional spaces.

Figure V.8 - Projected Campus-Wide Parking Needs with New Development

Currently, a few on-street parking spaces exist in front of the Leprino Building.

FUTURE PARKING DEVELOPMENT FRAMING CONCEPTS

Based on Walker's analysis of parking needs and input received from Anschutz Medical Campus stakeholders, the following core concepts should be applied to future parking management and development scenarios.

- The TMA may take on an increased role in coordinating parking resources across the site. The TMA would be involved in the implementation and management of a shuttle system to allow for the utilization of light rail and possible future off-site parking, and provide better access to existing resources throughout the campus.
- Staff, student, faculty, and visitor parking should be provided using a zone-based pricing system. Fees for remote parking and commuter surface lots will be set lower than lots and garages near the center of the campus. Pricing zones should be established to provide an incentive to use remote parking alternatives as well as the light rail. Pay parking is assumed for all parking facilities so as to avoid the precedent that any campus or Site-Wide parking is free of charge.
- Future development efforts should promote on-street parking from 19th Avenue north into FRA. On-street and visitor parking should be managed in a way to promote turnover (using time limits and/or graduated fees) to ensure that these spaces are not occupied by long-term parkers.
- 2022 projections suggest that no new parking structures should be built on the CHCO campus or the central area university campus.
- One new parking garage is proposed for CU Anschutz for the 10-year master plan period.
- Management agreements to lease spaces from CHCO or other possible policy changes may be options to address any remaining deficits.
- Additional projected parking needs for CU Anschutz can be addressed through the addition of on-street parking spaces and a temporary lot of approximately 300 spaces.

CU ANSCHUTZ GOALS FOR THE 10-YEAR MASTER PLAN

For the 10-year master plan, the university should focus on the following recommendations to address the projected need for parking:

- Develop a new temporary surface parking lot east of Uvalda Street to provide some short-term flexibility.
- Address the projected 10-year parking deficit of roughly 1,290 spaces by developing a new parking garage at a site to be determined south of Montview Boulevard and outside of the campus core area.
- Participate with other Anschutz Medical Campus entities in the TMA in order to promote shuttle service, parking lease agreements between entities, transit alternatives, and demand management strategies such as zone-based pricing.
- For the mid-range, leverage the TMA to look at other campuswide alternatives for shared parking such as future off-site resources at FRA, CoA, and RTD Park-n-Ride locations.

This aerial view looking north-northwest shows potential for campus north-south connectivity.

V.5 FIXED CAMPUSWIDE SYSTEMS

The fixed campuswide systems provide an armature of infrastructure that will support a wide variety of possible future development scenarios. The fixed systems will not all be built on day one, but they are designed to come online as demand warrants. The campus's planning to this point has relied heavily on the superblock structure, which has few through roads. Blocks sized to be consistent with the surrounding urban fabric will be a prime organizing system moving forward, and this makes the roadways the most critical fixed system within the Site-Wide area. Other fixed systems, including utilities and service access, work within the roadways framework to enhance connectivity of those systems between the three campus institutions.

The fixed systems support two of the primary goals for the master plan: connectivity and stewardship. The plan addresses increased physical connectivity through pedestrian, bicycle, vehicle, and transit systems, as well as virtual connectivity by incorporating future information technology systems. The master plan strives to create stronger physical connections among the three Anschutz Medical Campus institutions. The circulation systems are also intended to reduce transportation energy use by improving public transit and human-powered transportation options, which support the goal of stewardship. Good stewardship is also reflected in the importance of the campus's impact on the natural storm water system.

A. Circulation

The ability to deliver the staff, patients, visitors, and students to the Anschutz Medical Campus and Site-Wide area is critical to success. Ongoing urban planning of the campus should continue to integrate transportation management and improvements as growth continues. The goal of the campus transportation system is to provide service to all users. This is realized in part via visual cues for users upon entering the campus but also via an integrated multi-modal system for all user types. Balancing the needs of each mode is essential in serving the travel demand anticipated from the campus. With this balance comes an understanding that each mode is faced with opportunities and constraints, all of which need to be integrated into a relatively confined area given the level of travel demand.

The proposed transportation elements are provided in this chapter of the master plan report. Included are the roadways system for build-out; the 10-year implementation plan to 2022 is provided in the subsequent chapter. In addition, regional transit, bicycle, and pedestrian plans are all presented. Various other planning and design efforts are currently taking place related to the impending light rail design and construction, and the results and decisions that come from these could affect the transportation plans presented herein. Subsequent master planning phases of the campus should review the transportation components presented here and update as appropriate.

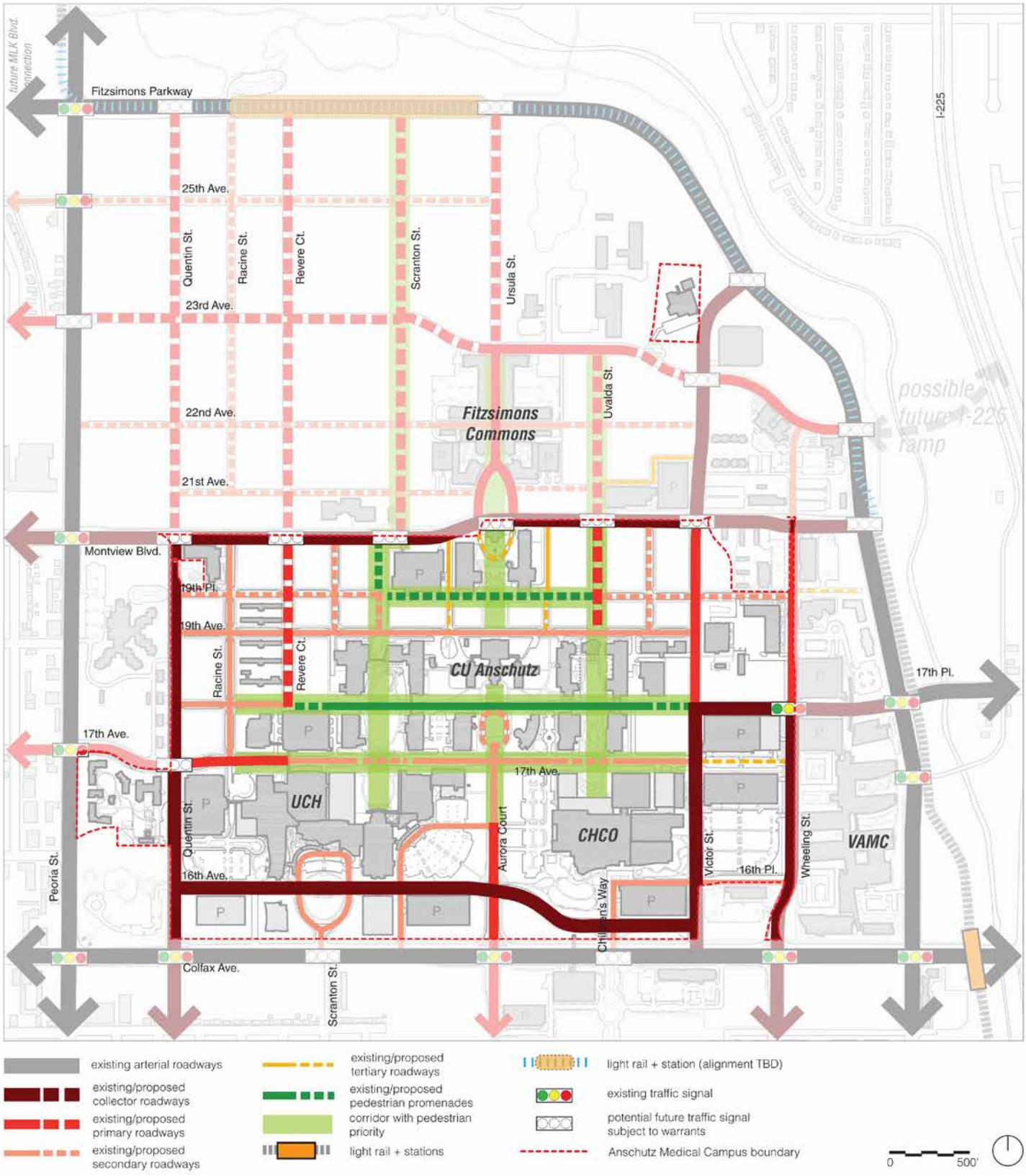


Figure V.9 - Proposed Roadway Network

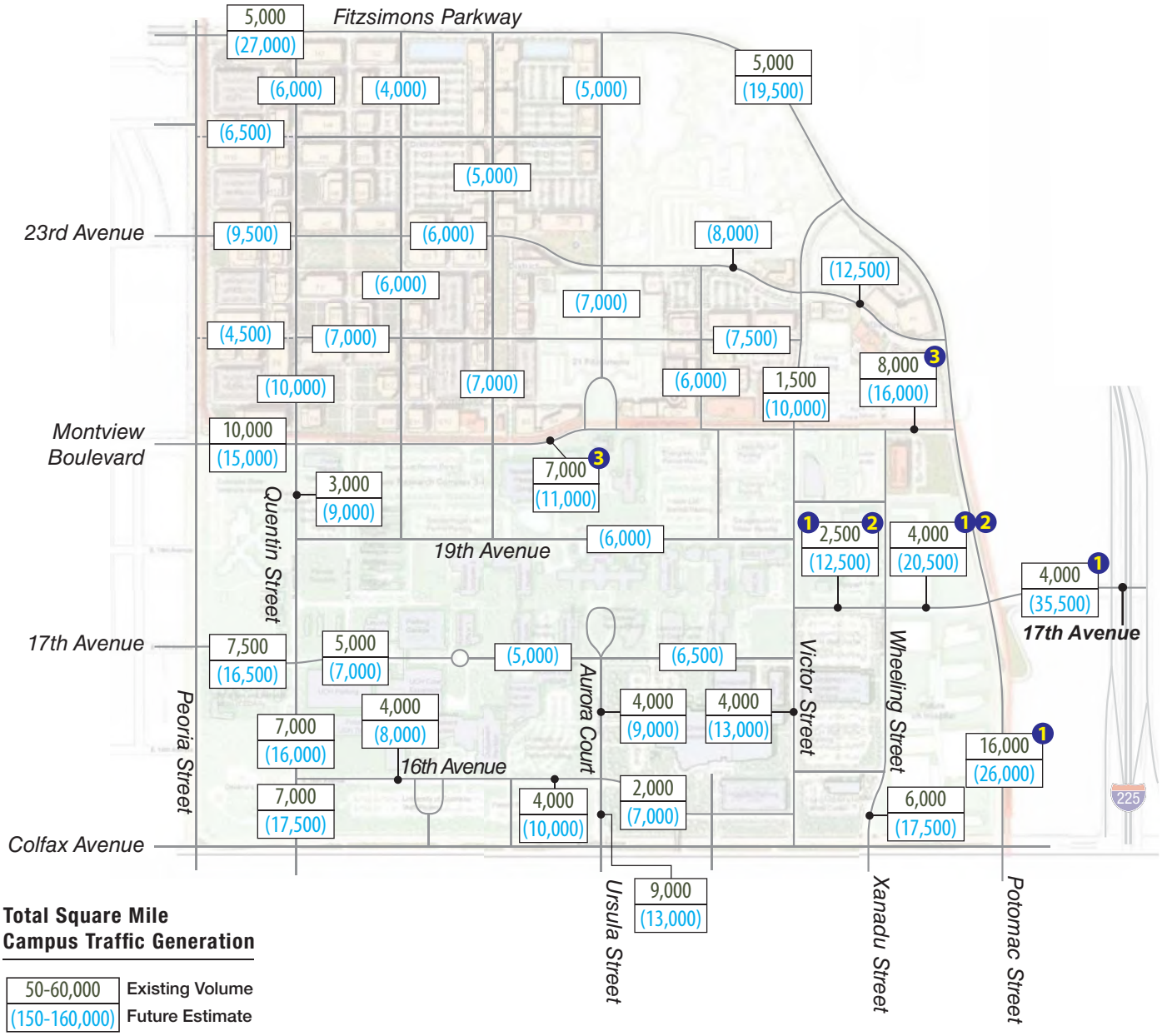
ROADWAY PLAN

The proposed roadway network illustrated in Figure V.9 shows both the campus road network and how it connects to the surrounding area. The network was developed based on designs from previous planning efforts, stakeholder input, and urban design concepts that promote connectivity, ease of navigation, and comfort for all modes on a local and regional level. Critical design issues in establishing the street layout were to connect to the city grid at the edges where possible and to increase connectivity to the north to integrate the university and the developing FRA over time. The size of blocks created by the streets create an accessible pedestrian scale while framing viable future development sites. It is upon this network that traffic forecasts were modeled in order to test projected operations. Analysis of future traffic forecasts and operations are presented in the subsequent two sections.

The network features a hierarchy of street classification types that define each roadway's functionality and character. These classifications facilitate the design of the roadway, which influences how and when a roadway is used. These factors help determine the volume of traffic and trip types (pass-through or local access) that use a roadway. Roadways are defined as being either arterial, collector, primary, secondary, or tertiary roadways or pedestrian promenades. Arterials carry the largest amount of traffic among these classifications by providing regional connectivity with higher capacities and speeds. Collectors bring traffic to/from arterials and clusters of land uses. The remaining classifications cater to localized traffic within the campus, and primary roadways are designed to carry more vehicles than secondary and tertiary roads. To summarize, higher classifications focus on moving a large number of vehicles for longer distances while lower classifications focus on access to land uses and accommodating a mix of travel modes.

The perimeter roadways of Colfax Avenue, Peoria Street, and Fitzsimons Parkway represent the arterial system for the campus. The central core area between 17th and 19th Avenues, namely 17th Place, will remain exclusive to pedestrian activity. Flanking this area are north-south collector roadways (Quentin and Victor Streets) that span the entire campus from Colfax Avenue to Fitzsimons Parkway. Other collector roads include portions of 16th Avenue, Wheeling Street, and 17th Place. North of the core exists a typical city block system of streets comprised of primary and secondary roadways.

The most notable differences in the roadway plan compared to previous transportation plans include the proposal to establish of 17th Avenue as a main street for the Anschutz Medical Campus. The roadway can be opened to a careful and safe balance of vehicular traffic and on-street parking, which will coexist within a primarily pedestrian- and bicycle-friendly environment. This new "translational corridor" will form the primary gathering space for the exchange of knowledge, ideas, goods, and services. It is envisioned to be a connected ribbon of mixed-use development between the academic and patient districts, encouraging and facilitating the migration of expertise, researching findings, and clinical knowledge between institutions and across disciplines.



XX,XXX — existing volume

(XX,XXX) — future estimated volume

1 — prior to full opening of 17th Place interchange

2 — count reflects time prior to 17th Place closure through VAMC

3 — reflects closure of 17th Place through the VAMC

Figure V.10 - Existing and Estimated Future Daily Traffic Volume on Site-Wide Roadways

TRAFFIC FORECASTS

A traffic forecasting model was developed using the roadway network presented in the previous section, and it takes into consideration all future land uses planned for the campus. Land-use quantities were translated into traffic demands through a series of trip-making assumptions and parameters using TRAFFIX software. The model shows that 22.5 million square feet of development (at full Site-Wide area build-out) would generate approximately 152,000 external trips per day (as compared to the 50,000 to 60,000 that occur today); approximately 70 percent of the trips generated by users within the Site-Wide area would be associated with development south of Montview Boulevard. To further analyze the impacts of this increase in trips made, the model applied the generated trips to the proposed roadway network by utilizing parameters such as speed, number of lanes, and connectivity that are set by each roadway's classification.

Figure V.10 shows the daily traffic projections based on the roadway network previously shown,excluding minor secondary and tertiary roadways. The diagram also shows existing daily traffic where such data are available (or where peak hour traffic data are available and daily traffic inferences applied). Traffic demands are anticipated to increase along all campus roadways. Noteworthy levels of traffic include:

- Montview Boulevard, which will serve 11,000 to 15,000 vehicles per day
- 17th Avenue between Quentin Street and Victor Street, which will serve 5,000 to 7,000 vehicles per day
- 17th Place connecting to Interstate 225, which will serve 35,500 vehicles per day
- Victor Street south of 17th Place, which could serve 13,000 vehicles per day. This roadway currently experiences significant pedestrian crossing activity between the parking areas and CHCO, and the increase in traffic along this roadway is noteworthy. Potentially, this roadway would benefit from a "road diet" in which four through lanes of traffic would be converted into three lanes comprised of one through lane and a continuous center left-turn lane.

A model run with 10-year development levels suggests that the roadways south of and including Montview Boulevard could reach 60 to 80 percent of the build-out traffic projection, which suggests that these areas are where improvements should first be considered. The section of Quentin Street between 16th Avenue and 17th Avenue is currently in design for widening by UCH.

The 17th Place connection to I-225 (shown here under construction) will serve 35,500 vehicles per day.

Figure V.11 - Existing and Estimated Levels of Service at Site-Wide Intersections

TRAFFIC OPERATIONS

Making use of the traffic projections by applying them to the roadway network and its intersections, peak hour intersection levels of service (LOS) were calculated at key intersections to assess functionality and needs to achieve that level of functionality. LOS is a qualitative measure based on the average delay per vehicle at a controlled intersection. LOS are described by a letter ranging from "A" to "F." LOS A represents minimal delay, while LOS F represents excessive congestion and delay. The signalized intersection analysis reports an LOS rating for the entire intersection while the unsignalized analysis reports an LOS for each movement through the intersection. For this analysis, the LOS was calculated through a summation of critical movements at each intersection, a procedure appropriate for a planning-level assessment of operations. Typically, an LOS D or better is preferred at the busiest traffic hours of the day, but it is also recognized that there may be traffic operations around the campus that will not meet this criterion.

The resulting LOS (as well as existing LOS at intersections where data were available) are presented in Figure V.11, and these reflect needed improvements that are generally highlighted in the same figure; an explanation of high-priority improvements is provided on page V.37, Proposed Roadway Projects.

Figure V.9 shows potential signalized intersections as well as the proposed roadway network. New signal locations have been identified based on the potential of that intersection to eventually warrant signalization upon build-out of the site. This is determined through the application of future traffic forecasts to the roadway network and its intersections. Actual installation of a signal will be dependent upon each intersection's satisfaction of technical warrants, based in part on whether it meets certain traffic volume criteria.

The busy intersection of Colfax Avenue and Potomac Street/ Fitzsimons Parkway is expected to maintain an '"F" level of service.

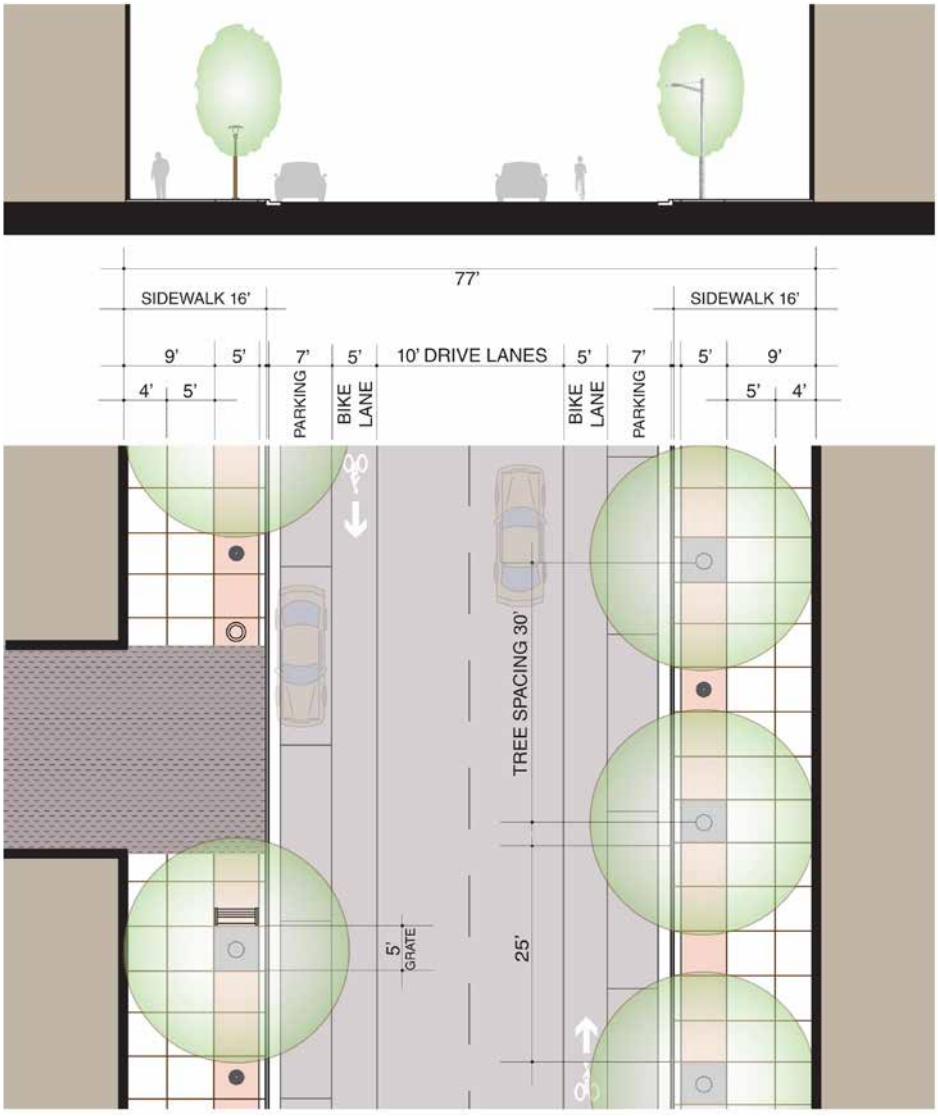
The southbound approach to this intersection at 16th Avenue and Aurora Court will require widening.

Seventeenth Place between Wheeling Street and Fitzsimons Parkway will need to be widened to accommodate five lanes of traffic.

STREET SECTIONS

The increased emphasis on the importance of the street grid as public realm in the master plan drives the enormous importance of improving the existing streets and defining the nature of future roadways to accommodate multi-modal transit alongside a friendly and active pedestrian environment. This master plan includes the following proposed street character diagrams, and further detail of street treatment is included in the Design and Development Guidelines. The street sections are intended to be consistent with FRA standards to promote a sense of unification across Montview Boulevard. On-street parking not only provides convenience parking for visitors but also helps to emphasize the pedestrian nature of the streets both by buffering the sidewalk and slowing vehicle speeds as drivers will enter and exit their cars. The bike network is also reflected in the street typologies, with dedicated lanes on most of the major campus bike routes.

Campuswide street design will promote connectivity and provide a unifying framework throughout the campus. Consistent street character will create rhythm and visual impact, highlight areas of significance, and tie all four Character Districts together to form a comprehensive whole.



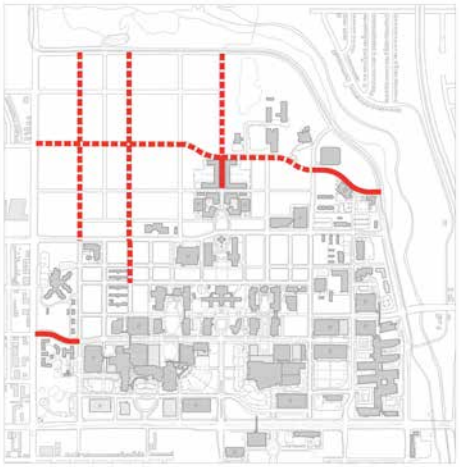


Figure V.12 - Primary Street Section and Key Plan

Primary and Secondary Streets

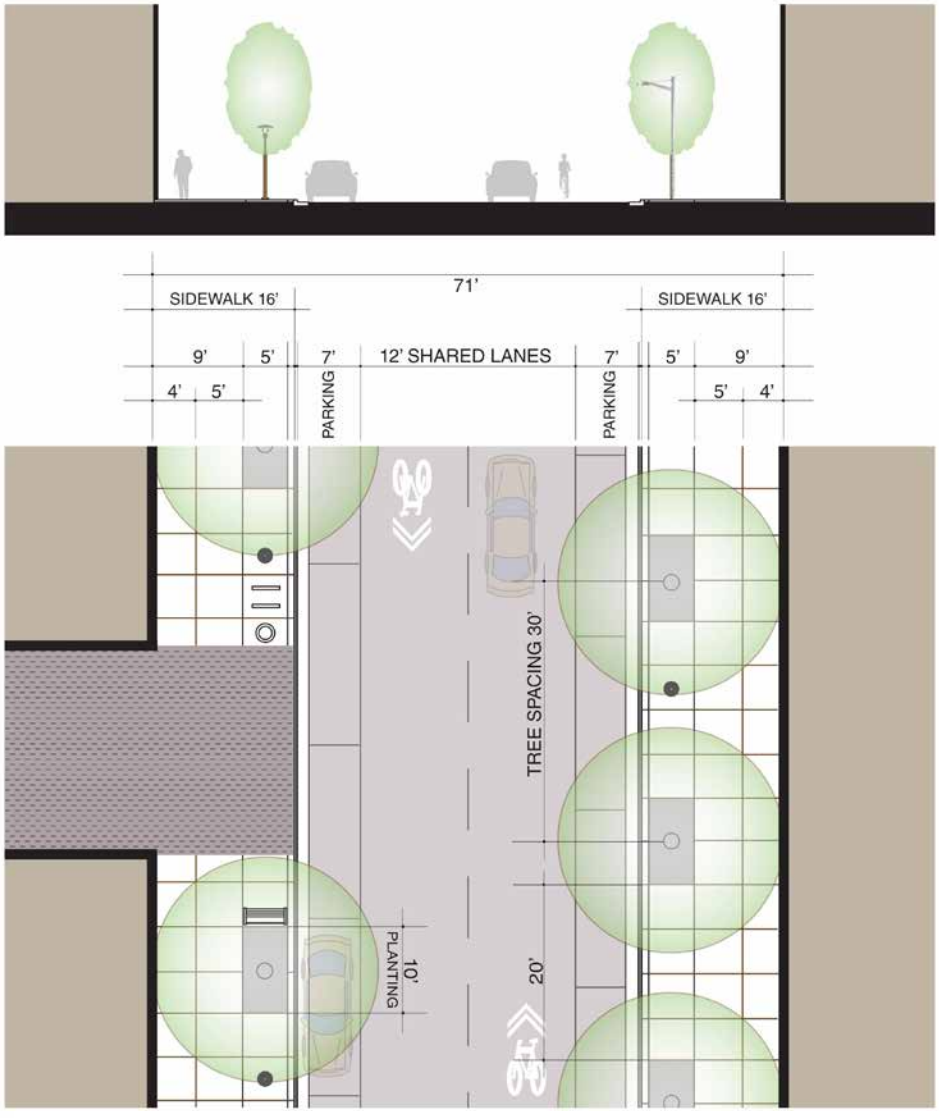
These streets are the primary vehicular pathways throughout the site and provide the major organizational framework for the Urban Campus environment. They provide on-street parking and include dedicated bike lanes in some instances.

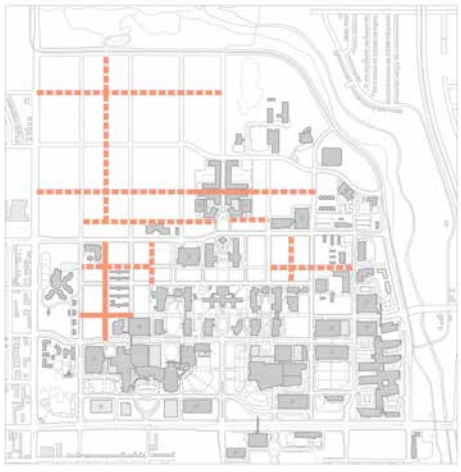
Road widths should be minimized to encourage reduced speeds while not sacrificing vehicular or pedestrian safety. Traffic speeds should not exceed 15 mph.

Traffic calming methods should be designed at regular intervals along minor roads, including clearly marked crosswalks, varying paving surfaces near high-use pedestrian areas, neckdowns, and roadside landscaping. These traffic calming methods should be balanced by the need for efficient transportation movement and other issues such as efficient plowing in the winter and long-term maintenance of the campus road system.

Roadbeds should be separated from pedestrian paths by concrete curbs and elevation changes.

Figure V.13 - Secondary Street Section and Key Plan





Tertiary Way

A tertiary way is defined as any street that functions as a commercial service drive. Service roads should be separated from pedestrian travel.

Appropriate service access should be accommodated in the design of all new campus buildings. Service access should typically be consolidated to only one location for each building.

The sights, sounds, and possible smells of the service area location should be minimized from pedestrian pathways through the use of landscaping, topography, or other visual barriers.

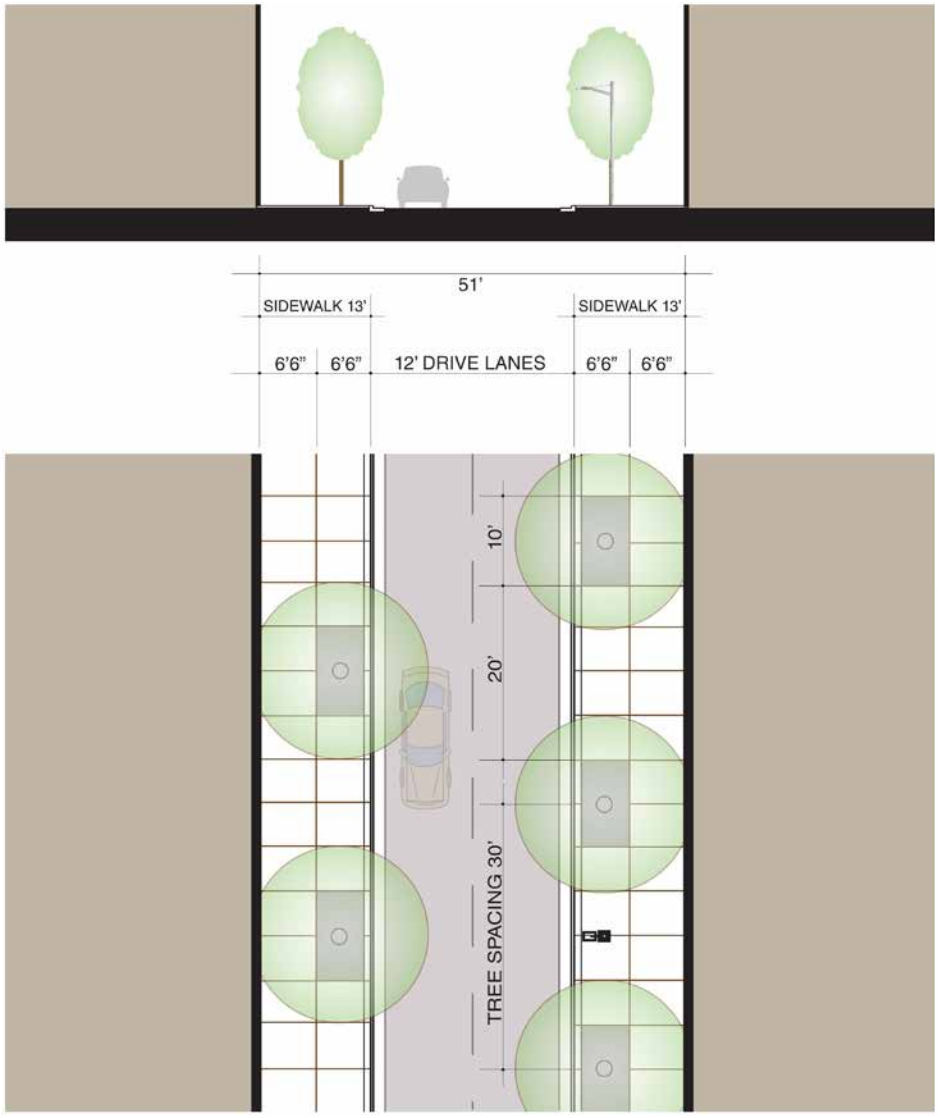


Figure V.14 - Tertiary Street Section and Key Plan

PROPOSED ROADWAY PROJECTS

The following reflect the 10-year improvements that should be pursued in support of the proposed build-out of the Anschutz Medical Campus:

- Seventeenth Place between Wheeling Street and Fitzsimons Parkway will need to be widened to accommodate five lanes of traffic. Associated with this is the need to add lanes along all approaches to the 17th Place/Wheeling Street intersection given the level of parking to be provided in that general vicinity. This is currently under construction as part of the VA Medical Center plan.
- Peoria Street and Colfax Avenue, being the intersection of two major arterial roads, should be widened out to the extent possible and include dual left-turn lanes along all approaches and separate right-turn lanes along all approaches.
- Aurora Court should be widened slightly along its southbound approach to 16th Avenue. The opening of 17th Avenue will place additional traffic along Aurora Court, and its intersection with 16th Avenue will require two southbound lanes into the intersection.
- Explore the potential for a "road diet" along Victor Street, given the significant increase in traffic projected and the fact that there are numerous driveways serving heavy traffic–generating uses (such as parking structures). The "road diet" would consist of converting four through lanes of traffic (two in each direction) to three lanes, where the center lane is a continuous dedicated turn lane. This allows left-turning vehicles to make use of a harbor area without interfering with through traffic. This would also benefit pedestrians crossing the street, as they would then only need to cross three lanes of traffic rather than four. This action would likely improve the safety of the roadway, and projected traffic volumes would not exceed the capacity of a three-lane section.

Montview Boulevard, a collector roadway, is in need of improvement for both vehicle and pedestrian access. As a CoA street, Montview Boulevard's improvements will be up to the city or the Metropolitan District to implement. Recommended improvements along Montview Boulevard include widening the street between Quentin Street and Victor Street so that there is one through lane in each direction plus a dedicated center left turn lane. East and west of this central section, additional turn lanes should be considered to improve the performance of the intersections at Peoria Street on the west and Fitzsimons Parkway on the east. Another issue to be considered is softening the jog in Montview Boulevard between Scranton and Ursula Streets. The intersections along Montview Boulevard should have traffic signals added in the future as warranted. In the interim, pedestrian-activated traffic control should be considered at critical crossings to promote easy pedestrian access between the university and the FRA. Sidewalk improvements similar to those described in the design guidelines would be an asset to both the north and south sides of the boulevard.

Other improvements recognized in Figure V.9 include widening Colfax Avenue over Toll Gate Creek, widening Peoria Street over Sand Creek, widening Victor Street north of Montview Boulevard, and the eventual connection of Martin Luther King Boulevard from Stapleton to the Fitzsimons Parkway/Peoria Street intersection. The figure also shows resulting intersection levels of service (LOS) given the building traffic demands and the recommended improvements described. Existing LOS are also provided as point of reference and comparison (to reflect existing traffic levels and existing intersection lane geometries).

The travel demand modeling results for the 10-year time period suggest that roadways south of Montview Boulevard could reach the 60 to 80 percent range of their build-out load projections shown in Figure V.10. As such, the 10-year plan should incorporate pursuit of all improvements shown for the Site-Wide area south of and inclusive of Montview Boulevard, some perhaps to be completed in phases as conditions allow.

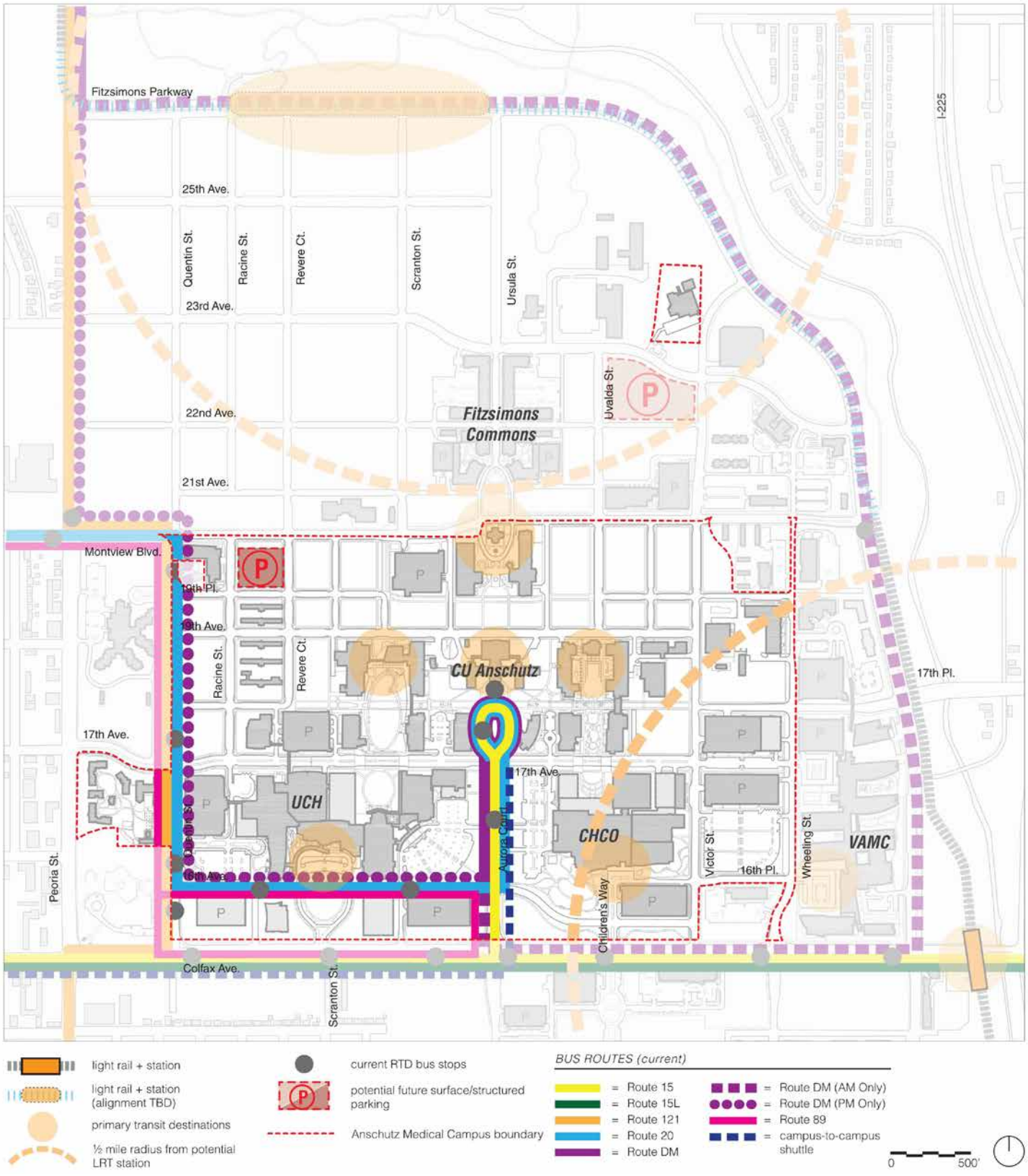


Figure V.15 - Transit Planning Diagram

TRANSIT

The planned light rail line serves as a cornerstone for transit service. The RTD routes will be subject to future planning, and RTD staff will restructure their bus service plan in conjunction with the light rail service. Two light rail stations are planned to serve the Anschutz Medical Campus, one to be elevated over Colfax Avenue just east of Fitzsimons Parkway and the other to be located along Fitzsimons Parkway between Racine Street and Scranton Street. At this time, RTD has indicated a desire to connect bus routes with the light rail stations and the campus core in an efficient manner making use of appropriate roadways. Further discussion and planning will be needed to identify the most appropriate bus routing that meets the desires and needs of the Site-Wide partners.

When operational, light rail transit will be a cornerstone of campus-related transportation. CU Anschutz, UCH, and CHCO all understand the benefits of linking light rail to the campus via shuttles. Once the exact route and stations are defined, the institutions will partner with Site-Wide constituents, the CoA, and RTD to plan, develop, and cost-share a shuttle system that benefits all.

The traffic situation on the Anschutz Medical Campus will improve if ridership on public transportation is increased.

PROPOSED TRANSIT PROJECTS

RTD FasTracks I-225 rail line, projected to begin light rail transit (LRT) service in 2016, will run along the eastern and northern perimeter of the Site-Wide area. The Anschutz Medical Campus will be served by two proposed stations, one on Colfax Avenue and another on Fitzsimons Parkway. However, at the time of this writing, RTD had not finalized its design or alignment of the I-225 corridor.

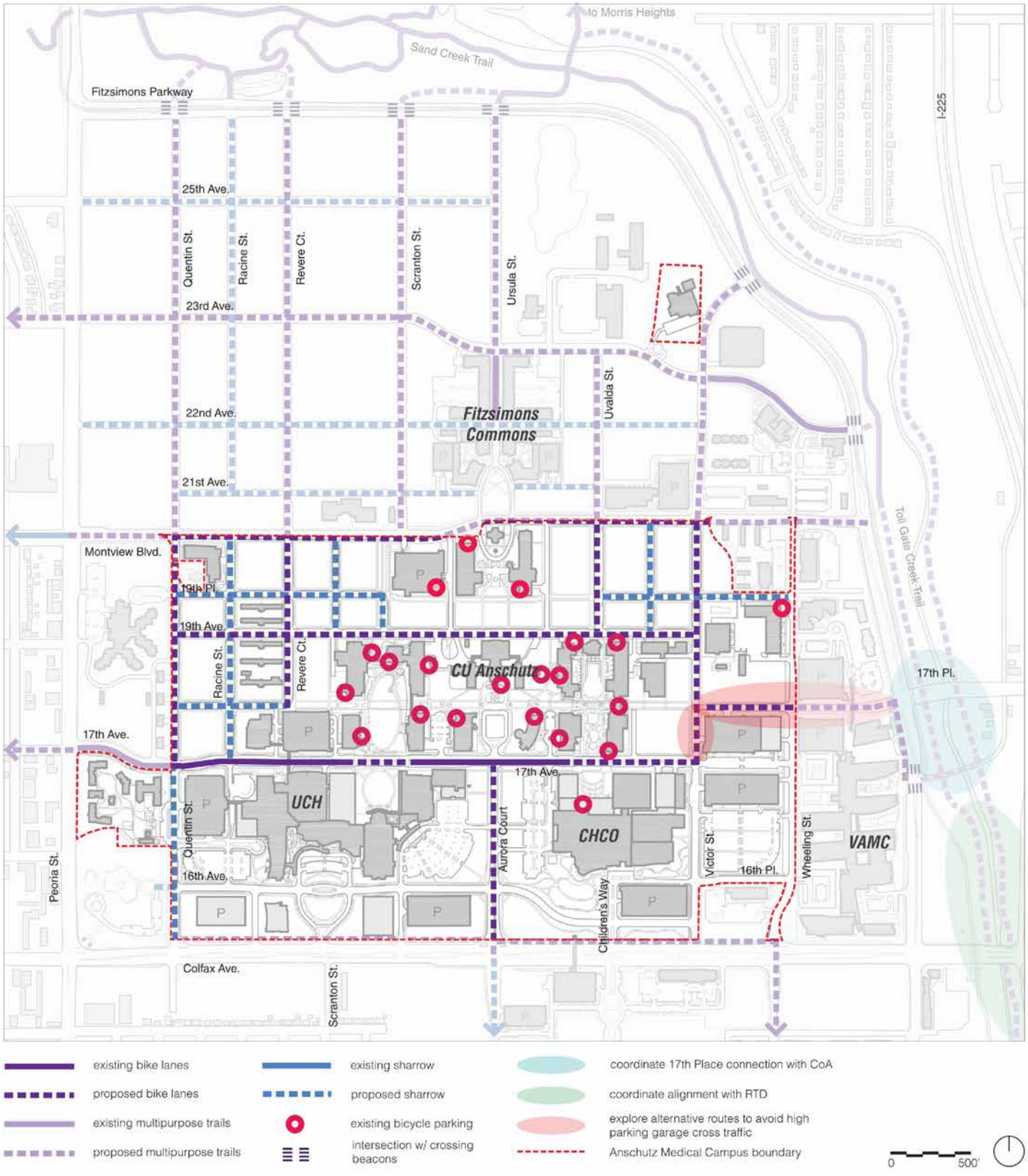


Figure V.16 - Proposed Bicycle Network

BICYCLES

A campuswide plan for major bikeways is shown in Figure V.16. The plan is characterized by the goal to provide dedicated connections to CoA bicycle facilities along the perimeter of the campus at 17th Avenue, Montview Boulevard, to the Sand Creek and Toll Gate Creek Trails System to the north and east, and to Ursula Street and Xanadu Street to the south. All new roadways and renovated roadways will provide bicycle accommodation. Designated bicycle facilities are proposed within the campus along Quentin Street, 17th Avenue, 19th Avenue, 23rd Avenue, and Victor Street. In addition, sections of Ursula Street, Aurora Court, Scranton Street, and 17th Place are identified as providing accommodations for bicycling.

Future studies will need to explore several bicycle accommodation issues. One issue entails connectivity to the Toll Gate Creek Trail at 17th Place. Two concerns are yet to be assessed with this issue, one being the potential to connect to Toll Gate Creek from the 17th Place/Fitzsimons Parkway intersection. Potentially, Potomac Street (which extends north to the mobile home park between Toll Gate Creek and I-225) could be utilized in accessing the Toll Gate Creek Trail.

The second concern regarding this issue relates to the pending construction of 17th Place east of Wheeling Street. As part of the VA construction, 17th Place is not planned to be equipped with bicycle lanes. The addition of this amenity at this point could be problematic as it relates to the planned construction. This bicycle link may not be easily implemented given development plans under construction. However, this master plan recommends a bike lane on 17th Place east of Victor Street. Recognizing the difficulty of implementation, this facility would provide an integral connection to Toll Gate Creek Trail that would be otherwise absent from the southeast quadrant of the Site-Wide area.

A bicycle facility is shown along Colfax Avenue and is intended to be a separate facility from the roadway, as part of the Colfax Frontage Exercise Trail. Further, the bicycle facility along Colfax Avenue can be separated from the sidewalk such that pedestrians and bicyclists are not using common space.

Another set of bicycle connections affecting the Anschutz Medical Campus pertains to tying into the Sand Creek Trail north of Fitzsimons Parkway. Accommodations along the north-south roadways between Fitzsimons Parkway and Montview Boulevard should be provided as part of the construction, but the challenge may be crossing Fitzsimons Parkway to Sand Creek, especially in light of the LRT. The exact alignment of the LRT will play a role in this decision, and ongoing discussions with RTD and the CoA are currently taking place to determine these best locations.

PROPOSED BICYCLE IMPROVEMENTS

With respect to bicycle accommodations, steps should be taken toward realizing the proposed bicycle network. Some key considerations that should be prioritized include:

- Connecting to the Sand Creek Trail System sooner rather than later, thereby allowing Stapleton bicyclists easier access to the core. This connection will need to be planned and integrated with LRT design. These bicycle connections will need to be coordinated with vehicular openings in the event that the LRT is located along the median of Fitzsimons Parkway.
- Design 17th Avenue through the core such that it provides a high level of bicycle accommodation via generous bicycle lanes along both sides of the roadway. This should be extended to Peoria Street so that it connects with CoA's signed bicycle route along 17th Avenue to the west.
- Enhance bicycle accommodations along Aurora Court so as to strengthen the campus's connection to 13th Avenue to the south. With the potential of 13th Avenue being extended to cross (via underpass) I-225, this connection would be beneficial for bicycle users, particularly those traveling to the opposite side of the interstate.
- Implement bicycle facilities along the west end of Montview Boulevard to properly receive the bicycle accommodations that exist along Montview Boulevard to the west today.

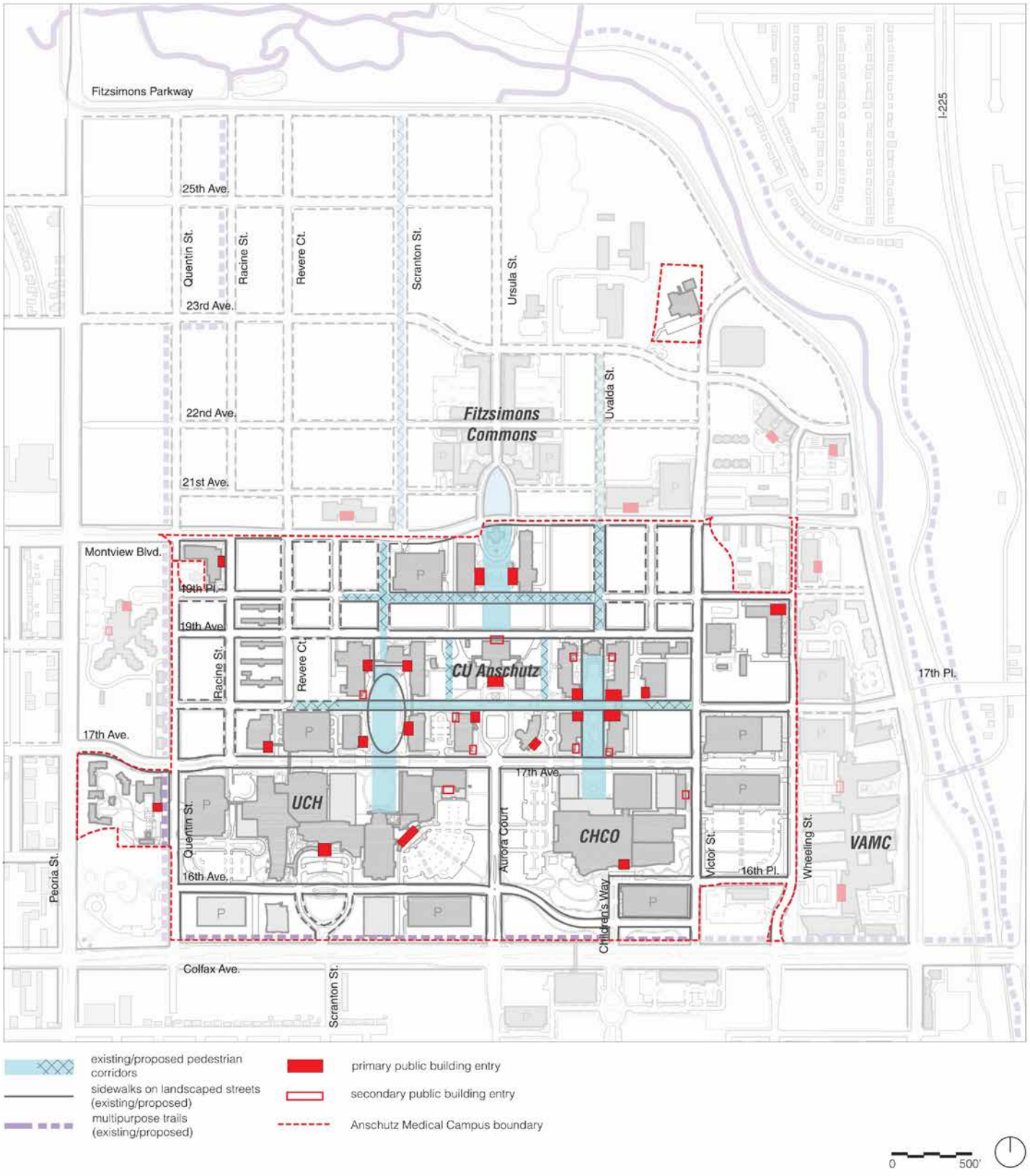


Figure V.17 - Proposed Pedestrian Network

PEDESTRIAN

CU Anschutz is committed to providing accessible pedestrian travel and ensuring an inviting pedestrian atmosphere. The pedestrian experience drives the open-space, roadway, and bicycle network propositions. The confluence of these systems creates a dynamic network of pedestrian-oriented streets, greenways, and promenades that connects to campus landmarks and open spaces.

PROPOSED PEDESTRIAN IMPROVEMENTS

Pedestrian accommodations should be improved concurrently with new building and roadway construction and/or renovation.

All future roadways and retrofit projects should include accommodations for pedestrian activity as defined in the street sections presented on pages V.34–36. Design elements to improve pedestrian travel include traffic calming methods such as well-marked crosswalks, varied paving surfaces for pedestrian corridors and crossings that experience a large volume of pedestrians, bulb-outs, and buffers between pedestrian facilities and the roadway (topography changes, landscaping and greenery, sidewalk furniture, etc.). Figure V.17 presents the proposed pedestrian network and where these improvements should be applied for the Anschutz Medical Campus.

To the extent possible, sidewalks should be detached from busier roadways to create a comfortable environment for pedestrians. Also, a wider sidewalk where significant pedestrian activity is anticipated would be appropriate. ADA requirements will be met and, whenever possible, exceeded to promote the campus's identity as a premier health care center, easily navigable and welcoming. Given the medical nature of this campus, providing for pedestrian accommodations that exceed these requirements would be appropriate, especially where patient activity is anticipated. Potentially, some areas may be developed such that pedestrian plazas are incorporated and place-making implemented such as in the area north of Building 500.

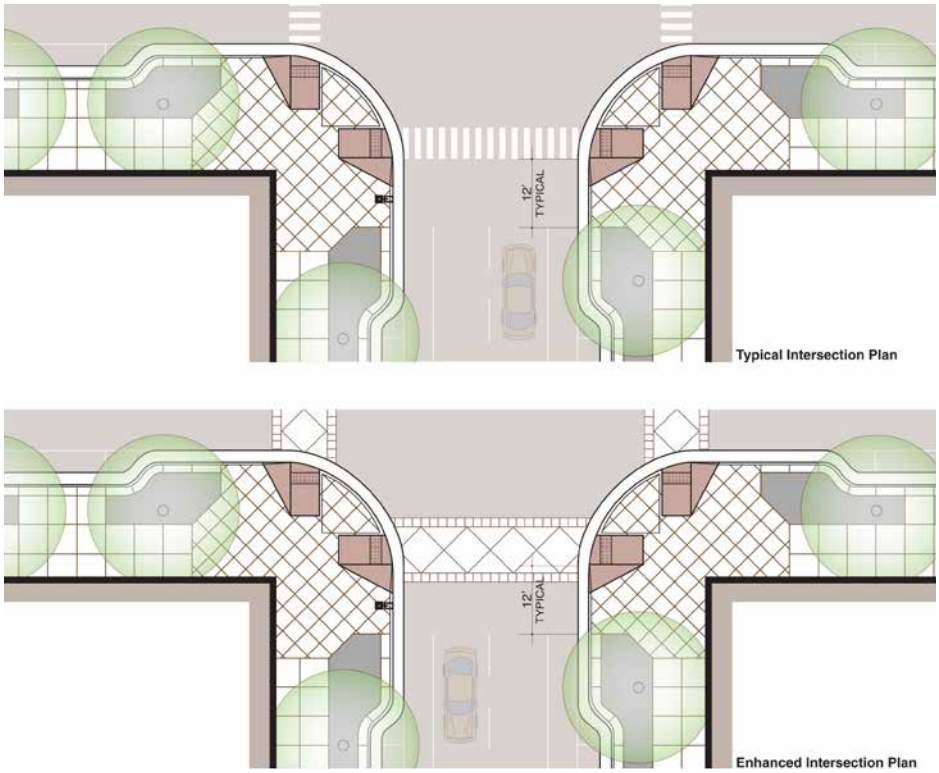


Figure V.18 - Intersection Plans

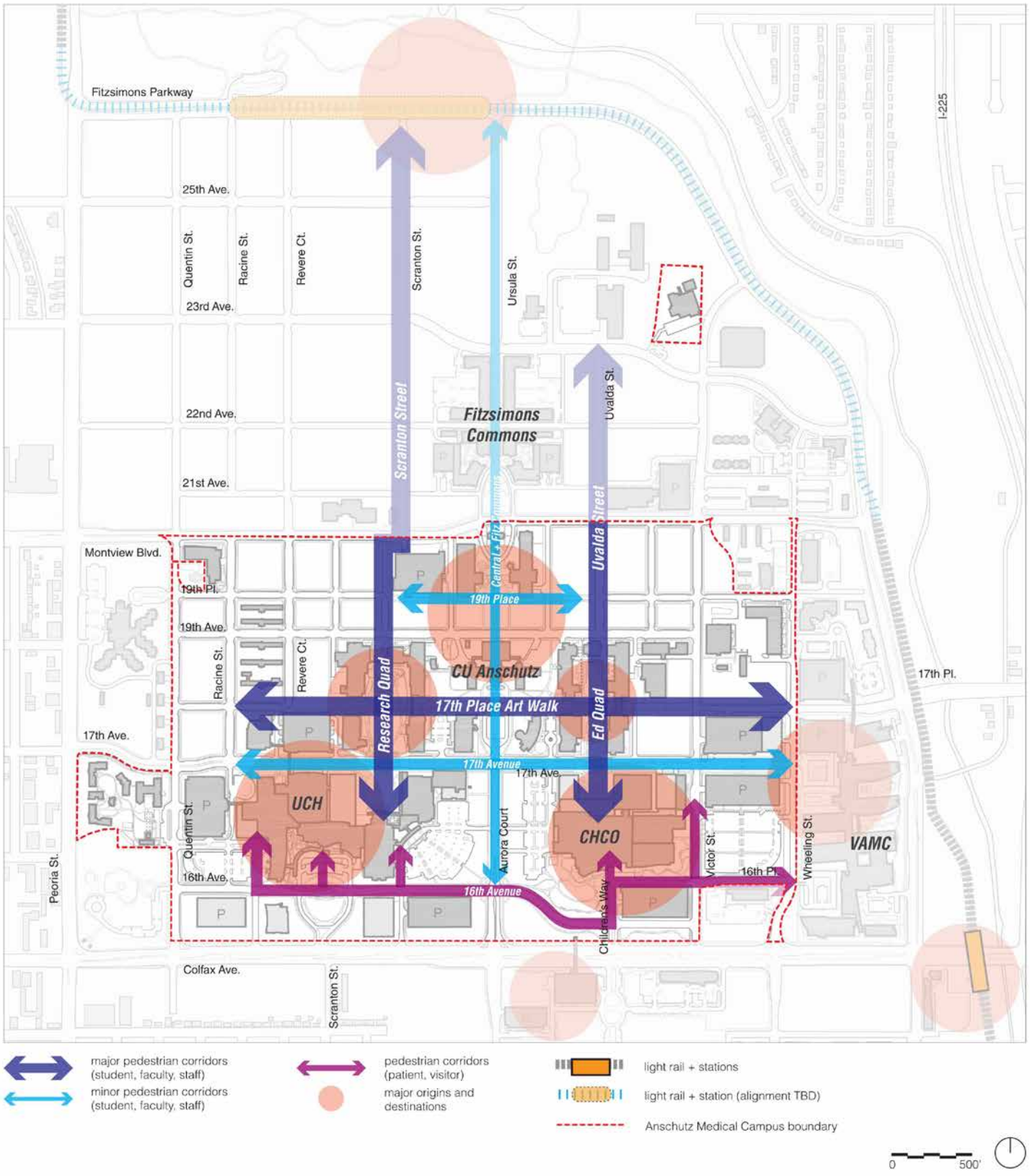


Figure V.19 - Proposed Pedestrian Hierarchy

PEDESTRIAN HIERARCHY

The pedestrian experience drives the open-space, roadway, and bicycle network propositions. Scranton Street and Uvalda Street can become primary north-south pedestrian connections through the Site-Wide area. There is current north-south connectivity from the hospitals to Montview Boulevard via the Research and Education Commons. The new Scranton Street and Uvalda Street greenways are envisioned to pick up this movement pattern and carry it from Montview Boulevard to the proposed light rail station on Fitzsimons Parkway, consequently connecting the hospitals to the LRT and beyond to the creek trails.

Complementing these primary north-south pedestrian boulevards is the 17th Place Art Walk. This is the major east-west pedestrian access, with 19th Place taking on a secondary, but still critical role in wayfinding and pedestrian place-making. The Art Walk can be extended to connect the Parade Grounds to the eastern threshold of the university.

Seventeenth Avenue will develop as an equally important pedestrian link across campus over time. It will become a true multi-modal street when it becomes open to vehicles and buses. Since it borders on all three hospitals as well as the southern edge of the university, 17th Avenue is well-placed to support active ground-floor uses that draw pedestrian traffic such as those already found in the Leprino Parking Garage. New interdisciplinary projects could well find sites here, and future density will make this a vibrant and busy pedestrian corridor.

Especially with the proposal for the LRT station on Fitzsimons Parkway west of Ursula Street, Aurora Court and Ursula Street will supplement the cross-axial relationships of pedestrian pathways with another north-south connection. From Colfax Avenue to 17th Place, pedestrians can enjoy the 300-foot landscape buffer and the historic viewshed to Building 500. The intersection at 17th Place is a major pedestrian node with options to connect east or west along the Art Walk, or continue through or around Building 500. At 19th Avenue and Ursula Street, pedestrians encounter the University Plaza, a vibrant civic center. They may continue through the Pauls Development and its ground-level retail shops to the future light rail station at Fitzsimons Parkway.

The hierarchical system of pedestrian-oriented pathways provides students, employees, and visitors a regular, organized means of navigating the campus. These roadways and promenades are punctuated by important campus landmarks that assist in the pedestrian wayfinding experience. For example, the hospital towers will be visible from Scranton Street and Uvalda Street, and prominent Building 500 will mark a major confluence of this pedestrian network.

The intersection of the Research Commons and the Art Walk shows the desired level of connectivity within the proposed network of pedestrian corridors.

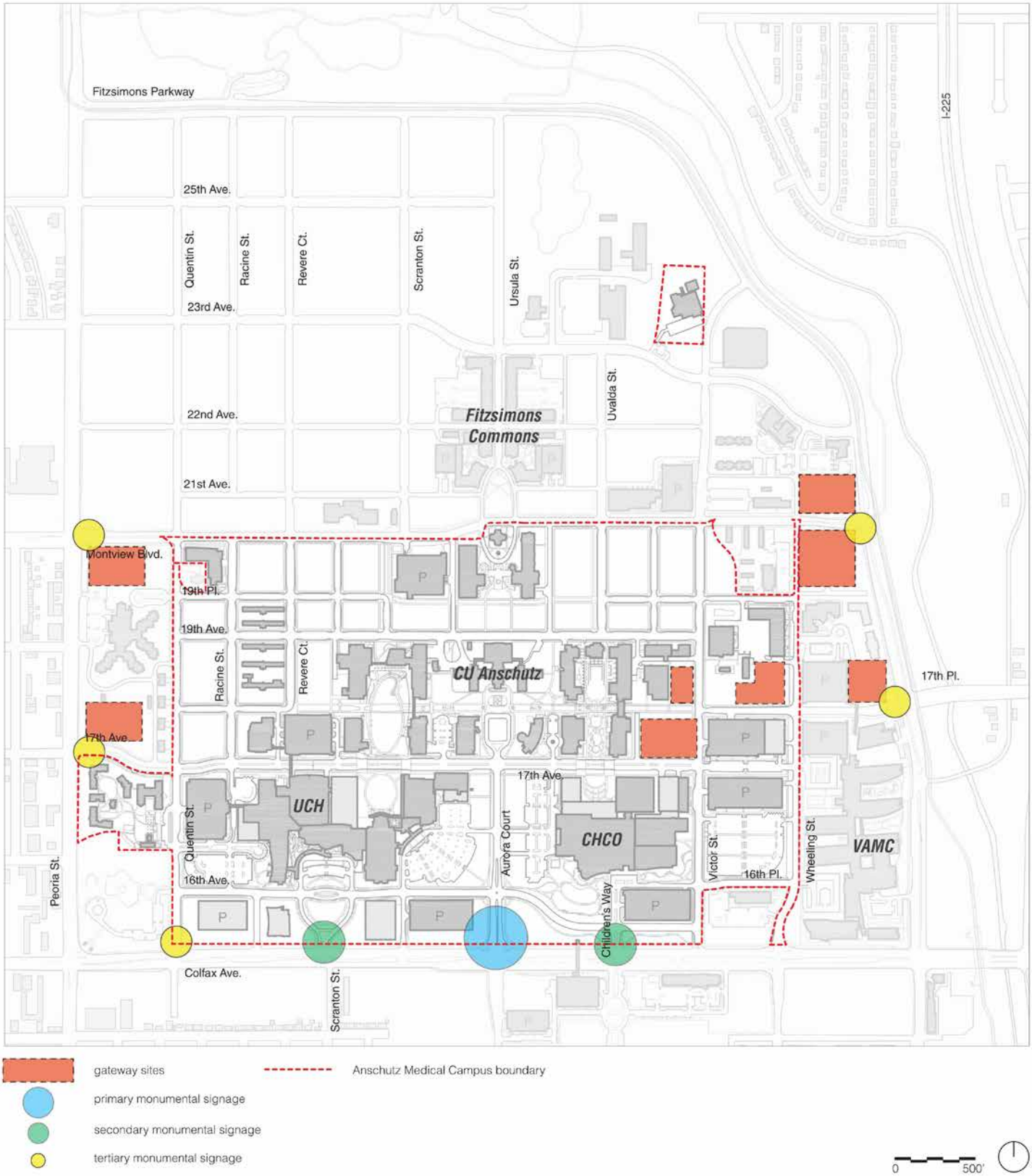


Figure V.20 - Gateway Sites and Monumental Signage

GATEWAYS AND EDGES

The edges of the Anschutz Medical Campus are designed to be porous and welcoming, consistent with the goal of the campus institutions to reach out to the community and provide services and opportunities. The identity of the campus is reinforced by a consistent language of gateway elements and prominent buildings along the edges.

A new signature gateway is currently being constructed at Aurora Court and Colfax Avenue. It is intended to provide clear expression to both vehicular and pedestrian traffic as to the mission, stature, and branded image of the Anschutz Medical Campus. Built of masonry, consistent with the palette of stone and brick materials used on our most prominent and memorable buildings, the gateway consists of two curving walls prominently elevated upon planted berms, and flanking the entrance to Aurora Court. They manifest a welcoming gesture, to delineate arrival at the University of Colorado Health Sciences Center, CU Anschutz Medical Campus, an homage to the university's most significant philanthropic donor, Philip Anschutz, as well as a recognition of the collaborative partnership between our three institutional stakeholders.

Secondary gateway elements are also being constructed at the major entry conditions off Colfax Avenue for UCH and CHCO. Designed to be of similar materials as the signature gateway, these signs—although somewhat lesser in scale and prominence—are of equal importance in delineating arrival and conveying the character of these two institutions. Each includes the branded logos of each respective hospital along with title text scaled for vehicular speed legibility. The words "Anschutz Medical Campus" are included on each to further communicate affiliation and partnership.

A family of boundary markers is currently being developed for tertiary entry points on to the campus. Located at Quentin Street and Colfax Avenue, the west end of 17th Avenue, both ends of Montview Boulevard, and the eastern end of 17th Place, these markers are meant to delineate the extents of the Anschutz Medical Campus. Taking the form of pillars, they are meant as visual beacons of arrival rather than a means for wayfinding toward any one specific institution. Signage on these pillars is limited to the CU logo.

The proposed signature gateway into the southern edge of campus at Aurora Court and Colfax Avenue.

The entrance to UCH will be marked by a proposed secondary gateway in the median at Tony Ruiz Plaza and Colfax Avenue.

Similarly, several prominent gateway sites have been identified at key intersections leading into the university that could, over time, be developed with signature buildings to help signify visitors' arrival to CU Anschutz.

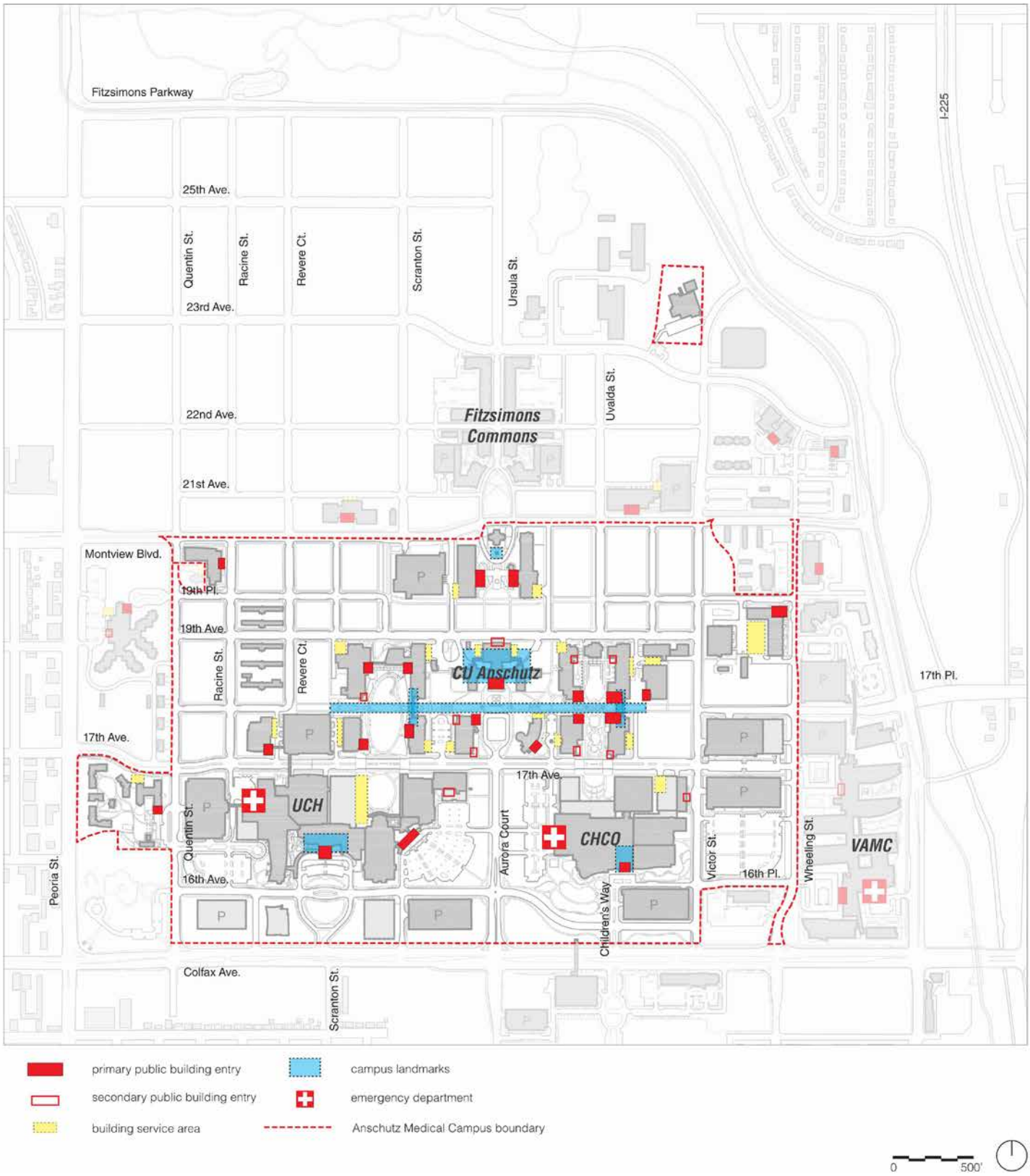


Figure V.21 - Current Public Building Entries, Service Areas, and Campus Landmarks

INDIVIDUAL SITE SERVICE AND ACCESS

As noted in the discussion previously on individual building sites in Section V.4, main building entrances should face public spaces and pedestrian streets. Service access and building support elements such as waste handling, electrical transformers, and loading areas should be located off service roads whenever possible. If there is no service road access, a service court should be designed in order to screen the back-of-house elements from the building entrances and main pedestrian routes.

A service area behind Building 500 is located off 19th Avenue, separate from the main building entrance on Aurora Court.

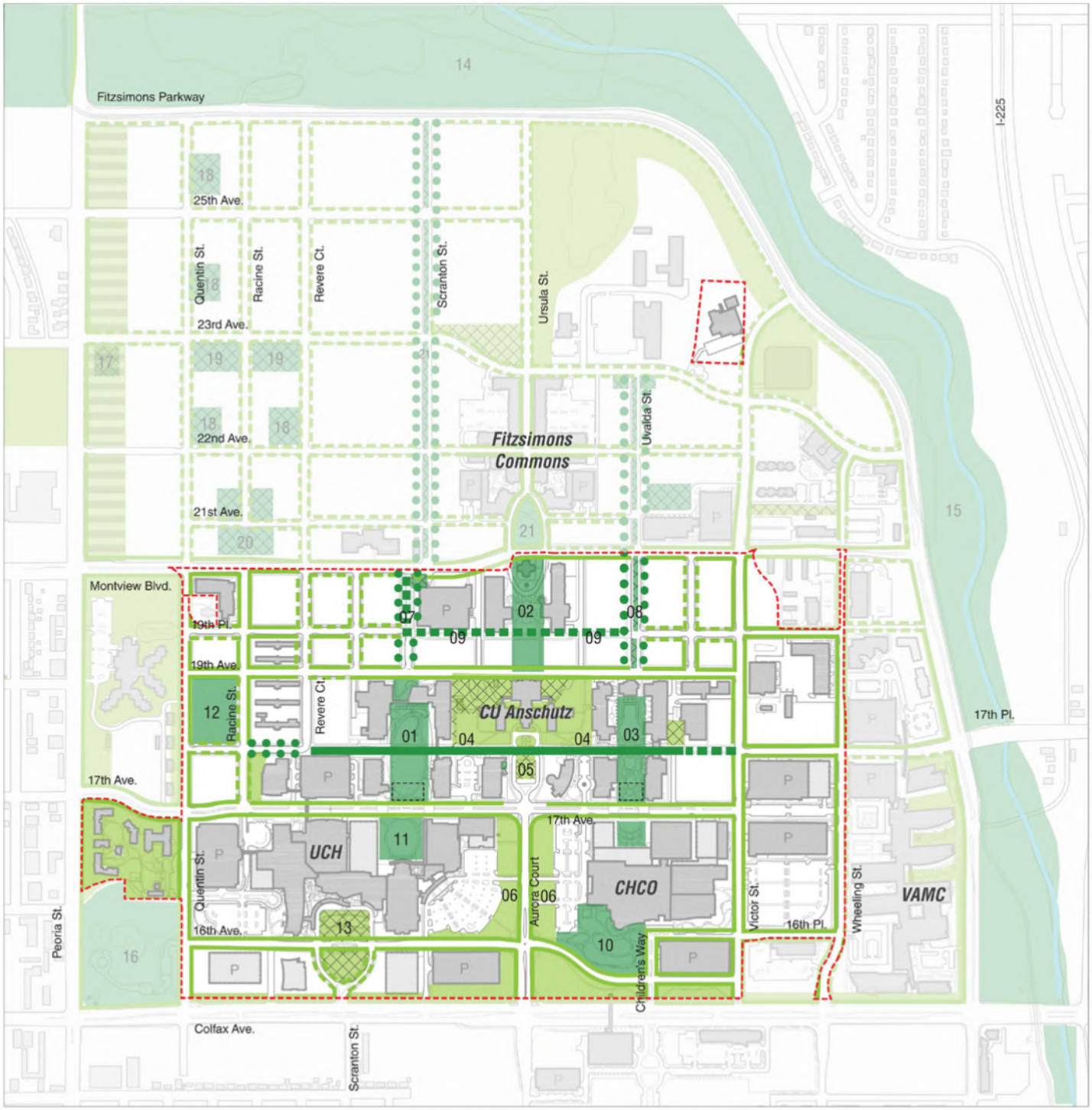


Figure V.22 - Proposed Open Space

B. Open Space

Open space is a broad category that includes all elements of the public realm from large ceremonial quadrangle spaces to street plantings and entry courts. Section V.4 explains how open space that is part of a specific building project falls under the “flexible” category, as open space can manifest on a particular building site in any number of ways based on its Character District and the unique variables of each building project.

The public open spaces that organize the campus, however, comprise a fixed system that provides clarity and navigability to the campus environment, as well as opportunities for gathering and recreation. There are seven major public open spaces within the campus that stand alone as independent campus elements. These include spaces such as the Research and Education Commons and the CHCO Healing Garden. Within the Site-Wide area, General’s Park and Sand Creek Park are fixed open-space elements that, although not part of the campus, do provide connectivity between green space amenities shared by community and campus users. The existing Art Walk and proposed 19th Place pedestrian promenades are fixed open-space elements that are linear and more connective in nature. These open-space types are all fixed elements that form part of the basic organization of the campus and will remain the constant anchors over time of memorable campus places.

Small-scale gathering spaces adjacent to the Barbara Davis Center.

The Uvalda Street Greenway will strengthen connectivity across Montview Boulevard west of the UPI building.

OPEN SPACE PROJECTS

Over the full build-out period, the recommendations of this master plan include a number of expansions to existing open spaces and greenways as well as the construction of new ones. As new infrastructure and building projects move forward, opportunities should be sought to tie landscape improvements to individual projects to incrementally further the campus's open-space vision.

Following are the proposed future fixed open-space projects, listed north to south.

Uvalda Street and Scranton Street Greenways

This master plan emphasizes the importance of complete streets that are designed for cars, transit, bikes, pedestrians, landscape, and activities to coexist and create vibrant places. Uvalda Street and Scranton Street should be designed as major north-south connectors that will bridge Montview Boulevard and provide safe, pleasant routes for pedestrian traffic between the university and the Colorado Science + Technology Park. A lively street environment with retail and other public uses at the ground level is encouraged along this green street. These two greenways could incorporate storm water planters and/or bioswales in their design and would become educational showcases for storm water management systems.

Scranton Street between 19th Place and Montview Boulevard will be pedestrian-only in order to preserve a safe alignment across Montview. Scranton Street can allow vehicular traffic between 19th Avenue and 19th Place. The pedestrian connection can tie into the west end of a pedestrian promenade along 19th Place and make a clear connection from the north end of the Research Commons to Montview Boulevard and the FRA. This alignment will also allow the preservation of three significant oak trees that can be incorporated into the landscape design of this walkway.

University Plaza

The open space between the Health Sciences Library and the Skaggs School of Pharmacy Building is a busy public square within the campus. The Red Cross Building is being considered for demolition due to the high cost of its restoration. If this building comes down, there is an opportunity to strengthen the plaza space just south of Montview Boulevard and, in particular, the campus's connection north to Fitzsimons Commons. The plan is for a new, wide intersection at Ursula Street and Montview Boulevard that will allow for easy pedestrian passage across Montview Boulevard to connect to the retail/residential neighborhood. This space will physically and symbolically unite the university with the Colorado Science + Technology Park at Fitzsimons.

Student Life Commons

This open space could be developed into an informal forecourt to University Plaza and is located on the southern half of the open space between the Health Sciences Library and the Skaggs School of Pharmacy Building, surrounding 19th Place. The Student Life Commons would be available for unstructured recreation and civic purposes and could be the central gathering space of the 19th Place Promenade.

The open space between the library and the School of Pharmacy, the Student Life Commons and University Plaza, will be strengthened.

Nineteenth Place Promenade

Nineteenth Place is planned to become a pedestrian walk similar to the Art Walk. It can serve as connective tissue between the Uvalda Street and Scranton Street north-south greenways as well as to the Student Life Commons. The promenade will connect at either end to pedestrian-friendly streets tying into the city street grid.

Seventeenth Place Art Walk Extensions

This popular pedestrian route links the Research and Education Commons. Not only does it provide access through the heart of campus, but it also offers a place to stop, enjoy art, and socialize. Extensions will strengthen both the green space and pedestrian networks, connecting east to the new gateway sites along Victor Street that will be developed as university parcels in the future.

Parade Grounds

When the square mile was still the Fitzsimons Army Medical Garrison, the Parade Grounds filled an important symbolic role. In the first decade of the Anschutz Medical Campus master plan, the space has become a place for active recreation. In the future, this site will link to important east-west and north-south connective elements, including the west leg of the loop exercise path along Quentin Street. The proximity to the exercise route and the Health and Wellness Center create a great opportunity to support the fitness and health agenda of CU Anschutz.

The 17th Place Art Walk will extend west toward the Parade Grounds.

The pathway through the quad south of the Health Sciences Library will develop into a more-robust 19th Place Pedestrian Promenade.

The Parade Grounds will connect to the Art Walk to the east as well as the Health and Wellness Center (shown above) to the north.

Bonfils Circle

Centrally located, this space is intended to be the symbolic heart of the campus. It provides definition to the terminus of the existing view corridor from Colfax Avenue toward Building 500 and is meant to reinforce the mission, stature, and image of the campus and its affiliated institutions.

Currently, an underutilized green is encircled by a two lane, 24-foot-wide, vehicular turnaround providing patient and visitor access to the Building 500 porte cochère. RTD buses utilize an abbreviated portion of this turnaround with stops located along its perimeter. Pedestrian access to the central green space has been effectively cut off by this predominantly vehicular-oriented condition.

The design goals are to retain these operational qualities while allowing for more active, pedestrian-oriented uses. The intent is to allow the space to accommodate formal outdoor gatherings and activities such as graduations, presentations/lectures, dedications, press conferences, etc. without adversely impacting the pragmatic need for vehicular drop-off accommodations in close proximity to Building 500.

The loop, while remaining functional and legible for patient and visitor access, can be minimized, allowing the surrounding buildings to delineate a larger civic space more integrated with the campus. The roadway alignment would be reduced in scale to 10 feet in width with pavers used to delineate the roadbed in lieu of the existing asphalt condition. The loop's northernmost extent would be moved south of 17th Place, allowing the Art Walk to run continuously east-west across the Aurora Court viewshed.

Bonfils Circle can be redesigned to respond more sympathetically with the 17th Place Art Walk and the forecourts of both the Barbara Davis and Nighthorse Campbell buildings, with Building 500 as the focal point for the space. A mixture of hardscape and irrigated turf would enhance the space with a formal arrangement of walkways, pedestrian-scale lighting, furnishings, and signage. The central core of the space would be primarily flat to accommodate the aforementioned ceremonial activities, with opportunities for a variety of more intimate and informal gathering spaces provided along the perimeter courtyards.

Bonfils Circle, the turnaround in front of Building 500 will become a ceremonial green space.

Seventeenth Avenue Improvements

The most important area of future development is along 17th Avenue between Quentin Street and Victor Street. There is great interest on campus in making 17th Avenue a fluid connection path for all three hospitals (including VAMC) and the university. Of all of the many desirable locations for collaboration and connection, 17th Avenue has the most powerful center of gravity on campus. There is a daily need for many of the faculty, physicians, staff, and students to travel between the different institutions. In addition to establishing a dedicated, frequent shuttle route along 17th Avenue, the road will also be open to private vehicles from Victor Street all the way west to Peoria Street. Pedestrian crossings should be enhanced at the quadrangles, and on-street parking should be added for short-term use.

Traffic should be controlled at a slow speed to promote a pedestrian-first environment along this stretch of the campus. Development of new projects along this corridor should engage the opportunity for multi-disciplinary collaboration spaces with active, public, ground-level functions that activate the pedestrian environment. Recent projects such as the Leprino Building typify to the desired character along 17th Avenue and include on-street parking, wide sidewalks, outdoor eating areas, and ground-floor restaurants.

Figure V.24 on the following pages provides a more in-depth look at the proposed character of 17th Avenue.

Seventeenth Avenue looking west.

Proposed 17th Avenue Character

Seventeenth Avenue should be enhanced to strengthen the connection between the hospitals and the university. These fixed infrastructure improvements should include opening the road to through traffic, accommodating buses, enhanced crosswalks at the commons, and adding additional on-street parking. The roadway will be opened to a careful and safe balance of vehicular traffic and on-street parking, which will coexist within a primarily pedestrian- and bicycle-friendly environment. The infrastructure can support additional building sites along 17th Avenue, which will help to increase the desired density to spur interaction and collaboration

Figure V.23 - 17th Avenue Aerial (2011) - Peoria Street to Fitzsimons Parkway

Figure V.24 - Proposed 17th Avenue Street Plan - Peoria Street to Fitzsimons Parkway

among the various institutions. Locating public and visible program functions along the street will help 17th Avenue to become a vibrant internal main street for the Anschutz Medical Campus.

Improved east-west connectivity will culminate in a new “translational corridor” along 17th Avenue that will form the primary gathering space for the exchange of knowledge, ideas, goods, and services. It is envisioned to be a connected ribbon of mixed-use development between the academic and patient districts, encouraging and facilitating the migration of expertise, researching findings, and clinical knowledge between institutions and across disciplines.

Research Quadrangle | South-End Redesign

Currently, the 17th Place Art Walk bisects the Research Quadrangle and forms two distinct open-space conditions to the north and south. The southern portion of the research quad is characterized by naturalistic, undulating topography of drifts of shrubs planted within a field of native grasses. A sculpture installation, titled *Opening Doors*, provides the focal point to this area of the common. Although accessible to the public visually, the existing topography does not permit individuals to physically occupy the space or to access the art installation. The existing setting forms a physical barrier between Research 1 and Academic Office 1 with pedestrian circulation restricted to the perimeter.

The Research Quadrangle | South-End redesign would relocate the *Opening Doors* installation to a more publicly accessible campus location. The existing, underutilized landscape would be regraded to mirror the character of the northernmost portion of the common, with flat landscape similar to the Education Commons. The intention would be to create a more active, integrated space to allow for greater flexibility of recreational and leisure uses as well as for enhanced connectivity and accessibility between facilities around the quadrangle. Also, the master plan recommends the southernmost portion of the research quadrangle to be a potential near-term building site. Regrading of this area will allow both for future facilities development and enhancement of the functionality of the Research Quadrangle through a more complete and unified composition.

University of Colorado Hospital Garden

South of 17th Avenue on the UCH grounds there are plans for a signature garden similar in spirit to the one at CHCO. It will be a place for patients and their families to relax and a refuge for physicians and staff as well. The garden will mirror the Research Commons to the north across 17th Avenue to visually extend that central green space.

Opening Doors *in the Research Quadrangle's native grasses.*

An exercise trail will develop in the landscape buffer on the northern edge of Colfax Avenue (roadway along left edge of photo).

Colfax Frontage Exercise Trail and Landscape

The traditional landscape buffer along the north side of Colfax Avenue from General's Park on the west to Fitzsimons Parkway on the east should be maintained. This will continue to provide the hospitals with a strong public presence on the primary public street adjacent to the campus as well as to preserve the historic viewshed to Building 500. This master plan carries forward the vision for the bike/pedestrian exercise loop that would encircle the entire Site-Wide area connecting to the Toll Gate Creek and Sand Creek Trails. The landscape buffer along the north edge of Colfax Avenue can incorporate an exercise path and exercise stations, and eventually form a quarter of the full loop.

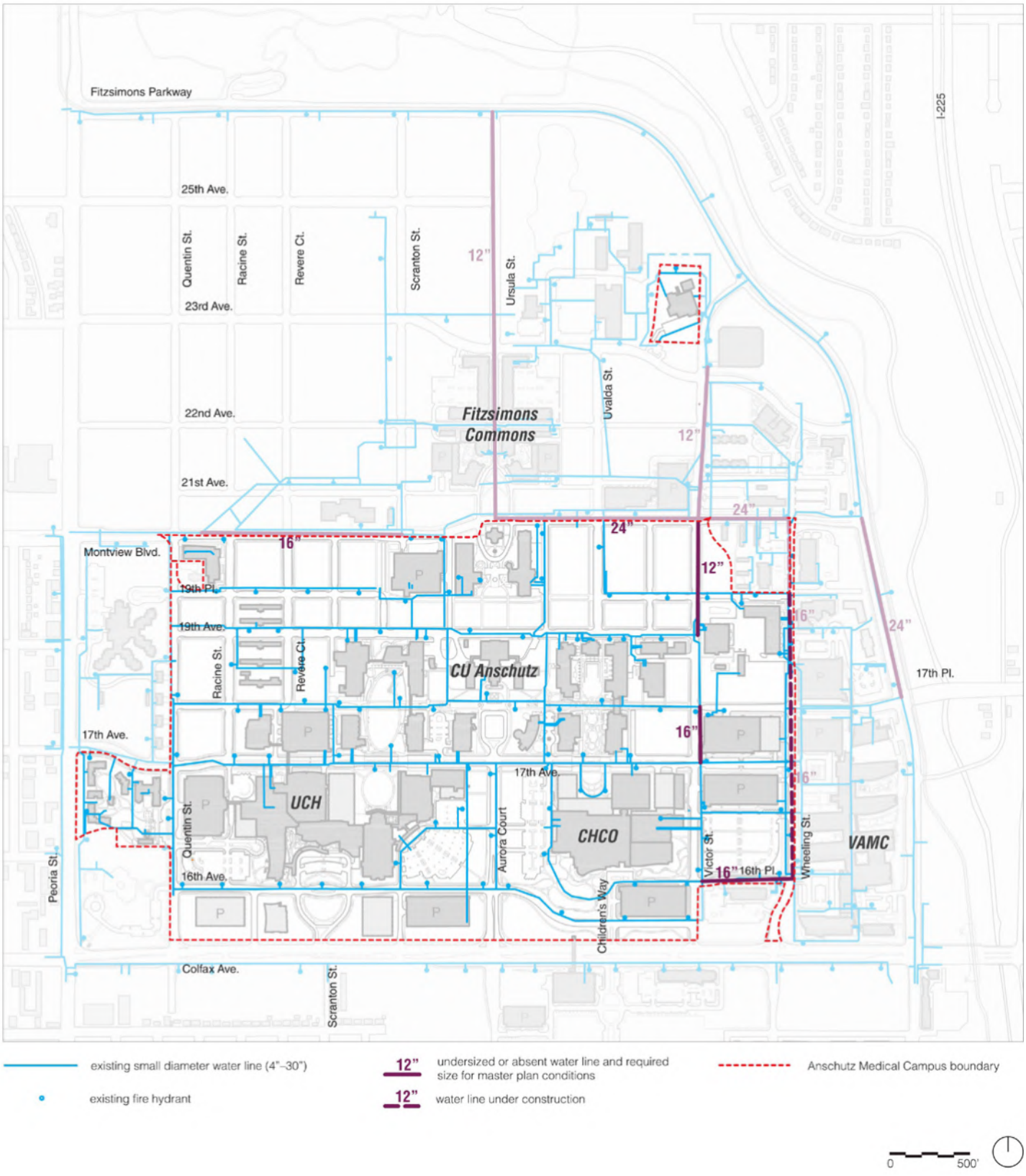


Figure V.25 - Water Master Plan

C. Utilities

WATER

The following upgrades to the water infrastructure are proposed to support the ultimate build-out of the Anschutz Medical Campus:

- Replace the existing 6-inch line with a 16-inch PVC main in E. Montview Boulevard, connecting to the existing 16-inch main at the approximate midpoint between Quentin Street and Racine Street, to Scranton Court.
- Replace the existing 6- and 8-inch lines with a 24-inch PVC main in E. Montview Boulevard from Wheeling Street and connect to the existing 24-inch main northeast of the Health Sciences Library.
- Install a 12-inch PVC main in Ursula Street from E. Montview Boulevard to Fitzsimons Parkway.
- Replace the existing 10-inch line with a 12-inch PVC main in Victor Street from E. 19th Avenue to E. 23rd Avenue.
- Replace the existing 16-inch line with a 24-inch PVC main in E. Fitzsimons Parkway between E. 17th Place and E. Montview Boulevard.
- Replace the existing 12-inch line with a 16-inch PVC main in Victor Street from E. 17th Avenue to E. 17th Place.
- Replace the existing 12-inch line with a 16-inch PVC main in E. 16th Place from Victor to Wheeling Streets.
- Add PVC mains as required per the master plan as the existing golf course area develops.

Per the Infrastructure Master Plan, dated October 11, 2001, the Fitzsimons campus water demands at full build-out are shown in Figure V.26.

Future development will drive phasing new water lines into the existing system to support building loads.

Future development will require upgrading water infrastructure.

Campus Water Demands at Full Build-Out in Millions of Gallons Per Day (MGD)
Anschutz Medical Campus and Site-Wide Study Area
October 2001

Average Daily Demand (MGD)	*Maximum Daily Demand (MGD) (1)*	*Peak Hourly Demand (MGD) (2)*
3.88	10.86	17.45

(1) The Maximum Daily Demand is 2.8 times the average daily demand per discussions with the City of Aurora.
(2) The Peak Hourly Demand is approximately 4.5 times the average daily demand per discussions with the City of Aurora.

Figure V.26 - Campus Water Demands at Full Build-Out

STEAM/CHILLED WATER AND GAS

Introduction

The campus needs for steam, chilled water, and natural gas were evaluated for 2012–2022, and planned development during this period is accounted for.

Taking this expansion into consideration, the distribution system consisting of buried steam, condensate, and chilled water piping was evaluated to see if it could handle expected increases and to identify expected bottlenecks.

Generation capacity for steam and chilled water was also evaluated to see if additional boilers or chillers are needed. In addition, the option of a satellite chilled water plant was evaluated as a means of providing additional chilled water to the west side of campus, to overcome piping and pumping problems in delivery from the CUP.

Finally, options for energy conservation and carbon footprint reduction are discussed for campus steam/chilled water and gas systems.

A chiller outside the CUP is about to be installed.

Campus Future Growth

The three campus entities submitted plans for new buildings and expansion of existing buildings for the 10-year planning period. A complete list of these Anschutz Medical Campus projects can be found in Chapter VI. These plans included projected GSF and occupancy type for each project.

These data were used to calculate projected steam and chilled water peak demand values as shown in Figure V.27, Building and CUP Peak Steam and Chilled Water Demand - Projected. The peak utility values are based on demand per square foot values, obtained from actual metering of similar existing buildings on the campus as listed in Chapter II in Figure II.36, Building and CUP Peak Steam and Chilled Water Demand - Actual.

CU Anschutz projects the addition of nine new building projects, one of which, the Bioscience 2 Building, will be located north of Montview Boulevard. It will have a stand-alone HVAC system and not receive steam or chilled water from the campus utility system.

UCH projects expansion of 869,000 GSF, and an expansion at Rocky Mountain Lions Eye Institute (RMLEI) is currently under way and projected for completion in 2015. No definite date for construction of UCH's other projects is known at this time. Therefore, UCH's three projects are grouped together in the year 2023. The expected utility demand per square foot for these new spaces is the same as for similar existing spaces.

CHCO plans two new buildings during the planning period, totaling 447,000 GSF. The expected utility demand per square foot is the same as for similar existing spaces.

On the right side of Figure V.27, the projected peak steam and chilled water demand is listed for each year of the planning period in which building projects are expected. The data starts with measured peak values for the year 2012 and adds the projected growth values to those numbers from completed projects in a given year. These projected peak demand values are used to predict the need for adding additional chillers and boilers to the CUP.

Building and CUP Peak Steam and Chilled Water Demand - Projected
Anschutz Medical Campus
2013

Building						
Name	*Total Size (GSF)*	*Vault Connection*	*Peak CHW Demand (Tons)*	*Peak Steam Usage (PPH)*		
2013					End of 2013 - Predicted	
Anschutz Inpatient 2nd Tower, Phase I	400,000	V12A	1,714	24,000	Peak Campus Demand (1)	
					Steam (PPH)	*CHW (tons)*
Subtotal 2013	400,000		1,714	24,000	252,000	12,128
2015					End of 2015 - Predicted	
Rocky Mtn. Lions Eye Institute Expansion	87,792		0	3,512	Peak Campus Demand (1)	
CHCO Bed Tower 2, Finish (2)	129,000	V19	368	5,160	*Steam (PPH)*	*CHW (tons)*
Subtotal 2015	216,792		368	8,672	260,672	12,521
2016						
Anschutz Inpatient 2nd Tower, Finish (2)	200,000	V12A	857	12,000	End of 2016 - Predicted	
Interdisciplinary Building Phase I	72,200		152	1,415	Peak Campus Demand (1)	
Dental/Outpatient Building (CHCO)	180,000		400	6,429	*Steam (PPH)*	*CHW (tons)*
Subtotal 2016	452,200		1,409	19,844	280,516	14,024
2017					End of 2017 - Predicted	
CTRIC Imaging	48,000		137	960	Peak Campus Demand (1)	
					Steam (PPH)	*CHW (tons)*
Subtotal 2017	48,000		137	960	281,476	14,170
2019					End of 2019 - Predicted	
Interdisciplinary Building Phase II	308,786		1,079	15,748	Peak Campus Demand (1)	
					Steam (PPH)	*CHW (tons)*
Subtotal 2019	308,786		1,079	15,748	297,224	15,321
2020					End of 2020 - Predicted	
Maternal Fetal Medicine (CHCO)	267,000		593	9,536	Peak Campus Demand (1)	
					Steam (PPH)	*CHW (tons)*
Subtotal 2020	267,000		593	9,536	306,760	15,954
2021					End of 2021 - Predicted	
Education 3 Academic Building	89,762		214	1,721	Peak Campus Demand (1)	
Vivarium Expansion	27,342		98	1,823	*Steam (PPH)*	*CHW (tons)*
Subtotal 2021	117,104		312	3,544	310,303	16,286
2022					End of 2022 - Predicted	
Auxiliary Services Building	32,000		64	640	Peak Campus Demand (1)	
Interprofessional Commons	80,000		160	1,600	*Steam (PPH)*	*CHW (tons)*
Subtotal 2022	112,000		224	2,240	312,543	16,525
2023						
UCH Main Building Expansion	734,000		2,097	29,360	End of 2023 - Predicted	
UCH Cancer Pavilion Expansion	35,000		100	1,400	Peak Campus Demand (1)	
UCH Marion Downs Hearing Center	100,000		200	2,000	*Steam (PPH)*	*CHW (tons)*
Subtotal 2023	869,000		2,397	32,760	345,303	19,082

(1) Peak campus demand for CHW tons has been adjusted from building tons (15F Delta-T) to CUP tons required (16F Delta-T). These values start with the peak value recorded through the end of 2012 and add predicted values for future dates.
(2) Ken Neeper Master Spreadsheet - CUP and Elec Load Projections 10-3-09_From Neeper 2-2010.xls

Figure V.27 - Building and CUP Peak Steam and Chilled Water Demand - Projected

Steam/Chilled Water

Based on the projected growth during the planning period, the current steam and condensate campus distribution system pipe sizes can adequately handle the projected steam and condensate flows.

Based on the projected growth during the planning period, the current chilled water campus distribution system pipe sizes can adequately handle the projected chilled water flows.

Boilers

Figure V.28 shows the projected demand for steam on the campus for each year of the planning period correlated with the number of boilers in the CUP. The figure shows that after installation of Boiler B-6 in 2012 there is adequate capacity to handle the steam load until 2016, when a larger boiler will need to be added to replace Boiler B-5. A second boiler upgrade will be needed to meet the projected 2023 steam demand. Boiler B-1 will be replaced at that time with a 90,000 pph boiler, adding an additional plant capacity of 30,000 pph.

CUP Boiler Capacity
Anschutz Medical Campus
2012

Year	*Boiler Tag*	*Peak Generation Capacity (PPH)*	*Fixed Firm Capacity (PPH) (1)*	*Expected Peak Demand (PPH)*	*Comments*
	B-1	60,000			Original Boiler
	B-2	60,000			Original Boiler
	B-3	60,000			Original Boiler
	B-4	60,000			Original Boiler
	B-5	30,000			Original Boiler
2009		270,000	210,000	212,000	Actual Measured Peak Demand
2010		270,000	210,000	212,000	Peak Demand Exceeds FFC
2011		270,000	210,000	223,855	Peak Demand Exceeds FFC
	B-6	90,000			Install New Boiler (Expansion III)
2012		360,000	270,000	228,000	Actual Measured Peak Demand
2013		360,000	270,000	252,000	Okay
2014		360,000	270,000	252,000	Okay
2015		360,000	270,000	260,672	Okay
	Replace B-5	90,000			Replace Old Boiler with Larger One
2016		420,000	330,000	280,516	Okay
2017		420,000	330,000	281,476	Okay
2018		420,000	330,000	281,476	Okay
2019		420,000	330,000	297,224	Okay
2020		420,000	330,000	306,760	Okay
2021		420,000	330,000	310,303	Okay
2022		420,000	330,000	312,543	Okay
	Replace B-1	90,000			Replace Old Boiler with Larger One
2023		450,000	360,000	345,303	Okay

(1) Definition of Fixed Firm Capacity: Capacity of remaining boilers in case the largest boiler fails.

Current Conditions

Future Projections

Figure V.28 - CUP Boiler Capacity

Chillers

After installation of a 2,200-ton chiller in 2013, there is projected to be a period of excess cooling capacity at the CUP so that a new chiller will not be needed until demand in 2019 must be met. At that point, a new 2,200-ton chiller will be added, along with associated pumps and cooling towers.

A second new 2,200-ton chiller and associated pumps and cooling towers will need to be added for the projected 2023 chilled water demand. To do this will require that the waterside economizer located in the northeast corner of the chiller room be relocated to the basement pump room to make room for chiller CH-11. At that point there will be a total of 11 chillers in the plant, which is the maximum number that can be comfortably accommodated.

CUP Chiller Capacity
Anschutz Medical Campus
2012

Year	*Chiller Tag*	*Peak Generation Capacity (Tons)*	*Fixed Firm Capacity (Tons) (1)*	*Expected Peak Demand (Tons)*	*Comments*
	CH-1	1,200			Original Chiller
	CH-2	1,200			Original Chiller
	CH-3	2,000			Expansion 1 Chiller
	CH-4	2,000			Expansion 1 Chiller
	CH-6	2,200			Expansion 2 Chiller
	CH-7	2,200			Expansion 2 Chiller
	CH-8	2,200			Expansion 2 Chiller
	CH-9	2,200			Expansion 2 Chiller
2009		15,200	13,000	12,000	Actual Measured Peak Demand
2010		15,200	13,000	12,000	Okay
2011		15,200	13,000	10,820	Actual Measured Peak Demand
2012		15,200	13,000	10,300	Actual Measured Peak Demand
	CH-5	2,200			Expansion 4 Chiller
2013		17,400	15,200	12,128	Okay
2014		17,400	15,200	12,128	Okay
2015		17,400	15,200	12,521	Okay
2016		17,400	15,200	14,024	Okay
2017		17,400	15,200	14,170	Okay
2018		17,400	15,200	14,170	Okay
	CH-10	1,200			Move CH-1 to CH-10 Position
	CH-1	2,200			Replacement for Old CH-1
2019		19,600	17,400	15,321	Okay
2020		19,600	17,400	15,954	Okay
2021		19,600	17,400	16,286	Okay
2022		19,600	17,400	16,525	Okay
	CH-11	2,200			Add Chiller in Old PFHX Location
2023		21,800	19,600	19,082	Okay

(1) Definition of Fixed Firm Capacity: Capacity of remaining chillers in case the largest chiller fails.

Current Conditions
Future Projections

Figure V.29 - CUP Chiller Capacity

Natural Gas

To accommodate the replacement of Boiler B-5 with a bigger boiler, projected to occur in 2016, and the replacement of Boiler B-1 with a bigger boiler, projected to occur in 2023, Xcel will need to increase the gas pressure into the building to 25 psig or changes will have to be made to the gas line in the building to reduce the pressure drop. One option is to add a six-inch branch from the gas line entry and connect it to the existing line at the far northern end of the building so that the gas line forms a loop, allowing gas to flow in two directions to reach the distant boilers. This will reduce the pressure drop enough to allow the use of gas at 20 psig.

STEAM/CHILLED WATER PROPOSED PROJECTS

Central Utility Plant Boiler (CUP) and Generator Expansion

This project expands the steam-generating capacity of the Anschutz Medial Campus CUP by 60,000 pph. In 2011 an electrical load study found that Boiler 6, recently added to support hospital load growth, had fully loaded the existing generator. This project includes the addition of a second 1000kW generator within the existing building. The planned campus expansion for the next five years will push steam loads above existing fixed firm capacity. An existing 30,000 pph boiler will be replaced with a 90,000 pph unit. The existing CUP building has enough space to accommodate this new boiler, and this utility expansion does not include new building construction. This expansion will be required when the next large future scale building project is constructed on the Anschutz Medical Campus in order to provide adequate steam utility service. This CUP utility expansion would be required prior to the completion of future Interdisciplinary Building Phase II.

STEAM/CHILLED WATER AND GAS ENERGY CONSERVATION OPPORTUNITIES

Steam and Electricity Cogeneration

The campus has a unique opportunity to reduce its utility costs and its carbon footprint by adding a cogeneration system to the campus. This system typically uses a natural gas–fired turbine to produce electricity and captures the waste heat off the turbine to generate steam. The limiting factor on the overall economic benefit of cogeneration is the demand for steam in the warm months of the year. This campus, primarily through its inclusion of hospitals and research facilities, has a large off-season steam demand of 55,000 pph. With this large steam demand, it would be possible to generate 10MW of electricity with a matched load, or even more with an unmatched load. This would offset the purchase of a significant portion of the electricity needs for the campus. The economics of cogeneration systems are especially attractive these days due to the low cost of gas. Further analysis is recommended.

Waterside Economizer

As the campus has grown, the demand for chilled water cooling in the winter months has also grown significantly. The current demand is above 2,000 tons. A waterside economizer at the CUP allows chilled water to be produced on cold days by only running cooling towers, without the need for running chillers. This results in a large cost savings. There is a small waterside economizer currently at the CUP, but it only has a capacity of 450 tons and is no longer used. Installation of a new economizer system with a capacity of over 2,000 tons is recommended. It should also be piped so that when it can't provide all the needed chilled water for the campus, it can at least be used to pre-cool the return water before it enters the chillers.

Steam Driven Chiller

All the current chillers at the CUP are powered with electricity. A steam-driven chiller uses steam to turn the chiller's refrigerant compressor. The benefit of using a steam-driven chiller is that it can be used to lower the peak electrical demand on the campus, thus reducing the demand charge that is part of each electrical bill. This type of chiller can also be used to generate steam during a power outage. Currently the boilers are backed up with an emergency generator, but the chillers are not. Auxiliary chiller equipment such as pumps and cooling towers would need to be connected to emergency power for this option to be viable. The downside is that these chillers are larger than electrical chillers and also more expensive, but they can still be economical. Further analysis is recommended, including an option to power an absorption chiller with the discharge steam.

STEAM/CHILLED WATER AND GAS MISCELLANEOUS ISSUES

Vivarium Chilled Water with Backup Power

The main campus vivariums, located in the basements of Research 1 North and in Research 2, are cooled with chilled water from the CUP. They can also receive chilled water from the chilled water plant in Building 500, which can be powered from emergency generators if there is an electrical outage. Chilled water production at the CUP does not have electrical backup power. There is concern that the chillers in the Building 500 plant are too old. Some chillers were installed in 1992. It is imperative that chilled water for the vivariums be reliable and available at all times. Some options for upgrading the chilled water supply reliability for the vivariums:

- If a west-side satellite chilled water plant is built, the new chillers and associated pumps and cooling towers could be provided with emergency power generators to cover the vivariums.
- The chiller plant at Building 500 could be upgraded with newer chillers and support equipment to increase their reliability.
- An emergency generator could be added to the CUP to provide power for two smaller chillers and associated pumps and cooling towers. Power for two chillers and associated support equipment is recommended to provide N+1 reliability in case one unit is down for repair or maintenance.

West-Side Chilled Water Plant

The need for a satellite chilled water plant on the west side of campus has been discussed for several years. A previous study of the chilled water system found that the chilled water piping feeding the west side of campus would be overloaded if projected buildings were built. This would result in an excessively high pressure drop in that line. There was also a large expected increase in demand for chilled water in the northwest quadrant of the campus.

The urgency of this problem has been greatly reduced since it has been decided to not build a new wet-lab type research building, Research 3. This building by itself would have required a new chiller to be added at the CUP or at a satellite chilled water plant.

Based on the projected increase in demand for chilled water on the campus during the planning period, which is relatively low, there no longer seems to be a compelling reason to add a satellite chilled water plant. Even with the projected large growth at UCH, the existing plant has room to handle that growth through 2023.

ELECTRICAL

Campus Future Growth

A review of the Anschutz Medical Campus medium-voltage electrical distribution system determined short-term and long-term needs of equipment and system infrastructure to meet the anticipated growth of the campus from 2012 to 2022. Anticipated growth is based on plans that the three campus institutions submitted for new buildings and expansion of existing buildings for the 10-year planning period.

CU Anschutz projects the addition of nine new buildings. Interdisciplinary Building Phase I will house the new campus data center, which will have a high demand for electricity.

UCH projects one new building and two expansions of existing buildings for a total projected area of 869,000 GSF. The expected electrical demand per square foot is the same as for similar existing spaces.

CHCO plans two new buildings during the planning period for a total of 447,000 GSF. The expected electrical demand per square foot is the same as for similar existing spaces, and it is important to note that CHCO electrical supplies are not derived from campus switchgear.

These data were used to calculate projected electrical peak demand values. The peak utility values are based on demand per square foot values obtained from actual metering of similar buildings on the campus.

Campus Switchgear's Ability to Accommodate Growth

Without modification, the campus switchgear can provide adequate capacity for several years. As stated in Chapter II, switchgear buses are sized adequately to accommodate growth. The pinch point is the size and capacity of the Xcel Energy feeders that feed the campus switchgear.

Figure V.30, Estimated Building and CUP Peak Electrical Demand, shows the addition of buildings on campus that will be fed from the campus switchgear. The spreadsheet shows the percentage loading of switchgear buses and Xcel feeders as buildings are added between now and 2023.

Summarizing the information in Figure V.30:

1. All three campus switchgears (1A, 2A, and B) are adequately sized to accommodate the proposed growth. In 2023, they are projected to be loaded as follows:

   - Switchgear Bus 1A loaded to 48.8 percent
   - Switchgear Bus 2A loaded to 42.8 percent
   - Switchgear Bus B loaded to 29.7 percent

2. Xcel campus feeders 1A and 2A are sufficient to accommodate the proposed growth. The chiller addition to the CUP to accommodate UCH's growth in 2023 will overload the Xcel feeders to Switchgear Bus B. The spreadsheet indicates that measures to increase Xcel's feeder capacity will need to be initiated and completed in 2022.

Estimated Building and CUP Peak Electrical Demand
Anschutz Medical Campus
2012

Facility Name (3)	*Bus Conn (2)*	*Total Area (GSF)*	*Est. Demand (watts/ SF)*	*Peak Load (MW)*	*Bus 1A % Capacity (1)*	*Bus 2A % Capacity (1)*	*Bus B % Capacity (1)*	*Xcel Feeder 1A % Capacity (1)*	*Xcel Feeder 2A % Capacity (1)*	*Xcel Feeder B % Capacity (1)*
Present Campus Load - 2012 (MW)					9.23	5.63	11.58	9.23	5.63	11.58
Present Campus Load - 2012 (%)					38.23%	23.32%	28.78%	70.58%	43.05%	88.55%
2015										
RMLEI	2A	87,792	3.00	0.263		24.411%			45.067%	
Subtotal 2015		87,792		0.263						
2016										
Anschutz Inpatient 2nd Tower, Finish	2A	200,000	4.00	0.800		26.634%			49.170%	
Interdisciplinary Bldg Ph. 1 Data Center	1A	5,000	25.00	0.125	38.750%			71.538%		
Interdisciplinary Bldg Ph. 1 Office	1A	67,200	4.00	0.269	39.863%			73.593%		
Subtotal 2016		272,200		1.194						
2017										
CTRIC Imaging	1A	48,000	4.50	0.216	40.758%			75.245%		
Subtotal 2017		48,000		0.216						
2019										
Interdisciplinary Building, Phase 2	1A	308,786	5.00	1.54393	47.153%			87.052%		
Subtotal 2019		308,786		1.544						
2021										
Ed 3 Academic Bldg	B	89,762	3.00	0.269			29.448%			90.612%
Vivarium Expansion	1A	27,342	6.00	0.164	47.833%			88.306%		
Subtotal 2021		117,104		0.433						
2022										
Auxiliary Services	B	32,000	3.00	0.096			29.687%			91.346%
Interprof. Commons	1A	80,000	3.00	0.240	48.827%			90.141%		
Subtotal 2022		112,000		0.336						
2023										
All UCH Projects	2A	2,019,000	4.50	9.086		42.832%			79.074%	
CUP 3 Chillers, Pumps & Towers	B			6.000			29.687%			137.228%
Subtotal 2023		2,019,000		15.086						

(1) Capacity percentages for switchgear are based on the rating of one or two buses tied together with a tie breaker. Thus, the percentages reflect the switchgear capacity with one main breaker open.
(2) Connections to distribution loops are chosen based on the proximity to the assumed location of each facility. Connection to other distribution loops are possible as well.
(3) Children's Hospital Colorado loads are not shown because they are not fed from campus switchgear.

Figure V.30 - Estimated Building and CUP Peak Electrical Demand

ELECTRICAL PROPOSED PROJECTS

CUP Chiller and Electrical Expansion

The demand for chilled water for HVAC cooling on the campus has actually declined in the last several years. It went from a high of about 12,000 tons in 2009 to a high of about 10,000 tons in 2012, even though there has been growth on the campus. This is largely due to energy conservation efforts. The demand is expected to grow in 2013 with the addition of projects at UCH and CHCO. This growth will be accommodated by the addition of a new 2,200-ton chiller in 2013. After that, within the planning period campus growth is expected to require the addition of two new 2,200-ton chillers and associated cooling towers and pumps. At that point, the plant will be fully built out in terms of chiller capacity, but no expansion of the facility will be required.

In order to accommodate the additional chillers, a major upgrade of the CUP electrical system is required. Electrical modifications would include the addition of circuit breakers and protective relaying for the existing 15kV CUP switchgear; provision of a new 4,160-volt substation for chiller power, addition of 480-volt switchgear for pumps, towers, and associated equipment; and the provision of a second 1000kW diesel-powered standby generator for backup power.

The CUP can accommodate boiler and generator expansions within the existing building envelope.

ELECTRICAL ENERGY CONSERVATION, BACKUP, AND RENEWABLE ENERGY OPTIONS

Cogeneration

The mechanical section of this report makes a strong case that cogeneration should be considered for this campus. A preliminary size of 10 MW was suggested.

A cogeneration system could partially solve one significant electrical concern as well. If a cogeneration system were connected to the CUP Primary Bus, it could be configured to be the primary source of power for the entire bus (both sides of the tie breaker). In this scenario, each side of the CUP Bus would be backed up via the existing Xcel feeder system. In this way, the reliability of the critical CUP power system would be vastly improved utilizing a system that has an acceptable payback period. A cogeneration system could similarly be used to back up the entire B Bus. Further study is recommended.

ISOC On-Site Backup Generating System

This option consists of a centralized diesel engine driven backup generating system, financed, built and operated by a third-party operator. The financial incentive for a third-party operator comes from Xcel Energy's Interruptible Service Option Credit (ISOC) plan. In this plan, Xcel Energy offers generous credits to entities that agree to be switched off and isolated from Xcel's system in circumstances where Xcel cannot accommodate all of their customers. This would include very hot days and during a failure of a transmission line, generator, or substation. Generally speaking, events that would trigger a request from Xcel to switch off the grid would not be frequent. They could amount to three to five days per year. In this case, CU Anschutz could assign the ISOC credits to a third-party operator and the third-party operator, would use these funds to amortize the costs of building and operating the plant. Ideally, the plant can be built and operated with no up-front cost or monthly charges to CU Anschutz. The University of Northern Colorado (UNC) has recently installed and

commissioned an ISOC generating facility to back up its west campus. In that particular installation, UNC has elected to own and operate the plant themselves to maximize rate of return on investment.

Advantages of this option include:

- Increased reliability since an Xcel system failure would not cause an extended CU Anschutz power shutdown
- CU Anschutz would require only one Xcel electrical feed for any bus that this option served, and the current Xcel reserve capacity charge would not be charged for that bus.
- If this option were implemented for Bus B, or for the CUP Bus, concerns about a failure of Xcel's Fitzsimons substation would be significantly lessened.
- All risks of plant operation and conformance to the ISOC requirements would be borne by the third-party operator.

Disadvantages of this option would include:

- CU Anschutz would need to dedicate suitable land area on campus as a site for the plant. The dedicated area should be close to the present ATO switchgear assemblies fed by the ISOC system.
- Service to the site of the new plant would need to be extended from the existing Xcel service point. However, this extension would be the responsibility of the third-party provider.

Further study of the ISOC alternative is recommended.

Renewable Energy Systems

Renewable energy systems were examined as options to reduce demand and liberate distribution system capacity.

On-site wind power from a wind turbine is not an option due to the variability of the wind source and high maintenance costs.

Solar photovoltaic (PV) panels could help, but they cannot be counted on to provide enough power all of the time to offset present demand. PV should be considered to cut energy costs and provide a source of green power to help with overall campus LEED certification, or to help CU Anschutz meet the goals of the campus's Climate Action Plan, and to generally help decrease greenhouse gas emissions. At present, the cost of solar panels has decreased to an all-time low. Nevertheless, even including government energy credits, the payback period and the footprint required for solar installations is generally not attractive. The option of entering into a power purchase agreement (PPA) with a third party should be explored. In this scenario, a third party would install a large solar array on campus and sell the energy generated to CU Anschutz at a predetermined rate. The PV arrays could be installed on the roof and south-facing walls of a building to minimize the land required for a large PV array. In this scenario, CU Anschutz would not own the system but would need to provide land for the array and permit access to the third party for operation and maintenance.

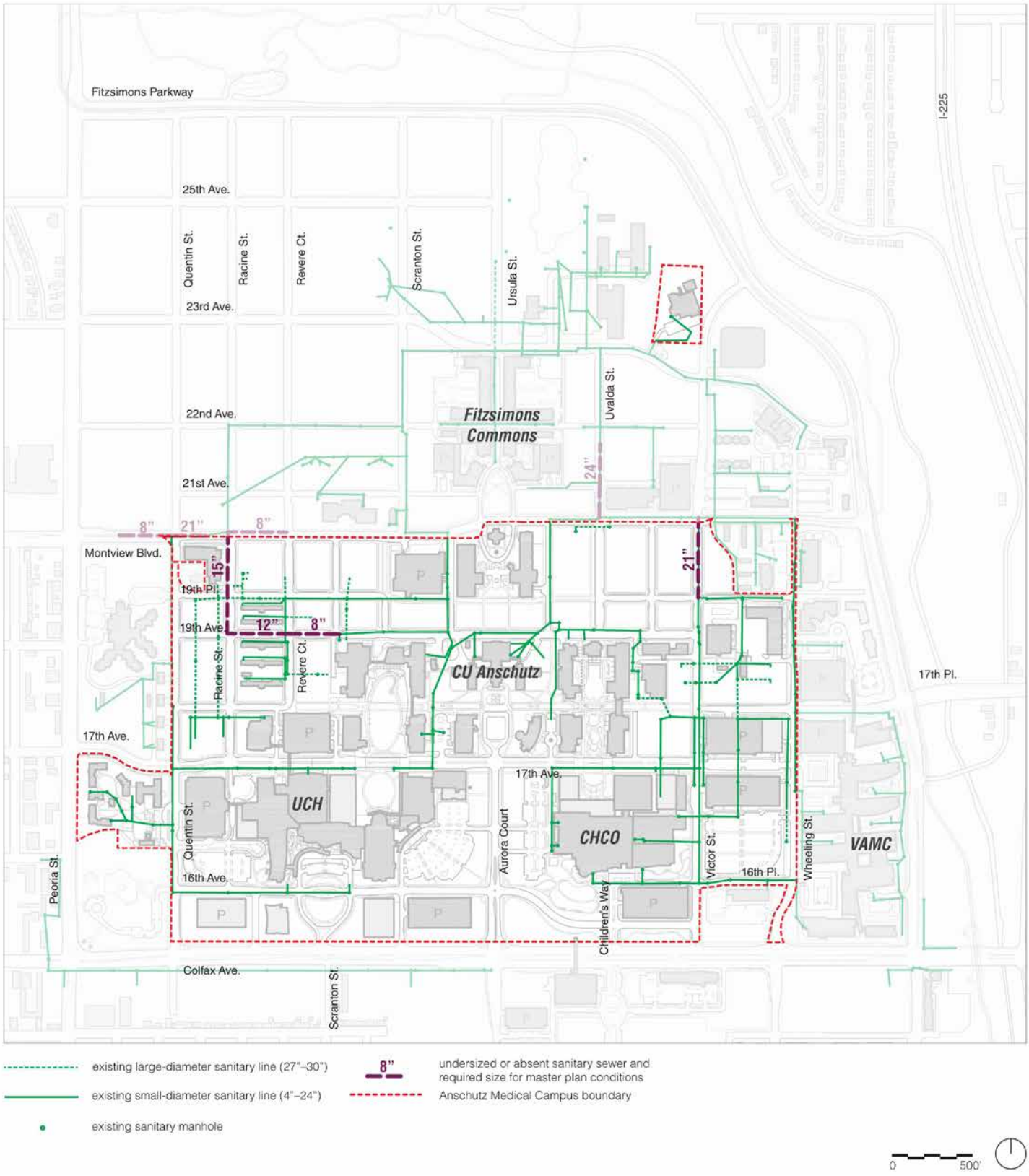


Figure V.31 - Sanitary Sewer Master Plan

SURROUNDING MUNICIPAL UTILITIES: SANITARY SEWER

The following upgrades to the sanitary sewer infrastructure are proposed to support the ultimate build-out of the Anschutz Medical Campus based on the CoA's master sanitary sewer record drawings dated July 1, 2012, and the master plan build-out conditions identified in the Fitzsimons Infrastructure Master Plan (FIMP) prepared by Matrix Design Group, Inc., dated March 2004:

- Install a 8-inch PVC main in E. Montview Boulevard from the midpoint of Peoria Street and Quentin Street to Quentin Street.
- Replace the existing 18-inch sewer main with a 21-inch PVC main in E. Montview Boulevard from Quentin Street to the midpoint of Quentin Street and Racine Street.
- Install an 8-inch PVC main in E. Montview Boulevard from Racine Street to Revere Court.
- Install a 15-inch PVC main in Racine Street from E. 19th Avenue to E. Montview Boulevard.
- Install a 12-inch PVC main in E. 19th Avenue from Racine Street to Revere Court.
- Install a 8-inch PVC main in E. 19th Avenue from Revere Court to the existing manhole just west of Research 2.
- Replace the existing 12-inch main with a 15-inch PVC main just north of E. 19th Avenue from the approximate midpoint of Fulginiti Center for Bioethics and Humanities to the drive just east of the Health Sciences Library.
- Replace the existing 21-inch PVC main in Uvalda Street from E. Montview Boulevard to the connection with the existing 24-inch sewer main south of E. 22nd Avenue.
- Replace the existing 18-inch sewer main with a 21-inch PVC main in Victor Street from E. 19th Place and E. Montview Boulevard.
- Add PVC mains as required per the master plan as the existing golf course area develops.

Per the Colorado Science + Technology Park at Fitzsimons Infrastructure Master Plan, dated August 2007, the park's full build-out wastewater flow is 4.12 MGD. Per the FIMP, dated March 2004, the Fitzsimons full build-out wastewater flow is 14.47 MGD.

Future sanitary improvements should be conveyed to the main trunk line system as improvements are made across the site. As future phases of the master plan progress, the existing sanitary line will require improvements.

Development will require installation of new sewer lines.

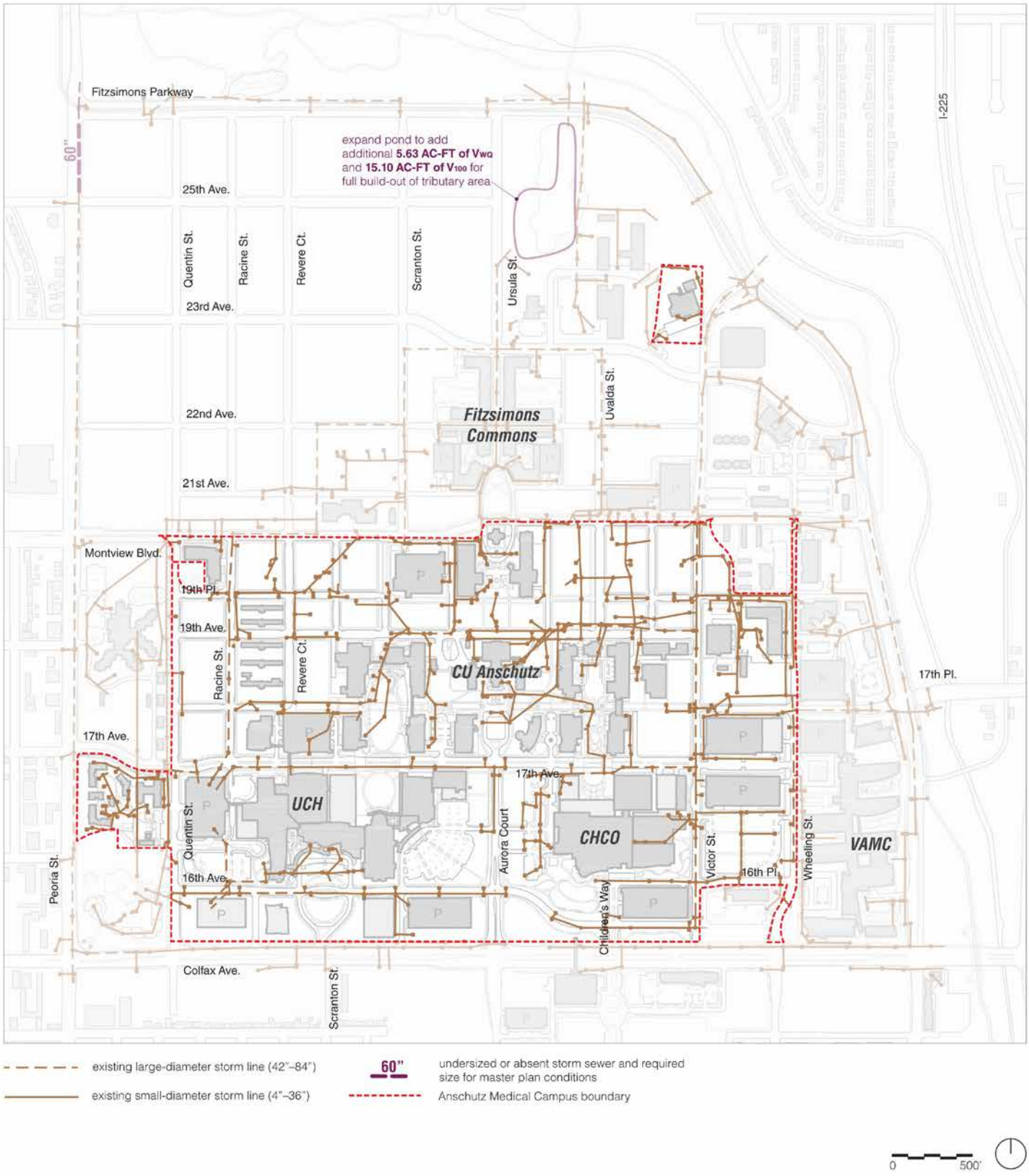


Figure V.32 - Storm Water Master Plan

STORM WATER

The following upgrades to the storm sewer infrastructure are proposed to support the ultimate build-out of the Site-Wide area based on CoA's master sanitary sewer record drawings dated July 1, 2012, and the master plan build-out conditions identified in the FIMP prepared by Matrix Design Group, Inc., dated March 2004:

- In its existing condition and the current state of the tributary area, Pond 374 has approximately 4.11 acre-feet available for 100-year storm runoff storage, and 0.35 acre-feet available for water-quality treatment. Any future developments on the Anschutz Medical Campus that exceed the current capacity of existing Pond 374 will require the expansion of the pond to the ultimate condition, as detailed in the Ursula Street Drainage Outfall plans (CoA #204193) or an interim condition.
- Add storm sewer mains as required per the master plan as the existing golf course area develops.

Expansion of the existing Pond 374 can be minimized or eliminated by utilizing storm water best management practices (BMPs) for new developments. Acceptable BMPs are outlined in the U*rban Storm Drainage Criteria Manual, Volume 3* (USDCM) and include grass swales, grass buffers, rain gardens, green roofs, sand filter basins, and permeable pavement systems. Per the USDCM, "The functions provided by BMPs may include volume reduction, treatment and slow release of the water quality capture volume (WQCV), and combined water quality/flood detention. Ideally, site designs will include a variety of source control and treatment BMPs combined in a treatment train that controls pollutants at their sources, reduces runoff volumes, and treats pollutants in runoff." If the full WQCV and 100-year detention volumes can be captured and treated on site for new developments, expansion of Pond 374 can be avoided.

Regional Detention Pond 374.

This chapter of the master plan detailed the fixed and flexible systems, and specific planned and proposed projects. The following chapter, Chapter VI: Implementation, organizes the future developments on campus into phases and proposes sites for new projects. It also looks at the related issues of financing and design guidelines that are covered in detail in separate documents developed by the university.

VI. IMPLEMENTATION

VI. IMPLEMENTATION

VI.1 OVERVIEW

A 10-YEAR PLAN: 2012–2022

The Anschutz Medical Campus 2012 Facilities Master Plan describes modifications and additions to the campus that are presently planned to occur over the next decade. Each of these building projects has been generally described, programmed, and assigned a date of anticipated completion. Based on these assumptions, these projects have been modeled for cost and schedule of delivery.

The Anschutz Medical Campus projects are distributed over 10 years based on anticipated program need and/or availability of funding. The dates for these projects are projections of program models prepared by the Office of Institutional Planning (OIP), developed in collaboration with the colleges and schools at the university. The projects are spread across this 10-year time period as indicated on the schedule included in this section (Figures VI.4 and VI.5).

UCH has identified projects that will be constructed during this period of time, and weighted them toward design, construction, and delivery in the later third of the facilities master plan period, years 7 to 10 (2018–2022) or beyond. CHCO projects have been identified and scheduled by their Facilities Operations Department.

VI.2 PHASING

Much growth is planned for the Anschutz Medical Campus over the coming 10 years. The phasing plan for future growth for the Anschutz Medical Campus is organized into two five-year windows: Phase I (2012–2013 to 2016–2017, or five years out from the submittal of the facilities master plan), and Phase II (2017–2018 to 2021–2022, or 10 years out from submittal). The projects have also been organized into three categories: new construction, renovation, and campus infrastructure. The chronological order in which the projects are presented is based upon a unique and flexible set of parameters that will continue to evolve over time. These include anticipated funding sources and priorities for individual projects, program needs, new offerings coming to the university, and the ability to renovate existing spaces only after current occupants have vacated or moved to other spaces.

All CU Anschutz projects noted below are described for programmatic use in Section V.4.A. The square footage of UCH projects is shown below, CHCO projects are described, and each hospital project is included on overall Anschutz Medical Campus development timelines for reference.

Below, the relevant issues regarding phasing are noted for each university project.

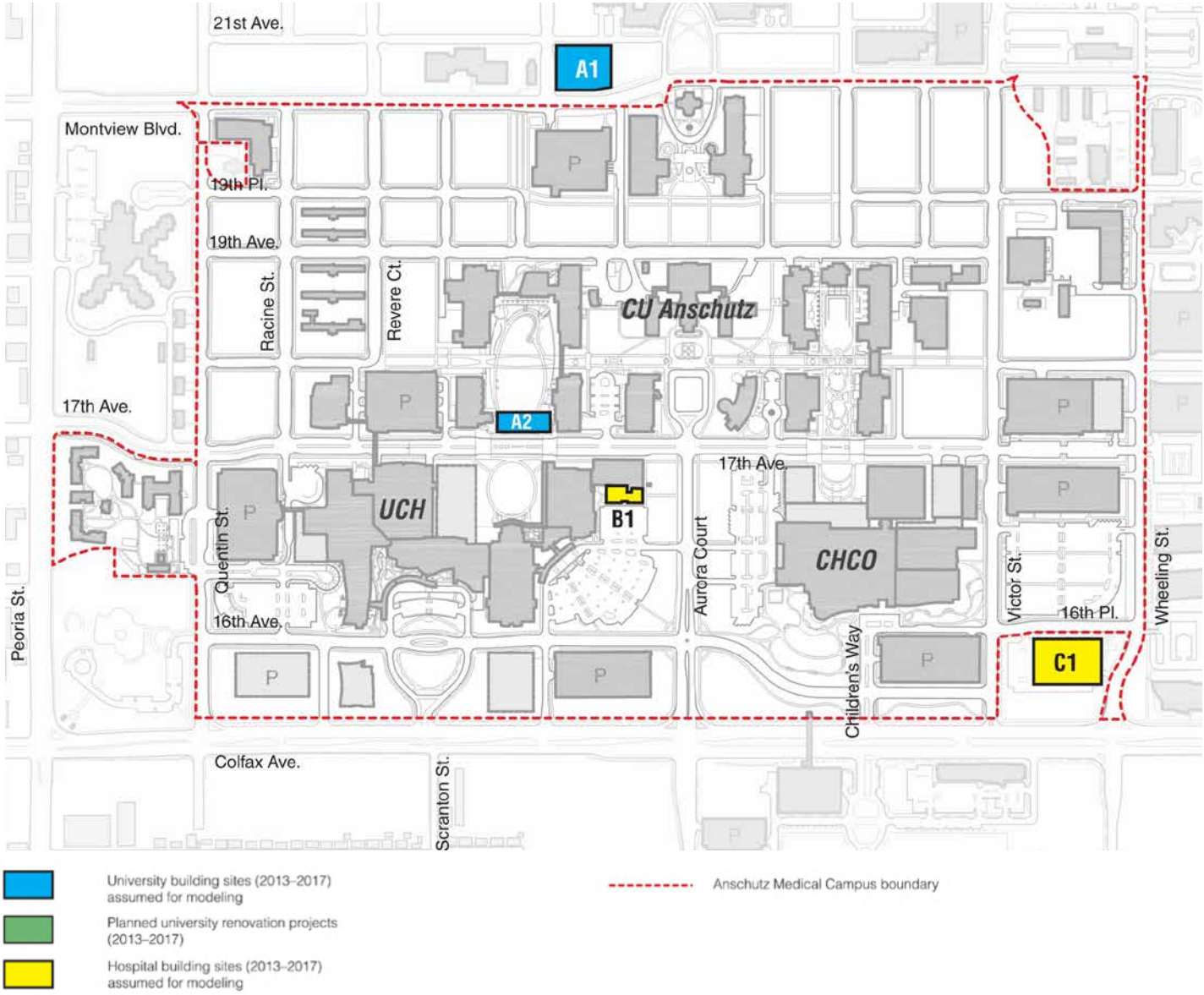


Figure VI.1 - New Construction and Renovation Phase I: 2013–2017

A. New Construction and Renovation: Phase I (Years 1–5)

NEW CONSTRUCTION - CU ANSCHUTZ

A1 - Bioscience 2 Building

Courses for the third- and fourth-year bioengineering students are planned to be taught at CU Anschutz starting in the fall 2015 semester. The Bioscience 2 Building will provide a new home for these programs (classrooms, teaching labs, student support space, faculty offices, and research labs), and thus should be ready for occupancy in fall of 2015. Additionally, space for university partners Clinimmune and iC42 will be constructed in this facility to accommodate their growth.

A2 - Interdisciplinary Building Phase I and Data Center

The existing university data center's deficiencies are significant, and it will become unable to grow over time. This limitation will soon have an impact on the ability of departments to grow their computing capabilities, which the new data center can accommodate. The project also is planned to include clinical faculty offices, which are currently in great need among all three Anschutz Medical Campus institutions. For these reasons, this project has been scheduled early in Phase I (2012–2017). It is presently scheduled for occupancy by the fall term, 2017.

NEW CONSTRUCTION - HOSPITALS

B1 - UCH Rocky Mountain Lions Eye Institute (RMLEI) Expansion

UCH's expansion of RMLEI is slated to be completed in Phase I and will add 87,792 GSF to the existing facility.

C1 - CHCO Dental/Outpatient Building

The site of CHCO's current Dental Pavilion/Healthy Smiles Clinic will be repurposed as a multistory outpatient medical office building. The dental practices will likely relocate into this medical office building, and other specialties will relocate, expand, or build practices in the space depending on patient needs and volumes. Size and occupancies are to be determined depending on financial resources and growth opportunities.

The vivarium expansion will occur in Phase II below-grade under the Research Commons.

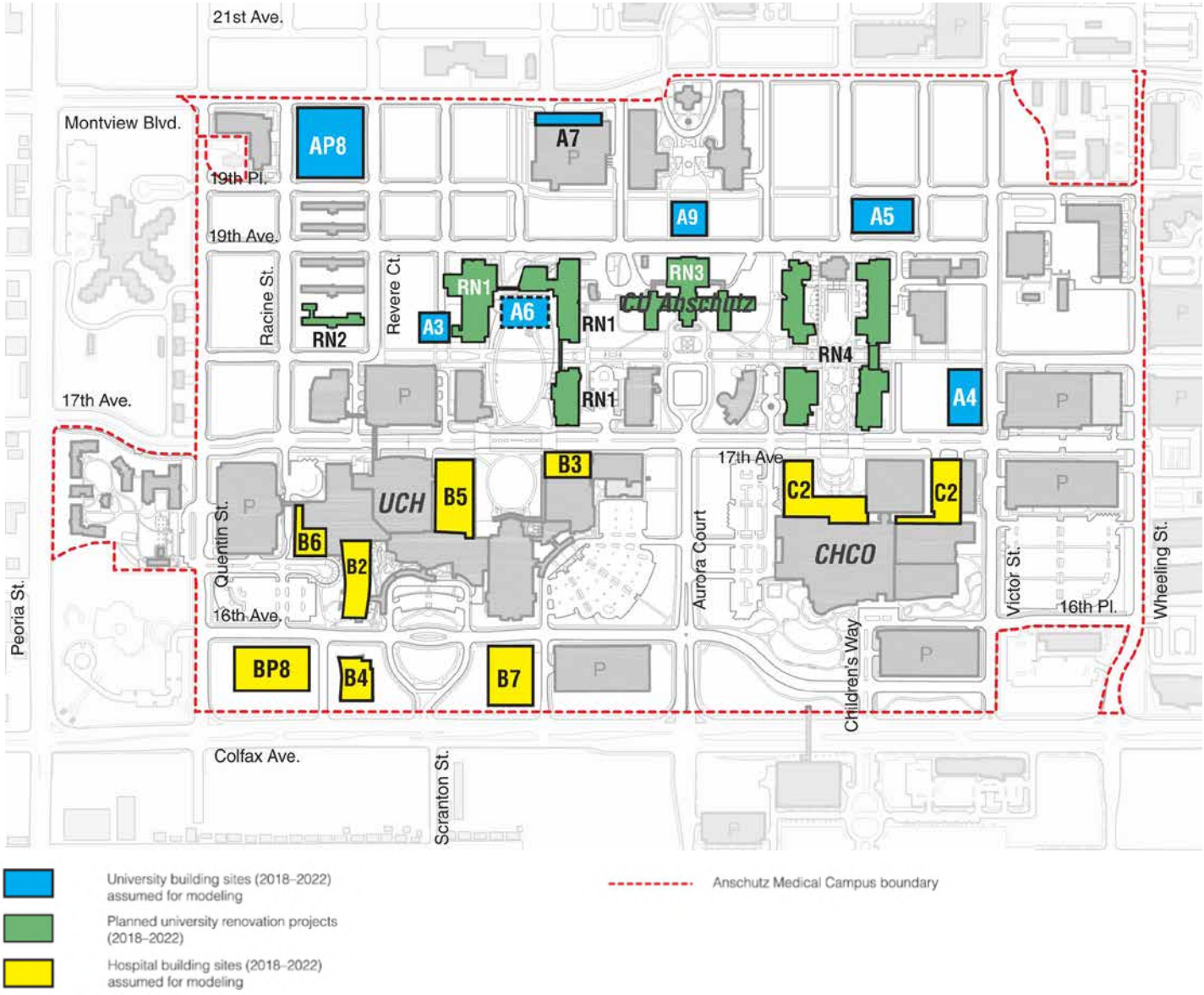


Figure VI.2 - New Construction and Renovation Phase II: 2018–2022

B. New Construction and Renovation: Phase II (Years 6–10)

NEW CONSTRUCTION - CU ANSCHUTZ

A3 - Colorado Translational Research Imaging Center (CTRIC)

CTRIC is slated to develop primarily in the beginning of Phase II (Years 6–7). The project is dependent upon the availability of funding. The imaging that will occur there is critical for programs across the campus, and thus makes it a high-priority project. This building would become the center for all imaging research, which is currently spread across campus in various locations.

A4 - Interdisciplinary Building Phase II

Growth in research is projected to require additional space in Year 8 of the master plan. Interdisciplinary Building Phase II is planned to accommodate this growth. Design for this space may begin in Year 5 at the end of Phase I. This space should be available for use in Year 8 for the fall term of 2020. Like the CTRIC project, this facility is scheduled due to the projected program needs, but it is dependent on available funding. This building will also accommodate future clinical space, creating a dynamic crossroads for academics, research, and clinical functions.

A5 - Education Building 3

Increased student enrollment, space utilization, and the need for a centralized simulation center drive the programmatic need and phasing of this project. Education Building 3 is currently scheduled for programming and design beginning in Year 7 of the master plan and occupancy in fall of 2022 to address the need for more classroom and teaching lab space at CU Anschutz.

A6 - Vivarium Expansion (Underground)

The need for new research space will drive the vivarium expansion. It is presently scheduled to be available for use two years after the construction of Interdisciplinary Building Phase 2, or for the fall term of 2022 (Year 10).

A7 - Auxiliary Services Building

The predominate program users in the Auxiliary Services Building will be the University Police and Parking Services offices, and the building is envisioned as a wraparound or addition onto the existing Henderson Parking Garage's north side, facing Montview Boulevard. Both programs utilize a fair number of vehicles and require adjacent covered/protected parking available in the Henderson Garage to park and store vehicles. Given the narrow site dimension, the building will be multi-storied with pedestrian access bridges aligned with the existing parking levels of the Henderson Garage. Although this project is currently planned along the north side of the Henderson Parking Garage, it may be considered a component of the Parking Structure 2 (AP8) project scope depending upon the site location selected, the program space needs, parking space needs, and alignment of the project timelines.

AP8 - Parking Structure 2

A new multilevel parking structure of 490,000 GSF to accommodate 1,540 vehicles is scheduled to be constructed toward the end of the 10-year planning period. The building is planned as a seven-level parking garage similar to the existing Henderson Parking Garage constructed in 2007, which is located immediately west of the Skaggs School of Pharmacy Building. It is envisioned that the new Parking Structure 2 will be located near or directly adjacent to the Health and Wellness Center, located on the northwest corner of the university campus. Although the Auxiliary Services Building is planned along the north side of the Henderson Parking Garage, it may be considered a component of the Parking Structure 2 project scope depending upon the site location selected, the program space needs, parking space needs, and alignment of the project timelines.

A9 - Interprofessional Commons

This project is programmed to accommodate the growing need for a central location for a bookstore, food service, student organization, open computer/study lounge, and open collaborative meeting space for faculty, students, and other professionals on the university campus. The proposed building site location directly north of Building 500 is equidistant to the education, research, and administrative functions that occur on the campus. A project that combines select student services similar to those of a student center will be a much needed amenity for students, faculty, researchers, and other professionals as the CU Anschutz population continues to grow during the planning period.

NEW CONSTRUCTION - HOSPITALS

UCH Projects

- B2 - New Inpatient Tower: 734,000 GSF
- B3 - Cancer Pavilion Expansion: 35,000 GSF
- B4 - Marion Downs Hearing Center: 100,000 GSF
- B5 - Inpatient Tower Expansion (East): 250,000 GSF
- B6 - Inpatient Tower Expansion (West): 400,000 GSF
- B7 - Outpatient Expansion: 250,000 GSF
- BP8 - Visitors Parking Garage: 250,000 GSF

C2 - CHCO Maternal Fetal Medicine (West)

CHCO has planned for a multistory addition to the northwest side of the main hospital to accommodate its growing intensive care unit needs. The addition will also house the expansion of the Colorado Institute for Maternal and Fetal Health. The size and timeline for this expansion are yet to be determined.

RENOVATION/EXPANSION

RN1 - Phase I Renovations: Research 1 and Research 2

The renovations identified for Aquatics, Cage Fit, Security, RFID, and the fitting out of shelled space in Research 1, Research 2, and the ABSL3 Core do not require the relocation of existing programs. These renovations are shown to occur in Years 6 and 7 of the phasing plan accordingly to help increase capacity and operational efficiencies.

RN2 - Phase II Renovations: Coordination with CTRIC

When the new CTRIC facility is completed (scheduled for fall of 2018), a series of moves and small renovations will become necessary. These include SOM programs moving to CTRIC, imagers moving to CTRIC, and small classroom renovations. These are presently scheduled to begin in the fall of 2019, once existing spaces are vacated and moved into the new CTRIC building.

RN3 - Phase III Renovations: Building 500

Occupancy of the new Interdisciplinary Building Phase I and Data Center in 2017 will allow space occupied by the old data center and offices in Building 500 to be renovated. Occupancy of the renovated space is proposed for the fall of Year 6 (2017).

RN4 - Phase IV Renovations: Education 2, Education 1B, School of Dental Medicine Building

Occupancy of the new Education Building 3 in the summer of Year 10 (2022) will make space in Education 2, Education 1B, and the School of Dental Medicine Building (primarily existing simulation labs) available for construction renovation. Occupancy is proposed for the renovated space in the summer of Year 11 (2023). Renovation of these spaces allows existing departments to grow in their current locations.

Selected spaces in the buildings around the Education Commons will be renovated in Phase II.

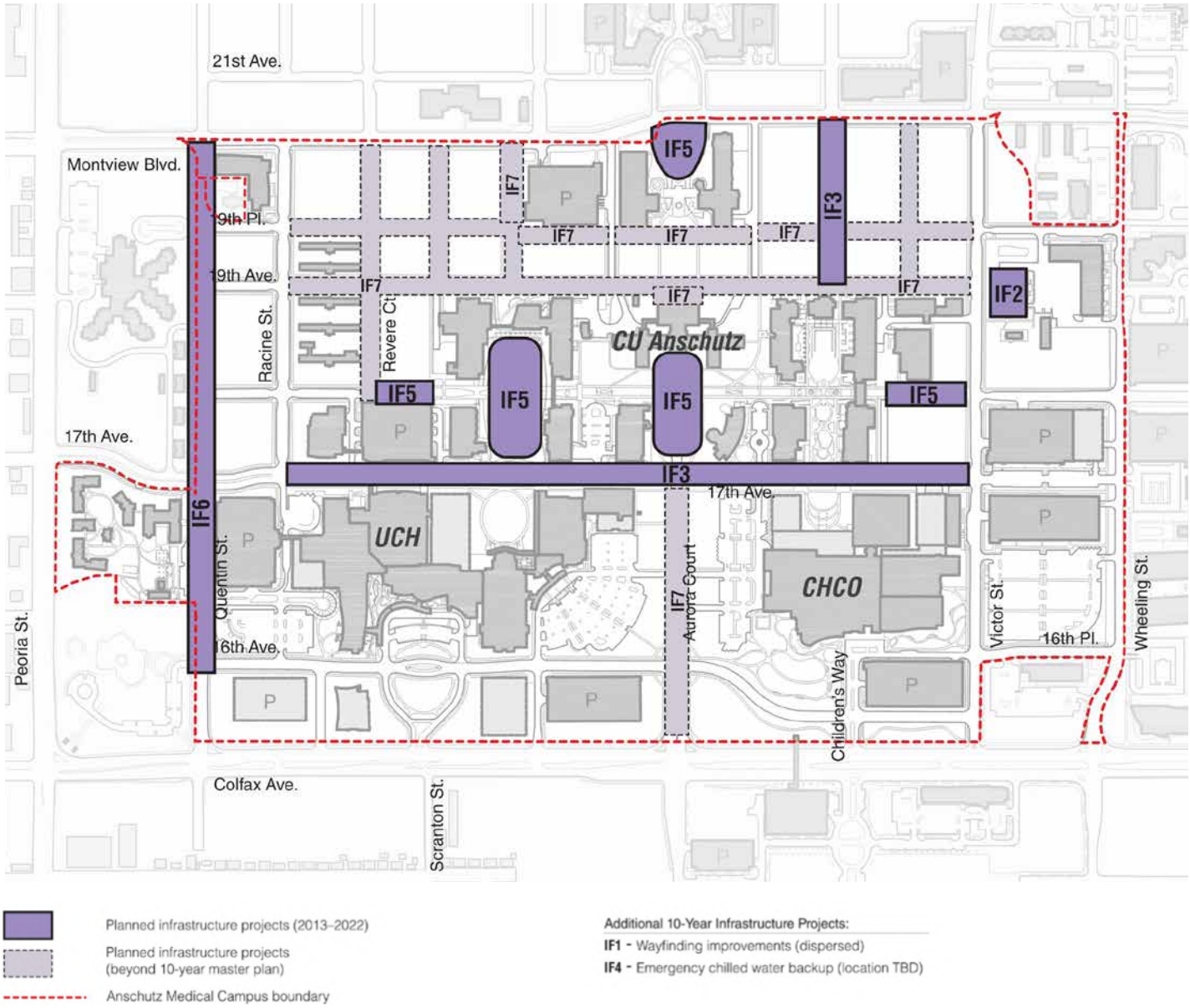


Figure VI.3 - Infrastructure and Utilities Phases I and II: 2013–2022

C. Infrastructure and Utilities: Phases I and II

PHASE I

IF1 - Wayfinding Improvements

Development of monumental campus signage and other campus wayfinding improvements is presently under way. The full scope of this work is anticipated to be complete by Year 3, end of summer 2015.

IF3 - Circulation/Roadway Improvements

Roadway improvements along 17th Avenue, 19th Avenue, Uvalda Street, Revere Street south of Montview Boulevard, and other minor projects (recommended through traffic analysis in this master plan) are proposed to occur in Years 4 and 5 (2016 and 2017), primarily due to proposed availability of funding.

PHASE II

IF2 - CUP Boiler and Generator Expansion

CUP expansion would be required for the construction of Interdisciplinary Building Phase II. This project is also scheduled assuming that the 10-year master plan projects for UCH and CHCO will not move forward ahead of the schedule shown in this document. If they do so, the CUP expansion will need to move ahead accordingly, as any excess capacity described in Section V.4.A., Planned and Proposed Projects, would be consumed and thus unavailable for Interdisciplinary Building Phase I and II.

IF4 - CUP Expansion to Support Vivarium - Emergency Chilled Water Capacity

Vivarium expansion (construction to begin in Year 9) may require utility expansion of the emergency chilled water that is available for the vivarium, but this will depend on UCH and CHCO expansion project timetables. This expansion would need to be designed, constructed, and ready for use by the end of 2021 (Year 9), when the vivarium is expanded.

IF7 - Circulation/Roadway Improvements

Assorted roadway improvements identified under the future projects in Section V.5.A are shown in the phasing plan as occurring late in the 10-year master plan window due to assumed competing needs for capital funding. These improvements are separate from those identified in IF3 but may complement or be a continuation of those developments.

A summary Development Schedule of all Phase I and Phase II projects, including new facilities, renovation, and infrastructure, for the Anschutz Medical Campus is presented on the following pages.

Development Schedule
Anschutz Medical Campus

Project		GSF	
NEW FACILITIES:			
A1	**Bioscience 2 - Building**		**120,000**
	Bioengineering	28,594	
	IC42	16,284	
	Clinimmune	28,122	
	FRA leased space (core & shell only)	47,000	
	Total	120,000	
A2	**Interdisciplinary Building Phase I**		**72,600**
	Data Center Servers	5,000	
	Offices-Data Center and IT Services	32,328	
	Bioinformatics Center	9,392	
	Clinical Faculty Offices	22,296	
	Other Spaces	3,584	
	Total	72,600	
A3	**CTRIC Imaging**		**48,000**
	Imaging	48,000	
	Total	48,000	
A4	**Interdisciplinary Building Phase II**		**308,786**
	Programming Additional Need		
	Unidentified Research - 50/50 wet/dry	293,350	
	Unidentified Admin/Support Space	15,436	
	Total	308,786	
A5	**Education 3 Academic Building**		**89,762**
	Faculty Office/Conf Rooms & Service Space	21,600	
	Simulation Center	24,000	
	Academic Classroom & Service	16,482	
	SOM Medical Teaching Labs	27,680	
	Total	89,762	
A6	**Vivarium Expansion**		**27,342**
	Vivarium Expansion	27,342	
	Total	27,342	
A7	**Auxilary Services Building**		**32,000**
	University Police	32,000	
	Total	32,000	
AP8	**Parking Structure II**		**490,000**
	Faculty/Staff/Student Parking Facility	490,000	
	Total	490,000	
A9	**Interprofessional Commons**		**80,000**
	Bookstore, Food Service, Student Orgs., Student & Faculty Mtg. Spaces, Study & Computers	80,000	
	Total	80,000	
TOTAL NEW FACILITIES CU Anschutz Medical Campus			**1,268,490**
	New Facilities Total		778,490
	New Parking Structures Total		490,000
UCH & CHCO NEW FACILITIES:			
B1	**Rocky Mountain Lion's Eye Institute Expansion (UCH)**		**87,792**
C1	**Dental/Outpatient Building (Childrens Hospital)**		**180,000**
C2	**Maternal Fetal Medicine (Childrens Hospital)**		**267,000**
	University Hospital Projects (UCH 10+ Years)		**2,019,000**
B2	Main Building Expansion	734,000	
B3	Cancer Pavilion Expansion	35,000	
B4	Marion Downs Hearing Center	100,000	
B5	Inpatient Tower Expansion [East]	250,000	
B6	Inpatient Tower Expansion [West]	400,000	
B7	Outpatient Expansion [South of 16th Avenue]	250,000	
BP8	Visitor Parking Garage	250,000	
TOTAL NEW FACILITIES UCH & CHCO			**2,553,792**
	New Facilities Total		2,303,792
	New Parking Structures Total		250,000

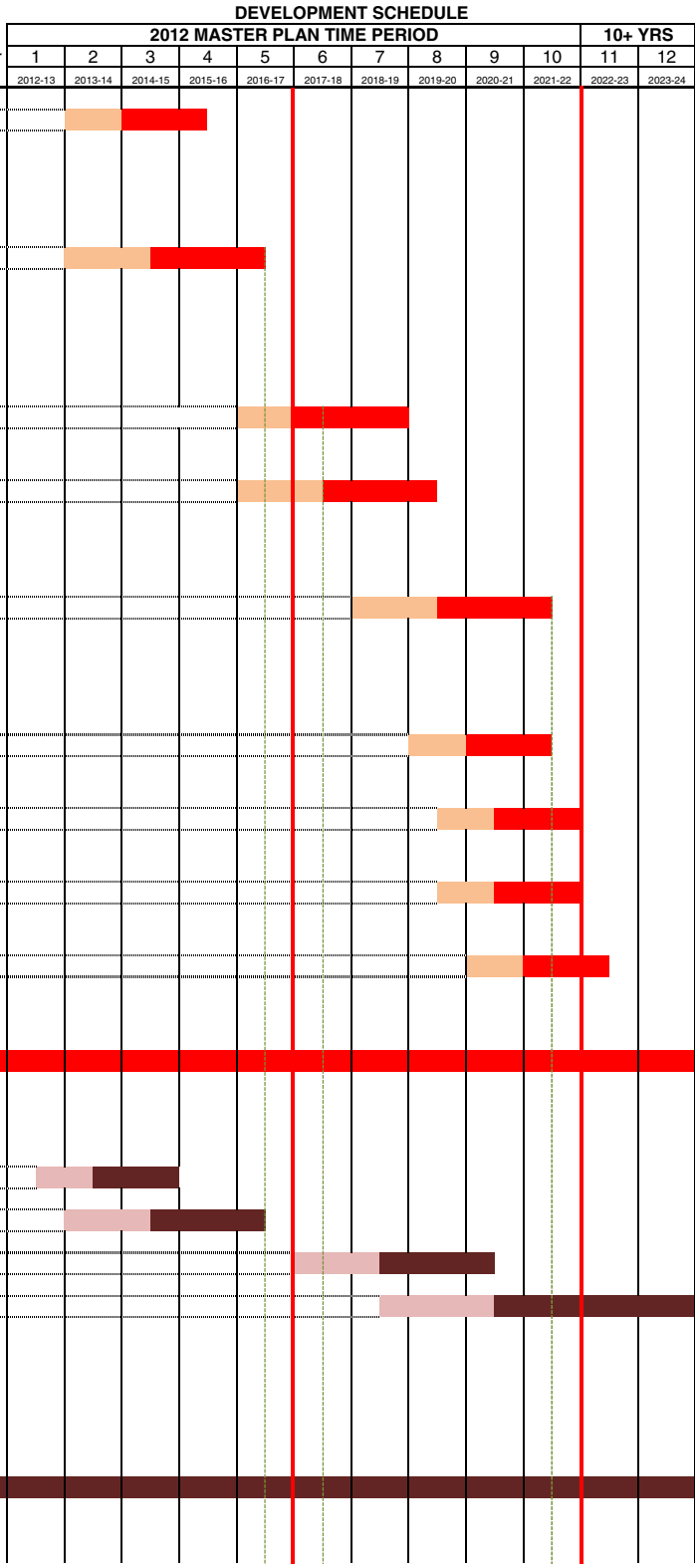
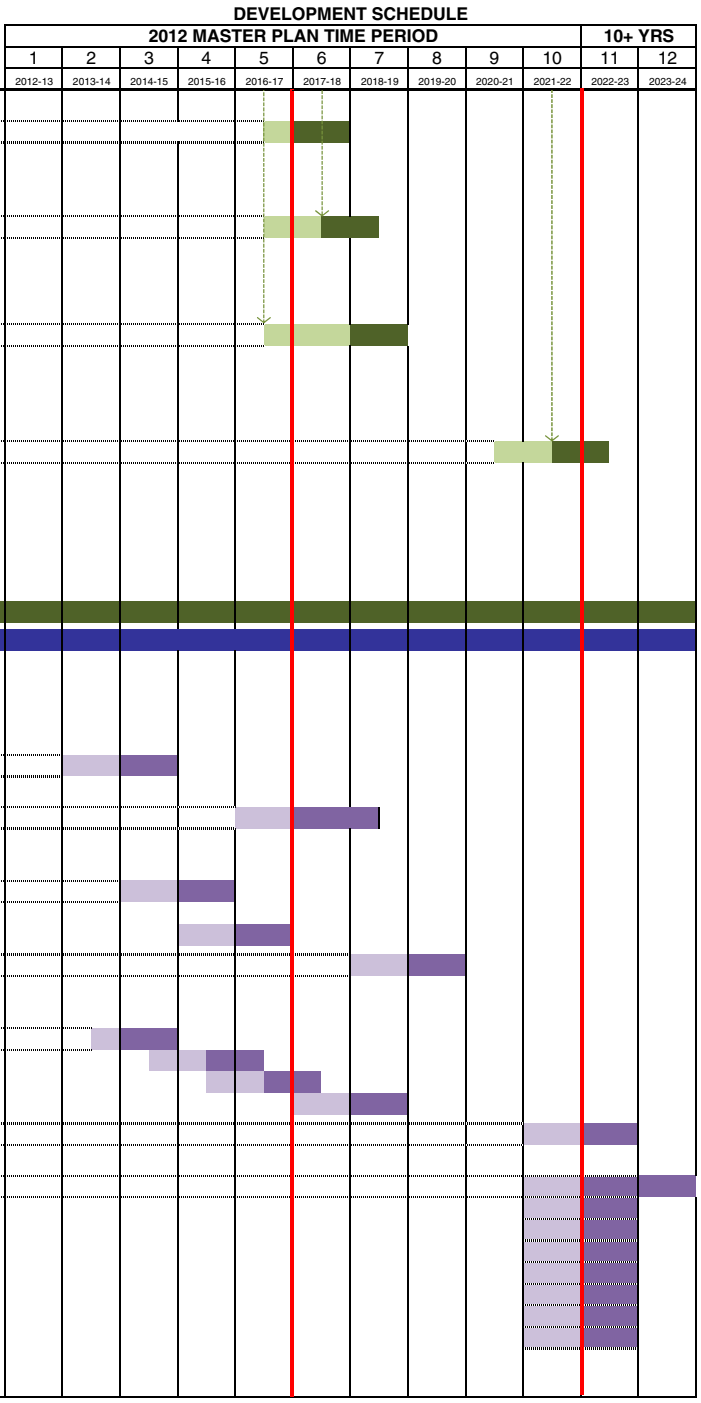


Figure VI.4 - 10-Year Development Schedule - New Facilities

Development Schedule
Anschutz Medical Campus

	Project		GSF
	RENOVATION:		
RN1	**Phase I**		17,638
	R1 & R2 - Aquatics, Cage Fit, Security, RFID	8,206	
	R2 Fit-Out of Shelled Space, ABSL3 Core	9,432	
	Total	17,638	
RN2	**Phase II - Coordinate with CTRIC Development**		56,411
	B400 - SOM Programs to CTRIC	31,331	
	B533 - Imager Move to CTRIC	5,080	
	Reconfiguration of Existing Classrooms	20,000	
	Total	56,411	
RN3	**Phase III - Coordinate with Data Center Occupancy**		56,690
	SPH & AMC Adm offices to Backfill space in Bldg 500		
	B500 - CU Anschutz IT Moves to Data Center	26,810	
	B500 - UCH IT Moves to UCH leased space	29,880	
	Total	56,690	
RN4	**Phase IV - Coordinate with Education Building 3**		22,400
	Expansion of Exist. Programs (Nursing, SOM, Dental)		
	B500 - Move to New Simulation Center	1,600	
	Ed 2 North - Move to New Simulation Center	4,800	
	Ed 2 N - ESS Moves to Interdisciplinary Ph. 2	12,800	
	Ed 1 SIM Space - Move to New SIM Center	3,200	
	Total	22,400	
	TOTAL RENOVATION CU Anschutz		153,139
	TOTAL New and Renovation CU Anschutz		931,629
	New Facilities and Renovation Total for Anschutz Medical Campus		3,235,421
	New Parking Structures for Anschutz Medical Campus		740,000
	INFRASTRUCTURE - Projects Not Required for Building Construction		
IF1	**Wayfinding Improvements**		
	Wayfinding Signage		
IF2	**Infrastructure - Support for Interdisciplinary Building Phase II**		
	Assumes UCH & CHCO have no expansions		
	CUP Boiler Expansion		
IF3	**Circulation Improvements**		
	17th Avenue Development to complete Roadways		
	Uvalda Roadway - 19th Avenue to Montview (Alignment)		
IF4	**Infrastructure - Support for Vivarium Expansion**		
	Assumes UCH & CHCO have no expansions before this time period		
	Emergency Chilled Water Back-Up		
IF5	**Landscaping Improvements**		
	Research Commons Quad Landscape Redesign		
	Fitzsimons Plaza - Demolish Red Cross & Develop Plaza		
	South of B500 & Art Walk Extensions-Coordinate w/ Interdisciplinary Bldg I & II		
IF6	**Utility Improvements**		
	Quentin Storm Sewer - 16th to Montview		
IF7	**Improvements Planned beyond the 10 Year Master Plan**		
	B500 North Side Exterior Improvements		
	Aurora Court Redesign - Colfax to 17th Ave		
	19th Place Promenade		
	Scranton Street Greenway		
	Street Grid & Campus Greenway Development		
	19th Avenue - Victor Street to Racine Street		
	Construct Revere Court - 17th Place to Montview		
	Note: Demolition of Existing Buildings Included in Project Costs		



Total program and space requirements above exclude affiliates.
KEY: Bars represent time required for planning and construction. The lighter portion of the bar represents the planning phase; the darker portion, construction.

Figure VI.5 - 10-Year Development Schedule - Renovation and Infrastructure

VI.3 FINANCING STRATEGY

FINANCIAL PLAN SUMMARY

CU Anschutz prepared a Financial Plan to support the development identified for the campus in the 2012 Facilities Master Plan. The Financial Plan was developed using financial models to estimate projected construction costs for new facilities, renovation, new facility operating and maintenance, and infrastructure to support the new facilities and campus community. The process used to develop the Financial Plan includes the following steps:

- First, requirements are identified for construction of new and renovated space, infrastructure development, controlled maintenance of existing space, and operating costs for new space.
- Next, funding strategies are identified that include CU Anschutz resources as well as other options such as public/private partnerships.
- Rather than applying projected resources to space requirements, the funding strategies serve as guidelines that can be applied to specific projects as resources become available or other options are identified.
- If the resources are not available to fund a project shown at a specific time on the development timeline, the project will be moved farther out on the timeline or reconsidered for development.

The 2012 Facilities Master Plan Financial Plan is included in this report as a companion document, and it contains the following information:

- Overview of the existing development of the campus and its economic impact to the state of Colorado and the surrounding region
- Description of the 2012 development plan
- Current funding climate
- Financial Plan methodology
- Major assumptions for the Financial Plan requirements
- Major assumptions for the Financial Plan funding strategies
- Financial Plan summary

Figure VI.6 summarizes the financial requirements identified for the development plan.

New construction projects, like the UCH employee parking garage shown above, will continue to better the Anschutz Medical Campus.

Summary of the Projected Financial Requirements
University of Colorado Anschutz Medical Campus
August 2013

Description	*Ten Years 2012–2022* *(in 2013 Construction Dollars)*
New Facilities	
A1 - Bioscience 2	$38,551,581
A2 - Interdisciplinary Building Phase I	$43,676,175
A3 - CTRIC Imaging	$32,842,152
A4 - Interdisciplinary Building Phase II	$175,547,237
A5 - Education 3 Academic Building	$44,096,493
A6 - Vivarium Expansion	$49,907,887
A7 - Auxiliary Services (Univ. Police & Parking Services)	$14,463,687
AP8 - Parking Structure 2 (1,540 spaces)	$27,587,725
A9 - Interprofessional Commons	$38,459,583
Total New Facilities	**$465,132,520**
Renovation of Existing Spaces	
RN1 - Phase I - R1 & R2 Vivarium Renovations/Upgrades	$21,550,745
RN2 - Phase II - Backfill of Imaging Spaces/Classroom Renovations	$10,964,389
RN3 - Phase III - Data Center Backfill	$12,927,278
RN4 - Phase IV - Simulation, ESS, and Education Backfill	$5,191,890
Total Renovation	**$50,634,302**
Other	
Facility Operating	$6,825,144
Facility Controlled Maintenance	$58,330,060
Infrastructure	$14,976,269
Total Infrastructure	**$80,131,473**
Grand Total	**$595,898,295**

Note: Budget $ estimate amounts are in 2013 Construction Dollars and do not include inflation.

Figure VI.6 - Summary of the Projected Financial Requirements

Figure VI.6 shows the following information for the 2012 Facilities Master Plan:

- The total projected costs (in 2013 construction dollars) for the development plan are $595,898,295, and they include the anticipated costs to construct new facilities, renovate space, operate and maintain new space, and develop infrastructure to support the new space and campus community.
- Because some of the projects are anticipated to begin in the later years of the planning horizon from 2012–2013 to 2021–2022, they are scheduled to be completed after this 10-year time period. These costs are not included in this analysis.

Figure VI.7 on the following page provides a comprehensive look at the implementation phasing and shows both Phase I and Phase II new construction project sites, as well as potential developable areas for Site-Wide area build-out.

Figure VI.8 summarizes Phase I and Phase II implementation phasing and costs.

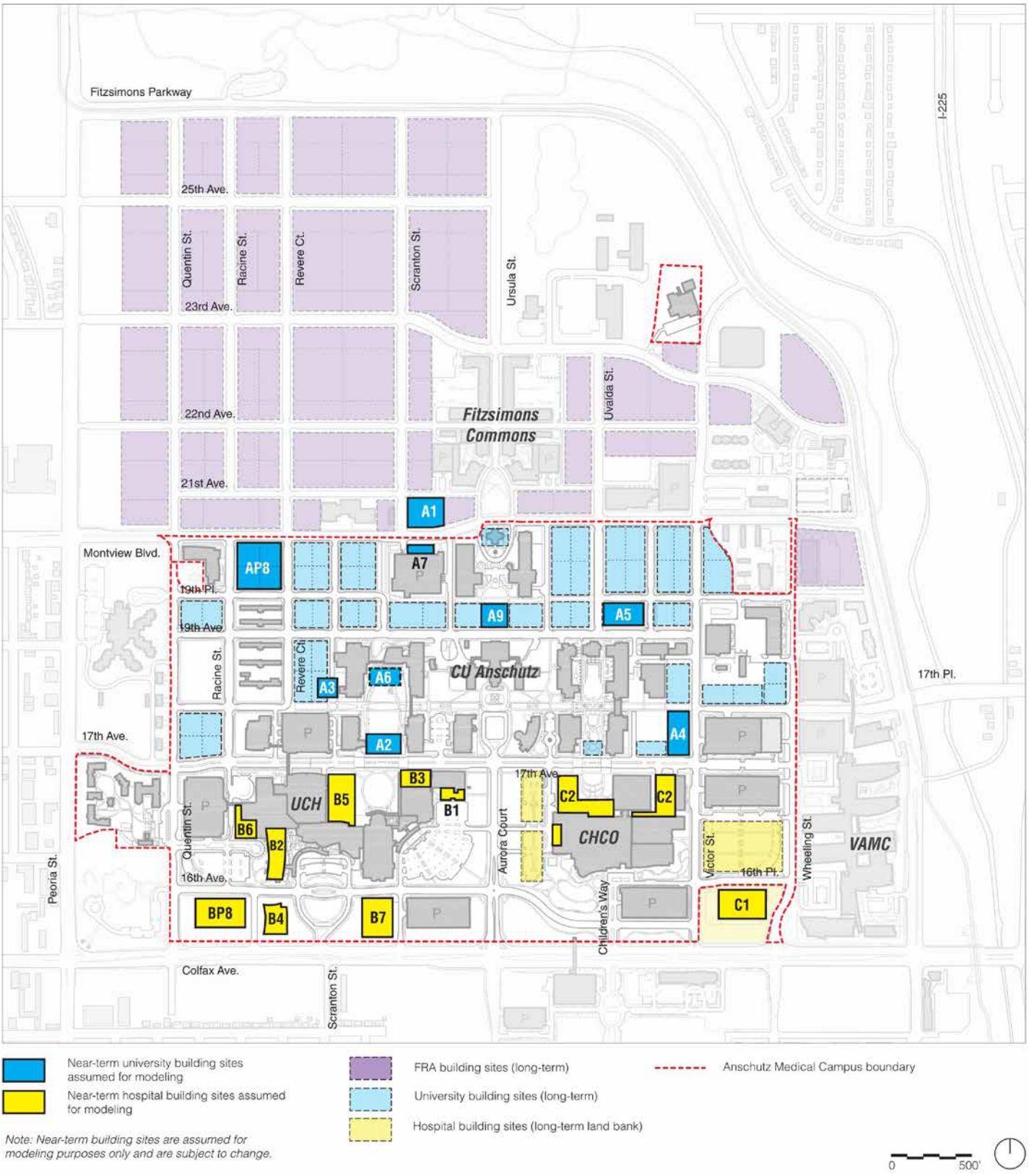


Figure VI.7 - Potential 10-Year and Long-Term Building Sites

Project Implementation Phasing and Costs
University of Colorado Anschutz Medical Campus
2012

ref.	Projects	CU Anschutz Estimated GSF	Anticipated Year of Development Completion	Estimated $ Cost (in 2013 Construction Dollars) Phase I (2013–2017)	Phase II (2018–2022)
Facilities					
A1	Bioscience 2 (1)	120,000	2015	$38,551,581	
A2	Interdisciplinary Building Phase I	72,600	2017	$43,676,175	
A3	CTRIC Imaging	48,000	2018		$32,842,152
A4	Interdisciplinary Building Phase II	308,786	2018		$175,547,237
A5	Education 3 Academic Building	89,762	2019		$44,096,493
A6	Vivarium Expansion (underground)	27,342	2020		$49,907,887
A7	Auxilary Services Building	32,000	2021		$14,463,687
AP8	Parking Structure 2 (Approx. 1,540 vehicles)	490,000	2021		$27,587,725
A9	Interprofessional Commons	80,000	2022		$38,459,583
Renovations of Existing Spaces					
RN1	Phase I - R1 & R2 Vivarium Renovations/Upgrades	17,638	2018		$21,550,745
RN2	Phase II - Backfill of Existing Imaging Spaces/Classroom Renovations	56,411	2019		$10,964,389
RN3	Phase III - Existing Data Center Backfill in Building 500	56,690	2019		$12,927,278
RN4	Phase IV - Existing Simulation, ESS, and Education Backfill	22,400	2023		$5,191,890
Infrastructure					
IF1	Wayfinding	-	2015	$456,412	
IF2	CUP Boiler/Generator Expansion (2)	-	2018		$7,660,800
IF3	Circulation Improvements (Roadway, Pedestrian, Bike)	-	2015–17	$3,494,848	
IF4	Emergency Chilled Water for Vivarium Expansion (3)	-	2018–20		$523,050
IF5	Landscaping Improvements (4)	-	2015–22	$2,012,421	$828,738
IF6	Utility Improvements (Storm Sewer)	-	2022+	-	(5)
IF7	Demolition of Vacant/Abandoned Buildings (700 Series) & Other Projects Beyond 2022	-	2022+	-	(5)
Total		**1,421,629**		**$88,191,437**	**$442,551,654**

Note: Budget $ estimates are based upon 2013 construction dollars and do not include inflation for future years
(1) GSF total includes 47k GSF for lease to the FRA. Cost of property is included in above $ amount.
(2) Project may need to be completed prior to opening of the Interdisciplinary Building Phase I.
(3) Project must be completed prior to the opening of the Vivarium Expansion.
(4) Pricing only includes those landscape projects within the 10-year master plan period.
(5) Beyond 10-year planning horizon.

Figure VI.8 - Project Implementation Phasing & Costs

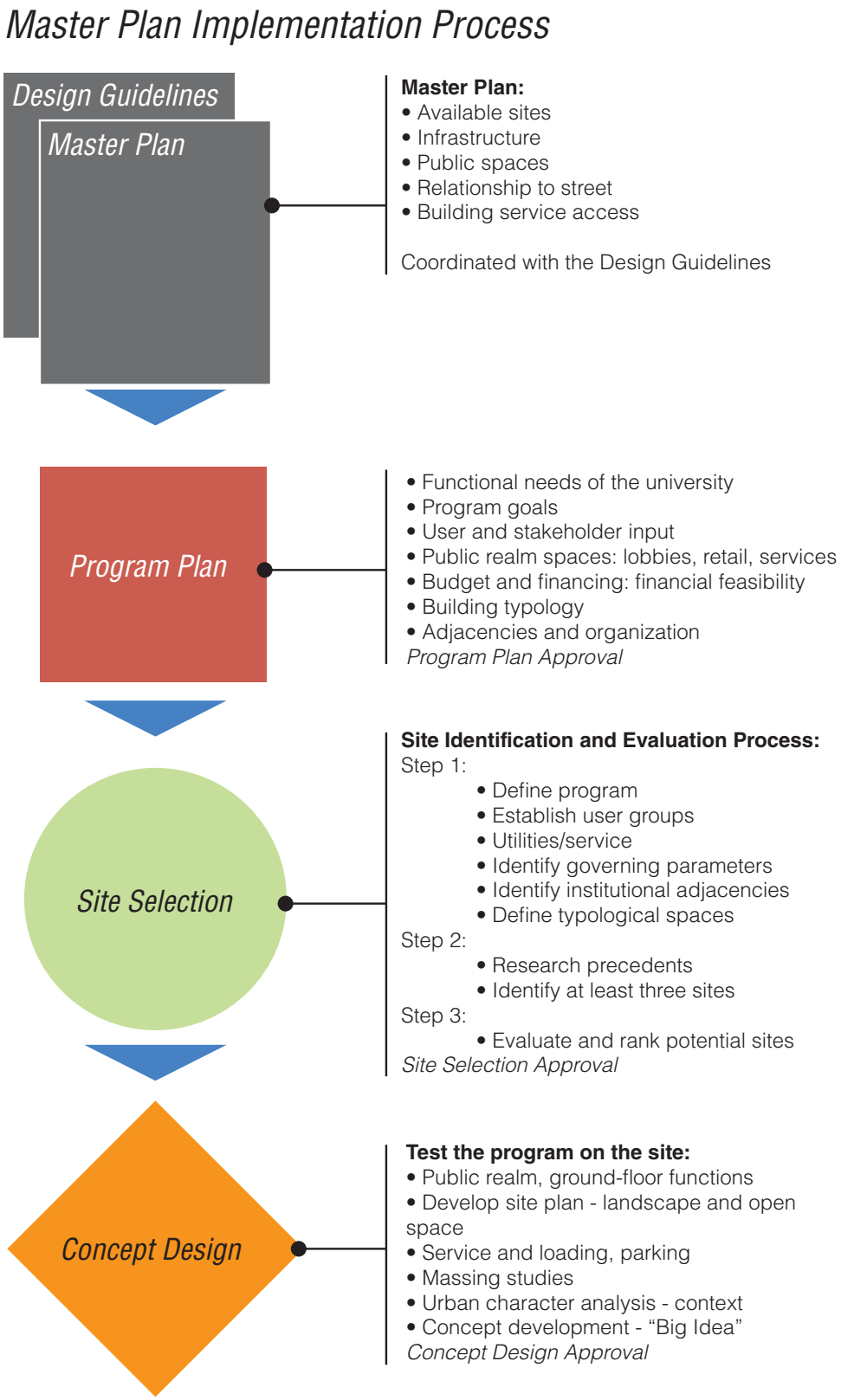


Figure VI.9 - Master Plan Implementation Process

VI.4 KEEPING THE VISION

The highly participatory 2012 Facilities Master Plan process resulted in broad consensus on an exciting physical vision for the 21st-century Anschutz Medical Campus—supported by commendable goals and realistic principles—that together informed the creation of plan propositions, recommendations, and design and development guidelines. However, a worthy vision without a clear strategy for implementation oversight may never be realized. Success requires stakeholders put forth a concerted effort to ensure that the vision is sustained and subsequent actions stay the course recommended in the plan. Implementation should maintain the spirit of stakeholder collaboration and consensus that guided the facilities master plan process.

Fortunately, the three Anschutz Medical Campus stakeholder institutions all came to this new campus for proximity, connectivity, and collaboration. Together, they acknowledge that they share the campus and its fate: The character and quality of their buildings and grounds affect the "fabric" of the larger environment. Each institution must understand its stake in and responsibility for the positive appearance and successful functionality of the campus.

One path moving forward would be to study the creation of a collective Building and Grounds Committee (BAG) that would serve as a campus planning, project review, and advisory body to assist in the implementation of the 2012 Facilities Master Plan. A BAG committee would be assigned this oversight role on behalf of the Anschutz Medical Campus community and advise campus leadership and the CU Design Review Board (DRB) on planning and design issues and initiatives. Such a committee would be meant to augment, not replace, the CU DRB and existing campus committees such as the TMA. A BAG committee should be structured to represent a cross section of the campus community and include faculty, students, residents, administration, and staff of CU Anschutz, UCH, and CHCO. The CU Anschutz Office of Institutional Planning and Facilities Management and Projects will provide support for the committee.

The primary function of the committee would be to:

- Review proposed planning and design relative to the vision, goals, and principles as defined in the 2012 Facilities Master Plan
- Evaluate projects to ensure they promote the programmatic needs of users
- Review each project relative to its Character District, proposed sites, adjacent buildings, open spaces, and its contribution to the quality and civic structure of the campus
- Review plans and studies that will have a significant impact on the campus's physical environment and/or operations

VI.5 DESIGN AND DEVELOPMENT GUIDELINES

A. Overview

PURPOSE

The Design and Development Guidelines have been prepared to help direct the planning and design of future site development and building construction. The guidelines are a part of the 2012 Facilities Master Plan and serve as a companion document to the 2013 CU Design and Construction Standards document that can be accessed on the CU Anschutz OIP website at http://www.ucdenver.edu/about/departments/InstitutionalPlanning.

The guidelines emphasize the consistent application of concepts, materials, and details. They are intended to provide standardized design recommendations to assist in implementing the university's developmental goals and principles as established in the 2012 Facilities Master Plan.

Used in concert with principles of good design, applicable jurisdictional regulations, and with input and guidance from OIP staff and the CU DRB, the guidelines should expedite the approval process and facilitate the development of quality environments throughout the campus.

USE OF THE GUIDELINES

The guidelines should be used primarily by staff, consultants, and the DRB. They will provide guidance for all physical additions, improvements, expansions, and renovations.

DESIGN REVIEW BOARD

The DRB, as advisory to the president of CU, is responsible for reviewing and consulting at the time of pre-design, conceptual design, schematic design, and design development phases of each project. All capital projects are reviewed to determine their compliance with the intent of the 2012 Facilities Master Plan and the Design and Development Guidelines.

AUTHORITY

The guidelines are part of the Anschutz Medical Campus planning and design process. They were developed as part of a collaborative process of engagement with the university and its affiliates, partners, and neighbors and constitute a consensus-driven framework for future development.

In order to meet unforeseen situations in either the master plan or the Design and Development Guidelines, it may be necessary for the university administration to consider variances pertaining to certain requirements. Any variance granted is considered to not be precedent-setting. In addition, the university administration may find it necessary to amend the guidelines to respond to changing factors in the university or marketplace.

B. Framework

The guidelines are intended to assist in improving the overall aesthetic character and visual unity of the whole Anschutz Medical Campus. Each new project should contribute to this goal through an integrated design approach that creates a desirable sense of place and reflects the appropriate scale, image, functionality, and integration of building and open space within the context of identified Character Districts. These design guidelines represent the university's commitment for future projects to create a more vibrant and collaborative campus environment.

The garden between PASCAL and Education 2 North encapsulates desired qualities of flexibility and comfort, and frames views of CHCO, which contributes to wayfinding on the site.

C. Circulation

PUBLIC REALM

Campuswide roadway design should promote connectivity and provide a unifying framework throughout the campus. Its design should create rhythm and visual impact, highlight areas of significance, and tie all four Character Districts together to form a comprehensive whole.

A hierarchy of street types has been developed to assist in pedestrian and vehicular wayfinding. Streets expected to have higher pedestrian activity are meant to incorporate a greater level of detailing and upgraded paving materials. This should enhance the pedestrian experience to create a more unique and dynamic space. Streets that are anticipated to receive more vehicular circulation should be treated with a more simplified design.

WALKWAYS

CU Anschutz is committed to providing accessible pedestrian travel. Path locations generally follow the natural "desire line" between destinations, with the recognition that in most cases 90 degree turns are not comfortable and therefore not realistic for pedestrian movement.

Similar to how streets have been treated, a hierarchy of walkways has been developed to assist in wayfinding and general pedestrian orientation with defined vocabularies of lighting, signage, and site furnishings.

D. Parking

The experience of arriving to and departing from campus by car is to be a positive experience. Parking is proposed to be located toward the perimeter of the campus and accessed primarily by streets contiguous with off-site roadways, thus reducing traffic on interior roads.

On-street parking is proposed to be incorporated into street design throughout the Urban Campus as well as along 17th Avenue.

As facilities are developed over the next 10 years, the reservoir of existing parking will be diminished as new roadways are constructed and surface parking areas are claimed as sites for new buildings. As demand continues to increase, it will be necessary to consider constructing parking structures and/or providing parking as an integral component of new buildings.

E. Open Space

Open spaces on campus should contribute to a sense of wellness and healing. Landscaping should visually unify the campus and simultaneously provide interest. It should enhance comfort and provide shelter for people using exterior spaces. By creating unique qualities, patterns, and character with the landscape, it can serve as a wayfinding mechanism by helping to orient and direct individuals to their destination. Open spaces should be planned and designed to contribute to energy conservation and, as a consequence, lower utility costs. Landscapes should respond to sun and climate in such a way as to create distinctive spaces, and landscape should enhance the image of the campus.

Campus edges, corners, and entrances are critical in establishing a positive first impression and a memorable sense of place. Landscaping along edges is to be simple but elegant, with emphasis on major visitor entrances and prominent corners. To relate the campus to the surrounding community, the landscaping of campus edges is to complement edges of surrounding properties including the native landscape of nearby Sand and Toll Gate Creeks as well as General's Park.

The Education Commons at dusk and its vibrant open-space lighting strategy.

F. Buildings

Façades are to relate to surrounding conditions and help to create a unified campus identity. Buildings should reinforce the integrity of adjacent open spaces and support the structural organization of the Character District in which they are located. They should be sympathetic to adjacent façades, major datum, cornice lines, etc. Secondary façades shall be of comparable quality to the primary façade with walls, windows, doors, and façade articulations designed to accentuate human scale.

Public entrances to buildings should be welcoming and easily found and accessed. Building entrances and adjacent lobby spaces should be designed to encourage interaction. They should be readily visible, prominent, and contribute to the life and vitality of the pedestrian environment.

G. Sustainability

The university recognizes the importance of sustainable practices and has committed to reducing natural resource use, reducing greenhouse gas emissions, and constructing superior facilities built for the long term. For this reason, the university has adopted green building design policies to establish a basis for incorporating the principles of environmental stewardship, energy efficiency, and resource conservation into the design of new campus buildings and major renovation projects. Its goal is to pursue holistic, integrative, and collaborative design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants.

VI.6 PROPOSED FUTURE STUDIES

During the planning process, a number of future efforts were identified to develop specific systems in greater detail. These studies are proposed to be done within the context of the master plan framework, which should serve as a consistent basis for coordination among the studies.

CAMPUS LANDSCAPE MASTER PLAN

This master plan would address landscape in the broad context of identifying major open spaces and connections. A future in-depth study of materials, water use, trees, and plants should be pursued.

FRA MASTER PLAN UPDATE

The FRA plans to update the master plan for its property north of Montview Boulevard. The FRA has recognized that the overall scale of the property is too big for solely research park functions, and the updated plan will consider more mixed-use development and capitalize on the transit-orient development opportunity afforded by the accelerated RTD light rail schedule.

LIGHTING STUDY

The university plans to undertake a campus lighting survey and improvements study of all exterior lighting on the Anschutz Medical Campus. The objectives of the study are to enhance campus safety and wayfinding at night for both pedestrians and motorists through improved illumination, and to develop guidelines for governing future exterior lighting projects, including lighting for landscapes, art, memorials, and signage.

SITE-WIDE STORM WATER MASTER PLAN

CU Anschutz exists within a complex storm water drainage system that encompasses the entire square mile of the original FAMG. The Anschutz Medical Campus spans two of the five major drainage basins within the Site-Wide area, and it shares those two basins with a number of other institutions. The natural drainage pattern flows to the two adjacent creeks, and as the Site-Wide area gets closer to the site capacity and water quality standards rise, the Site-Wide stakeholders will need to work together to develop appropriate storm water strategies. Among those strategies, the team should consider integrated, sustainable methods for treating and retaining storm water.

SITE-WIDE WAYFINDING AND SIGNAGE PLAN

Creating a single identity for the Site-Wide area, starting with a name, will benefit all of the participating institutions. The complexity of the site and the number and variety of institutions within the square mile creates challenges for visitors and patients. The wayfinding and signage plan would address the need to create a consistent strategy that coordinates access to parking as well as pedestrian access to buildings and public transit options.

Currently, all institutions have independent wayfinding strategies.

CAMPUS SUSTAINABILITY MASTER PLAN

Issues and discussions relating to sustainability were woven through the master plan process, but a comprehensive effort at examining options, setting goals, and developing holistic campus strategies warrants a separate, extended effort. A future sustainability master plan would delve into carbon output issues as well as analyze the risks and potential impacts of climate change on the campus. Water issues relating both to use within buildings and to landscape irrigation are particularly important in Colorado's dry climate. Linked to water issues are the issues of storm water retention and treatment. Any sustainable site strategies should coordinate with the landscape master plan. The plan could engage utility pricing and escalation and look for efficiency strategies throughout the system as well as look for opportunities to incorporate sources of renewable energy. Potential benchmarks for incrementally reducing energy use could be evaluated for adoption on campus. Another issue for future study is expansion of the solid waste reduction and recycling program. The evolving plan for alternative transportation including infrastructure for electric vehicles could be addressed as well. CU Anschutz's core mission includes research and teaching, so the arenas of innovation and public education about sustainability are a natural fit.

A digital rendering of the Health and Wellness Center illuminates the university's dedication to sustainable design.

VII. APPENDICES

VII. APPENDICES

COMPLEMENTARY DOCUMENTS

Separate planning efforts have developed in concert with the Anschutz Medical Campus 2012 Facilities Master Plan and are referenced throughout this document. These complementary documents should be referenced as necessary and can be found online.

SITE-WIDE COORDINATED MASTER PLAN - PHASE I

http://www.ucdenver.edu/about/departments/institutionalplanning/documents/mp_bg_docs/2011_phasei_coordinated%20masterplan.pdf

SITE-WIDE COORDINATED MASTER PLAN - PHASE II

http://www.ucdenver.edu/about/departments/InstitutionalPlanning/Pages/Phase-II-Coordinated-Site-Wide-Master-Plan.aspx

VII.1 STUDY PARTICIPANTS

			Committees				Focus Groups									Focus Sub-Groups			
Name		Title	Executive	Site-Wide Steering	Anschutz Steering	Planning	Parking	Traffic & Roadways	Urban Design	Utilities & Infrastructure	Research	Clinical	Education	Parking Management	Green Parking Facilities	Storm Water	Open Forums
Children's Hospital Colorado																	
Selina	Burridge						X	X						X			Invited
Paula	Davison															X	Invited
Beth	Gaffney			X													Invited
Scot	Garcia									X							Invited
Mark	Grimes																
Joe	Hartenberger																
Jena	Hausmann	Senior VP/COO										X					Invited
Dave	Heaton																
John	Hudgens			X		X	X	X						X			Invited
Kathy E.	Hurley			X		X	X		X	X							Invited
Todd	Koechlein								X								Invited
Rob	Reid	Director Facilities Operations							X	X							Invited
Rhonda	Skallan					X			X	X							Invited
Fred	Touchy										X						Invited
Sunand	Yagnik									X							Invited
City of Aurora																	
Andrea	Amonick			X		X	X	X	X	X							Invited
Tom	Barrett	Director Parks, Rec., & Open Space		X		X											Invited
Jason	Batchelor	Finance Director		X													Invited
Curtis	Bish																
Anna	Bunce							X									Invited
Mac	Callison	Senior Transportation Planner						X		X							Invited
Margee	Cannon																
David	Chambers	Director of Public Works		X		X											Invited
Cindy	Colip							X									Invited
Loretta	Daniel								X								Invited
Moira	Dungan							X									Invited
John	Fernandez			X		X	X	X	X	X							Invited
Nancy	Freed																
Dan	Gleim																
Darrell	Hogan									X							Invited
Huiliang	Liu						X	X									Invited
Bill	McCormick							X		X							Invited
Tom	McMinimee																

			Committees				Focus Groups									Focus Sub-Groups			
Name		Title	Executive	Site-Wide Steering	Anschutz Steering	Planning	Parking	Traffic & Roadways	Urban Design	Utilities & Infrastructure	Research	Clinical	Education	Parking Management	Green Parking Facilities	Storm Water	Open Forums
Danny	Montoya							X									Invited
Mindy	Parnes								X								Invited
Melissa	Rogers																
Jim	Sayre																
Nancy	Sheffield	Director Neighborhood Services		X		X											Invited
Cliff	Stephens																
Pieter	Van Ry									X							Invited
Terry	von Clausburg																
Bob	Watkins						X	X	X	X							Invited
Kevin	Wegener	Engineer						X	X	X							Invited
Tracy	Young																
Denver Veterans Affairs Medical Center																	
Judy	Guy	Senior Project Coordinator							X	X							Invited
Thomas	Hayden	Senior Resident Engineer		X		X											Invited
Peggy	Kearns	COO | Associate Director		X		X								X			Invited
Ray	Marsh					X											
Timothy	Pogany			X		X											Invited
Fitzsimons Redevelopment Authority																	
Lyle	Artz			X		X	X	X	X	X				X			Invited
Denise	Brown	Interium Executive Director							X								Invited
Kelly	Davis	FRA Design Review Board Member														X	
Steve	Van Nurden	Executive Director		X													Invited
University of Colorado Anschutz Medical Campus																	
Doug	Abraham	Chief of Police						X									Invited
Ralph	Altiere	Dean, SOP			X												Invited
Matt	Artley																
Mike	Barden	Director Facilities Projects				X		X	X	X							Invited
Jack	Barnette	Colorado School of Public Health - Admin.				X							X				Invited
Amy	Barton	CON Assoc. Dean of Clinical Affairs										X	X				Invited
Kerrie	Bathje						X										Invited
Mark	Berthold	Senior Planner, OIP				X	X	X	X	X	X	X	X	X	X	X	Invited
Mike	Boroviak									X							Invited
Jonathan	Bowser	SOM, Inter. Dir. Child Health Assoc.											X				Invited
Don	Brandes	Design Review Board Member															
Kay	Carpenter	Director of Financial Planning				X	X		X	X	X	X	X				Invited

			Committees				Focus Groups								Focus Sub-Groups			
Name		Title	Executive	Site-Wide Steering	Anschutz Steering	Planning	Parking	Traffic & Roadways	Urban Design	Utilities & Infrastructure	Research	Clinical	Education	Parking Management	Green Parking Facilities	Storm Water	Open Forums
Betty	Charles	Assoc. Dir. Education Support Services											X				Invited
Leanna	Clark	VC Commuications & Marketing			X												Invited
Paul	Cook	Director - Center for Nursing Research		X		X					X		X				Invited
Noel	Copeland	OIP Architect					X	X	X	X							Invited
Brian	Davison	SODM				X											Invited
Michael	Del Giudice	Director - Institutional Planning				X	X	X	X	X	X	X	X	X	X	X	Invited
Lisa	Douglas																
Don	Elliman	Chancellor	X		X												Invited
Rick	Epstein	Design Review Board Member															
Danny	Felipe-Morales	Exempt Professional Assembly - President				X											Invited
Kari	Franson	SOP Assoc. Dean for Professional Education											X				Invited
Catherine	Freeland	SODM Dir. of Communication & Advancement							X								Invited
Don	Galarowicz	IT Services, Director of Operations								X							Invited
Nicole	Ganley	Exempt Professional Assembly - Secretary															Invited
David	Goff	Dean, Colorado School of Public Health			X												Invited
Richard	Hamman	Colorado School of Public Health									X						Invited
Galen	Hartenberger	Student Senate - VP of Diversity															Invited
Kim	Huber	Asst. VC Budget and Finance				X											Invited
Cathy	Jarvis	SOP Assistant Dean Student Services											X				Invited
Lonnie	Johnson	SODM, Assoc. Dean of Clinical Operations				X						X					Invited
Shauna	Jones	SOM Peds, Student Representative											X				Invited
Doug	Jones	SOM, Sr. Assoc. Dean for Clinical Affairs										X					Invited
Henri	Jupille	Student Senate - VP of Legislative Affairs				X											Invited
Denise	Kassebaum	Dean, School of Dental Medicine			X												Invited
Celia	Kaye	SOM Senior Assoc. Dean for Education											X				Invited
Nicole	Keenan	Student Senate - VP of Legislative Affairs															Invited
Regina	Kilkenny	Assoc. VC Academic Resources & Services											X				Invited
Randy	Kluender	SODM Assoc. Dean Advanced Dental											X				Invited
Neil	Krauss	Director of Administration Exec. VC Office		X		X			X		X	X	X				Invited
Richard	Krugman	Dean, School of Medicine			X												Invited
Jori	Leszcynski	Director of Vivarium Services									X						Invited
Kathy	Magilvy	CON Assoc. Dean Academic Programs											X				Invited
Lilly	Marks	Exec. VC Anschutz Medical Campus	X		X												Invited
Robert	McGranaghan	SOM															X
Kathy	McNally	Project Manager, Facilities				X			X	X							Invited
Paula	Meek	Faculty Assembly Vice Chair															Invited

			Committees				Focus Groups								Focus Sub-Groups			
Name		Title	Executive	Site-Wide Steering	Anschutz Steering	Planning	Parking	Traffic & Roadways	Urban Design	Utilities & Infrastructure	Research	Clinical	Education	Parking Management	Green Parking Facilities	Storm Water	Open Forums
Gina	Moore	SOP - Director of Clinical Affairs										X					Invited
Roderick	Nairn	Provost	X		X												Invited
Ken	Neeper	Manager Infrastructure Development				X		X		X							Invited
Victor	Olgyay	Design Review Board Member															
Teresa	Osborne	CU Systems - Dir. Budget & Finance		X													Invited
Fran	Osterberg	Graduate School, Assist. Dean											X				Invited
Beth	Otis	Academic Resources & Services											X				Invited
Jeff	Parker	VC for Finance & Administration	X		X												Invited
Jerry	Perry	Director - Health Science Library											X				Invited
Mackenzie	Pett	Office of Institutional Planning															
Heather	Ponicsan	Student Senate															
Russ	Poole	Asst. VC IT Services				X				X							Invited
David	Port	Faculty Assembly Chair				X											Invited
Anthony	Pozzuoli	CU Student															
John	Prosser	Professor Emeritus															
Del	Quiel							X									Invited
Chad	Reiling	Communications				X											Invited
E. Chester	Ridgeway	Senior Associate Dean, SOM									X						Invited
Candy	Roberts	Design Review Board Member															
David	Ross	SOP									X						Invited
Cathy	Ruff	SOM, Child Health Assoc. Asst. Professor											X				Invited
Jerry	Scezney	Planning Consultant				X			X		X	X	X				Invited
Margaret	Schenkman	SOM, Asst. Dean Allied Health											X				Invited
Amy	Schlueter	CON, Assistant Dean											X				Invited
Leah	Schulz	Student Senate - VP of Finance															Invited
Jane	Schumaker	SOM, Senior Assoc. Dean F + A										X					Invited
Veronica	Searles	CU Student															
Michael	Sherman	Building Maintenance & Operations								X							Invited
Barry	Shur	Dean, Graduate School			X												Invited
Bradford	Silsby	Senior Planner, OIP						X	X	X	X	X	X				Invited
Stephen	Smidt	ADM AVCBO University Police						X									Invited
Jarrett	Smith	Sustainability Officer				X	X	X	X	X							Invited
Ron	Sokol	SOM									X						Invited
Darcy	Solanyk	SOM, Child Health Assoc, Academic Coord.											X				Invited
Karen	Sousa	College of Nursing									X						Invited
Jeffry W.	Stansbury	SODM									X						Invited

			Committees				Focus Groups									Focus Sub-Groups				
Name		Title	Executive	Site-Wide Steering	Anschutz Steering	Planning	Parking	Traffic & Roadways	Urban Design	Utilities & Infrastructure	Research	Clinical	Education	Parking Management	Green Parking Facilities	Storm Water	Open Forums
Gregory	Stiegmann	SOM, Surgery Div. Head, Chair										X					Invited
Ajay	Thomas	Student Senate															Invited
David	Thompson	School of Pharmacy				X											Invited
Sarah	Thompson	Dean, College of Nursing			X												Invited
Byers	Tim	SCPH, Assoc. Dean Public Health Practices										X					Invited
Richard	Traystman	VC for Research			X						X						Invited
David	Turnquist	Assoc. VC Facilities Management		X		X	X		X	X				X			Invited
Andre	Vite	Campus Architect				X	X	X	X	X	X	X	X	X	X	X	Invited
Margo	Waite	Office of Institutional Planning				X											Invited
Christopher	Walker	Student Senate - VP of Student Life															Invited
Cary	Weatherford	Senior Planner, OIP				X	X	X	X	X	X	X	X	X	X	X	Invited
Jack	Westfall	SOM, Dir. Area Health Education Center											X				Invited
Malaika	White	Exempt Professional Assembly - Vice President															Invited
Mollie	Young	SOM									X						Invited
University of Colorado Hospital																	
Mark	Ernest	Assoc. Professor University Medicine								X			X				Invited
Sean	Menogan			X		X			X								Invited
Keith	Peterson	Director of Guest Services					X	X			X						Invited
Steve	Ringel	VP Clinical Effectiveness							X			X					Invited
Tony	Ruiz	Project Executive, Facilities Management		X					X	X							Invited
John	White								X								Invited
University Physicians, Inc.																	
Steffanie	Emerson	Director Business Development & Planning		X													Invited
Augie	Trujillo																
RTD																	
Lacy	Bell	Senior Transportation Planner						X									Invited
Charles	Culig	Project Manager, I-225 Rail Line															Invited
John C.	Shonsey	Senior Manager, Engineering/Chief Engineer															Invited
Danielle	Smith	Design Manager, I-225 Rail Line															Invited
Community Members																	
Peg	Alt																X
Gloria	Arguillo																X
Aleida	Beazer																X
Gloria	Blanchard																X
Cathy	Bouska																X

		Committees				Focus Groups								Focus Sub-Groups			
Name	Title	Executive	Site-Wide Steering	Anschutz Steering	Planning	Parking	Traffic & Roadways	Urban Design	Utilities & Infrastructure	Research	Clinical	Education	Parking Management	Green Parking Facilities	Storm Water	Open Forums
Aaron	Bowen															X
Douglas	Bowen															X
Michele	Bowen															X
Mark	Burry															X
Eric	Busch															X
Nadine	Caldwell															X
Terry	Campbell Caron															X
Marianne	Farrell															X
Catherine	Flynn															X
Curtis	Gardner															X
Lindsay	Gardner															X
William	Gondrez															X
Claudia	Gonzalez															X
Paula	Greene															X
Bob	Hagedorn															X
Vanessa	Hernandez															X
Katy	Hodge															X
Douglas	Howey															X
Debi	Hunter Holen															X
Craig	Jackson															X
Ermine	Johnson															X
Lisa	Jones															X
Art	Karlin															X
Scott	Kindolspeer															X
Matthew	King															X
Levester	Lyons															X
Eileen	Mathews															X
Denise	May															X
Ellen	McPherson															X
Noelle	Melchizedek															X
George	Mills															X
Beulah	Moore															X
Keelie	Moore															X
Schnell	Moore															X
Sally	Moriner															X
Anita	Murano-Sweetman															X

			Committees				Focus Groups									Focus Sub-Groups			
Name		Title	Executive	Site-Wide Steering	Anschutz Steering	Planning	Parking	Traffic & Roadways	Urban Design	Utilities & Infrastructure	Research	Clinical	Education	Parking Management	Green Parking Facilities	Storm Water	Open Forums
Brad	Pierce																X
Karen	Schneider																X
Judy	Stobel																X
Stephanie	Takis																X
Isabel	Theriot																X
Cindy	Vaegan																X
Norma	Vette																X
Mark	Wessley																X
Randy	Winter																X

VII.2 PROPERTY CONVEYANCE GUIDE

PROPERTY CONVEYANCE GUIDE FOR THE FORMER U.S. ARMY GARRISON FITZSIMONS
With Controlling Interests & Development Options

Maintained by CU Anschutz
April 15, 2013

Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Parcel 1 Deed: 5-12-1998 Acres: 48.6	Transferred from the U.S. Army to the U.S. DOE, which conveyed to CU Anschutz with the following restrictions: • For 30 years, the property will be used solely and continuously for educational purposes in accordance with the proposed program set forth in the application. • During this time, the Grantee will: 1. Not sell, resell, lease, rent, mortgage, encumber, or otherwise transfer any interest in any part of the property except as authorized in advance in writing by the Grantor. 2. Provide biennial reports to the Grantor on the operation and maintenance of the property. 3. Remain a tax supported institution or exempt from taxation under 501(c)(3) guidelines. 4. Comply with federal programs including civil rights, non-discrimination, Americans with disabilities, and Title IX. • Penalty for non-compliance: reversion of the property to the federal government. Abrogation Option: • Grantee may seek abrogation (repeal) of the restrictions by obtaining written consent of the Grantor for payment of the property at fair market value.	Roadways 16th Ave., 17th Ave., and Quentin St.: • Conveyed by the U.S. DOE for a nominal amount to **CU Anschutz.**	• **Trunk roadways restricted for public access per agreements with the City of Aurora (see Roadways-Trunk).**
		Property north of 17th Ave.: • Conveyed by the U.S. DOE for a nominal amount to **CU Anschutz.**	• **Restricted to educational uses.** • Development per CU Anschutz role and mission.
		Property south of 17th Ave. and east of Quentin St.: • Conveyed by the U.S. DOE for a nominal amount to CU Anschutz. • Leased by CU Anschutz for a nominal amount to **UCH.**	• **Restricted to educational uses.** • Development per UCH role and mission, which includes supporting the clinical mission of CU Anschutz.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Parcel 2 Deed: 5-12-1998 Acres: 30	• Same as for Parcel 1.	Roadways 16th Ave., 17th Ave., and Victor St.: • Conveyed by the U.S. DOE for a nominal amount to **CU Anschutz.**	• **Trunk roadways restricted for public access per agreements with the City of Aurora (see Roadways-Trunk).**
		Property north of 17th Ave.: • Conveyed by the U.S. DOE for a nominal amount to **CU Anschutz.**	• **Restricted to educational uses.** • Development per CU Anschutz role and mission.
		Property south of 17th Ave.: • Conveyed by the U.S. DOE for a nominal amount to CU Anschutz. • CHCO paid fair market value to the U.S. DOE for abrogation of the property. • Leased by CU Anschutz for a nominal amount to **CHCO.**	• **No restrictions on use.** • Development per CHCO role and mission, which includes supporting the clinical mission of CU Anschutz.
Parcel 3 Deed: 5-12-1998 Acres: 4.5	• Same as for Parcel 1.	• Conveyed by the U.S. DOE for a nominal amount to **CU Anschutz.**	• **Restricted to educational uses.** • Development per CU Anschutz role and mission.
Parcel 4 Deed: 5-12-1998 Acres: 3.7	• Same as for Parcel 1.	• Conveyed by the U.S. DOE for a nominal amount to **CU Anschutz.**	• **Restricted to educational uses.** • Development per CU Anschutz role and mission.
Parcel 5 Deed: 5-12-1998 Acres: .8	• Same as for Parcel 1.	• Conveyed by the U.S. DOE for a nominal amount to **CU Anschutz.**	• **Restricted to educational uses.** • Development per CU Anschutz role and mission.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Parcel E Deed: 1-29-2004 Acres: 14.6	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	Roadways 17th Ave. and Victor St.: • Purchased by CHCO from the FRA under the terms of an early buyout agreement between the FRA and CU Anschutz. • Conveyed by CHCO for a nominal amount to **CU Anschutz.**	• **Trunk roadways restricted for public access per agreements with the City of Aurora (see Roadways-Trunk).**
		Property north of 17th Ave. and west of Victor St.: • Purchased by CHCO from the FRA under the terms of an early buyout agreement between the FRA and CU Anschutz. • Conveyed by CHCO for a nominal amount to **CU Anschutz.**	• **No restrictions on use.** • Development per CU Anschutz role and mission.
		Rest of property: • Purchased by CHCO from the FRA under the terms of an early buyout agreement between the FRA and CU Anschutz. • Conveyed by CHCO for a nominal amount to CU Anschutz. • Leased by CU Anschutz for a nominal amount to **CHCO.**	• **No restrictions on use.** • Development per CHCO role and mission, which includes supporting the clinical mission of CU Anschutz.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Parcel O Deed: 4-29-2005 Acres: 16.3	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	Roadways 17th Ave. and Racine St.: • Purchased by UCH from the FRA under the terms of an early buyout agreement between the FRA and CU Anschutz. • Conveyed by UCH for a nominal amount to **CU Anschutz**.	• **Trunk roadways restricted for public access per agreements with the City of Aurora (see Roadways-Trunk).**
		Property north of 17th Ave. and west of Racine St.: • Purchased by UCH from the FRA under the terms of an early buyout agreement between the FRA and CU Anschutz. • Conveyed by UCH for a nominal amount to **CU Anschutz**.	• **No restrictions on use.** • Development per CU Anschutz role and mission.
		Rest of property: • Purchased by UCH from the FRA under the terms of the early buyout agreement between the FRA and CU Anschutz. • Conveyed by UCH for a nominal amount to CU Anschutz. • Leased for a nominal amount from CU Anschutz to **UCH.**	• **No restrictions on use.** • Development per UCH role and mission, which includes supporting the clinical mission of CU Anschutz.

PROPERTY CONVEYANCE GUIDE FOR THE FORMER U.S. ARMY GARRISON FITZSIMONS
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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Parcel U Deed: 12-12-2000 Acres: 105.3	• Same as for Parcel 1.	Roadways: • Conveyed for nominal amount from U.S. DOE to **CU Anschutz.** • Quentin St. north of Parcel 1 and south of Montview Blvd. • Racine St. from 17th Place to Montview Blvd. • Aurora Court from Colfax Ave. to 17th Place • Victor St. from Colfax Ave. to Parcel E. • Wheeling St. from Colfax Ave. to Montview Blvd. • 16th Ave. from Parcel 2 to Victor St.	• **Trunk roadways restricted for public access per agreements with the City of Aurora (see Roadways-Trunk).**
		Property north of 17th Ave.: • Conveyed by the U.S. DOE for a nominal amount to **CU Anschutz.**	• **Restricted to educational uses.** • Development per CU Anschutz role and mission.
		CeDAR property: • Conveyed by the U.S. DOE for a nominal amount to CU Anschutz. • Leased by CU Anschutz for a nominal amount to **UCH.**	• **Restricted to educational uses.** • Development per UCH role and mission, which includes supporting the clinical mission of CU Anschutz.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Parcel U Continued	• See above.	Property south of 17th Ave. and between Parcel 2 and Wheeling St.: • Conveyed by U.S. DOE for a nominal amount to CU Anschutz. • CHCO paid fair market value to the U.S. DOE for abrogation of the property. • Leased by CU Anschutz for a nominal amount to **CHCO.**	• **No restrictions on use.** • Development per CHCO role and mission that includes supporting the clinical mission of CU Anschutz.
		Property north of Colfax Ave. and east of Aurora Court (note: the small areas north of Colfax Ave. were conveyed with the roadways): • Conveyed by U.S. DOE for a nominal amount to CU Anschutz. • CHCO paid fair market value to the U.S. DOE for abrogation of the property. • Leased by CU Anschutz for a nominal amount to **CHCO.**	• **No restrictions on use.** • Development per CHCO role and mission that includes supporting the clinical mission of CU Anschutz.
		Property north of Colfax Ave. and west of Aurora Court (note: the small areas north of Colfax Ave. were conveyed with the roadways): • Conveyed by the U.S. DOE for a nominal amount to CU Anschutz. • Leased by CU Anschutz for a nominal amount to **UCH.**	• **Restricted to educational uses.** Development per UCH role and mission, which includes supporting the clinical mission of CU Anschutz.

PROPERTY CONVEYANCE GUIDE FOR THE FORMER U.S. ARMY GARRISON FITZSIMONS ***With Controlling Interests & Development Options*** ***Maintained by CU Anschutz*** ***April 15, 2013***			
Property	***Original Conveyance***	***Current Controlling Interest***	***Current Development Options***
Parcel U Continued	• See above.	The realignment of Wheeling St. north of Colfax Ave. required several property transfers: • South of 16th Place – northern section: ○ Conveyed by the U.S. DOE for a nominal amount to CU Anschutz. ○ Conveyed by CU Anschutz for a nominal amount to the FRA. ○ Sold at fair market value by the FRA to **VA.** • South of 16th Place – southern section: ○ Conveyed by the U.S. DOE for a nominal amount to CU Anschutz. ○ Conveyed by CU Anschutz for a nominal amount to UPI. ○ Sold at fair market value by UPI to **VA.**	• **No restrictions on use.** • Development per VA role and mission.
Parcel Z Deed: 7-17-2001 Acres: 3	• Same as for Parcel 1.	Perinatal Research Facility property: • Conveyed by the U.S. DOE for a nominal amount to **CU Anschutz.**	• **Restricted to educational uses.** • Development per CU Anschutz role and mission.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
APS Transfers Deed: 7-31-2006 Acres: 2.2	Transferred from the U.S. Army to the U.S. DOE, which conveyed to Aurora Public Schools (APS) with the following restrictions: • For 30 years, the property will be used solely and continuously for educational purposes in accordance with the proposed program set forth in the application. • During this time, the Grantee will: 1. Not sell, resell, lease, rent, mortgage, encumber, or otherwise transfer any interest in any part of the property except as authorized in advance in writing by the Grantor. 2. Provide biennial reports to the Grantor on the operation and maintenance of the property. 3. Remain a tax supported institution or exempt from taxation under 501(c)(3) guidelines. 4. Comply with federal programs including civil rights, non-discrimination, Americans with disabilities, and Title IX. • Penalty for non-compliance: reversion of the property to the federal government. Abrogation Option: • Grantee may seek abrogation (repeal) of the restrictions by obtaining written consent of the Grantor for payment of the property at fair market value.	Roadways - 16th Place from Victor St. to Wheeling St.: • With approval by the U.S. DOE, purchased from APS at fair market value by CHCO. • Conveyed by CHCO for a nominal amount to **CU Anschutz.**	• **Trunk roadways restricted for public access per agreements with the City of Aurora (see Roadways-Trunk).**
		CHCO Dental Clinic property south of 16th Place and west of Wheeling St.: • With approval by the U.S. DOE, purchased from APS at fair market value by **CHCO**.	• **No restrictions on use.** • Development per CHCO role and mission, which includes supporting the clinical mission of CU Anschutz.
		Property north of 16th Place: • With approval by the U.S. DOE, purchased from APS at fair market value by CHCO. • Conveyed by CHCO for a nominal amount to CU Anschutz. • Leased by CU Anschutz for a nominal amount to **CHCO.**	• **No restrictions on use.** • Development per CHCO role and mission, which includes supporting the clinical mission of CU Anschutz.

PROPERTY CONVEYANCE GUIDE FOR THE FORMER U.S. ARMY GARRISON FITZSIMONS
With Controlling Interests & Development Options

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
APS Transfers Continued	• See above	The realignment of Wheeling St. north of Colfax Ave. required several property transfers: • South of 16th Place – northern section: ○ With approval by the U.S. DOE, purchased from APS at fair market value by CHCO. ○ Conveyed by CHCO for a nominal amount to FRA. ○ Sold by the FRA at fair market value to the **VA**. • South of 16th Place – southern section: ○ With approval by the U.S. DOE, purchased from APS at fair market value by CHCO. ○ Conveyed by CHCO for a nominal amount to UPI. ○ Sold by UPI at fair market value to the **VA**.	• **No restrictions on use.** • Development per VA role and mission.
Daycare Center - CHCO	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Sold by the FRA at fair market value to **CHCO**.	• **No restrictions on use.** • Development per CHCO role and mission, which includes supporting the clinical mission of CU Anschutz.
Colonel's Row	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Sold by the FRA at fair market value to **UCH**.	• **No restrictions on use.** • Development per UCH role and mission, which includes supporting the clinical mission of CU Anschutz. • Development per historic preservation guidelines.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Red Cross Parcel Deed: 11-10-2004 Acres: 1.4	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	The property was conveyed by the FRA under a quitclaim deed to **CU Anschutz** for the following considerations: • CU Anschutz's agreement to maintain and renovate the Red Cross Building in accordance with historic preservation guidelines. • CU Anschutz's providing the FRA with its plan for completing the improvements. • Penalty for non-compliance: injunction, including specific performance and/or reversion of the property to the FRA. • Other renovation or demolition requires coordination with the FRA and the Aurora Historic Preservation Commission.	• **No restrictions on use.** • Development per CU Anschutz role and mission. • Development in accordance with historic preservation guidelines.
Roadways – In-Tract	• Conveyed in the various parcels described above for the AMC.	• All roadways within the CU Anschutz footprint except trunk roadways. • Controlling interest: **CU Anschutz.**	• **Restricted to educational uses.** • Development per CU Anschutz role and mission. • CU Anschutz operations and maintenance.
		• All roadways within the UCH footprint except trunk roadways. • Controlling interest: **UCH.**	• **Restricted to educational uses.** • Development per UCH role and mission. • UCH operations and maintenance.
		• All roadways within the CHCO footprint except trunk roadways. • Controlling interest: **CHCO.**	• **No restrictions on use.** • Development per CHCO role and mission. • CHCO operations and maintenance.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Roadways - Trunk	• Conveyed in the various parcels described above for the AMC.	Trunk roadways – controlling interest **CU Anschutz:** • Quentin St. from Colfax Ave. to Montview Blvd. • Racine St. from 17th Ave. to Montview Blvd. • Aurora Ct. from Colfax Ave. to 17th Place • Victor St. from Colfax Ave. to Montview Blvd. • Wheeling St. from Colfax Ave. to Montview Blvd. • 16th Ave. from Quentin St. to Victor St. • 16th Place from Victor St. to Wheeling St. • 17th Ave from Quentin St. to Victor St.	• **Restricted for public access under agreements with the City of Aurora.** • CU Anschutz manages and maintains the roadways under the AMC Infrastructure Development & Maintenance Agreement. • UCH and CHCO share the costs of the trunk roadways with the CU Anschutz under the AMC Site Operating Agreement.
21 Fitzsimons Apartments	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Sold by the FRA at fair market value to **Paul's Corporation**.	• **No restrictions on use.** • Development per Paul's Corporation role and mission. • Developed as apartments with parking and commercial space on the ground floor of Phase 1.
Bioscience Center East	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Leased by the FRA to various tenants. • Controlling interest: **FRA.**	• **No restrictions on use.** • Development per FRA role and mission.
Bioscience Park Center	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Leased by the FRA to various tenants. • Controlling interest: **FRA.**	• **No restrictions on use.** • Development per FRA role and mission.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Buildings 301 & 302 - Homeless Provider Agencies	• Conveyed for a nominal amount from the U.S. Army to the FRA under a federal economic development conveyance.	• Leased for 30 years by the FRA to Aurora Mental Health and the Comitis Crisis Center. • Controlling interest: **FRA.**	• **Restricted to use by homeless provider agencies for the lease term.** • Development per FRA role and mission.
Chapel	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance. • Windows remain the property of the U.S. Army and must be returned to the U.S. Army if the building is demolished or the windows removed.	• Controlling interest: **FRA.**	• **No restrictions on use.** • Development per FRA role and mission. • Development per historic preservation guidelines.
City of Aurora Police Station #1 and Police and Fire Training Academy	• Transferred by the U.S. Army to the U.S. Department of Justice, which conveyed the property to the City of Aurora.	• Conveyed by the U.S. Department of Justice for a nominal amount to the **City of Aurora**.	• **Restricted to use by law enforcement and public safety.** • Development per City of Aurora role and mission.
Colorado State Veteran's Home	• Conveyed for a nominal amount from the U.S. Army to the FRA for consideration that the FRA will convey the property to the State of Colorado for construction of a state veteran's home.	• Conveyed by the FRA for a nominal amount to the State of Colorado Department of Human Services (**CDHS).**	• **Restricted to use by the FRA under the Homeless Provider Agreement with CDHS.** • Development per CDHS role and mission.
Fisher House	• Conveyed from the U.S. Army to the FRA for consideration that the FRA will lease the property to the VA for a specified number of years.	• Leased by the FRA to the VA. • Controlling interest: **FRA.**	• **Restricted to use by the VA for the duration of the lease.** • Development per VA role and mission.
Fitzsimons Federal Credit Union (FFCU)	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Sold by the FRA at fair market value to the **FFCU**.	• **No restrictions on use.** • Development per the FFCU role and mission.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
General's Park	• Conveyance document not available. • Understood that the property was conveyed with restrictions for use as a public park. • Transferred by the U.S. Army to the U.S. Department of the Interior, which conveyed the property to the City of Aurora.	• Conveyed by the U.S. Department of the Interior for a nominal amount to the **City of Aurora**.	• **Restricted to use as a public park.** • Development per City of Aurora role and mission. • Development per historic preservation guidelines.
Golf Course	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• The FRA has an operating agreement with the City of Aurora to provide the golf course to the public. • Controlling interest: **FRA.**	• **No restrictions on use.** • Development per FRA role and mission.
Open area north of Montview Blvd.	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Controlling interest: **FRA.**	• **No restrictions on use.** • Development per FRA role and mission.
Roadways - City of Aurora	Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance: • Fitzsimons Pkwy. north of 17th Place. • Ursula St. from Montview Blvd. to 23rd Ave. • 23rd from Victor St. to Fitzsimons Pkwy. • Uvalda from Montview Blvd. to 21st Ave. • Wheeling St. from 23rd Ave. south approximately 250 feet to the northern edge of the City of Aurora police station.	• Conveyed by the FRA for a nominal amount to the **City of Aurora.**	• **No restrictions on use.** • Development per City of Aurora role and mission. • After reconstruction, all of Montview Blvd. will be conveyed from the FRA to the City of Aurora.
	Transferred by the U.S. Army to the U.S. Department of Justice, which conveyed to the City of Aurora with the police parcel: • Montview Blvd. from Fitzsimons Pkwy. to Victor St.	• Conveyed by the U.S. Department of Justice for a nominal amount to the **City of Aurora**.	• **Restricted to use by law enforcement and public safety.** • Development per City of Aurora role and mission.

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Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Roadways – FRA	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	17th Place from Wheeling St. to Fitzsimons Pkwy.: • Controlling interest: **FRA.**	• **Restricted development per utility right of way easement to the City of Aurora under the roadway.** • Roadway will be closed for approximately 2.5 years during construction of the VA. • After construction is complete, the roadway will be conveyed from the FRA to the City of Aurora.
		Other roadways controlled by the **FRA**: • Most of Montview Blvd. • Victor St. from Montview Blvd. to Fitzsimons Pkwy. • Scranton St. north of Montview Blvd. • 23rd Ave. west of Victor St.	• **No restrictions on use.** • After reconstruction, all of Montview Blvd. will be conveyed from the FRA to the City of Aurora. • Victor St. and Wheeling St. will be conveyed from the FRA to the City of Aurora when they are constructed in their final configurations.
UPI Building	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Sold by the FRA at fair market value to **UPI**.	• **No restrictions on use.** • Development per UPI role and mission.
U.S. Army Reserve	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• The FRA exchanged this property with the U.S. Army Reserve for their original property north of Colfax Avenue and west of Fitzsimons Pkwy. • Controlling interest: **U.S. Army Reserve.**	• **Restricted to use by the federal government.** • Development per U.S. Army Reserve role and mission.

PROPERTY CONVEYANCE GUIDE FOR THE FORMER U.S. ARMY GARRISON FITZSIMONS
With Controlling Interests & Development Options

Maintained by CU Anschutz
April 15, 2013

Property	*Original Conveyance*	*Current Controlling Interest*	*Current Development Options*
Veterans Affairs Hospital	FRA property east of Wheeling St. and south of 19th Place: • Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Sold by the FRA at fair market value to the **VA**.	• **No restrictions on use.** • Development per VA role and mission.
	Former U.S. Army Reserve property north of Colfax Ave. and west of Fitzsimons Pkwy.: • Transfer from the U.S. Army to the U.S. Army Reserve.	• The U.S. Army Reserve exchanged this property with the FRA for the property that is now the current site of the U.S. Army Reserve. • Sold by the FRA at fair market value to the **VA**.	• **No restrictions on use.** • Development per VA role and mission.
	Former Fitzsimons Federal Credit Union (FFCU) property located north of 17th Place and east of Wheeling St.: • Land lease from the U.S. Army to the FFCU. • FFCU owned the building.	• Sold by the FFCU at fair market value to the **VA**.	• **No restrictions on use.** • Development per VA role and mission.
	Former City of Aurora swimming pool located south of 19th Place and east of Wheeling St.: • Transferred by the U.S. Army to the U.S. Department of the Interior, which conveyed the property for a nominal amount to the City of Aurora.	• After the U.S. Department of the Interior removed deed restrictions, the City of Aurora conveyed the property for a nominal amount to the **VA**.	• **No restrictions on use.** • Development per VA role and mission.
Xcel Energy Substation	• Sold at fair market value by the U.S. Army to the FRA under a federal economic development conveyance.	• Sold by the FRA as part of the Gas and Electric System Total Sale Package to **Xcel Energy**.	• **Restricted to use for an electric substation and distribution center.** • Development per Xcel Energy role and mission.

VII.3 PARKING OCCUPANCY SUMMARY

Parking Occupancy Summary (2012 Sample Occupancies)
Anschutz Medical Campus
February/August 2012

Parking Lot / Area	*Estimated Spaces Available*	*Owner*	*Intended User*	*Estimated Occupancy*	*Unoccupied Spaces*	*Percent of Capacity*	*Source*
UCH Patient/Visitor Lot	420	UCH	Patient/Visitor	393	27	94%	1
UCH Valet Lot	36	UCH	Valet	35	1	97%	1
UCH Outpatient Garage	412	UCH	Patient/Visitor	294	118	71%	1
UCH Valet Garage (Lower Level)	200	UCH	Valet	125	75	63%	1
UCH Outpatient Lot	285	UCH	Visitor	283	2	99%	1
UCH Leprino Bldg Garage	1,415	UCH	Employee	1,254	161	89%	1
UCH Offsite Temp. Lot	700	UCH	Employee	685	15	98%	1
CHCO Patient/Visitor Garage	671	CHC	Patient/Visitor	511	160	76%	1
Lot 11	164	CHC	Dental Center	125	39	76%	1
Lot 10 Gary Pavilion	500	CHC	Visitor	325	175	65%	1
Lot 8 Garage - Staff	1,658	CHC	Employee	1,239	419	75%	1
Lot 7 Garage - Staff	1,405	CHC	Employee	950	455	68%	1
UPI Garage	652	UPI	Employee/Visitor	343	309	53%	1
Henderson Garage	1,544	CU Anschutz	Patient/Visitor/Permit	1,423	121	92%	1
Purgatory Lot	179	CU Anschutz	Permit	175	4	98%	2
Frisco Lot	345	CU Anschutz	Permit	338	7	98%	2
Evergreen Lot	384	CU Anschutz	Permit	376	8	98%	2
Breckenridge Lot	322	CU Anschutz	Permit	316	6	98%	2
Aspen Lot	612	CU Anschutz	Permit	600	12	98%	2
Leadville Lot	294	CU Anschutz	Permit	288	6	98%	2
Durango Lot	133	CU Anschutz	Permit	130	3	98%	2
Ignacio Lot	107	CU Anschutz	Visitor	96	11	90%	3
Monte Vista	165	CU Anschutz	Visitor	149	16	90%	3
Georgetown Lot	184	CU Anschutz	Visitor	166	18	90%	3
Snowmass Lot	100	CU Anschutz	Visitor	90	10	90%	3
Cheyenne Wells/Building 401	102	CU Anschutz	Visitor	92	10	90%	3
Julesburg Lot	104	CU Anschutz	Visitor	94	10	90%	3
Kiowa Lot	88	CU Anschutz	Visitor	79	9	90%	3
Barbara Davis Center	41	CU Anschutz	Visitor	37	4	90%	3
PRF Lot	40	CU Anschutz	Permit	39	1	98%	2
Misc. Small Lots (<15 spaces)	55	CU Anschutz	Permit/Visitor	50	5	90%	3
Total	13,317			11,100	2,217		

(1) Car counts collected by Walker staff on Wednesday, August 1, 2012; counts collected roughly 10 AM–1 PM.
(2) Based on peak month (Feb 2012) parking occupancy data provided for permit lots; only average combined percentage occupancies were provided.
(3) Based on peak month (Feb 2012) parking occupancy data provided for visitor lots; only average combined percentage occupancies were provided.
(4) All occupancy observation have been adjusted for March 2014 based on new facilities available at CU Anschutz and

Percent of capacity 91%–100%

Percent of capacity 81%-90%

VII.4 10-YEAR PROJECTED PARKING DEMAND

10-Year Projected Parking Demand - Mid-Range Growth Scenario
University of Colorado Anschutz Medical Campus
2013

Population	*Existing Supply*	*Estimated Current Need*	*Estimated Future Need*	*Recommended Parking Added*
Permit Parking				
Faculty/Staff/Other Permit		3,000	3,420	
Commuter Student (Permit)		970	1,220	
Subtotal Permit Parking	3,950	3,970	4,640	690
Visitor Parking				
Daily Commuter Students/Employees (1)		320	410	
Remote Students		140	150	
Special Event		350	610	
Clinical Patients and Visitors		200	290	
Subtotal Visitor Parking	1,160	1,010	1,460	300
Other				
Additional Events and Visitors (Moderate Projection)			300	300
Subtotal Other			300	300
Total	5,110	4,980	6,400	1,290

(1) Changes to parking policy may result in a transition from some of this demand from visitor parking to remote permit parking.

10-Year Projected Parking Demand - Increased Transit Adjustment from 5 Percent to 8 Percent
University of Colorado Anschutz Medical Campus
2013

Population	*Existing Supply*	*Estimated Current Need*	*Estimated Future Need (2)*	*Recommended Parking Added*
Permit Parking				
Faculty/Staff/Other Permit		3,000	3,350	350
Commuter Student (Permit)		970	1,200	230
Total Permit Parking	3,950	3,970	4,550	580
Visitor Parking				
Daily Commuter Students/Employees (1)		320	400	80
Remote Students		140	150	10
Special Event/Other Visitors		350	440	90
Clinical Patients and Visitors		200	290	90
Total Visitor Parking	1,160	1,010	1,280	270
Other				
Additional Events and Visitors			270	270
Subtotal Other			270	270
Total	5,110	4,980	6,100	1,120

(1) Changes to parking policy may result in a transition from some of this demand from visitor parking to remote permit parking.
(2) This scenario assumes a slower growth rate for all visitor/patient/miscellaneous visitor parking needs on campus (excluding students using visitor lots). User groups in blue are assumed to grow annually at somewhat less than 2.5 percent over 10 years (25 percent total growth) in line with growth expected for employee and student populations.

VII.5 LIST OF ABBREVIATIONS

Full Name	*Subsequent Use*
Accreditation Council for Pharmacy Education	ACPE
Americans with Disabilities Act	ADA
academic health center	AHC
Auraria Higher Education Center	AHEC
Aurora Public Schools	APS
assignable square feet	ASF
Building and Grounds Committee	BAG
best management practice	BMP
Base Realignment and Closure Commission	BRAC
Center for Advancing Professional Excellence	CAPE
Communications Center	CC
Communications Center Annex	CCA
campus distributed antenna system	CDAS
Colorado Department of Higher Education	CDHE
Center for Dependency, Addiction and Rehabilitation	CeDAR
cubic feet per second	cfs
Children's Hospital Colorado	CHCO
Controlled Maintenance	CM
City of Aurora	CoA
College of Nursing	CON
Colorado State University	CSU
Colorado Translational Research Imaging Center	CTRIC
University of Colorado	CU
CU Anschutz Medical Campus	CU Anschutz
CU Board of Regents	CU BOR
CU BOR Capital Construction Subcommittee	CU BOR CCS
Central Utility Plant	CUP
Doctor of Nursing Practice	DNP
U.S. Department of Education	DOE
U.S. Department of Interior	DOI
U.S. Department of Justice	DOJ
Environmental Health and Safety	EH&S
Fitzsimons Army Medical Garrison	FAMG
Facility Condition Index	FCI
Federal Emergency Management Agency	FEMA
Fitzsimons Infrastructure Master Plan	FIMP
Fitzsimons Redevelopment Authority	FRA
fiscal year	FY
Graduate School	GS
gross square feet	GSF
heating, ventilation, and air conditioning	HVAC
Interruptible Service Option Credit	ISOC

Full Name	*Subsequent Use*
information technology	IT
Lease in Furtherance of Public Benefit Conveyance	LIFPBC
Leadership for Innovation in Team Science	LITeS
level of service	LOS
light rail transit	LRT
long-term evolution	LTE
manhole	MH
Metropolitan Statistical Area	MSA
North Central Association of Colleges and Schools	NCA
National Institutes of Health	NIH
National Renewable Energy Laboratory	NREL
Office of Institutional Planning	OIP
Office of Information Technology	OIT
outside plant	OSP
Preservation and Access Service Center for Colorado Academic Libraries	PASCAL
Public Benefit Conveyance	PBC
Power Purchase Agreement	PPA
pounds of steam per hour	pph
professional research assistant	PRA
pounds per square inch gauge	psig
photovoltaic	PV
Rocky Mountain Lions Eye Institute	RMLEI
Regional Transportation District	RTD
State Buildings Programs	SBP
School of Dental Medicine	SDM
Schweitzer Electric Laboratories	SEL
School of Medicine	SOM
Skaggs School of Pharmacy and Pharmaceutical Sciences	SOP
Colorado School of Public Health	SPH
time division multiplex	TDM
transportation management association	TMA
University of Colorado Colorado Springs	UCCS
University of Colorado Hospital	UCH
University of Colorado Health Sciences Center	UCHSC
University Planning and Accreditation	UPAC
University Physicians, Inc.	UPI
Urban Storm Drainage Criteria Manual	USDCM
Denver Veterans Affairs Medical Center	VAMC
Voice over IP	VoIP
water quality capture volume	WQCV

VII.6 FINANCIAL PLAN

University of Colorado
Anschutz Medical Campus

2012 Master Plan

Financial Plan

August 2013

I. Background & Introduction

A. Overview of the Development of the University of Colorado Anschutz Medical Campus

With the announcement of the planned closure of the U.S. Fitzsimons Army Medical Garrison in 1994, the former University of Colorado Health Sciences Center, now named the University of Colorado Anschutz Medical Campus (CU Anschutz), coordinated with the City of Aurora, the U.S. Army, and the U.S. Department of Education to prepare a redevelopment plan for the base. The redevelopment plan submitted by CU Anschutz called for a 30 to 50-year transition of the base into a state-of-the-art academic health sciences center with ties to the adjacent Biomedical Research Park being developed by the Fitzsimons Redevelopment Authority. Under the plan, CU Anschutz gained title to 217 acres of land and 71 buildings at no acquisition cost.

The financial plan component of the master planning process for the transition from the 9th Avenue campus to the Fitzsimons site included several phases:

- Preliminary financial feasibility study in 1997 for transitioning the campus in a ten-year timeframe.
- Development of four transition scenarios and corresponding financial plans in 1998 according to policy guidelines developed by the CU Board of Regents.
- Selection of a single transition scenario and financial plan that was approved in 1998 by the CU Board of Regents and the Colorado Commission on Higher Education (now named the Colorado Department of Higher Education).
- Review by the *Urban Land Institute* in 2000 that recommended transitioning to the new campus as quickly as possible to attain the economic benefits projected for the new site and to mitigate the financial impacts of operating two campuses.
- Annual updates to the financial plan through 2006.

As recommended by the *Urban Land Institute*, CU Anschutz was able to complete most of the transition to the new campus relatively quickly through the development of new and renovated space by the end of 2008.

This financial report is developed to accompany the 2012 Facilities Master Plan for the former U.S. Fitzsimons Army Medical Garrison, now referred to as the Fitzsimons Site-Wide area**.** Although the overall Master Plan process encompasses all the entities now occupying the Site–Wide area, this financial plan is developed only for CU Anschutz and excludes all the other entities. CU Anschutz is one of two campuses of the University of Colorado Denver|Anschutz Medical Campus with the other campus located in downtown Denver. The

University of Colorado Denver|Anschutz Medical Campus is one of three campuses of the University of Colorado system with the other two campuses located in Boulder and Colorado Springs.

CU Anschutz currently consists of more than 3.7 million gross square feet of space (not including leased space) that includes nearly 3.1 million square feet of new facilities and approximately 644,000 square feet of existing facilities that have been renovated to support its research, education and clinical missions. The below also includes vacant spaces but does not include the 700 Series Buildings which are now inactive and ready for demolition. The chart below lists the CU Anschutz facilities.

UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS
Facility Development Through 2012

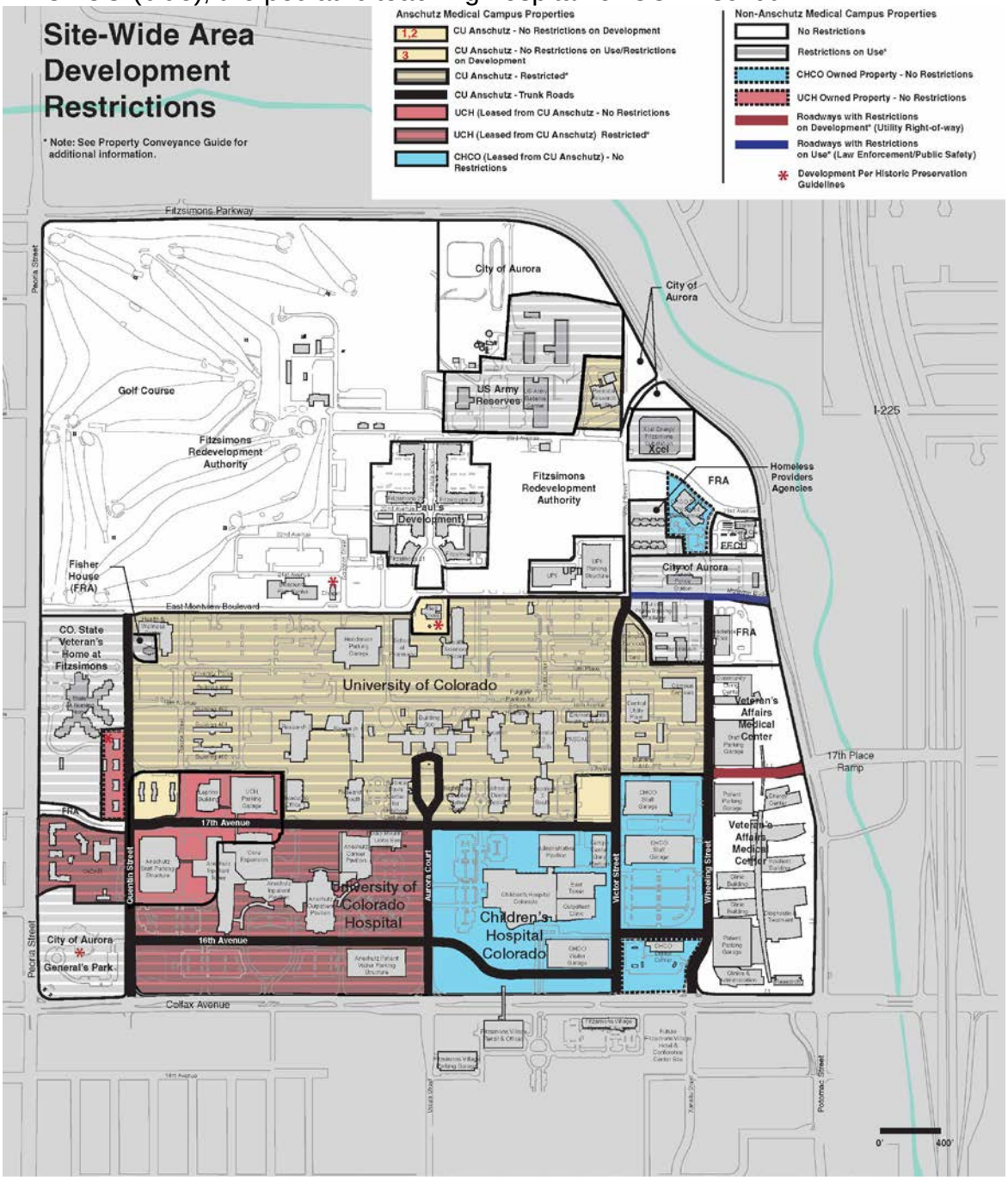
Description	Gross Square Feet		
	New	Renovated & Vacant	Total
Research, Education & Clinical Outpatient:			
Academic Office 1	204,974		204,974
Barbara Davis Center for Childhood Diabetes	112,646		112,646
Building 400		31,331	31,331
Building 401		22,656	22,656
Building 402		22,632	22,632
Building 406		19,485	19,485
Building 500 [1]		479,660	479,660
Building 533		5,080	5,080
Building 534		3,299	3,299
Education 1	115,251		115,251
Education 2	275,376		275,376
Fulginiti Center for Bioethics & Humanities	19,475		19,475
Health and Wellness Center	95,141		95,141
Health Sciences Library	113,005		113,005
Lazarra Center for Oral-Facial Health	116,060		116,060
Nighthorse Campbell Native Health	45,396		45,396
Perinatal Research Facility	13,230	15,415	28,645
Research 1	628,423		628,423
Research 2	479,085		479,085
Skaggs School of Pharmacy	171,416		171,416
Total	2,389,478	599,558	2,989,036
Support Facilities:			
Building 407 - University Police		19,509	19,509
Building 610		6,960	6,960
Campus Services	68,333		68,333
Central Utility Plant	82,156		82,156
Environmental Health & Safety	21,002		21,002
Fire Station		4,829	
Henderson Parking Garage	495,499		495,499
PASCAL - Library Materials Storage	28,906		28,906
Total	695,896	31,298	722,365
Vacant Buildings:			
Red Cross Building		13,176	13,176
Total		13,176	13,176
Total	3,085,374	644,032	3,729,406

[1] The majority of B500 is occupied by CU Anschutz's research, education, and clinical outpatient programs. Several administrative and support programs are also located in it.

The chart above does not include the clinical facilities completed and under construction by the University of Colorado Hospital (UCH) or Children's Hospital Colorado (CHCO), nor does it include facilities for other affiliates and entities who have relocated to the Site-Wide area or may relocate in the future.

The map below shows the entities that currently occupy the Site-Wide area. It also highlights the location of the three entities that comprise the Anschutz Medical Campus:

- CU Anschutz (yellow and yellow striped).
- UCH (red and red striped), the adult teaching hospital for CU Anschutz.
- CHCO (blue), the pediatric teaching hospital for CU Anschutz.



The Site-Wide area map also identifies the location of other entities located and occupying property in the Site-Wide area:

- City of Aurora
- Colorado State Veteran's Home at Fitzsimons
- Fitzsimons Federal Credit Union (FFCU)
- Fitzsimons Redevelopment Authority (FRA)
- Paul's Corporation
- University Physician's Inc. (UPI)
- U.S. Army Reserves
- Veteran's Administration Medical Center (VA) – under construction
- Xcel Energy

B. Economic Impact of CU Anschutz

In April 2011, the University of Colorado Anschutz Medical Campus together with Sammons/Dutton LLC conducted an economic impact study for CU Anschutz and its affiliates that highlights the benefits they provide to the State of Colorado and surrounding region. The *Economic Contributions of the Anschutz Medical Campus* is located in **Appendix A**. The following statistics are highlights from the study.

The study estimates the following for CU Anschutz and University Physicians, Inc., which is the clinical practice plan for its School of Medicine:

- Together, they generate an output of approximately $2.05 billion annually.
- Together, they support nearly 17,800 jobs and a total payroll of $1.15 billion.
- Together, they generate more than $46 million in state income and sales tax revenue.

Including University of Colorado Hospital and Children's Hospital Colorado, according to the Sammons/Dutton LLC report, the entire Anschutz Medical Campus supports nearly 36,000 associated jobs and generates annual output of more than $4.5 billion.

II. Description of the 2012 Development Plan

A. Overview

The 2012 Facilities Master Plan focuses on developing strategies that will guide the future development of the Site-Wide area for all its stakeholders. It also includes guidelines for:

- Developing space to support the current initiatives of CU Anschutz.
- Developing space for other projected research, academic, and administrative/support needs through 2021-22.
- Developing infrastructure to support space development and improve the campus community.

The foundation for the Financial Plan is the development plan for CU Anschutz for the ten-year period from 2012-13 to 2021-22 as summarized in the chart below. Several projects are anticipated to begin in the later years of this time period with completion dates in the two years following the ten-year planning period.

UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS
Development Plan for 2012-13 to 2021-22

Description	GSF			Development Timeline	Planned Occupancy
	CU Anschutz	Other Occupants	Total		
New Facilities:					
Bioscience 2	73,000	47,000	120,000	2013-2015	8-1-2015
Interdisciplinary Phase I	72,600		72,600	2013-2016	1-1-2017
CTRIC Imaging	48,000		48,000	2014-2017	1-1-2018
Interdisciplinary Phase II	308,786		308,786	2016-2019	1-1-2020
Education 3 Academic Building	89,762		89,762	2018-2021	1-1-2022
Vivarium Expansion	27,342		27,342	2019-2021	1-1-2022
Auxiliary Services Building	32,000		32,000	2020-2022	7-1-2022
Interprofessional Commons	80,000		80,000	2020-2022	1-1-2023
Total	731,490	47,000	778,490		
New Parking Structure:					
Parking Structure II	490,000		490,000	2020-2022	7-1-2022
Total	490,000		490,000		
Renovation / Backfill:					
Phase 1	17,638		17,638	2014-2015	7-1-2015
Phase 2	56,411		56,411	2017-2018	7-1-2018
Phase 3	56,690		56,690	2016-2017	7-1-2017
Phase 4	22,400		22,400	2021-2022	7-1-2022
Total	153,139		153,139		
Sub-Total Non-Parking Development	884,629	47,000	931,629		
Sub-Total Parking Structure	490,000	-	490,000		
Total Development	1,374,629	47,000	1,421,629		

The Development Plan chart shows the following information:

- New facilities totaling approximately 778,500 gross square feet are planned to be started within the ten-year development planning period from 2012-13 to 2021-22.
- A new Parking Structure will total 1,540 parking spaces in a 490,000 gross square foot building.
- The occupants of the new buildings are anticipated to include CU Anschutz programs as well as programs of its affiliates.
- CU Anschutz programs will occupy approximately 731,500 gross square feet of the new facilities, and its affiliates will occupy 47,000 gross square feet.
- Additionally, renovation of approximately 153,100 gross square feet is planned during the same time period to renovate and complete shelled space in the existing research facilities and to provide expansion and relocation opportunities in space vacated by programs moving into the new facilities.
- The total development plan (excluding the Parking Structure) will create and renovate approximately 931,600 gross square feet of space.
- Infrastructure improvements are anticipated throughout the time period to support the new facilities and the campus community.

B. Project Descriptions

New facilities are anticipated to include the following:

- *Bioscience II* – This facility will be built by CU Anschutz but located on property on the FRA portion of the Site-Wide area. The FRA will give CU Anschutz long term land lease to build on in return for a financial agreement including building space.
- *Interdisciplinary Building Phase I* – This building will be developed to house over 100 offices, a new IT data center and the Bioinformatics Center.
- *CTRIC Imaging* – The Colorado Translational Research Imaging Center will house all the animal and human research imaging equipment on the Anschutz Medical Campus.
- *Interdisciplinary Building Phase II* – This building will be almost entirely wet/dry research space and will house a small amount of academic support.
- *Education 3 Academic Building* – Due to the academic space need, this building will offer space for offices, classrooms, conference rooms and new teaching labs.
- *Vivarium Expansion* – This expansion will meet the University's need for vivarium space to keep up with the increasing research demand.

- *Auxiliary Services Building* – This building will provide options for a new university police building and parking services space.
- *Parking Structure II* – Due to projected increases in traffic, a new parking garage will be needed.
- *Interprofessional Commons* – As the campus grows, the need for a student center and interprofessional space for collaborative interaction is an evident need on campus. This building will provide students, faculty, staff, professional research assistants, and visiting professionals collaborative meeting space. Also provided is a university bookstore, conferencing areas, study areas, food services and other spaces for auxiliary student services.

The development plan also includes the following renovation and backfill projects:

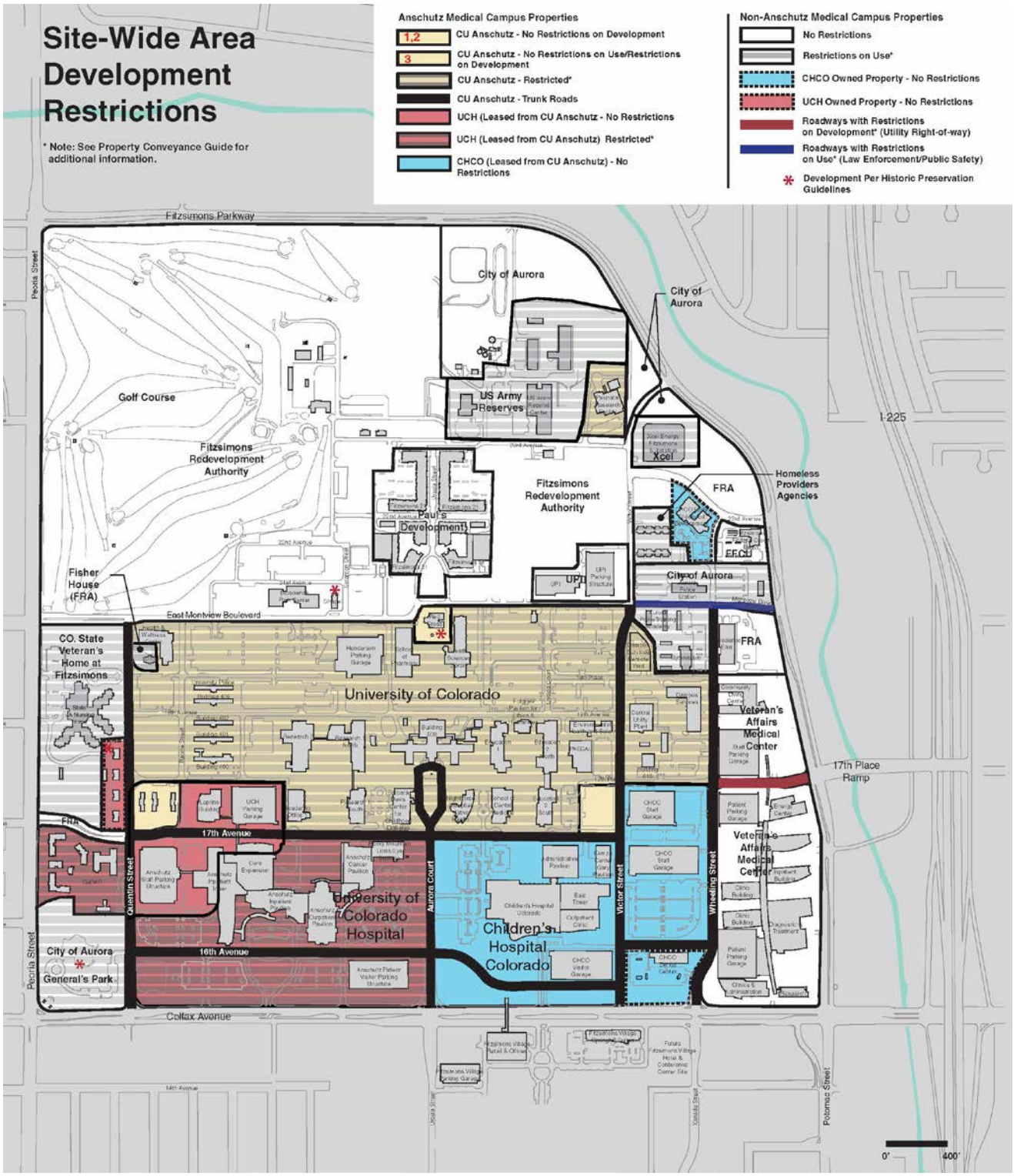
- Phase I – R1 and R2 – Aquatics and Cage Fit
- Phase II – Renovate space vacated by move to CTRIC Building
- Phase III – Renovate space vacated by move to Data Center
- Phase IV – Expansion for Nursing, SOM and Dentistry

Infrastructure projects are anticipated to include the following:

- Wayfinding, roadways and parking improvements to facilitate circulation around and through the campus.
- Landscaping and utility improvements to improve the campus community.

C. Location Strategies

Like the Site-Wide area District map shown on page 3, the map below highlights the three entities that comprise the Anschutz Medical Campus. It also identifies development and use restrictions for each of the parcels conveyed by the federal government to occupants of the Life Sciences District.



The chart on the next page summarizes the restrictions shown in the map above.

LIFE SCIENCES DISTRICT Summary of Conveyance Deed Restrictions			
Controlling Interest	Map Locator	Deed Restrictions	End Date
CU Anschutz		Restricted to educational uses; no restrictions on development.	Varies from 5-12-2028 to 7-17-2031
	1,2	No restrictions on use or development.	None
	3	No restrictions on use; restricted development per historic preservation guidelines.	None
UCH		Restricted to educational uses; no restrictions on development.	Varies from 5-12-2028 to 12-12-2030
		No restrictions on use or development.	None
CHCO		No restrictions on use or development.	None
Other Entities		Various restrictions on use according to the property.	None
		Roadways with restrictions on development.	None
		Roadways with restrictions on use.	None
		No restrictions on use or development.	None

The chart above shows the following information:

- CU Anschutz has three parcels without use restrictions and two parcels without development restrictions. The rest of its site is restricted to educational use.
- UCH has one parcel without use or development restrictions, and the rest of its site is restricted to educational use.
- CHCO does not have use or development restrictions on its site.
- The other entities occupying sites within the Site-Wide area have various use and development restrictions according to the specific conveyance mechanism.

For CU Anschutz, the parcels without use restrictions are important for its future development because they could be used to site new buildings that contain non-educational programs such as those that might be developed within a public–private partnership. For example, the parcels that are restricted to educational uses can only contain programs related to the CU Anschutz role and mission. The parcels without these restrictions could contain facilities housing outside entities that pay a portion of development and operating costs.

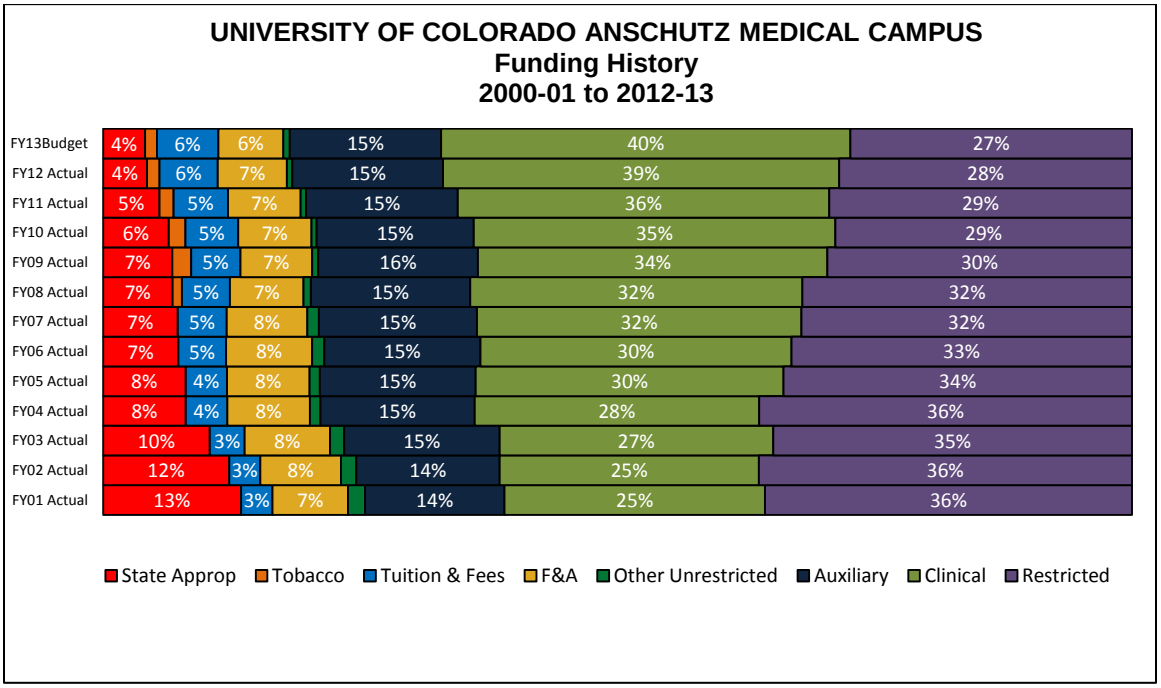
It is important to note that the conveyance deed restrictions could be removed from these CU Anschutz sites through federal legislation that removes them or by

paying the federal department that conveyed them the fair market value of the property to remove them.

III. Current Funding Climate

A. Background

Like most other states, Colorado experienced significant economic downturns from the national recession after the September 11, 2001 attack on the World Trade Center in New York and from the global recession that began in 2008 from the turbulence in the U.S. housing market. In both recessions, the impacts to public higher education in Colorado included reductions in State funding, increases in student tuition and fees, and program consolidations and downsizing. The chart below summarizes the funding changes for CU Anschutz for the 12 year period from 2000-01 through 2012-13.



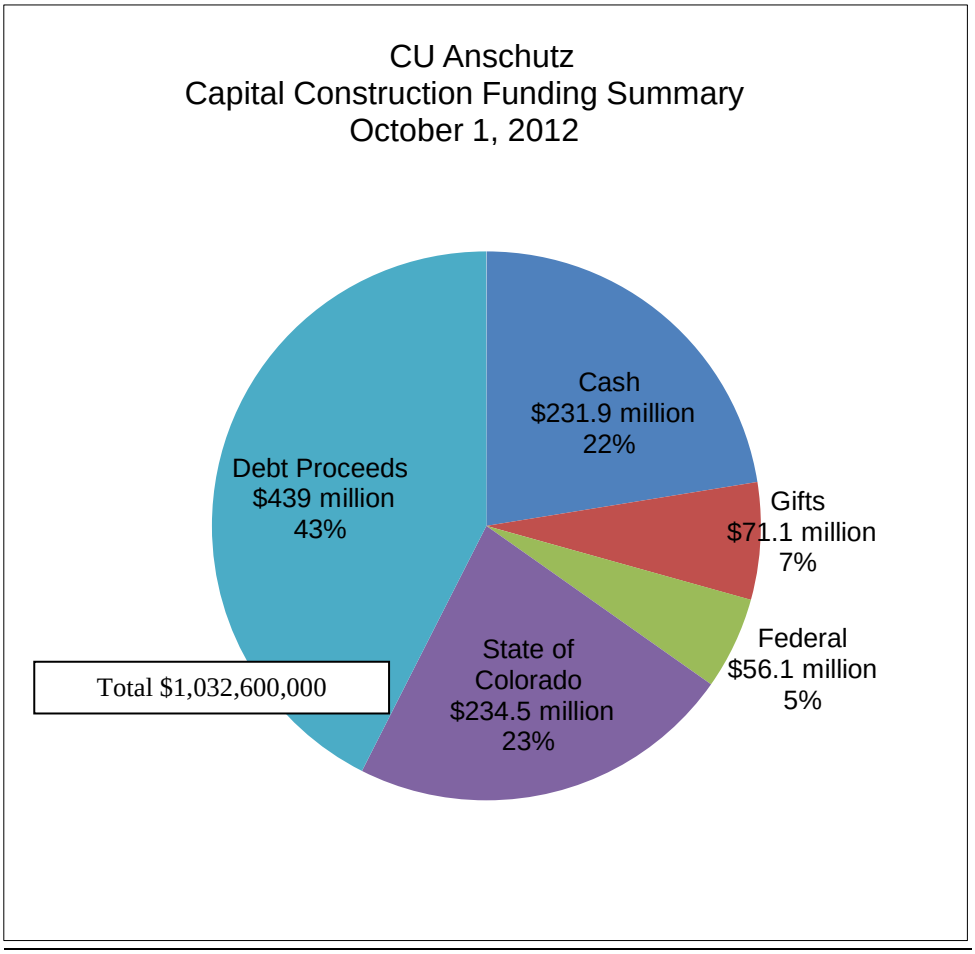
As the chart above shows:

- State of Colorado appropriations to the campus have declined from 13% of total resources in 2000-01 to 4% in 2012-13.
- Temporary funding from Colorado's portion of the legal settlements from class action lawsuits with tobacco companies has partially replaced the reductions in State appropriations, but it too is decreasing.
- Student tuition and fees have increased from 3% of total resources in 2000-01 to 6% in 2012-13, reflecting a shifting of the cost of education to students as State resources have declined.

- Facilities and Administrative (F&A) cost recoveries from sponsored programs and Auxiliary resources have remained nearly the same proportionate share of total resources over the 13 year period.
- Restricted resources that include sponsored programs and gifts have declined from 36% of total resources in 2000-01 to 27% in 2012-13.
- Clinical resources that primarily include the dental clinics and the School of Medicine practice plan have grown from 25% of total resources in 2000-01 to 40% in 2012-13, reflecting changes in the direction and management of health care services.
- The chart also shows that the campus economy began to stabilize in 2005-06 after the 2001 recession and in 2011-12 after the 2008 recession.

B. Capital Construction Funding for CU Anschutz

To date, nearly $1.033 billion has been invested in the development of the CU Anschutz portion of the Site-Wide area. This investment is summarized in the chart below and discussed on the next page.



The chart on the previous page summarizes the following funding strategies for the construction of CU Anschutz:

- Debt Proceeds - $439 million: CU Anschutz leveraged F&A cost recoveries, clinical resources, and auxiliary resources to issue bonds for constructing new research, clinical outpatient, and support facilities.
- State of Colorado - $234.5 million: State of Colorado capital construction, Fitzsimons Trust, and State Certificates of Participation (COP) resources supported the construction of new education, clinical, and support facilities.
- Gifts - $71.1 million: Gifts supported the construction of new facilities and landscaping projects.
- Federal - $56.1 million: Federal grants supported the construction of new facilities, renovation projects, and infrastructure.
- Cash - $231.9 million: CU Anschutz cash and cash reserves supported the construction of new facilities, renovation projects, and infrastructure.

C. State of Colorado Support

It is important to note that the State invested approximately $234.5 million in the development of the Anschutz Medical Campus as follows:

- $27.4 million – Initially, the State invested through the capital construction appropriation process to support construction of the Anschutz Cancer Center, PASCAL storage facility for library materials, and early infrastructure projects.
- $4.5 million – In addition to the capital construction process, the State created the Fitzsimons Trust during 1997-98 that was intended to be funded for ten years by annual appropriations of $7.8 million, earn interest from the State Treasury, and be withdrawn for projects in the later stage of transition from the 9th Avenue campus to the new campus. The Trust supported the construction of Education 1A.
- $202.6 million - In 2001-02, the State COP was created to fund projects as quickly as possible and enable the acceleration of the transition off 9th Avenue as recommended by the *Urban Land Institute* in its review of the transition plan. The State COP supported construction of the library, academic offices, education facilities, and support facilities.

Annual debt service for the State COP is approximately $14.5 million per year. The State appropriated resources to fund this debt service during the height of both recessions when it could not fund any other capital construction projects. Because of this and the backlog of requested support for other capital development projects by other state entities, it is uncertain how deeply the State may be able to further invest in the development of CU Anschutz.

D. Federal Support

The federal government has invested nearly $56.1 million in the development of CU Anschutz through grants it has awarded to the campus to support the construction of the Barbara Davis Center for Childhood Diabetes, Nighthorse Campbell Native Health building, Perinatal Research Facility, Research 1, Research 2, Building 500 renovations, and Infrastructure Phases 1-4B.

The federal government has also invested in the development of CU Anschutz's research facilities and infrastructure through F&A cost recoveries from research grants awarded to the campus. These cost recoveries have been leveraged to issue bonds of approximately $322 million for constructing new research facilities, and they are used to repay the obligations to bond holders.

There is uncertainty about the future level of federal funding for CU Anschutz. Unless Congress and the President agree on a budget plan, the 2011 Budget Control Act requires automatic, across the board cuts to the federal budget known as sequestration. Sequestration will cut $1.2 trillion over the next ten years from the federal budget with half from defense spending and the rest from non-defense. It is anticipated that sequestration will mandate cuts of approximately $109.4 billion in discretionary spending in 2013, including an 8.2% budget reduction for the National Institutes of Health (NIH). The NIH is the major sponsor of the CU Anschutz research program, providing approximately 50% of total awards for both 2009-10 and 2010-11. For both these years, total awards from all sponsors were approximately $400 million and the NIH provided approximately $200 million.

IV. Overview - Financial Plan Methodology

A. Background

The original financial plan developed to support the transition from the 9th Avenue campus to the CU Anschutz Medical Campus used the following process:

- First, the original Master Plan space requirements were identified for construction of new and renovated space, infrastructure development, controlled maintenance of existing space, operating costs for new space, and duplication costs of supporting two campuses during the transition.
- Then, all major types of one-time and incremental resources were identified, one-time balances documented, and yearly increments for all funding sources were projected.
- In the third step, the one-time and incremental resources for each year were allocated to: (1) maintain the existing campus operating base, (2) enhance existing campus programs and develop new programs, or (3) meet the master plan space requirements.
- In the final step, an evaluation was done to adjust the financial plan for actual occurrences in the prior year, new information made available for future years, and changes in the transition scenario. The evaluation also determined whether there were sufficient one-time and incremental resources to fund space requirements identified by the original Master Plan. If not, the transition scenario is adjusted accordingly.

This process and the accompanying financial models were reviewed during December 2000 by the *Urban Land Institute* and found to compare with those used by first tier private and public entities to undertake similar projects.

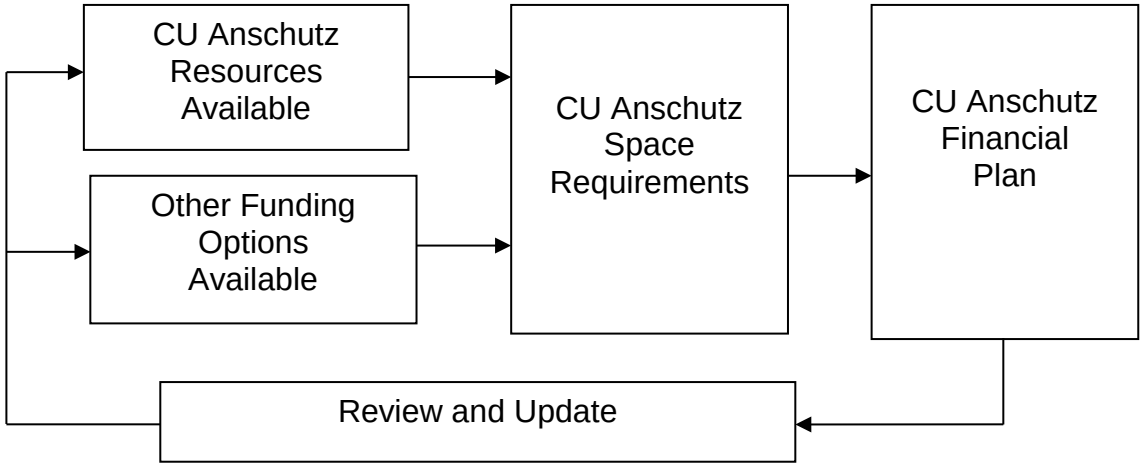
B. Current Process

Now that the transition is complete and the Facilities Master Plan focuses on development strategies for CU Anschutz, this process has been updated as follows:

- First, requirements are identified for construction of new and renovated space, infrastructure development, controlled maintenance of existing space, and operating costs for new space. There is no longer a need to identify duplication costs of supporting two campuses.
- Next, funding strategies are identified that include CU Anschutz resources as well as other options such as public / private partnerships.
- Rather than applying projected resources to space requirements, the funding strategies now serve as guidelines that can be applied to specific projects as the resources become available or other options are identified.

- If the resources are not available to fund a project shown at a specific time on the development timeline, the project will be moved further out on the timeline or reconsidered for development.

The graph below depicts the current process described above.



V. Major Assumptions - Financial Plan Requirements

All of the projected financial costs are compilations of various estimates. This section of the report describes the estimates and the processes used to develop them.

A. Facility Construction & Renovation

The University of Colorado Denver|Anschutz Medical Campus Offices of Institutional Planning and Facilities Projects used the facility cost estimating model to develop costs for both new space and the renovation of existing space. The duration of the projects is based on the size of the project, siting, and any special development requirements.

The foundation of the facility cost estimating model is cost estimates developed by the Office of Facilities Projects with input from other experts both within and outside of CU Anschutz. The cost estimates include all hard and soft program costs to produce a unit rate expressed in dollars per gross square foot. The model incorporates assumptions for project contingency and also includes assumptions for design and construction periods for each project to develop a detailed annual cash flow plan. The unit rate is extended against program gross square footage to arrive at total program costs for a specific project.

The format of the model organizes each project's program budget into the major categories of Service and Fees, Construction – Building and Site, Equipment and Furnishings, and Miscellaneous based on the UNIFORMAT II cost classification format that is the American Society for Testing and Materials (ASTM) standard for performing and reporting construction costs.

The facility cost model is a tool to estimate the cost of future building and renovation projects. As projects progress in the planning process and more detailed information about a particular facility is available, detailed costs estimating practices are performed specific to the facility.

Construction cost estimates are based on current prices in the metropolitan Denver, Colorado area. The model also applies program contingency to each project according to the following State Buildings Program guidelines:

- 5% of total costs for new construction projects.
- 10% of total costs for renovation projects.

The cost estimates for each space type include, but are not limited to:

- Professional service fees and reimbursable expenses.
- Program and project management fees and reimbursement expenses.

- Code review, site survey, geo-technical, testing and inspection services.
- Utility development, tap, and engineering fees.
- General contractor and subcontractor overhead, profit, and bonding.
- Equipment costs such as research, medical and food service.
- Furniture and furnishings.
- Information technology elements and connections to the facility.

B. Infrastructure

Infrastructure development is based on the *Infrastructure Master Plan* for the Site-Wide area that was created at the beginning of the transition to the site by its current occupants with the consultant assistance by the University of Colorado Denver|Anschutz Medical Campus Offices of Institutional Planning and Facilities Projects and other site-wide stakeholders. The *Infrastructure Master Plan* addresses the requirements, layout, and conceptual design for the infrastructure needed to support the site with the overarching goal of providing operational efficiency while maximizing short and long-term benefits. The planning established core infrastructure corridors for the underground utilities. The infrastructure components include the following:

- Underground utilities – Water, wastewater collection, storm drainage, steam and chilled water, electric, and technology systems.
- Landscaping – Enhancement of the campus environment.
- Grading and spoils management – Elevate portions of the site that are too low to drain properly.
- Roadways – Vehicle circulation around the campus.
- Bridges and tunnels – Facilitate circulation around the campus.
- Parking – Complements the campus build-out.
- Demolition – Removal of existing buildings past their useful life to allow construction of new facilities.
- Wayfinding – Signage for pedestrian and vehicle circulation.

The phasing plan for infrastructure uses two guiding principles: 1) provide infrastructure in an efficient and effective manner to avoid wasted time and effort, and 2) preclude duplication of costs during development.

Based on the phasing plan, the infrastructure model is developed to identify by fiscal year the cost of infrastructure improvements. The model includes estimates for capital, design, program management, survey/geotechnical, and inspection requirements for each of the infrastructure components. The model incorporates a 10% contingency for potential scope changes applied to baseline costs and also allocates the projected costs to each entity sharing in the project according to the *2004 Amended and Restated Infrastructure Development and Maintenance Agreement*.

C. Operating Costs

CU Anschutz incurs costs to provide support services to its facilities. These operating costs were developed by interviewing campus managers who provide support services to the research, education, and clinical programs of the campus. This process identified the following support services that are projected to grow to meet the demands of future development of the campus:

- Building Maintenance and Operation: Upkeep of building structure and systems.
- Environmental Health and Safety: Radiation safety, hazardous waste disposal, and biological safety and infectious waste disposal.
- Environmental Services: Housekeeping services.
- Grounds: Landscaping maintenance, irrigation, and watering.
- Information Technology: Help desk, network services, enterprise computing, and campus software agreements.
- Insurance: Property.
- Materials Management: Large item pickup and delivery.
- Roads: Street overlay, pothole repair, signage, snow removal, sweeping, and outside lighting.
- Security: Building and site police services.
- Utilities: Electric, water, sewer, steam, and chilled water.

The interview process identified the existing service units for each of the departments listed above and gathered information about how each of them would be impacted by additional development of the campus. For example, some services such as building maintenance and operations and housekeeping vary in direct proportion according to the addition of new square footage. Others, such as materials management and information technology vary according to the proximity of buildings and population density. Still others, such as roads vary according to the amount of new lane miles added to the campus.

The operating cost model uses the cost studies to identify the existing variable component of the service delivery costs as a base. It then applies the variable costs to the current square footage of the campus to develop an average variable cost for the current year for all of the services listed above with the exception of roadways. For roadways, an average variable cost per lane mile was developed. These costs per square foot and lane mile are then applied to the development plan to project future operating costs.

The operating costs are reduced for projected cost recoveries from other entities, such as University of Colorado Hospital and Children's Hospital Colorado, that use CU Anschutz services so that total costs only show CU Anschutz's share of

the costs. The costs are also adjusted for other operational changes such as lease cancellations and utility rate adjustments.

D. Controlled Maintenance

The cost estimates include limited controlled maintenance projections for existing facilities that are based on a detailed facility audit and prioritization conducted by the University of Colorado Denver|Anschutz Medical Campus Office of Building Maintenance & Operations that analyzes specific needs, such as elevators and roofing, for each year of the financial plan. The analysis prioritizes the projects and then estimates future State funding available for the projects using projected and historic controlled maintenance funding levels. The projects with lower priority that fall below the estimated funding level for a specific year are captured in the model as controlled maintenance in future years. Historical funding patterns and practices are taken into consideration, as well as the impact of the current economic climate in Colorado. Inflation is not applied to the controlled maintenance cost estimates for future years since the calculations are based on projected State funding for the projects.

VI. Major Assumptions - Financial Plan Funding Strategies

As previously discussed, there is uncertainty about the level of federal and state support for future investments in the CU Anschutz Medical Campus. Additionally, CU Anschutz Medical Campus is servicing debt obligations that funded approximately 43% of its development. For these reasons, CU Anschutz Medical Campus will only be able to provide marginal investments in the near future for additional development of its campus, and it will also need to explore new funding strategies.

A. Survey of Peer Institutions

To assist in identifying new funding strategies, CU Anschutz Medical Campus used the *Education Advisory Board* to survey peer institutions to understand how other public institutions have developed the following:

- Capital projects in a financially challenging environment.
- Location strategies for their projects.
- Capital funding strategies for their projects.
- Operating funding strategies for their projects

In summary, the survey found that:

- Institutions continue to rely on traditional funding sources, including state support, debt financing, and gift giving.

- Partnerships with private investors in which the investor builds the space and the institution leases the space from the investor are explored as a last resort.
- Private developers construct and own primarily non-academic facilities.
- Institutions prefer to locate facilities on-campus to enhance collaboration among faculty, staff and students.
- Institutions enter into partnerships with other universities, affiliated hospitals, and medical groups to collectively construct and own the space, with each partner then renting space from the 501(c)(3).
- One institution formed a limited liability company (LLC) with private medical groups to build a shared office building. The institution owns 25% of the LLC and rents office space directly from it.
- Another institution recently formed a 501(c)(3) partnership with a health system to fund a new 55,000 square foot research building for translational and clinical research. The health system reports that its independent, non-profit research institute receives more research funding from the NIH than almost one-third of the country's medical schools.
- Institutions are purchasing and renovating existing facilities to spread the renovation costs over future years when the space is needed.
- Institutions typically manage their facilities and charge departments for space in the facilities.

B. CU Anschutz Experience With Public / Private Partnerships

During its development, CU Anschutz has explored and entered into public / private partnerships to construct its facilities and develop and manage various programs. The chart below summarizes these partnerships.

UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS Experience with Public / Private Partnerships			
Facility / Program	Lazzara Center for Oral Facial Health	Central Utility Plant	Parking Operations
Partnership Description	• Private company constructed the facility using the University's tax exempt status and debt capacity. • Private company funded the development of several programs. • University owns the facility. • University operates the facility. • University pays the debt service.	• Private company constructed the facility using the University's tax exempt status and debt capacity. • Private company owned the facility with an option for the University to purchase at a later date. • University operates the facility. • University pays the debt service.	• University constructed surface and structure facilities. • University owns the facilities. • University operates the facilities. • University pays the debt service. • Private company manages the parking program.
Current Status	• Ended by the private company several years after the partnership was formed.	• Ended when the University purchased the facility.	• The operating agreement is currently in place.

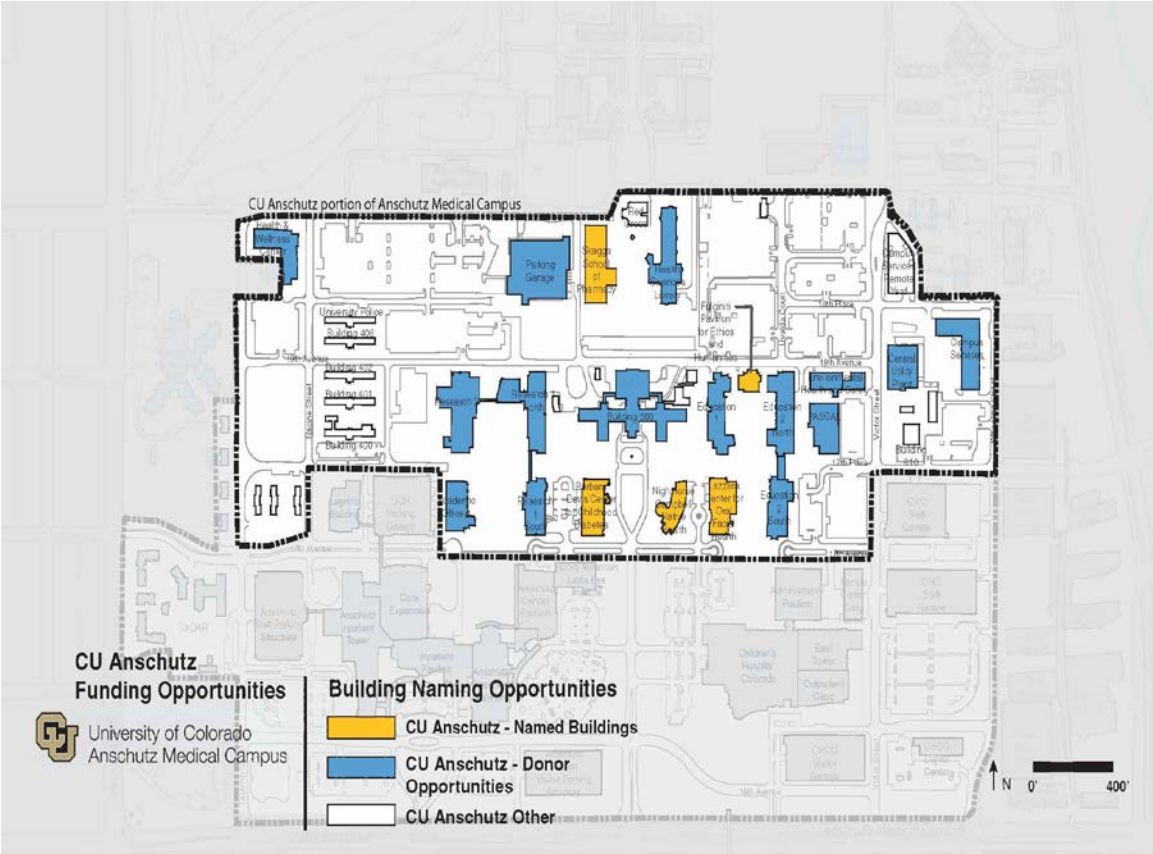
It is important to note that the constraints of a public / private partnership often prevent the entities from entering into business arrangements. These constraints include:

- Requirements for the public partner are different from those of the private partner. Public entities are required by state statutes and other guidelines to provide services at the cost of service without a profit, do not pay taxes, and can issue tax-exempt debt to finance their facilities. Private companies require a profit margin, pay taxes, and issue taxable debt.
- For the reasons above, it is more expensive for a private company to provide services to a public entity.
- Public entities are more restricted than private companies about how they can conduct business based on state statutes and state operating guidelines.

These restrictions can be more than private companies are willing and financially able to undertake.

C. Gift Giving Opportunities

An important strategy for future capital development of CU Anschutz is gift giving. As the chart on page 11 shows, gifts historically have played an important role in the development of the campus, providing 7% of the current total development funding. The two graphs in this section of the report suggest the range of naming opportunities and other gift giving options available to potential donors. The graph below highlights naming opportunities for buildings already constructed as discussed on the next page.



The colors in the CU Anschutz Funding Opportunities graph show:

- Yellow - CU Anschutz buildings already named.
- Blue - Naming opportunities for CU Anschutz buildings already constructed.
- White – Other CU Anschutz buildings that are not anticipated to be desirable as naming opportunities.

D. Funding Priorities

To help develop funding strategies, CU Anschutz developed the matrix shown below to prioritize the projects identified for the Facilities Master Plan.

UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS Funding Priorities	
Priority	Project Description
Immediate (1 Year)	• Projects that need to be completed as soon as possible so that other projects with established timelines can proceed on schedule.
Short-Term (2-5 Years)	• Space projects that facilitate development of research, academic, and clinical programs in the short-term.
	• Infrastructure projects that support the space projects above.
	• Facility maintenance and operating support for the projects above.
	• Infrastructure projects that improve the campus community in the short-term.
Long-Term (6-10 Years)	• Space projects that facilitate development of research, academic, and clinical programs in the long-term.
	• Infrastructure projects that support the space projects above.
	• Facility maintenance and operating support for the projects above.
	• Infrastructure projects that improve the campus community in the long-term.

The matrix above summarizes the following information:

- The first priority for funding will be projects that need to be completed so that other projects with established timelines can proceed. An example is the construction of Bioscience 2.
- Short-term funding priorities will be space projects identified as CU Anschutz initiatives in the near future, the infrastructure to support new facilities, and the related facility maintenance and operating support. Other short-term funding priorities include infrastructure projects that are identified as initiatives to improve the campus community in the near future. Examples of these projects are the development of CTRIC Imaging and the infrastructure required to support the new facility.
- Long-term funding priorities are for space and infrastructure development that is anticipated to be needed but is not yet identified as specific initiatives for CU Anschutz or is identified as initiatives further out on the development timeline. For example, the Facilities Master Plan programming process identified that CU Anschutz will need approximately 437,000 gross square feet of additional research space by the end of 2021-22. Not all of this new space has been programmed yet but will

continue to evolve as new programs, initiatives, and clinical opportunities begin at the university.

E. Summary of CU Anschutz Funding Strategies

As previously noted, CU Anschutz will only be able to make marginal investments in its campus in the near future. As the state and national economic recovery progresses and CU Anschutz pays down its obligations to bond holders, it can again make significant capital investments in its campus. Until that time, CU Anschutz has developed the strategies shown in the table below to fund future development in the near future.

UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS
Funding Strategies for Development

Type of Development	New Facilities	Space Renovations	Infrastructure	Controlled Maintenance	New Facility Operating
Development Description	• Research • Academic • Administrative / Support	• Research • Academic • Administrative / Support	• Utilities • Landscaping • Roadways • Parking • Demolition • Wayfinding	• Maintenance of existing facilities	• Building maintenance & operations • Housekeeping • Utilities • Environmental health & safety • Security • Grounds • Insurance
Funding Options	• Gifts • Federal grants • State appropriations • University cash • Partnerships with affiliates • Public / private partnerships • Leasing as an alternative to building	• Gifts • Federal grants • University cash	• Gifts • Federal grants • F&A • University cash • Partnerships with affiliates • Debt pledged with user fees for parking and utility projects • University cash	• State appropriations for controlled maintenance	• F&A • University cash

The chart above summarizes the following information:

- For new facilities, CU Anschutz will review cash it has available to partially fund new construction, and will explore funding opportunities from other sources including potential gift giving, federal and state funding, and partnerships with other entities. It will also explore leasing space as an alternative to constructing space.
- Although the Facilities Master Plan anticipates that additional research space will be needed in the next ten years, CU Anschutz will not include issuing debt pledged with F&A revenues as a potential funding strategy for the reasons previously discussed.
- Space renovations will be funded with gifts, federal grants and cash as these resources become available.

- Infrastructure requirements could be funded from a variety of resources including gifts, federal grants, F&A resources to support the research infrastructure, and cash. Depending on the type of infrastructure, partnerships with other entities that would benefit from the development and debt pledged with user fees will be explored as potential funding sources. For example, the infrastructure agreements CU Anschutz has with other entities who occupy the Life Sciences District identify cost sharing according to the benefit received. Also, the construction of parking lots is typically funded by parking user fees.
- As previously discussed, the projected controlled maintenance requirements are based on future estimated State appropriations for the projects.
- The funding options that will be explored for new facility operating requirements are F&A resources to support the research infrastructure and cash to support other facilities.

The chart on the previous page also lists each resource included in the funding strategies. The following are definitions for the resources:

- Gifts: Funding provided by donors either for specific projects or general development of the campus.
- Federal grants: Funding provided by the federal government through ear-marked and competitive grants.
- State appropriations: Funding provided by the State of Colorado through annual appropriations to CU Anschutz.
- Affiliate partnerships: Funding provided by affiliate entities that currently include UCH and CHCO as well as potential new affiliates.
- Public / private partnerships: Funding provided by private sector entities for the specific project.
- F&A: Facilities and administrative cost recoveries related to CU Anschutz sponsored programs.
- University cash: Funding provided by the general resources of CU Anschutz.
- Debt pledged with user fees: Funding provided by leveraging user fees to issue debt for specific projects.
- Leasing: Leasing agreements to accommodate space needs either in the short-term or long-term.

VII. Financial Plan Summary

Using the processes and assumptions described in the *Financial Plan Requirements* section of this report, the costs shown in the following chart summarize the financial requirements identified for the development plan.

UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS
Summary of the Projected Financial Requirements
All Projections in 2013 Dollars

Description	***Ten Years 2012-13 to 2021-22***
New Facilities:	
Bioscience 2	$38,551,581
Interdisciplinary Building Phase I	$43,676,175
CTRIC Imaging	$32,842,152
Interdisciplinary Building Phase II	$175,547,237
Education 3 Academic Building	$44,096,493
Vivarium Expansion	$49,907,887
Auxiliary Services (Univ. Police & Parking Services)	$14,463,687
Parking Structure II (1540 spaces)	$27,587,725
Interprofessional Commons	$38,459,583
Total New Facilities	**$465,132,520**
Renovation:	
Phase I	$21,550,745
Phase II	$10,964,389
Phase III	$12,927,278
Phase IV	$5,191,890
Total Renovation	**$50,634,302**
Other:	
Facility Operating	$6,825,144
Facility Controlled Maintenance	$58,330,060
Infrastructure	$14,976,269
Total Other	**$80,131,473**
Total Development Plan	**$595,898,295**

The chart above shows the following information for the 2012 Master Plan:

- The total projected costs for the development plan are $595,898,295, and they include the anticipated costs to construct new facilities, renovate space, operate and maintain new space, and develop infrastructure to support the new space and campus community.
- Because some of the projects are anticipated to begin planning and design at the end of the overall planning period (2012-2022), these projects are not scheduled to be completed for occupying until after the ten-year Facilities Master Plan time period ends.

As discussed in the *Financial Plan Methodology* section, specific funding strategies are not identified for each of the projects and a summary funding plan is not included in this report. Instead, CU Anschutz will use the strategies as guidelines to develop the projects as they move up on the development timeline and become short-term initiatives.

APPENDIX A

APPENDIX A

economic contributions

of the Anschutz Medical Campus

University of Colorado
Anschutz Medical Campus

FY 2010 | APRIL 2011

Prepared by the University of Colorado Denver Offices
of Administration and Finance and Sammons/Dutton LLC

Executive summary

The University of Colorado Denver | Anschutz Medical Campus is an important engine to the state economy. Contributions to the Colorado economy include education, training, research, clinical health care, and community service activities. For the fiscal year ending June 30, 2010, the following are highlights of the economic contributions of the Anschutz Medical Campus and affiliated University Physicians, Incorporated:

- **Total state economic impact of $2.05 billion** through direct campus expenditures including payroll, operations, and student spending plus indirect effects. For every $1 in direct expense by the campus, there is up to an additional $1.04 in purchased goods and services in Colorado.
- Direct campus employment of 8,112 jobs creates nearly 9,700 additional jobs for a **total employment impact of nearly 17,800 jobs in Colorado.** On average, each faculty and staff position at the Anschutz Medical Campus supports another 1.19 additional jobs in the state.
- A **total payroll impact of $1.15 billion in Colorado** based on $718 million in direct wages, salaries, and benefits. For every $1 in compensation paid to campus employees, there is up to $0.60 in additional income provided to the state.
- Annual campus **operating revenue in excess of $1 billion.** Revenue from clinical health services represents 35 percent of the total, and federal grants and contracts account for 25 percent. Meanwhile, state appropriated resources in FY 2010, excluding one-time state fiscal stabilization funds, contributed 4.3 percent of total revenue.
- The state annually receives **more than $46 million in individual income tax and sales tax revenue** from Anschutz Medical Campus direct and indirect payroll and spending. Excluding one-time state fiscal stabilization funds, the state receives more in tax revenue than the operating funds it appropriates to the campus ($45 million).
- While not included in this study, spending and jobs by adjacent clinical partners supplement this economic impact. The combined contributions of the Anschutz Medical Campus, University Hospital, and The Children's Hospital **support up to 36,000 jobs** for a total state economic impact of more than $4.5 billion.

University of Colorado
Anschutz Medical Campus

Introduction

The University of Colorado Denver | Anschutz Medical Campus is a Colorado educational and research institution, offering comprehensive undergraduate, graduate and professional programs for students on two campuses—the Denver Campus and the Anschutz Medical Campus in Aurora. The university is home to more than 90 centers and institutes extending the reach of instruction and research into the community, covering subjects from entrepreneurship and education policy to medical and health concerns across the state. University faculty and researchers provide significant contributions to the national and global reputation for discovery and innovation characteristic of the University of Colorado.

This report estimates the economic contributions to the statewide economy by the Anschutz Medical Campus as well as University Physicians Incorporated (UPI), the faculty practice plan for the School of Medicine. These contributions include jobs and income for Colorado residents, investments in human and physical capital, cutting-edge health research and clinical trials, support for private sector businesses through purchases of goods and services, and tax revenue accruing to state and local governments. Based on the fiscal year ending June 30, 2010 (FY 2010), the report examines annual contributions associated with current operations such as payroll, campus expenditures, and student spending over and above tuition. This report also analyzes the impact of one-time and multi-year investments in current and planned facility construction.

University faculty and researchers provide significant contributions to the national and global reputation for discovery and innovation characteristic of the University of Colorado.

anschutz

Campus profile

collaboration & innovation

As the only public academic health center in the state, the Anschutz Medical Campus is vital to the citizens of Colorado and its economy.

The Anschutz Medical Campus is the largest health care center between Chicago, Texas and the west coast, serving an estimated 1,000,000 patients a year.[1] Innovative campus architecture and state-of-the-art technology bridge education and research in three collaborative zones: an education zone with remarkable facilities for training future physicians and other health professionals; a research zone with ground-breaking, internationally renowned research; and a clinical care zone with the University of Colorado Hospital and The Children's Hospital, the School of Medicine's primary adult and pediatric hospital partners, nearby. The proximity of these clinical care partners—as well as a planned Veterans Administration Hospital—to the university enhances the access of faculty and staff to the clinical areas and facilitates the flow of discoveries made from the bench to the bedside, and ultimately to the community.

As the only public academic health center in the state, the Anschutz Medical Campus is vital to the citizens of Colorado and its economy. It is home to five professional schools in the health sciences as well as the consolidated University of Colorado Denver Graduate School, and offers 40 degree programs.[2] The School of Medicine is Colorado's first and only allopathic medical school, attracting internationally recognized faculty. The School of Dental Medicine is nationally recognized for the quality of its educational programs and its broad range of clinical services. The College of Nursing is consistently ranked among the top nursing schools in the country. The School of Pharmacy is ranked among the top 100 schools nationally for individual grant awards from the National Institutes of Health. The newest school on the campus, the Colorado School of Public Health, was created in 2007 as a collaborative venture among the University of Colorado Denver, Colorado State University, and the University of Northern Colorado.

Health care workforce

While the Anschutz Medical Campus is facing constraints to expand its programs, its graduates are responsible for meeting a significant portion of the state's need for healthcare providers. In FY 2010, the campus conferred 926 degrees, up 15 percent from FY 2005. The table below shows the recent history of degrees awarded.

Table 1. History of Degrees Awarded[3]

	Bachelor's	Master's	Doctoral	Professional	Total
FY 2005	199	195	54	354	802
FY 2006	257	133	51	374	815
FY 2007	250	163	61	421	895
FY 2008	238	201	68	440	947
FY 2009	246	210	57	423	936
FY 2010	**211**	**190**	**69**	**456**	**926**

Each year the Anschutz Medical Campus graduates approximately 150 doctors, 50 physical therapists, 40 physician assistants, 70 dentists, 215 nurses, and 157 pharmacists. At a time when the state is facing dramatic shortages in healthcare professionals, the need for support of these academic programs has reached a critical level. Similar to the national trend, the Colorado Department of Labor and Employment projects a 24 percent increase in the state demand for selected healthcare practitioners in the next ten years. The demand for healthcare providers is amplified by the need to replace an aging workforce as over a third of job openings are anticipated due to retirement. The combined impact of openings due to occupational growth and replacement creates a need of over 3,000 professional healthcare providers each year for the next ten years. The table below illustrates the estimated employment growth and need for health care practitioners from 2009 to 2019.

Table 2. Occupational Employment Projections, 2009 - 2019[4]

Health Practitioners Occupation Detail	2009 Estimated Employment	2019 Estimated Employment	Total Percent Change	Annual Avg. Openings due to Growth	Annual Openings due to Growth and Replacement
Dentists and Orthodontists	2,944	3,142	6.7%	13	71
Medical Science Professionals	769	864	12.4%	10	34
Pharmacists	4,364	5,524	26.6%	116	192
Physical Therapists	3,677	4,684	27.4%	100	144
Physician Assistants	1,459	1,893	29.7%	43	63
Physicians and Specialists	9,224	10,657	15.5%	140	307
Nurses	50,523	63,697	26.1%	1,313	2,224
Subtotal, Selected Occupations	**72,960**	**90,461**	**24.0%**	**1,735**	**3,035**

a vital workforce

Of all health care professionals, dentists are facing the most significant shortfall over the next ten years due to retirement.

Incorporating the historical growth rates of supply and demand for health care professionals in Colorado, a recent study projected Colorado will need an additional 2,200 primary care providers beyond the anticipated supply by 2025.[5] This projected workforce need in Colorado illustrates the importance of the Anschutz Medical Campus, and many graduates remain in Colorado to help meet these needs. Based on current records, there are approximately 32,500 campus alumni. Of those, more than half of campus alumni reside in Colorado and 40 percent live in the Denver metro area.[6]

While there may be a shortage statewide, the need for health practitioners is more significant in rural areas where the number of primary care physicians per capita in 2005 was less than 1 per 1,500 residents in some of Colorado's rural counties (the central mountain range, the San Luis Valley, and the southeastern plains) and less than 1 per 2,500 residents in the central eastern plains. This ratio is expected to deteriorate in the next 15 years.[7]

Dentistry is also facing a statewide shortage, particularly in rural areas. There are nine Colorado counties with no licensed dentists and 43 counties or parts of counties have been designated as Dental Health Professional Shortage Areas. Of all health care professionals, dentists are facing the most significant shortfall over the next ten years due to retirement. While the number of all workers age 55 or older is on the rise, the aging workforce is most pronounced in dentistry where approximately 40 percent of dentists practicing in Colorado are age 55 or older.

The nursing profession, including registered nurses and advanced practice nurses, is the largest component of health care practitioners in the state. In rural areas of the state, nurses serve a critical need where licensed physicians are in short supply. Nurse practitioners and physician assistants provide a substantial contribution to health care, representing nearly half of the providers in rural federally-qualified community health centers.[8] A recent survey indicated that more than a third of all Colorado's nurse practitioners are over the age of 55.[9] The advancing age of these health care practitioners indicates that the supply of primary care providers will be further impacted in the future.

A recent study of supply and demand for health care professionals projected Colorado will need an additional 2,200 primary care providers beyond the anticipated supply by 2025.

Revenue

Revenue provides an overview of campus operations but also illustrates the diverse set of resources required to successfully operate an academic health center. As measured by revenue, the Anschutz Medical Campus and affiliated University Physicians Incorporated is clearly a major economic enterprise in the state, with annual revenues in excess of $1 billion.

In FY 2010, state appropriated resources provided $84 million, or eight percent, of the campus revenue. Excluding the one-time state fiscal stabilization funds, the state provided a base funding of $45 million or 4.3 percent of total operating revenue. State appropriated resources exclude annual certificate of participation payments for capital financing of the campus construction, as these payments go directly to certificate holders and are not received by the campus.

Table 3. Anschutz Medical Campus, FY 2010 Revenue[10]

	Amount	Percent
Non-State Resources		**92.0%**
Health Service Clinical Revenue	375,344,934	36.0%
Federal Grants and Contracts	265,533,279	25.4%
Sales of Educational Services	108,404,159	10.4%
Nongovernmental Grants & Contracts	61,057,911	5.9%
Student Tuition and Fees, including Scholarships	53,934,462	5.2%
Gifts, Bequests, etc.	24,485,720	2.3%
State and Local Grants & Contracts	23,301,052	2.2%
Auxiliary Enterprises, Net	14,480,723	1.4%
Investment Income, Net	13,528,195	1.3%
Other Revenue	19,386,067	1.9%
State Appropriated Resources		**8.0%**
State Fiscal Stabilization	39,020,695	3.7%
State Appropriations from Tobacco Settlement	17,150,000	1.6%
State Fee-for-Service Contracts	27,258,539	2.6%
State College Opportunity Fund Stipend	564,170	0.1%
Campus Revenue	**1,043,449,907**	**100.0%**

top 20

Compared with Colorado businesses, this revenue places the campus among the top 20 among publicly-traded companies based on 2009 sales.

Compared with Colorado businesses, this revenue places the campus among the top 20 among publicly-traded companies based on 2009 sales.[11] Note that this is based on companies that have headquarters, not just a presence, in Colorado.

Table 4. Anschutz Medical Campus Revenue Comparison to Colorado Public Companies

2010 Rank	Name	2009 Sales (000)	Industry
14	ProLogis	1,223,082	Real estate trust
15	TW Telecom Inc.	1,211,390	Telecommunications
16	Apartment Investment & Mgmt. Co.	1,195,763	Real estate trust
17	Teletech Holdings Inc.	1,167,915	Business process out-sourcing
	Anschutz Medical Campus	**1,043,450**	
18	Ciber Inc.	1,037,700	Computer services
19	Cimarex Energy Co	1,009,794	Oil and gas exploration/ production
20	Whiting Petroleum Corp.	979,360	Oil and gas operations
21	Vail Resorts Inc.	976,988	Resort operator

For every $1 appropriated by the state in FY 2010, another $11 to $12 in revenue comes to the Anschutz Medical Campus from other sources, and the campus now ranks at or near the bottom in state financial support when compared to national peers. But it is not accurate to conclude the campus does not rely on state funds. In fact, the opposite is true—state funding represents the financial foundation of the campus. State funding is critical for campus operations, such as building maintenance and utilities as well as academic support. While other institutions of higher education may be able to backfill lost state funding cuts with increased enrollment and tuition, the Anschutz Medical Campus faces enrollment constraints because of a lack of available clinical rotation settings and senior faculty instructors. Tuition rates are significantly above institutional peer averages and rising debt loads are compelling doctors to pursue specialties rather than general practice, where the need is greater. Moreover, the campus cannot subsidize basic campus functions by using revenue from grants and contracts as this is earmarked for research and projects with specific scopes of work. Likewise, clinical revenue represents reimbursement for health services provided at affiliated hospitals and is not intended for general campus operations. The School of Medicine has been a national model in leveraging a portion of clinical revenue to support the academic and research missions of the School. However, with shrinking margins and pressures from healthcare reform, further leveraging is not sustainable. While the campus has a diverse revenue picture, it depends on state funds to manage the entire academic health center.

Expenditures

Expenditures, including payroll and campus operations, provide the basis for campus direct and indirect economic impacts on the state. The Anschutz Medical Campus and affiliated University Physicians Incorporated annually contribute up to $2.05 billion in total economic activity in Colorado. In comparison, the Colorado ski industry estimates it adds $2.6 billion to Colorado's tourism economy.[12]

Table 5. Anschutz Medical Campus Economic Impacts and Multipliers

	Direct Input	Economic Impact (Low)	Economic Impact (High)	Multiplier (Low)	Multiplier (High)
Jobs	8,112	15,911	17,779	1.96	2.19
Payroll	718,151,200	1,048,710,300	1,146,470,000	1.46	1.60
Expenses	1,005,110,900	1,708,395,300	2,050,028,400	1.70	2.04

Anschutz Medical Campus expenses total more than $1 billion, including payroll and operations. In addition to payroll and benefits, the campus reported operating expenditures of $287 million, or 29 percent of all expenses, for goods and outside services in FY 2010. The economic impact analysis concludes that each $1 in campus expense generates between $0.70 and $1.04 in additional economic activity to Colorado. The direct and indirect spending supports between $1.71 billion and $2.05 billion within the state.

Jobs

The Anschutz Medical Campus not only plays an important role in educating the state workforce, but also provides the state with thousands of direct and indirect jobs. As of June 2010, the campus employed 8,112 individuals including faculty, staff and research assistants, medical residents, and student workers. This employment ranks the campus among the top 10 among private employers with headquarters in Colorado. The campus employment supports between 15,911 and 17,779 direct and indirect jobs throughout the state. Every job at the campus indirectly creates at least one other job in the state.

Table 6. Comparison of Employees in Colorado[13]

State Rank Among Private Employers	Company	Employees	Industry
6	Qwest	8,300	Telecommunications
	Anschutz Medical Campus	**8,112**	
7	Lockheed Martin	7,700	Aerospace & Defense
8	Target	6,250	Retail
9	Exempla HealthCare	6,100	Hospital

Payroll

The Anschutz Medical Campus had a total payroll of over $718 million in FY 2010. Each $1 in direct payroll at the campus, including student spending, generates between $0.46 and $0.60 in additional wages, salaries and other labor income in Colorado. The direct and indirect payroll supports between $1.05 billion and $1.15 billion within the state—an average of $65,000 per job.

Relative to those with other degrees, graduates of the Anschutz Medical Campus are likely to contribute more in payroll taxes and personal expenditures to the state economy. The average salary of health care occupations associated with degree programs offered by the campus is nearly twice the average of all occupations. The table below illustrates the average annual salaries for selected professional health occupations.

Table 7. 2009 Annual Salary by Occupation in Colorado[14]

Occupation	Entry Level	Average	Median	Experienced
Dentists	$66,271	$149,562	$129,344	$191,208
Family and General Practitioners	$97,869	$184,293	N/A	$227,504
Internists, General	$108,777	$167,355	$152,628	$196,644
Orthodontists	$91,545	$139,103	$123,056	$162,882
Pediatricians	$94,941	$165,221	$156,739	$200,360
Pharmacists	$86,459	$107,667	$110,423	$118,271
Physical Therapists	$52,221	$69,783	$65,774	$78,564
Physicians, Other Specialties	$102,818	$186,660	N/A	$228,581
Psychiatrists	$61,586	$147,079	$150,486	$189,825
Registered Nurses	$50,689	$66,802	$66,009	$74,859
Surgeons	N/A	$226,406	N/A	N/A
All Occupations	**$20,767**	**$45,993**	**$36,267**	**$58,606**

Relative to those with other degrees, graduates of the Anschutz Medical Campus are likely to contribute more in payroll taxes and personal expenditures to the state economy.

Student Expenses

Student spending is not reflected in expenses by the campus. However, there is a significant expense attributable to those enrolled in the academic programs at the medical campus. In addition to tuition, students spent an estimated $68.6 million in FY 2010 for rent, food, entertainment, books, transportation, utilities and other goods and services. This consumer spending is treated as a direct expense for purposes of the economic impact estimate.

Combined Impact with Clinical Care Partners

At the Anschutz Medical Campus, the schools and college are conveniently located next to the University of Colorado Hospital and The Children's Hospital—the School of Medicine's primary adult and pediatric clinical partners. The economic multiplier used in this study is specific to the Anschutz Medical Campus and was not calculated to reflect the economic activity of adjacent hospitals. At this time, however, a multiplier for nearby clinical partners is not available to assess a combined economic impact. Therefore, based on the multiplier used in this study, the combined impact of the Anschutz Medical Campus, the University of Colorado Hospital, and The Children's Hospital is estimated as follows:

- Direct expenses of nearly $2.25 billion for a total economic impact of $4.6 billion to the state;
- Direct employment of 16,515 for a total impact of 36,168 jobs in the state; and
- Direct payroll of more than $1.3 billion for a total state personal income impact of more than $2.1 billion.

Table 8. Anschutz Medical Campus, University of Colorado Hospital, and The Children's Hospital Economic Impacts and Multipliers

		Direct and Indirect Impact on State Economy	
	Direct Impact	**Low**	**High**
Jobs	16,515	32,369	36,168
Payroll	1,321,705,165	1,929,689,541	2,114,728,264
Expenses	**2,248,905,171**	**3,823,138,791**	**4,587,766,549**

combined impact

At the Anschutz Medical Campus, the schools and college are conveniently located next to the University of Colorado Hospital and The Children's Hospital—the School of Medicine's primary adult and pediatric clinical partners.

Campus and construction

continued growth

Once the redevelopment of the 578-acre site is complete, including the Anschutz Medical Campus, three hospitals, and adjacent industry partners, it will rank among the most substantial health and research complexes in the nation.

In the past 12 years, the campus has moved from its location at Ninth Avenue and Colorado Boulevard in Denver to the site of the former Fitzsimons Army Medical Garrison in Aurora. In recognition of the role played by the largest gifts from an individual donor, businessman Philip Anschutz, the new campus was renamed the Anschutz Medical Campus in November 2007. Since the migration, the Anschutz Foundation has provided more than $100 million in donated funds to the campus.

The investment by the university and the affiliated hospitals in facilities at the Fitzsimons site has totaled more than $2.1 billion—between 1997 and 2008, the university completed almost $900 million in construction and renovation. The fact that the relocation of the health sciences schools was completed in just over a decade is a testament to the university leadership, faculty, staff, and students in the pursuit of excellence in education, research, and clinical care.

The redevelopment of the former Fitzsimons Army Medical Garrison is still booming. Currently, the university is spending over an additional $100 million on several construction projects including the Pharmacy and Pharmaceutical Sciences Building, an additional floor on the School of Dental Medicine building, and the Health and Wellness Center. In the summer of 2010, University of Colorado Hospital announced an expansion of up to 288 beds in a new inpatient tower, expected to be completed by 2013.[15] The Children's Hospital also recently announced an expansion of 124 beds in a new tower expected to be completed by 2012.[16] The US Department of Veteran Affairs conducted a groundbreaking ceremony to begin construction of a 200-bed hospital near the campus. The new VA hospital is expected to be completed by 2014.[17] The Fitzsimons Redevelopment Authority has successfully attracted 35 companies to the adjacent Fitzsimons Life Science District north of the medical campus.[18] Due to the increased visits to the area, a new interchange located at I-225 and Colfax Avenue has become necessary to improve traffic flow. The project received nearly $14 million in federal funding and over $16 million from the city of Aurora to complete the construction.[19] Once the redevelopment of the 578-acre site is complete, including the Anschutz Medical Campus, three hospitals, and adjacent industry partners, it will rank among the most substantial health and research complexes in the nation.

Recent and Planned Construction Impact

In addition to ongoing annual contributions to the economy, additional stimulus is provided by periodic construction of new facilities. Currently, there are four significant projects recently completed or scheduled for completion at the Anschutz Medical Campus in upcoming years:

- Recent completion of the Pharmacy and Pharmaceutical Sciences Building at a total cost of $56.3 million and the planned fit-out of the third floor lab space at $7.6 million;
- Completion of a new 196,000 square foot building for University Physicians Incorporated at a total cost of $42.9 million;
- An additional floor on the School of Dental Medicine building at a total cost of $10.2 million; and
- A new 94,000 square foot Health and Wellness Center at a total cost of $35.0 million.

It is estimated these projects will provide up to 2,105 construction jobs and $109.3 million in wages and salaries to the state of Colorado. This supports $270.5 million in additional economic activity.[20]

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Tax revenue

a better colorado

State funding of $45 million returns up to $46.2 million, or 103 percent, back to the state in tax revenue.

Payroll and spending generates significant tax revenue to the state. Included in the total economic activity is more than $46 million in state taxes—up to $30.4 million in individual income taxes and up to $15.7 million in sales tax, including both the direct payments by university employees and students, and the indirect multiplier effects. Other tax revenues were recognized in the total economic impact—such as business income tax, vehicle registration and licensing fees—that are not highlighted in this section.

Compared with the state appropriated resources of $84 million in FY 2010, the state received as much as 55 percent back in estimated income and sales tax revenue. Excluding one-time state fiscal stabilization funds, the state received more in tax revenue than the operating funds it appropriated to the Anschutz Medical Campus. State funding of $45 million returns up to $46.2 million, or 103 percent, back to the state in tax revenue.

Table 9. Estimated State Income and Sales Tax Receipts

	Direct	Low Impact	High Impact
Individual Income Tax			
Direct by Employees	$19,022,900		
Indirect through Multiplier		$8,750,500	$11,413,700
Subtotal State Income Tax		$27,773,400	$30,436,600
Sales Tax			
Direct by Employees and Students	$8,363,000		
Indirect through Multiplier		$6,090,800	$7,376,600
Subtotal State Sales Tax		$14,453,800	$15,739,600
Total State Tax Revenue	**$27,385,900**	**$42,227,200**	**$46,176,200**

Other contributions

The Anschutz Medical Campus schools and college offer a broad array of initiatives that amplify and expand the economic contributions outlined above. These programs enrich the health and overall quality of life of Colorado residents and beyond. While some of the economic impact of these activities is captured in the payroll and operating expenditures, it is important to recognize the contribution of these enterprises upon health care, scientific discovery, public service, community outreach, and issue advocacy.

Technology Transfer

While the expenses from research funding were incorporated into the economic impact, technology development and discovery create a value that extends far beyond economic multipliers. These discoveries develop improvements in medical devices, pharmaceuticals, diagnostics, treatment of debilitating conditions, and the cures for diseases. In FY 2010, 118 patent applications were filed, five patents were granted, and 31 license/option transactions were executed by Anschutz Medical Campus research enterprises. In addition, over 120 inventions were disclosed and five start-up companies were formed utilizing campus intellectual property.

Research

Research activities at the Anschutz Medical Campus represent a cornerstone of the university mission. In fiscal year 2009-10, sponsored awards totaled nearly $400 million, a 17 percent increase from the prior year. The research performed by Anschutz Medical Campus faculty is unlocking, for example, the fundamental mechanisms of adult and children's diabetes, obesity, alcoholism, cancer (breast, kidney, prostate, lung, and skin), heart disease, emphysema, and organ transplants, among others. The university also exercises national leadership in interdisciplinary signature areas such as the study of altitude and its impact on people. In addition, centers at the Anschutz Medical Campus conduct nationally prominent work on comparative effectiveness, community prevention and policy change, and health among American Indians and Alaska Natives and others.

Table 10. Anschutz Medical Campus History of Research Grant Awards ($millions) [21]

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	5 year Total
Federal Awards	$235.7	$221.9	$215.8	$203.9	$261.8	$1,139.1
Nonfederal Awards	$114.1	$121.7	$137.7	$138.4	$137.4	$649.3
Total	**$349.8**	**$343.6**	**$353.5**	**$342.3**	**$399.2**	**$1,788.4**

discovery

Technology development and discovery create a value that extends far beyond economic multipliers. These discoveries develop improvements in medical devices, pharmaceuticals, diagnostics, treatment of debilitating conditions, and the cures for diseases.

The Anschutz Medical Campus has been particularly successful in attracting federal research dollars, receiving $262 million in awards from federal agencies in FY 2010. Of that, $215 million was awarded from the National Institutes of Health. Over the last five years, the campus has brought nearly $1.8 billion in research funding to Colorado. Without the research enterprise at the campus, a significant share of federal research revenues, as well as their indirect impacts, would be lost by the state.

Centers, Institutes, and Laboratories

The Anschutz Medical Campus has more than 50 centers and institutes providing research, health care, public service, professional development, outreach, and advocacy. While the expenses associated with these units were incorporated into the economic impact, centers and institutes illustrate the contributions to the Colorado, national, and global community:

The **Barbara Davis Center for Childhood Diabetes** in the School of Medicine is one of the largest programs specializing in type 1 diabetes research and care (both for children and adults) in the world. The Center provides state-of-the-art clinical diabetes care to 80 percent of the children with diabetes in Colorado and 2,000 adults within the Rocky Mountain Region as well as receiving national and international referrals. The BDC also provides diabetes-specific diagnostic services to national and international clinical studies and trials, evaluates new therapeutic agents and devices for patient care, and has patented and licensed new diagnostics.

The **University of Colorado Cancer Center** is the only National Cancer Institute-designated comprehensive cancer center in the region. Since its inception, center members have received almost $1 billion in cancer research funding. Some of the nation's foremost experts in lung cancer, melanoma, prostate cancer, breast cancer, blood cancers, colorectal and gastrointestinal cancers, ovarian cancer, childhood cancers, and companion animal cancer are center members. The Center also runs the region's largest clinical trials program. With six programs, 17 shared core resources, and more than 400 members from three state universities and five institutions, this Center is the hub for cancer research in Colorado.

The **Center for American Indian and Alaska Native Health** in the Colorado School of Public Health is engaged with every Native American reservation in the U.S. The center promotes the health and well-being of Native Americans by pursuing research, training, continuing education, technical assistance, and information dissemination within a framework that recognizes the unique cultural contexts of this special population. Their research activities include developing culturally acceptable and effective strategies to prevent infectious oral diseases; planning, designing, and assessing the feasibility of implementing a culturally appropriate mental health service model for Native American children with serious emotional and/or behavioral disturbances and their families; implementing high-quality, multidisciplinary, culturally grounded, problem-oriented research of major scientific and programmatic importance to health status; and conducting research on the health of elder Native Americans who are at greater risk for numerous acute as well as chronic illnesses.

The **Center for Human Nutrition** in the School of Medicine promotes interdisciplinary basic and clinical research, postgraduate training and career development in nutrition, obesity research. Our focus is on identifying and promoting lifestyles that maintain health and prevent chronic disease. The Center translates science based programs into the community to improve lifestyle in order to maximize wellness, prevent and treat obesity and prevent chronic diseases.

The University of Colorado Cancer Center is the only National Cancer Institute-designated comprehensive cancer center in the region.

The **Gates Regenerative Medicine and Stem Cell Biology Program** at the School of Medicine seeks to understand the biology of stem cells in order to develop new therapies for debilitating diseases such as cancer, pediatric diseases, heart diseases, juvenile diabetes, vascular diseases, liver diseases, blood diseases and neuronal diseases. The Gates Center is partnering with the Cancer Center to launch the nation's first program to identify and test drugs that target and destroy cells thought to be at the root of cancer—cancer stem cells.

The **Center for Women's Health Research** in the School of Medicine boasts an innovative research enterprise model that studies the causes and treatments of diseases that affect women to improve women's health, longevity, and well-being. By training the next generation of scientists and physician-scientists in the study of women's health, the Center expects to educate healthcare providers, policymakers, and the public about research findings for the benefit of women everywhere, their families, and communities.

The **Center for Pharmaceutical Biotechnology** in the School of Pharmacy partners with pharmaceutical biotechnology companies to form a unique program emphasizing multi-disciplinary scientific education as well as training in non-scientific disciplines critical to the success of this industry: regulatory affairs, health care policy, technology transfer, finance, and marketing. The CPB originated from a collaborative relationship between the PhD programs in pharmaceutical sciences and chemical engineering.

The **National Resource Center for Health and Safety in Child Care and Education** at the College of Nursing contributes to the improvement of the quality of care for children in early care and education programs. NRC provides up-to-date resources and technical assistance to families, child care providers, health professionals, policy makers, state and local health departments, and child care regulatory agencies. Most recently, the NRC has developed a training program for child care providers that prepares them to include children with special needs in child care and preschool programs.

The **Biomaterials Research Laboratory** in the School of Dental Medicine provides materials-based research opportunities to undergraduate students, dental students and dental residents at the Anschutz Medical Campus. The Laboratory supports a wide range of dental materials, biomaterials, and bioengineering research work including the development of new materials and analytical techniques. In addition to several NIH-funded projects, a variety of local and national industrial contract research projects have been and continue to be conducted in the Laboratory. Most recently, the Laboratory has created a new composite resin material for use in posterior dental fillings that is changing the practice of dentistry.

The **Rocky Mountain Prevention Research Center** in the Colorado School of Public Health, established in 1998, is one of 37 Prevention Research Centers in the United States funded by the Centers for Disease Control and Prevention. The Center works as an interdependent network of community, academic, and public health partners to conduct prevention research and promote the wide use of practices proven to promote good health. The Center has focused its efforts on identifying local health priorities in the San Luis Valley in southern Colorado. Researchers from the Anschutz Medical Campus have worked with this rural, low income, Latino, and non-Latino population—where 43 percent of middle school students are obese or overweight—on epidemiologic and health-promotion studies related to Type 2 diabetes for more than 20 years.

The **Colorado Clinical and Translational Sciences Institute** at the School of Medicine is a collaborative enterprise between Anschutz Medical Campus, University of Colorado Boulder, six affiliated hospitals and health care organizations, the private sector and multiple community organizations with a goal to accelerate the translation of research discoveries into improved patient care and public health. The CCTSI was created in 2008 with a $76 million grant from the National Institutes of Health.

Methodology

The Anschutz Medical Campus economic impact analysis is based on the fiscal year 2010 expenditures of the university, as well as expenditures of students. Expenditures were taken from the University's financial records, while estimated student spending was based on annual housing, transportation and living expenses provided by the University's Office of Financial Aid. These data were analyzed, adjusted to net out social security taxes, retirement contributions and other payroll deductions that do not result in current expenditures, and consolidated into categories compatible with the economic impact model's requirements.

Economic Impact Analysis

This analysis was conducted using IMPLAN, an economic impact model that predicts how changes in one industry affect all other industries within the same region. The model estimates how the impact of one dollar or one job impacts the local economy by creating additional expenditures or jobs (the multiplier effect).

The campus "purchases" goods and services from other organizations in order to operate. Direct impact refers to the initial value of these goods and services. Indirect impact measures the value of labor, capital, and other inputs of production needed to produce these goods and services required, while induced impact measures the change in spending by local households due to increased earning by employees who produce these goods and services.

Economic activity is the total value of goods and services produced, both directly and indirectly, by campus operations and spending. It includes the value added, as well as the profits, payrolls, taxes, costs of materials and other inputs associated with meeting increased consumer demands and changes in demands by vendors and suppliers.

The economic impact multipliers indicate there is a range of secondary impacts on the economy. The range of the total impacts and multipliers reflects different assumptions about the extent to which purchases of goods and services are made in-state.

economic impact

The model estimates how the impact of one dollar or one job impacts the local economy by creating additional expenditures or jobs (the multiplier effect).

Expenditures versus Revenues

Revenues provide one measure of the economic stimulus associated with campus operations. Revenues, however, relate only to the direct economic stimulus, failing to capture the secondary impacts, including indirect impacts (e.g. goods and services consumed by the campus) and induced effects (e.g. additional income generated and spent by those providing goods and services to the campus) associated with the economic linkages between various sectors of Colorado's economy. Each link increases the overall economic contribution, even as portions of subsequent iterations of expenditures are lost to the local economy. To capture these secondary effects, it is necessary to focus instead on the amount and type of expenditures.

Inputs to the Model

The Anschutz Medical Campus payroll and benefits totaled $718.2 million in FY 2010. Of that amount, $558.6 million is the basis for estimating the secondary economic effects. The remainder is treated as leakage from the state in the form of federal taxes and other non-current expenditures or is the non-cash component of the reported benefits.

The Anschutz Medical Campus reported total operating expenditures of $287.0 million for goods and outside services. A portion of this total ($16 million) was in the form of research collaborations with entities located outside Colorado, and were excluded from the impact analysis. Additional expenses were excluded such as interdepartmental transfers ($27.6 million) as well as student aid, honoraria and similar outlays that were treated as labor expenses ($16 million).

The remaining expenses were assigned to one or more of IMPLAN's 400+ industrial sectors (e.g. legal services, office supplies, computer equipment, or utilities). Each sector has different labor, capital, transportation, material and subsequent multipliers. In the case of student expenditures, an adjustment of $4.1 million was made to student spending to avoid double counting the expenditures of students who were employees or received cash aid.

Table 11. Summary of Direct Expenditures and Input to Model[22]

	Total Direct	Input to IMPLAN	Remainder
Wages, Salaries, and Benefits	$718,151,200	$558,600,200	$159,551,000
Other Operating Expenses	$286,959,700	$243,285,400	$43,674,300
Student Spending	--	$64,546,000	
Total	**$1,005,110,900**	**$866,431,600**	**$203,225,300**

Tax Revenue

The calculation of state tax collections was built upon the inputs and results of the IMPLAN economic analysis, but with specific assumption based on university records and data from the Colorado Department of Revenue. For individual income taxes, the amount withheld from wages and submitted to the state was deemed to be a reasonable measure of the taxes eventually paid, and that same ratio was applied to the total labor income generated by the model. In the case of sales taxes two separate calculations were made. For students it was possible to estimate the portion of the expenditures that was likely to be taxable and the current state sales tax rate was applied to this taxable base. For the employees and other labor income, the relationship of statewide income and sales tax collections from the Department of Revenue was used to establish the effective share of income that went to taxable sales.

ENDNOTES

[1] Inpatient and outpatient care at University of Colorado Hospital and The Children's Hospital.

[2] University of Colorado Denver | Anschutz Medical Campus "2011 Essential Facts, FY 2009-2010"

[3] University of Colorado Denver | Anschutz Medical Campus Office of Institutional Research Planning and Analysis "Degrees Awarded Summary FY 2006-2010"

[4] Colorado Department of Labor and Employment, Labor Market Information, 2009-2019 Employment Projections.

[5] Colorado Health Institute. Based on 2005 ratios of primary care providers, including physicians, physician assistants, and advanced practice nurses, to population.

[6] University of Colorado Denver | Anschutz Medical Campus Office of Alumni Relations and University of Colorado Denver | Anschutz Medical Campus Office of Institutional Research Planning and Analysis, December 2010.

[7] Colorado Health Institute, Primary Physician Staff Ratio by Health Statistics Regions 2005-2025, October 2009.

[8] Colorado Health Professions Workforce Policy Collaborative, Addressing Colorado's Primary Care Provider Shortage, 2009.

[9] Colorado Center for Nursing Excellence, The Nursing and Health Care Workforce in Colorado, March 2010.

[10] University of Colorado Denver | Anschutz Medical Campus Finance Office Statement of Revenues, Expenses, and Changes in Net Assets, and University of Colorado Denver | Anschutz Medical Campus Budget Office Budget Data Book. Total percentages may not add up due to rounding. This excludes revenue from administrative indirect cost recoveries, interdepartmental transfers, internal service centers, and intercampus sales.

[11] ColoradoBiz Magazine. Top 100 Colorado-based public companies, June 2010. http://www.cobizmag.com/lists/

[12] Colorado Ski Country USA Facts and Stats, Retrieved February 2011.

[13] Colorado Economic Development Data Book, 2010-11. Colorado Office of Economic Development and International Trade.

[14] Colorado Department of Labor and Employment. Colorado Labor Market Information, Occupational Employment Statistics. Entry level and experienced wage rates represent the means of the lower third and upper third of the wage distribution, respectively.

[15] University of Colorado Hospital, "UCH Moving Forward with $400 Million Expansion," 05/26/2010.

[16] The Children's Hospital. "The Children's Hospital Grows – Again!" 07/28/2010.

[17] Aurora Sentinel. Veterans get early look at plans for VA hospital , 01/09/2011.

[18] Fitzsimons Redevelopment Authority, December 2010.

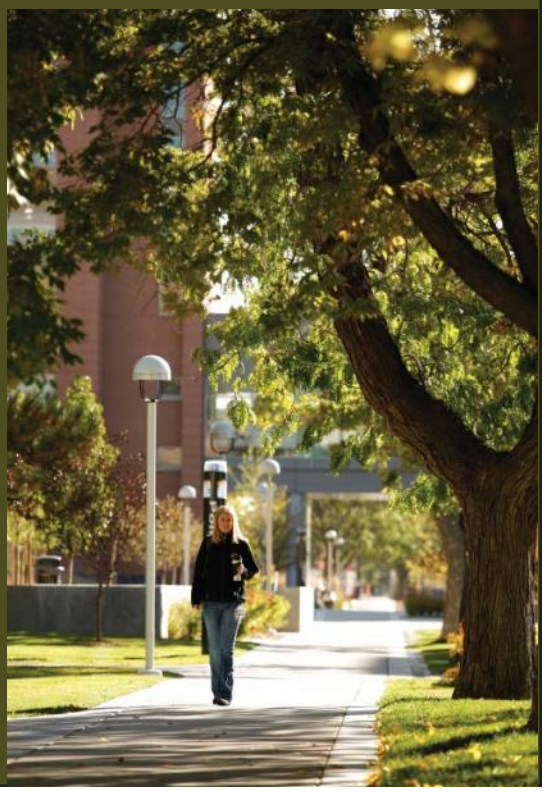
[19] Aurora Economic Development Council. 07/22/2010, and University of Colorado Denver Office of Media and Public Relations

[20] Construction projects occur during a number of years; therefore, the impacts of these projects are distributed throughout the years in which they occur.

[21] University of Colorado Denver | Anschutz Medical Campus Office of Grants and Contracts Annual Reports. Awards will not match revenue because revenue is recognized in the year the expenses occur while the award reflects a multi-year amount granted.

[22] Source: University of Colorado Denver | Anschutz Medical Campus and Sammons/Dutton LLC

VII.7 DESIGN AND DEVELOPMENT GUIDELINES



University of Colorado
Anschutz Medical Campus
2012 Facilities Master Plan

Design & Development Guidelines

Office of Institutional Planning

Design & Development Guidelines

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I. GOALS

I.1 INTRODUCTION

These Design and Development Guidelines are intended to provide guidance and recommendations to assist staff and consultants in implementing the university's goals and principles as established in the Facilities Master Plan.

All physical improvements, additions, expansions, and renovations should contribute to enhancing the overall aesthetic character and visual unity of the Anschutz Medical Campus as a whole. Each new development on campus will contribute to this goal through a comprehensive design approach reflecting the appropriate integration of urban design, buildings, and open space within the context of identified character districts.

These guidelines represent the university's commitment to create a more vibrant and collaborative environment on campus. They are part of the Anschutz Medical Campus 2012 Facilities Master Plan and a companion document to the University of Colorado Design and Construction Standards*.

*The University of Colorado - Design and Construction Standards document includes: Part 0 - General Information, Part 1 - Design Management, Part 2 - Design & Development Guidelines, Part 3 - University Program Guidelines, and Part 4 - Specification Guidelines. The complete document can be accessed at the following web site: http://www.ucdenver.edu/about/departments/FacilitiesManagement/PoliciesGuidelines/Pages/ForUniversityCommunityGeneralPublic.aspx

The Anschutz Medical Campus is committed to improving the interdisciplinary unity of the campus as a whole. Each new project should be designed to enhance the campus's image, functionality, and collaborative opportunities. The design intent for all projects should include promoting a sense of community derived from actively shared spaces providing opportunities for both planned and chance encounters.

The following principles should guide the future design of the campus.

A Built Environment Promoting Intellectual and Social Exchange: Public space, comprised of exterior spaces (streets, promenades, plazas, etc.) and interior spaces (lobbies, atria and internal connectors), provides opportunities for the coming together of a diverse campus population. These spaces provide opportunities for intellectual and social exchange. The public realm should be designed to accommodate a variety of active and passive spaces for conversation, relaxation, recreation, and collaboration.

Respect for Context: The Anschutz Medical Campus can be perceived at multiple levels; as a whole, as a grouping of districts, and as a variety of individual buildings and spaces. All new projects should successfully contribute to a sense of cohesiveness as well as being

individually strong works of architectural design on their own. They should be sited and designed in a manner so as to compliment their surroundings in materials, scale, and proportion. New buildings should be designed so that they enhance the quality of adjacent buildings, streets and open spaces. They should be sympathetic to the character of their districts as well as contribute to the campus identity as a whole.

Flexibility: The campus must effectively meet the current and foreseeable future needs of its diverse population of users. It should be designed for flexibility and adaptability. As user needs and requirements evolve over time, the built environment should be able to accommodate some level of reconfiguration without exorbitant expense or operational disruption.

Quality: It is essential that the campus continue to be designed and constructed to the highest standards of quality possible within the funds available. The sense of permanence and care communicated by high quality planning, design, execution, and maintenance has a significant impact on prospective students, faculty and staff that are considering joining the university as well as on the confidence and peace of mind of the patients relying upon campus clinical services.

Economy: The long-term operating costs of the built environment far exceed the original cost of construction. As a state supported institution committed to excellence in learning, research, clinical care, and community service and engagement, it is important that projects be constructed in a cost effective manner. The university's focus, to the extent practical, is to design environments that are economical over their total anticipated life-cycle and not simply based upon lowest first cost.

Stewardship: The university recognizes the importance of sustainable practices and has committed to reducing natural resource use, greenhouse gas emissions, and to the design and construction of high quality "green" facilities and environments on campus. Principles of environmental stewardship, energy efficiency, and resource conservation should be incorporated into all new campus developments and major renovation projects.

Students enjoy a game of volleyball on the Educations Commons.

The Barbara Davis Center for Childhood Diabetes, while a predominately clinical use building, was designed with the ability to accommodate future wet-lab research.

Anschutz Health and Wellness Center - Green roof garden.

II. URBAN DESIGN GUIDELINES

II.1 PRINCIPLES

Twentieth Century urban and regional planning has typically focused upon the segregation of land use types and property uses. The conventional tools used for directing development densities have been FAR, height limits, setbacks, parking ratios, etc. The unfortunate consequence this sort of land use regulation has been the development of planned environments often judged to be less than successful in terms of their ability to generate any sort of cohesive and substantive public realm.

This segregation of use planning has often resulted in stagnant, rigid communities, lacking in flexibility, adaptability, and the vibrancy found in mixed-use environments of the past. Contemporary open space is often handled as something of an afterthought with roadways being viewed as nothing more than pragmatic connections within and between discrete developmental zones. Seldom is the desired character of the public realm considered nor is it adequately communicated through the Master Planning process.

Form-Based developmental planning attempts to address these shortcomings of traditional land use regulation by focusing more on the physical form of development. Less emphasis is made upon building and land usage. Instead, planning efforts are devoted to encouraging strong relationships between buildings and their context. The interaction between streets and buildings in terms of scale, massing, form and frontage areas attempts to create a predictable character for the public realm. A flexible and adaptable mixture of uses is encouraged along with the privatization of civic spaces.

The Cecil Group

These Design Guidelines advocate this form-based approach to the continued growth and development of the Anschutz Medical Campus.

The existing campus can be understood within the context of four specific form-based districts, each having its own defining character and organizational structure:

C1 | Academic Village,

C2 | Urban Campus,

C3 | Hospital District, and

C4 | Special Districts

II.2 CHARACTER DISTRICTS

The framework for future campus development is predicated upon an understanding of the physical and operational pragmatics unique to a variety of existing campus conditions and to their future developmental goals. District specific guidelines have been developed to help designers build upon the existing strengths and established development patterns of each, reflecting the appropriate scale, image, functionality, and integration of buildings and open spaces.

The original physical framework for the Anschutz Medical Campus (formerly the Fitzsimons Army Medical Center) was predicated upon the creation of programmatic usage zones within the 230 acre site for research, education and clinical facilities. The campus was to be organized around the concept of planned open spaces and groupings of buildings having one unifying image or character. It was critical to achieve this quality of development as early as possible in order to facilitate the move from 9th and Colorado and to establish a cohesive physical identity for the Anschutz Medical Center as a national and international center for excellence in teaching, service and research. The success of this initial endeavor has been unprecedented.

Over time, these initially planned zones have established their own unique patterns of development based upon the pragmatic requirements inherent to their individual programmatic needs and goals. The hospital zone has developed in such a way as to accommodate very large, interconnected structures set far back from street lines to allow for the substantial parking requirements of visiting patients. The education and research zones have taken on a very collegiate formal arrangement with buildings delineating discrete campus quadrangles as centers for civic gathering. Other areas on campus have developed with more of an urban typology of higher densities and mixtures of uses with minimal setbacks having streetscapes and plazas constituting their major civic spaces.

The 2012 Facilities Master Plan organizes the Anschutz Medical Campus within the context of four distinct character districts, each having its own unique goals, requirements and organizational structure: C1 | Academic Village, C2 | Urban Campus, C3 | Hospital District, and C4 | Special District. Less emphasis is made upon “zoned” building and land usage. Instead, planning efforts are devoted to encouraging strong relationships between buildings and their context. The interaction between streets and buildings in terms of scale, massing, form and frontage areas attempts to create a predictable character for the public realm. An appropriate mix of uses is encouraged along with the prioritization of civic spaces. By acknowledging the benefits inherent in a variety of organizational frameworks, specific development patterns can be matched with programmatic functions best suited to each existing district.

C1 | Academic Village

C2 | Urban Campus

C3 | Hospital District

C4 | Special District

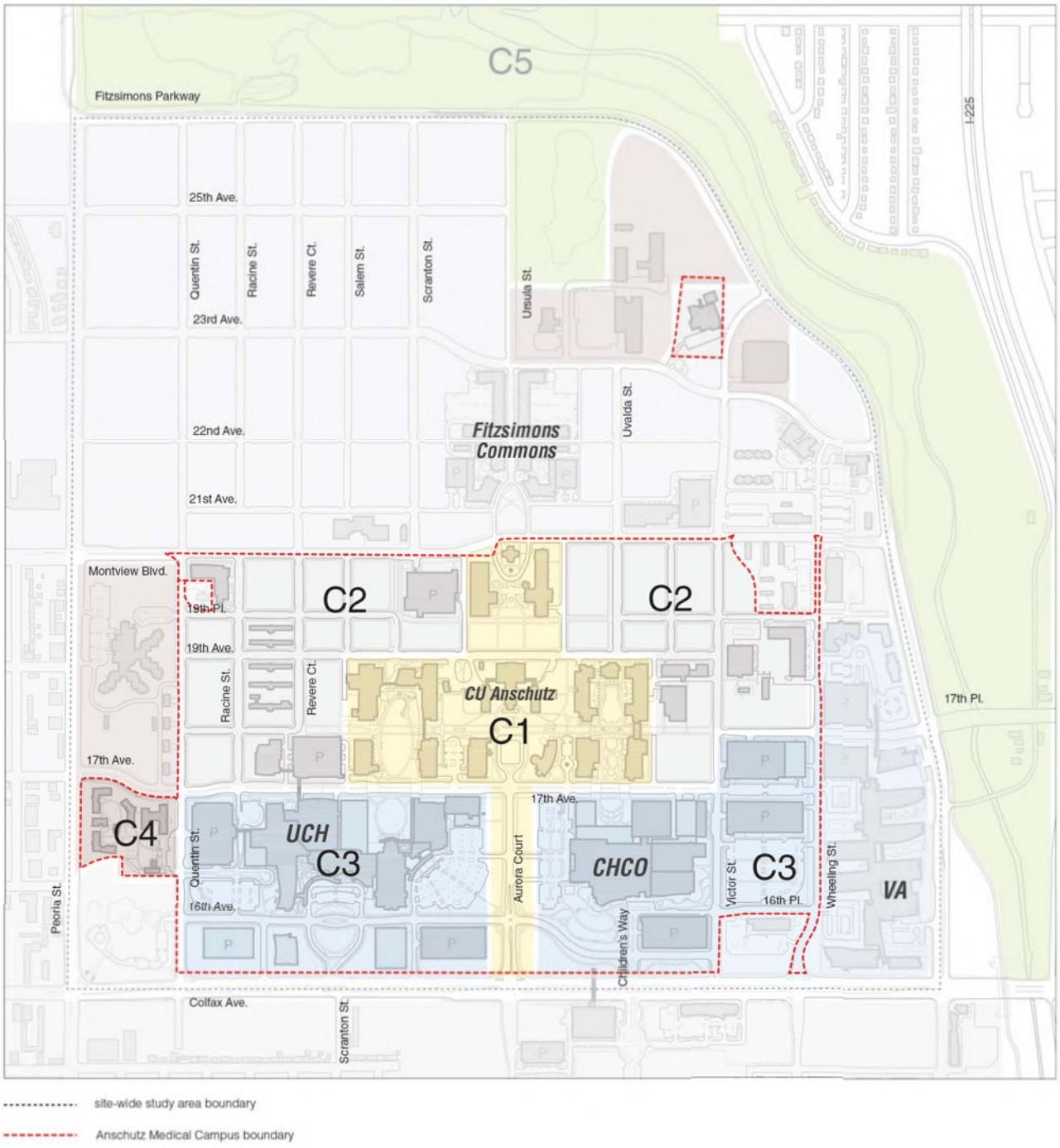


Figure II.2A - Character Districts C4 | Special

II.2.1 C1 | ACADEMIC VILLAGE

The Academic Village portion of the site has been organized in accordance with traditional campus planning concepts and is home to some of its most successful and memorable spaces. It is a fully walkable and sociable environment within a superblock structure. Buildings delineate cohesive civic spaces rather than being experienced as isolated objects unto themselves.

Organizational Structure:

Quadrangles | Promenades

Priorities:

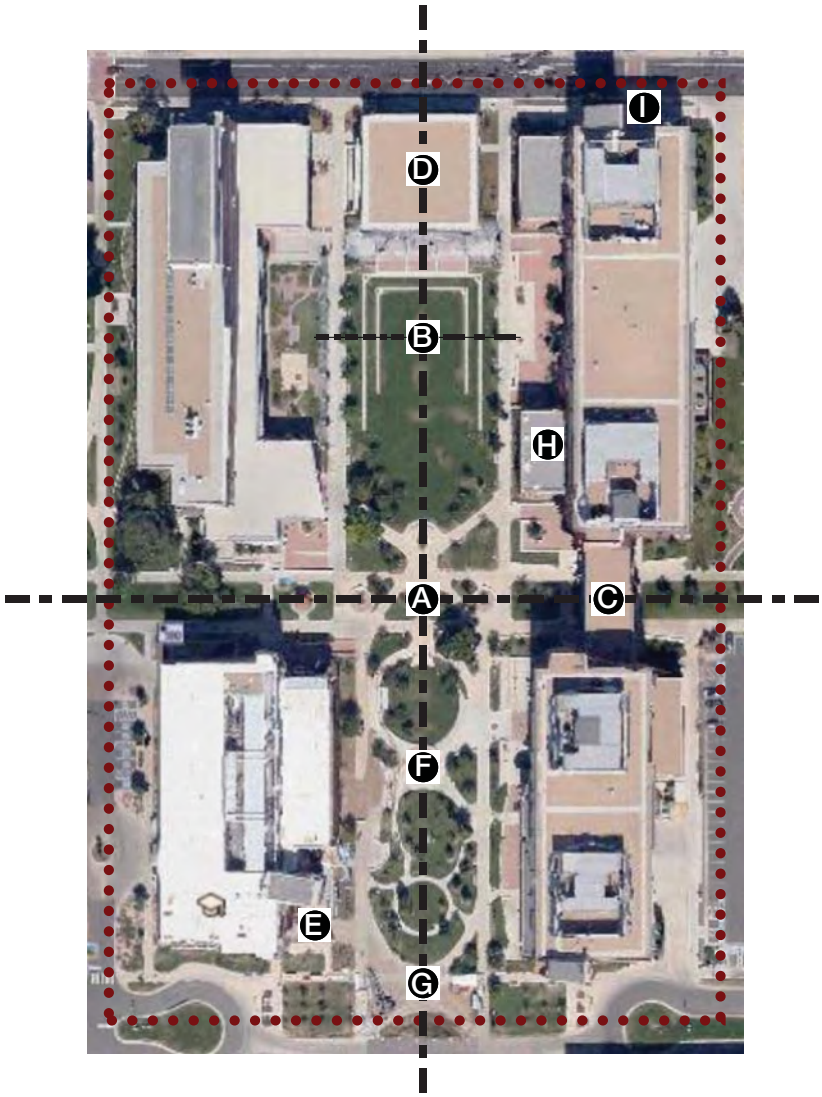
Safety | Collegiate Character | Places for Social & Intellectual Exchange| Pedestrian Scale | Memorability

Development Goals:

- Continue to create a variety of open spaces, of varying scales, to accommodate a full range of outdoor activities and to encourage collaboration, social interaction, vitality, as well as personal reflection.
- Design new buildings and renovations to be architecturally compatible with features of existing adjacent structures and to be harmonious with their contextual surroundings.
- Recognize historically significant aspect of the district.
- Minimize environmental impacts and maximize resource conservation through compact land use and increased density.
- Integrate public art and donor recognition | memorials appropriate to surrounding context.

C1 - Character Guidelines

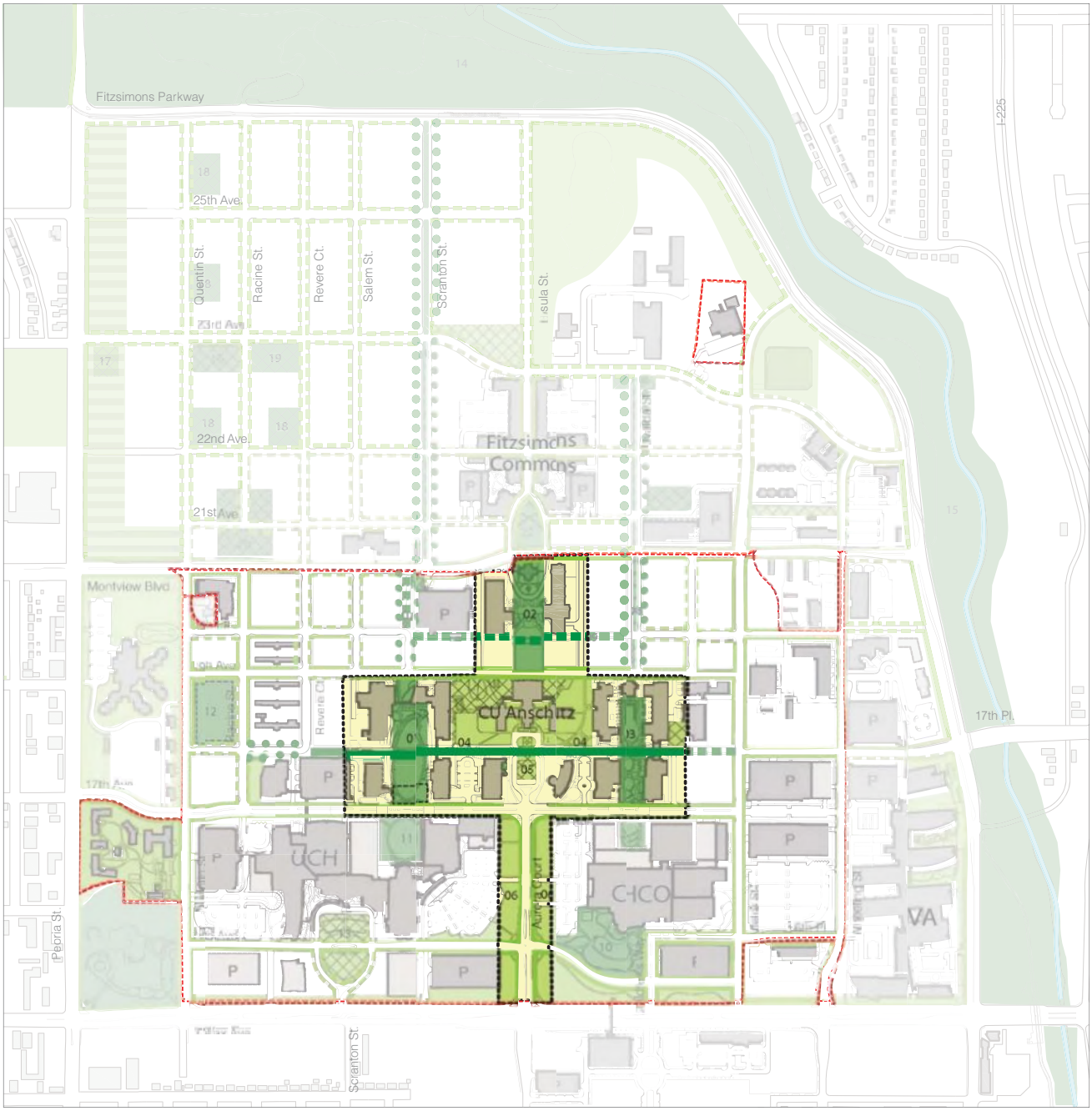
Building Placement	Building frontages define edges of civic open spaces
Frontage Types	Forecourts, Courtyards, Colonnades
Civic Space Typology	Quadrangles, Promenades, Greens, Plazas, & Gardens
Wayfinding Methodology	Promenade - landmarks within civic spaces
Building Height	4 story min., 6 story max. (up to 12 stories w/ EIR & approval)
Setbacks	Front: N/A Rear: N/A Side: N/A
Frontage Buildout	N/A
Thoroughfare Typology	Promenades and Pedestrian Pathways
1st Flr Fenestration Percentage	70% min. on primary & secondary facades
Lighting	Package A
Site Furnishings	Package A
Signage	Package A



Existing Education Quadrangle to illustrate key Urban Design Concepts within the C1 | Academic Village

A Use building forms to define civic space.
B Develop a network of collaborative open spaces to serve both formal & informal gathering
C Connect buildings at grade and with bridges above.
D Create visual landmarks at condition terminations to aid in wayfinding.
E Delineate building entries with wayfinding forms.
F Create relationships between buildings and across public spaces.
G Develop a hierarchical sequence of spaces.
H Consider providing accessible outdoor space on upper floors as public amenities.
I Provide secondary entrances off of secondary streets.

Figure II.2.1A - C1 | Academic Village, Urban Design Concepts



existing / proposed pedestrian promenade

existing / proposed open space

existing / proposed streetscape

proposed tree-lined boulevards

potential future building site on existing open space

Anschutz Medical Campus boundary

Named Open Space (major spaces in BOLD)

01	Research Commons	10	CHCO Healing Garden
02	Student Life Commons	11	UCH Clinical Commons
03	Education Commons	12	Parade Grounds
04	Art Walk Pedestrian Commons	13	Tony Ruiz Plaza
05	Campus Green	14	Sand Creek
06	Aurora Court	15	Tollgate Creek Greenway
07	Scranton Street Greenway	16	General's Park
08	Uvalda Street Greenway	17	Peoria Square
09	19th Place Promenade	18	Life Science Square
		19	Bioscience Quad
		20	Racine Park
		21	Research Green
		22	Fitzsimons Commons

Proposed Open Space
Academic Village

Figure II.2.1B - C1 | Academic Village, Open Space

C1 | Open Space Typologies

Quadrangles

Quadrangles are large scale courtyards framed by several buildings arranged in a rectilinear manner. They are gathering spaces of heavy and frequent use. The Education & Research Quadrangles stand as the major organizing elements for the Academic Village portion of the site. They constitute a symbolic landscape that clearly states “this is a traditional American educational campus.” They often serve as ceremonial spaces on campus; both formal and informal in nature.

They are the pedestrian crossroads. As such, quadrangles express and facilitate the collegiality of the university environment. They are designed for walking, waiting, playing, and gathering.

Education Quadrangle

Promenades

Linear gathering spaces connecting a string of formal and informal sub-spaces, promenades serve as major pedestrian corridors linking critical destinations within the Academic Village environment; and as such, they constitute the major way-finding system. They are intended to accommodate quiet activities such as strolling, study, relaxation and people watching.

Primary building entrances should be oriented towards the promenade with a vocabulary of forecourts, portico, loggias and arcades providing transition zones between the two.

17th Place - Art Walk Promenade

Common | Green

Commons or Greens are open spaces available for unstructured recreation and civic purposes. They allow for formal outdoor gatherings and can accommodate graduations, presentations/lectures, dedications, press conferences, etc. A common or green is spatially defined by building frontages. Its landscape consists of paths, lawn and trees, formally disposed. They are typically located at the intersection of important thoroughfares.

Campus Green

Plazas

A Plaza is an open public space commonly found in the heart of a traditional urban district or town used for community gatherings. Most Plaza are hardscapes suitable for open markets, music concerts, political rallies, and other events that require firm ground. Being centrally located, Plazas are usually surrounded by small shops, restaurants and civic buildings. At their center is often a

fountain, well, monument, or statue. A variety of activities can occur within a single plaza if the space is large enough to accommodate it and a hierarchy of uses is well defined. Clear definition of sub-spaces can be accomplished through plantings, seating, elevation changes, or other landscape elements.

Forecourts

Forecourts are paved area – far lesser in scale than a plaza - existing at building entrances, or at the intersections of major pathways, providing focus to the pedestrian experience. The design of forecourts should be appropriately scaled for their intended activity and associated structure – sheltering trees or shrubs located close together to provide quiet areas, open areas for larger gatherings, and benches in areas for resting and talking in small groups.

Courtyards

An area wholly or partially surrounded by walls or buildings. Courtyards are to vary in size and character and are to be integrated with adjacent buildings. Landscaping within courtyards is also intended to complement surrounding buildings and programs. In larger courtyard spaces, formal landscaping might be used around the perimeter of the space to reduce the overall feeling of scale. When buildings do not provide adequate enclosure, formal plantings shall be used to reinforce a sense of order and provide further definition to the space. Informal landscaping presents the flexibility to respond to programmatic needs.

Courtyards are important people places for passive activities such as waiting, resting, studying, and visiting. They warrant shelter from inclement weather, separation from high pedestrian traffic, unique paving materials, and appropriate site accessories to enhance user comfort.

Gardens

A garden is a planned outdoor space set aside for the display, cultivation, and enjoyment of plants and other forms of nature. They may include patio areas, tables, benches, fountains, etc.. Plantings should have seasonal variety and interest with a variety of scales and plant materials. Xeriscape gardens use local native plants that do not require irrigation or extensive use of other resources while still providing the benefits of a garden environment.

The character and image of each garden space is to vary throughout the campus and each is to reflect the function of the adjacent campus buildings.

University Plaza between the Health Sciences Library & the Pharmacy Building.

The forecourt of Education 2 provides a variety of seating options for students to study and relax.

Courtyard/Garden along east facade of Education 1.

C1 | Architectural Character

Colonnades

A highly successful vocabulary of colonnades has evolved within the Academic Village. These architectural elements provide richness to the building vocabulary; taking advantage of the ample Colorado sunlight to create a play of shade and shadow. They aid in the delineation of shared open space boundaries and provide transition zones between quadrangles or plazas and their adjacent sub-spaces.

The continued use of these colonnades in the form of arcades, loggias, and pergolas is highly encouraged in future campus development.

Colonnade at the Fulginiti Center for Bioethics & Humanities.

Towers

Towers play a crucial way-finding role within the Academic Village district. They are key landmarks of the built environment, allowing users to visually orient themselves as they move throughout the campus.

As landmarks, they should be used judiciously. Their presents should be limited to major civic buildings, important intersections of circulation routes, and critical destination making points within a view shed.

Health Sciences Library tower.

Bridges

Bridges between structures have been found to be critical to the interconnectivity of programs throughout the campus. They are physical manifestations of the universities commitment to inter-disciplinary collaboration and translational research.

Similar to towers, bridges play a significant role as visual landmarks throughout the campus. Their role as gateways between differing environments should be considered, as well as their impact upon the pedestrian experience when used to establish a rhythm along a linear path or promenade.

Bridges are encouraged not only within individual character zones but should span between them. Linkages between the Academic Village and the Hospital District, across the 17th Avenue- Translational Corridor, are particularly desirable.

Bridge connecting Research 1, north & south towers

II.2.2 C2 | URBAN CAMPUS

Medium density mixed use buildings within a hierarchical network of streets and plazas, this zone is characterized by wide sidewalks, steady street tree planting and buildings set close to the sidewalks. It is a fully walkable environment with a balance of pedestrian and vehicular activity.

The Urban Campus is a unifying framework tying together developments on the north and south sides of Montview Boulevard as well as the greater surrounding community.

Organizational Structure:

Formal Street Grid

Priorities:

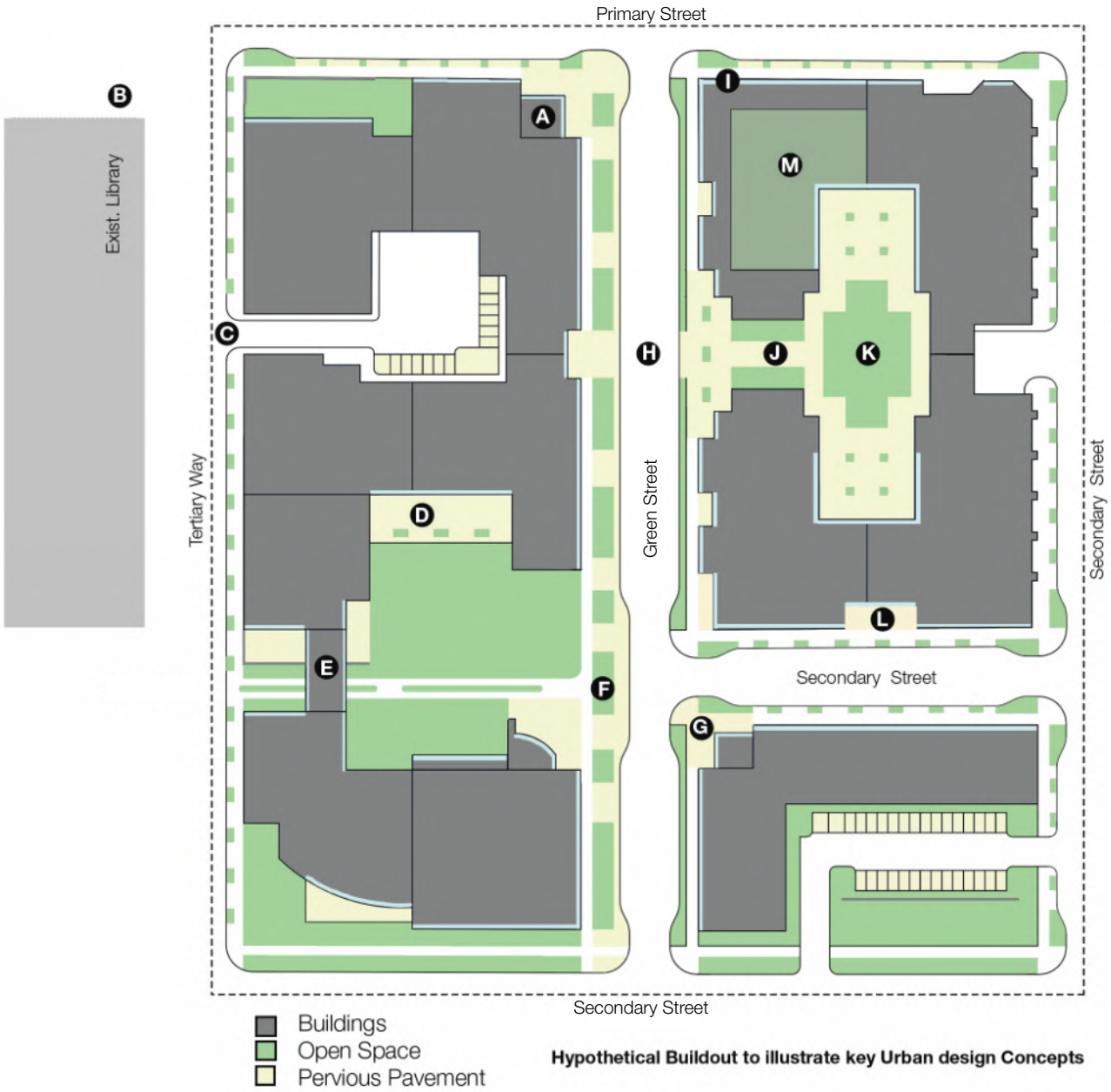
Safety |Pedestrian oriented streets |Connectivity with surrounding community and districts | Flexibility in vehicular movement and development opportunities.

Development Goals:

- Organize the arrangement and design of buildings and exterior spaces to encourage interaction and foster a sense of shared community.
- Acknowledge that the campus is part of the larger surrounding community through compatible character, land use relationships, and circulation patterns.
- Minimize environmental impacts and maximize resource conservation through compact land use and increased density.
- Design all roads to be complete streets - designed and operated to enable safe, attractive, and comfortable access and travel for all users.

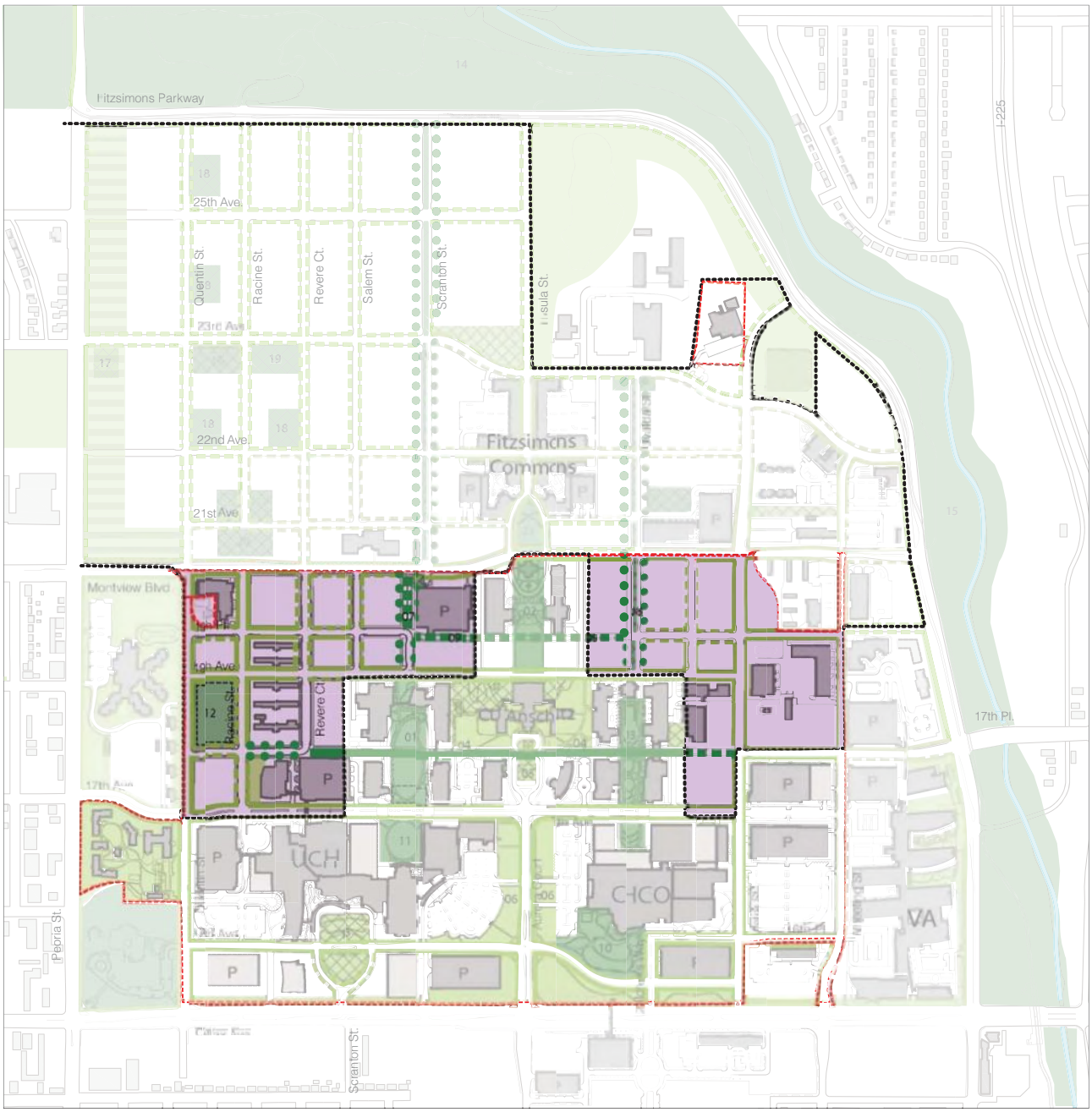
C2 - Character Guidelines

Building Placement	Shallow to no setbacks. Main building entrances oriented towards primary streets.
Frontage Types	Store fronts, Colonnades
Civic Space Typology	Streets, Plazas, Courtyards, Parks, & Gardens
Wayfinding Methodology	Street Grid
Building Height	4 story min., 6 story max. (up to 10 stories w/ EIR & approval)
Setbacks	Refer to following Table
Frontage Buildout	80% min. on primary streets
Thoroughfare Typology	Hierarchy of streets within an orthogonal grid.
1st Flr Fenestration Percentage	75% min. on primary & secondary street frontages.
Lighting	Package B
Site Furnishings	Package B
Signage	Package B



A Use building forms to define campus gateways.
B Respect alignment of existing adjacent buildings.
C Locate service access off of tertiary roadways.
D Develop a vocabulary of courtyard terraces on south facades.
E Connect buildings at grade and with bridges above.
F Create visual landmarks at condition terminations to aid in wayfinding.
G Activate intersections with building entries and wayfinding forms.
H Create relationships between buildings and across public spaces.
I Active ground floors with transparency on main and secondary facades.
J Use building forms to create a sequence of spaces.
K Consider interior courtyards as public amenities and access to natural daylight.
L Provide secondary entrances off of secondary streets.
M Consider green roofs.

Figure II.2.2A - C2 | Urban Campus, Urban Design Concepts



existing / proposed pedestrian promenade
existing / proposed open space
existing / proposed streetscape
proposed tree-lined boulevards
potential future building site on existing open space
Anschutz Medical Campus boundary

Named Open Space (major spaces in BOLD)

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08	Uvalda Street Greenway	17	Peoria Square
09	19th Place Promenade	18	Life Science Square
		19	Bioscience Quad
		20	Racine Park
		21	Research Green
		22	Fitzsimons Commons

Proposed Open Space
Urban Campus

Figure II.2.2B - C2 | Urban Campus, Open Space

C2 | Open Space Typologies

Plazas

A Plaza is an open public space commonly found in the heart of a traditional urban district for community gatherings. Most Plaza are hardscapes suitable for open markets, music concerts, political rallies, and other events that require firm ground. Being centrally located, Plazas are usually surrounded by small shops, restaurants and civic buildings. At their center is often a fountain, well, monument, or statue. A variety of activities can occur within a single plaza if the space is large enough to accommodate it and a hierarchy of uses is well defined. Clear definition of sub-spaces can be accomplished through plantings, seating, elevation changes, or other landscape elements.

Portland State University - Academic & Student Recreation Center. Photo by Christian Columbres

Courtyards

An area wholly or partially surrounded by walls or buildings. Courtyards are to vary in size and character and are to be integrated with adjacent buildings. Landscaping within courtyards is also intended to complement surrounding buildings and programs. In larger courtyard spaces, formal landscaping might be used around the perimeter of the space to reduce the overall feeling of scale. When buildings do not provide adequate enclosure, formal plantings shall be used to reinforce a sense of order and provide further definition to the space. Informal landscaping presents the flexibility to respond to programmatic needs.

Courtyards are important people places for passive activities such as waiting, resting, studying, and visiting. They warrant shelter from inclement weather, separation from high pedestrian traffic, unique paving materials, and appropriate site accessories to enhance user comfort.

Courtyard adjacent to the Campus Services Building.

Parks

Parks are natural preserves available for unstructured recreation. They are generally independent of surrounding building frontages. Their landscape consists of paths and trails, meadows, water bodies, woodland and open shelters, typically naturalistically disposed.

General's Park

Gardens

A garden is a planned outdoor space set aside for the display, cultivation, and enjoyment of plants and other forms of nature. They may include patio areas, tables, benches, fountains, etc.. Plantings should have seasonal variety and interest with a variety of scales and plant materials. Xeriscape gardens use local native plants that do not require irrigation or extensive use of other resources while still providing the benefits of a garden environment.

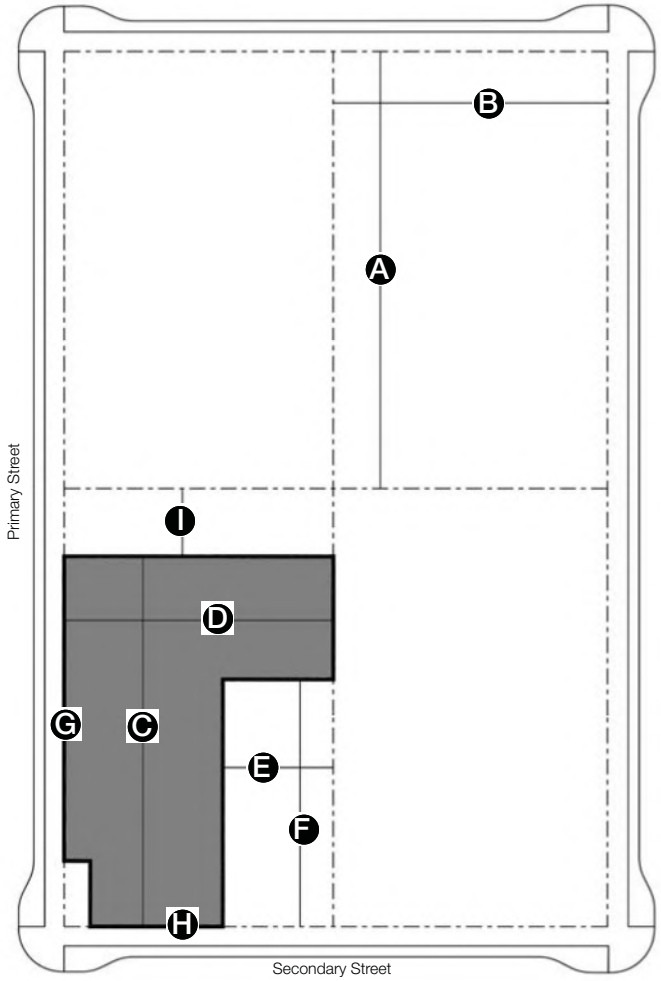
The character and image of each garden space is to vary throughout the campus and each is to reflect the function of the adjacent campus buildings.

Gardens surrounding the Health and Wellness Center.

Discovered Spaces

Discovered spaces have the potential to be the most intimate and special places on campus. They can be designed small-scale places or can constitute an unpredictable circumstance that creates a lasting impression (benches overlooking a pond; a small patch of lawn under a magnificent tree; or a warm sun pocket of space on a cold winter's day, etc.).

Pond outside of the Nighthorse Cambell Native Health Building.



KEY

Lot Line

Building

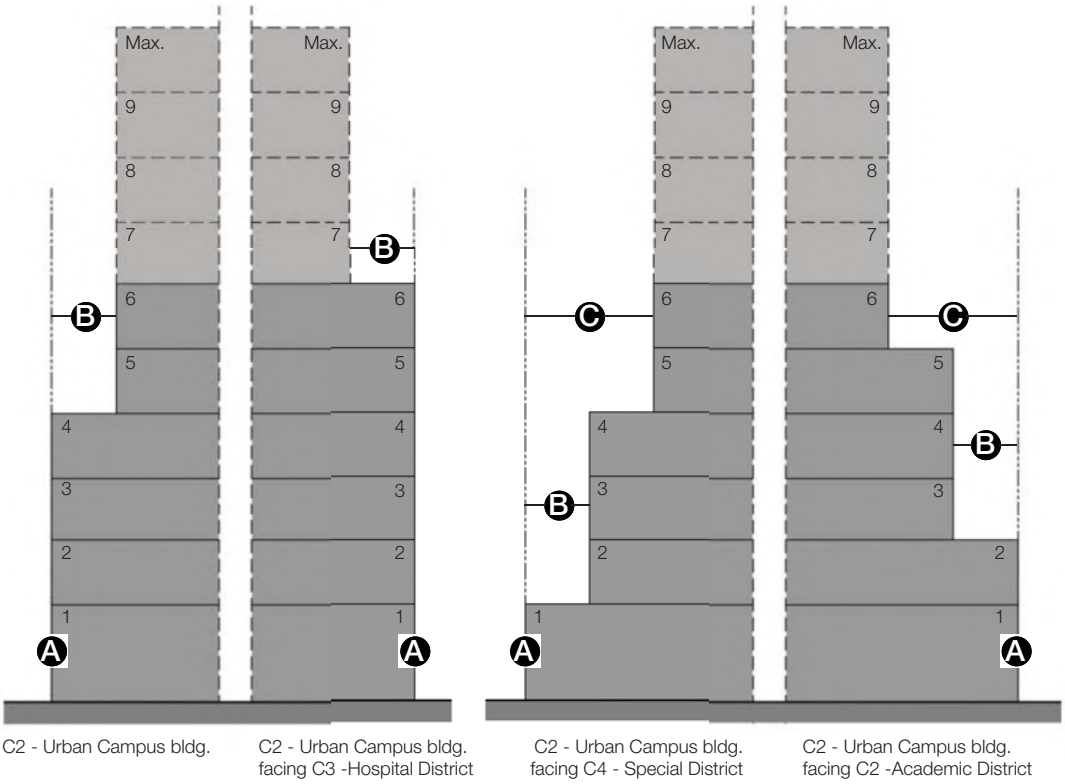
Mid-Rise: 4 to 6 stories tall with the potential to incorporate limited on-site surface parking or below grade structured parking. Vertical mixture of program with ground floor public usage.

Lot Size	
Width	A 150’ min.; 200’ max
Depth	B 100’ min ; 125’ max.
Building Footprint	
Width	C 200’ max.
Depth	D 125’ max.
Lot Coverage	40% min; 80% max.
Courtyard(s)	
Width	E 20’ min.; 120’ max.
Depth	F 20’ min.; 75’ max

Setbacks	
Primary Street	G 0‘ min; 12’ max
Secondary Street	H 0‘ min.; 12’ max.
Adjacent lot (on Primary Street)	I 0‘ min.; 31’ max

NOTE: Parcels may be combined. When combined, buildings should be articulated in such a way as to reflect original parcelization.

Figure II.2.2C - C2 | Urban Campus, Lot Development Guidelines



KEY

Lot Line

Building

Mid-Rise: 4 to 6 stories tall (with the potential for high-rise construction based upon Environmental Impact Report [EIR] approval. 10 story max.)

Primary & Secondary Street Setbacks

A 0' min., 12'max.

B 10' min.

C 20' min.

Figure II.2.2D - C2 | Urban Campus, Setback Guidelines

C2 | Architectural Character

A primary goal for the Urban District is the establishment of a continuous vertical building surface along the majority of length for each streetscape. The “street wall” is to be achieved by aligning facades with the back edges of sidewalks and limiting building setbacks to strategic locations adjacent to major public open spaces.

Minor variations in the massing and articulations in fenestration for each building will provide diversity. The nature of each building’s street wall presence will ultimately be defined by the functional opportunities and constraints of its programmatic requirements. Special emphasis should be given to the articulation of building entrances and street corner elements.

All buildings shall have their primary entrances located on primary street facades. Entrances should integrate with the streetscape design and directly connect with the public sidewalk except in cases where primary entrances front plazas or major open spaces. Entrances and lobbies with through-block connections will be incorporated into the design of buildings having parking areas located behind the building they serve.

Buildings shall be articulated by three major horizontal divisions to express base, middle, and upper level conditions. The base zone should be designed to give the appearance of greater height than any other single floor and should be composed of masonry and window systems, with the sill of ground floor storefronts being as close as reasonably possible to the exterior ground plane. Ground level activities should be oriented toward the street and contain a richness of architectural details and materials along with a variation in wall depth. This zone should directly relate to the street edge treatment.

The middle zone, above the base, establishes the primary massing of the building. The upper zone should be easily distinguishable. It is meant to create a distinct termination to the vertical street wall and should address a relationship between the building and the sky above.

Opportunities for underground parking should be explored in the design of buildings within the Urban Campus.

Rendering of future Academic Building 1

Conceptual rendering of an urban campus streetscape by Anderson Mason Dale Architects.

II.2.3 C3 | HOSPITAL DISTRICT

Much larger than a traditional city block, with greater building setbacks, these zones are typically bounded by widely spaced, high-speed, arterial or circulating routes rather than by local streets. Framework allows for the development of very large, interconnected, mega structures.

Organizational Structure:

Interconnected buildings within the landscape.

Priorities:

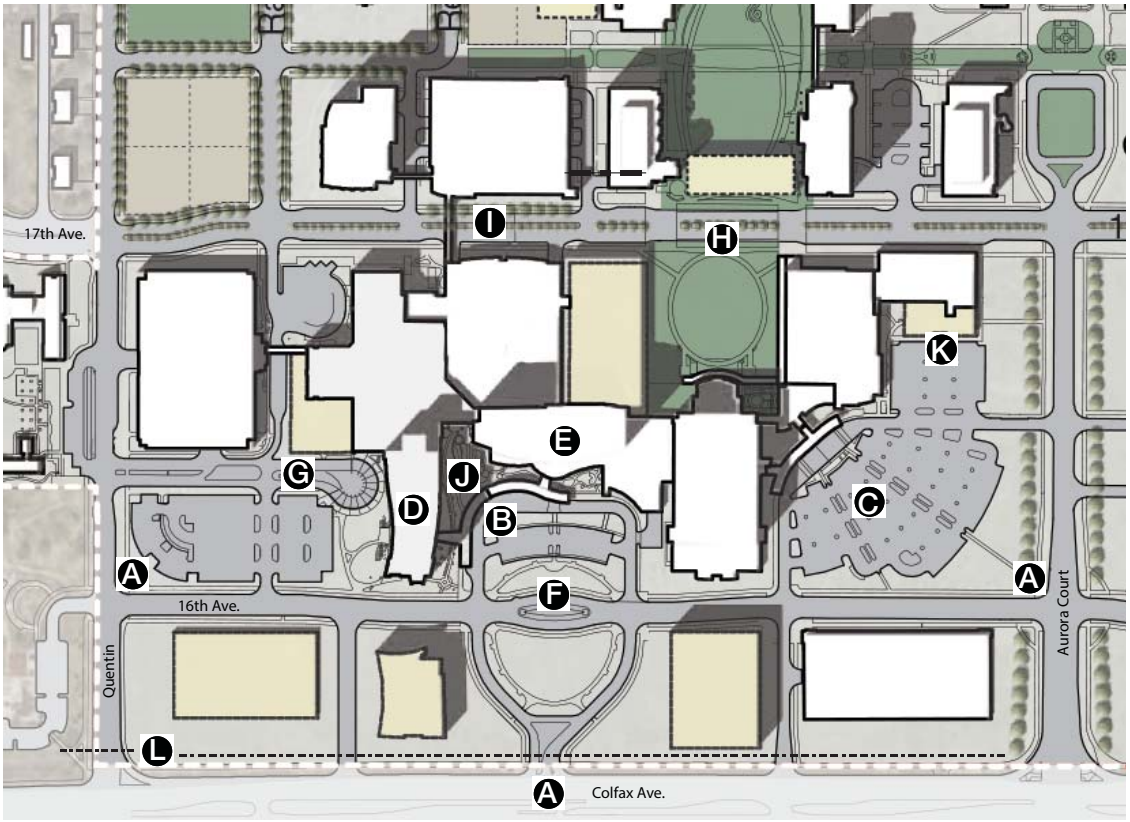
Safety | Patient Access | Parking | Way-finding

Development Goals:

- Enhance the patient|visitor centered experience through improvements in accessibility, way-finding and parking.
- Enhance connectivity between the C3|Hospital and C1|Academic districts.
- Protect and enhance open space providing an appropriate balance, both qualitative and quantitative, to the build environment.
- Effectively integrate with the regional transportation network.
- Encourage interdisciplinary and inter-institutional collaboration.

C3 - Character Guidelines

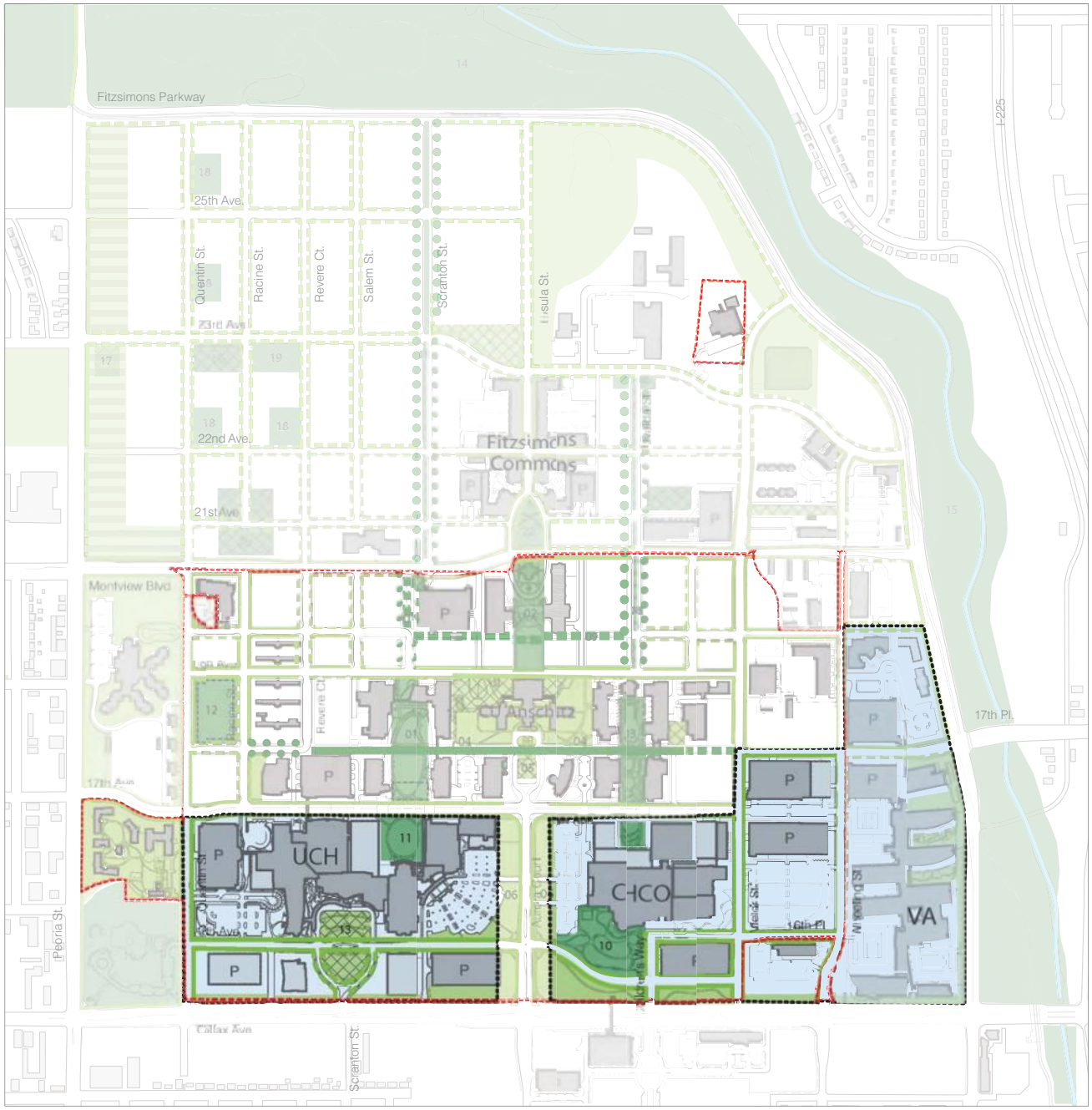
Building Placement	Greatest density located at center of superblock with lower density development toward the perimeter.
Frontage Types	Porte Cochere, Healing Gardens, Canopies
Civic Space Typology	Internal Atria, Commons, & Gardens
Wayfinding Methodology	Towers | Canopies | Signage
Building Height	4 story min., 6 story max. (up to 14 stories w/ DRB approval)
Setbacks	Front: N/A Rear: N/A Side: N/A
Frontage Buildout	N/A
Thoroughfare Typology	Collector Ring Road
1st Flr Fenestration Percentage	65% min. on primary & secondary facades
Lighting	Package A
Site Furnishings	Package A
Signage	Package A



Existing and Hypothetical Buildout of UCH to illustrate key Urban Design Concepts within the C3 | Hospital District

A Provide clear and comprehensive wayfinding for patients and visitors.
B Utilize a vocabulary of canopies and porte cocheres to designate points of arrival.
C Prioritize the arrival and parking experience of patients over that of others.
D Use of visual landmark towers to aid in wayfinding.
E Create an interconnected complex of structures with a clear hierarchical sequence of spaces.
F Implement traffic calming measures along internal roadways.
G Seperate service access conditions from public access.
H Strengthen the north|south physical relationship between C1 & C3 districts.
I Build upon the character established along 17th Avenue at Leprino.
J Design residual spaces as gardens and places of discovery.
K Activate ground floors with transparency on main and secondary facades.
L Colfax frontage to retain a character sympathetic to Govenor's Park

Figure II.2.3A - C3 | Hospital District, Urban Design Concepts



existing / proposed pedestrian promenade

existing / proposed open space

existing / proposed streetscape

proposed tree-lined boulevards

potential future building site on existing open space

Anschutz Medical Campus boundary

Named Open Space (major spaces in BOLD)

01	Research Commons	10	CHCO Healing Garden
02	Student Life Commons	11	UCH Clinical Commons
03	Education Commons	12	Parade Grounds
04	Art Walk Pedestrian Commons	13	Tony Ruiz Plaza
05	Campus Green	14	Sand Creek
06	Aurora Court	15	Tollgate Creek Greenway
07	Scranton Street Greenway	16	General's Park
08	Uvalda Street Greenway	17	Peoria Square
09	19th Place Promenade	18	Life Science Square
		19	Bioscience Quad
		20	Racine Park
		21	Research Green
		22	Fitzsimons Commons

Proposed Open Space
Hospital District

Figure II.2.3B - C3 | Hospital District, Open Space

C3 | Open Space Typologies

Common | Green

Commons or Greens are open spaces available for unstructured recreation and civic purposes. They allow for formal outdoor gatherings and can accommodate presentations/lectures, dedications, press conferences, etc. A common or green is spatially defined by building frontages. Its landscape consists of paths, lawn and trees, formally disposed. They are typically located at the intersection of important thoroughfares.

University of Colorado Hospital - Tony Ruiz Plaza

Gardens

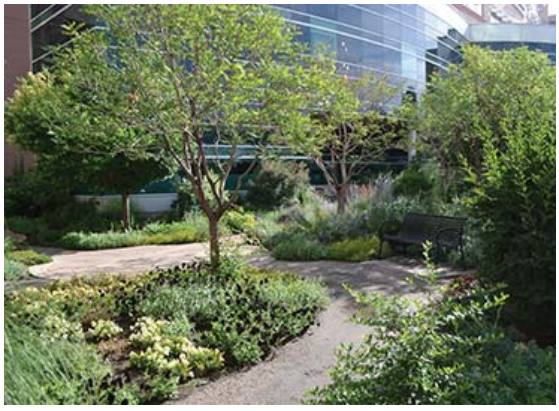
A garden is a planned outdoor space set aside for the display, cultivation, and enjoyment of plants and other forms of nature. They may include patio areas, tables, benches, fountains, etc. Healing gardens are found throughout the campus providing places for quiet contemplation and reflection within serene and calming environments. Plantings should have seasonal variety and interest with a variety of scales and plant materials. Xeriscape gardens use local native plants that do not require irrigation or extensive use of other resources while still providing the benefits of a garden environment.

The character and image of each garden space is to vary throughout the campus and each is to reflect the function of the adjacent campus buildings.

Children's Hospital of Colorado - Healing Garden

Discovered Spaces

Discovered spaces have the potential to be the most intimate and special places on campus. They can be designed small-scale places or can constitute an unpredictable circumstance that creates a lasting impression (benches overlooking a pond; a small patch of lawn under a magnificent tree; or a warm sun pocket of space on a cold winter's day, etc.).



University of Colorado Hospital - Discovered Space

C3 | Architectural Character

Development within the Hospital District has most closely followed the original vision of the 1999 Master Plan in terms of creating an environmental character of "Buildings in a Park". This has allowed for the development of very large, interconnected, mega structures that allow for the level of controlled public/ private interaction required by these institutions.

Healing gardens provide formally designed sub-spaces within the naturalistic landscapes surrounding structures and easily accessible patient/visitor parking.

CHCo's Main Tower - "Building in a Park"

Atria

Atria constitute the major civic gathering spaces within the Patient zone. As such they should designed with the highest level of architectural detail and patient/visitor amenities as allowable within the project budget. They shall be located immediately adjacent to the buildings primary entrance with ample connectivity to the outdoor environment. Natural lighting shall be utilized to the greatest extent possible. Clear and consistent way-finding shall make itself evident through the architectural design of the space with a minimal use of signage needed to supplement patient/visitor orientation.

Children's Hospital of Colorado atrium

Porte Cocheres | Canopies

A safe, secure, and efficient arrive sequence for patients and visitor is of the utmost importance with this zone. Porte Cocheres and canopies should be designed to integrate with the architectural expression of the building and should not appear as additive afterthoughts. Their role as way-finding element should be recognized and leveraged in such as to minimize signage.

University of Colorado Hospital - Cancer Pavilion

II.2.4 C4 | SPECIAL

Special districts constitute unique developments within the campus that for a variety of reasons (historic significance, unique ownership and/or conveyance regulations) do not fit within the other 3 district categories.

Organizational Structure:

Unique to each development.

Priorities:

Unique to each development.

Development Goals:

While there are no defined future developmental goals for these unique developments, their influence of the character of development within adjacent districts should be noted. Future development within the Urban Campus and Hospital District along Quentin Street must be sensitive to the residential scale and character of this special district.

C4 - Character Guidelines

Building Placement	Deep Setbacks
Frontage Types	Porches, Fences, Lawns, & Naturalistic tree plantings
Civic Space Typology	Shared Yards, Courts
Wayfinding Methodology	Signage
Building Height	One & Two Story
Setbacks	Front: Varies – Relatively Deep
	Rear: Varies
	Side: Varies – 30' on average
Frontage Buildout	Varies
Thoroughfare Typology	Varies – Sidewalks & Informal Pathways
Lighting	Package A
Site Furnishings	Package A
Signage	Package A

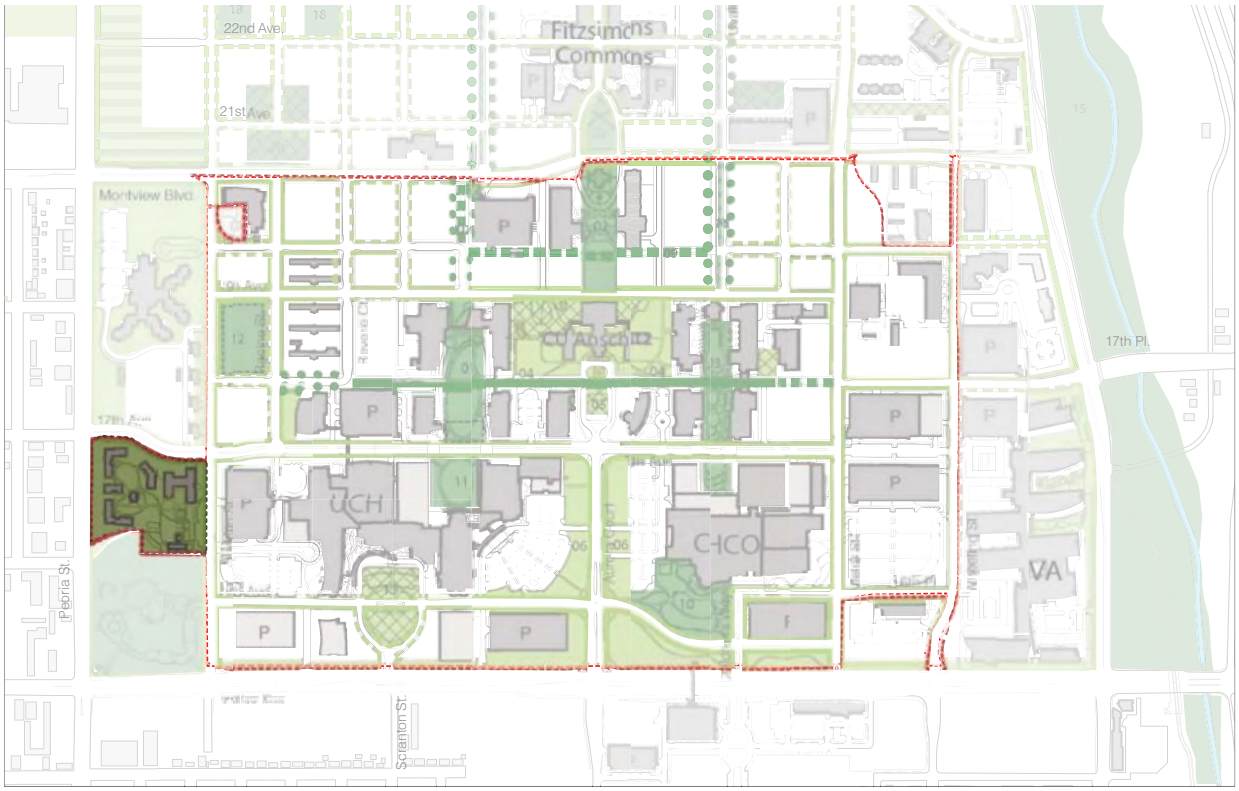


Figure II.2.4A - C4 | Special District, Open Space

C4 | Architectural Character

Any future development within the area of CeDAR will need to be sensitive to the residential scale of these unique structures as well as to their spatial organization. The CeDAR development forms a discrete compound of buildings, all sharing a similar vocabulary of materials and architectural features.

Any renovations, alteration, or additions to these structures (including fencing, plantings, etc.) will require evaluation by the University Design Review Board.

CeDAR's main treatment facility

II.3 PUBLIC REALM

Campus wide streetscape design will promote connectivity and provide a unifying framework throughout the campus. Their design will create rhythm and visual impact, highlighting areas of significance, and tying character zones together to form a comprehensive whole.

A hierarchy of streetscape has been developed to assist in pedestrian and vehicular way-finding. Streets expected to have higher pedestrian activity will incorporate a greater level of detailing and upgraded materials. This will enhance the pedestrian experience creating a more unique and dynamic space. Streets that are anticipated to receive higher speed vehicular circulation will be treated with a more simplified design.

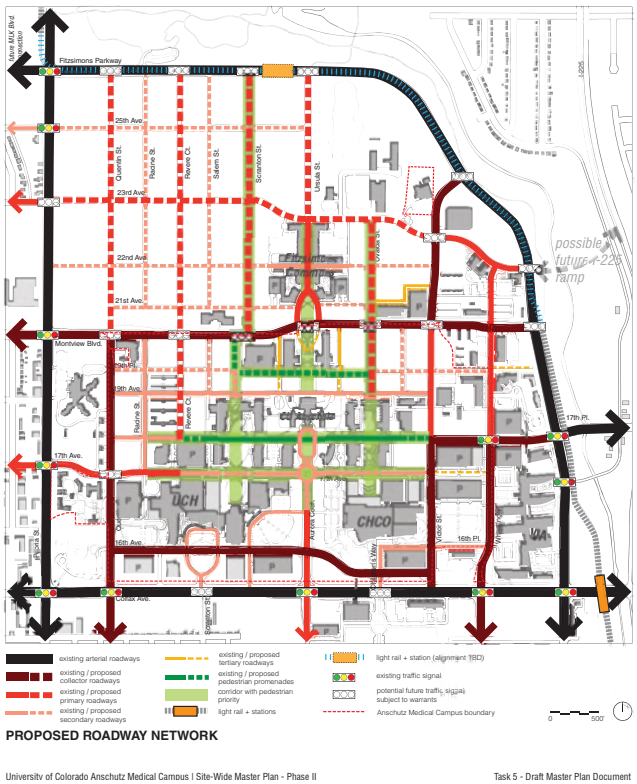
Lighting will further assist in way-finding through a vocabulary of predominantly pedestrian scale lighting fixture being used throughout with vehicular scale fixtures helping to delineate major vehicular routes along collector and service drives.

To add visual interest to the urban streetscape, primary building entries shall be enhanced to create a break in the streetscape paving pattern. Paving material that is reflective of the adjacent building's architecture shall extend uninterrupted from the doors to the back of curb. This change in pavement will alert pedestrians that they are approaching a special area as building entries are to be the only place where the streetscape paving pattern is to be broken. Paving material(s) selected at building entries may consist of colored concrete, exposed aggregate concrete or specialty porous pavers.

Site furnishings shall be located adjacent to building entries and within the furnishing zone indicated on the illustrative street sections. Street trees and lights should stop on the edge of the building entry to allow for an unimpeded entry to the building. Utility access should be coordinated to be placed away from building entries.

The location and layout of streetscapes in the Urban District are designed to be compatible with the surrounding community and sympathetic to City of Aurora standards.

The following streetscapes are listed in accordance with their priority within a hierarchy of corridors within the public realm. Main facades and entrances of buildings shall be oriented towards those streetscapes having primacy within this hierarchy.



PROPOSED ROADWAY NETWORK

University of Colorado Anschutz Medical Campus I Site-Wide Master Plan - Phase II

Task 5 - Draft Master Plan Document

Concept rendering of an urban streetscape by Anderson Mason Dale Architects.

Green Streets (Uvalda & Scranton)

Green Streets are envisioned to be multi-modal connectors weaving the organizational presence of the Academic Village character zone northward to Montview Boulevard and beyond. These roadways are primary entrances on to the campus and are meant to serve as educational showcases for best practice storm water retention and treatment strategies.

A 20' wide linear plaza is proposed, running along the west side of Uvalda; forming a cross axial terminus for the 19th Place Promenade. Within the plaza would be a series of infiltration, storm water planters with a variety of gathering spaces located in between planters.

A 5' wide continuous infiltration storm water planter runs along the east side of Uvalda. Refer to the Landscape Master Plan for material and plant density requirements at all planters.

The roadbed right-of-way consists of two 10" drive lanes flanked on both sides by 5' bike lanes and 7' parallel on-street parking.

Traffic speeds should not exceed 20 mph. Traffic calming methods should be utilized including varying paving surfaces at important intersections and bulb-outs at major pedestrian crossings. Allow for generous sight lines at intersections and at crosswalks. Do not install landscaping elements that will obscure sight lines.

Lighting along green streets shall follow a vocabulary of regularly spaced, vehicular scaled, pole fixtures within the 5' wide planter on one side of the roadway and pedestrian scale pole fixtures located along the plaza. Fixtures should be selected from Package A of Section II.12 of this guideline document to further strengthen to connection of these streets to the Academic Village character zone.

Scranton street should have a similar character as Uvalda however without vehicular access north of the 19th Place promenade and having its orientation reversed. The 20' wide linear plaza on Scranton will run on the east side of the roadway forming a cross axial terminus for the eastern end of the Promenade.

17th Avenue

17th Avenue is proposed to be opened up to multi-modal traffic and is envisioned to become the "Main Street" for the Anschutz Medical Campus. It is planned to be a vibrant, primary gathering space bridging between the Academic and Hospital character districts.

A shuttle service is proposed to run from Quentin to Wheeling streets providing safe and efficient transport between the hospitals and the Academic Village. Bus shelters are to be provided at locations indicated in the Facilities Master Plan. Mixed-use development, similar to that found at the Leprino building and its associated garage, is strongly encouraged along the 17th Avenue corridor.

On street, short-term parking is proposed at strategic locations, relating to building entry points, on both sides of the roadway. Generous 6' bike lanes are to be provided in both directions.

The existing 22' landscape median is suggested to be reduced down to 10' in width to allow for two lanes of traffic in each direction; one dedicated to unrestricted shuttle movement. Existing ornamental tree plantings within the median are suggested to be enhanced along with the addition of a variety of colorful perennial plantings to provide four seasonal interest.

Formal deciduous street trees should occur along both sides of the roadbed along with a variety of planters of various forms and scales.

Crosswalks along 17th Avenue will be of an enhanced design with two major ceremonial crossings occurring at the southern edges of the education and research quadrangles. These two crosswalks are to be designed as generously scaled plazas with street pavers, planters, street furnishings and bollard lighting to clearly indicate to vehicles their pedestrian nature and to mitigate traffic speeds. Traffic speeds should not exceed 15 mph along this corridor.

Accommodations for vendor trucks and carts should be considered adjacent to crosswalk plazas to provide much needed lunch time food purchase options.

Vehicular scale pole lighting will continue to be located along the median with pedestrian scale pole lighting along

sidewalks and at major pedestrian crossings. Fixtures should be selected from Package A of Section II.11 of this document.

Montview Boulevard

The redesign of Montview Boulevard should focus upon how it can become a unifying element in the shared public realm rather than a barrier between the campus and the Colorado Science and Technology Park to the north.

It should be designed similar to "Primary Street" guidelines however with three lanes of traffic being provided; the center being a shared turn lane. Minimum safe lane widths should be provided to encourage slower traffic speeds while still providing safe travel. Traffic speeds should not exceed 30 mph. Traffic calming methods should be utilized including varying paving surfaces at important intersections and bulb-outs at major pedestrian crossings.

Sidewalks shall be provided on both sides along the entire length of the road. Road beds should be separated from pedestrian paths by concrete curbs and elevation changes.

Primary & Secondary Streets

These streets are the primary vehicular pathways throughout the site and provide the major organizational framework for the Urban Campus environment. They provide on-street parking and bicycle access; dedicated lanes on primary streets and "sharrows" on secondary streets.

Primary and secondary streets differ in terms of tree wells, pavement detailing and site furnishings. Primary streets will have deciduous trees planted within 5' x 5' grates with 5' x 20' colored sandcrete sections between planters. Primary building entrances are to be located off of primary street with special paving conditions utilized to delineate their presence.

Secondary streets shall have deciduous trees planted within 5'x10' tree wells with landscape and rock mulch over fabric. Secondary building entrances are to be located off of secondary streets with embedded bike racks located adjacent to them.

Road widths should not exceed 10' in width. Traffic speeds should not exceed 20 mph.

Traffic calming methods should be designed at regular intervals, including clearly marked crosswalk, varying paving surfaces near high-use pedestrian areas, neck downs and roadside landscaping.

Road beds should be separated from pedestrian paths by concrete curbs and elevation changes.

Lighting along primary and secondary streets shall be pedestrian in scale, running continuously along sidewalks on both sides street; evenly spaced between tree wells. Pole mounted vehicular scale fixtures shall be located at intersections. Fixtures should be selected from Package B in Section II.11 of this document.

19th Avenue

In the original 1999 Master Plan, 19th avenue was designated to be the major service road to the center of campus. Access to the material loading docks for the research towers, Building 500, and the education buildings, flows directly off of this existing roadway. The corridor was meant to be "de-emphasized" with very light vehicular, pedestrian and bicycle traffic. Facades of existing structures located along the avenue were designed as tertiary elevations with doorways limited to occupant points of egress.

The nature of this corridor will be changing in the future, with multi-modal traffic expected to increase and it's prominence on campus magnified. A significant redesign of the streetscape is in order. It is important to acknowledge 19th Avenues critical role in both delineating as well as tying together the Urban Campus and Academic Village character zones. Pedestrian porosity in the north south axis must be balanced with efficient vehicular east-west access.

An asymmetrical road way section has been proposed with differing characters on either side of the roadway. The south shall remain service oriented, with predominantly vehicular scale light fixtures. Pedestrian scale pole fixtures shall be used at building egress points and at pedestrian crosswalk conditions. Addition landscaping effort will be required to screen view of existing service docks. Street trees should be planted as a single species with regular, formal spacing.

The north character of the streetscape should be far more pedestrian oriented, with a generous street-lawn to accommodate existing trees and an 8' sidewalk flanked on both sides by a variety of deciduous and ornamental

trees planted in a more naturalistic arrangement. Lighting should be addressed by pedestrian scale pole fixtures selected from Package A in Section II.11 of this document.

Aurora Court

Aurora Court shall retain its existing historical character and 300' view shed. Dedicated bike lanes shall be indicated on both sides of the existing roadbed. Vehicular scale pole lighting should continue to be located within the tree lawn on the west side of the roadway with pedestrian scale pole lighting to be added along existing sidewalks. Fixtures should be selected be from Package A of Section II.11 of this document.

Collector Roadways

Victor Street, Quentin and Montview Avenue constitute a system of vehicular collectors surrounding the Academic Village and Hospital districts.

Collector roadways should be designed with tree lawns lining the edges of the road. They should have minimum safe lane widths to encourage slower traffic speeds while still providing safe travel. Traffic speeds should not exceed 25 mph. Low impact traffic calming methods should be considered along collector roadways, including varying paving surfaces at important intersections, bulb-outs at major pedestrian crossings and roadside landscaping. Allow for generous sight lines at intersections and at crosswalks. Do not install landscaping elements that will obscure sight lines.

Sidewalks should be provided on both sides along the entire length of the road. Road beds should be separated from pedestrian paths by concrete curbs and elevation changes.

Lighting along collector street should follow a vocabulary of regularly spaced, vehicular scaled, pole fixtures within the tree lawn on one side of the roadway and pedestrian scale pole fixtures located inside and along the sidewalk on the other.

There is no on-street parking planned for any of these collector roadways.

Victor & Quentin Streets

Victor & Quentin were designed as the north-south running portions of the ring road system of the original 1998 Master Plan. The intent of this system was to divert heavy traffic flow from the center of campus. It's character is that of a parkway. It was to have an informal landscape with variations in tree densities, an undulating informal topography with mass plantings of various scales and plant varieties strategically placed to enhance views and define entrances.

Existing structures on both of these roadways to date are setback significant distances from the street. Future development along both Victor & Quentin shall conform with existing context. Colonels Row should provide the definitive set back distance for all development on the west side of Quentin with the new University of Colorado Hospital staff and visitor garage defining setback distances for the east side.

Victor provides a continuous connection from Colfax on the south to Fitzsimons Parkway to the north and is the major staff entrance for the Children's Hospital of Colorado. A large number of parking structures and ground lots have been sited along the roadway between Colfax and 17th Place, accommodating a total of 4,398 parking spaces to date. For this reason, bicycle traffic will not be directed along the section of Victor. However, 14' bicycle "sharrows" are to be incorporated into the section of Victor north of 17th Place.

Wheeling Street

The west side of Wheeling Street is currently home to groupings of mature conifers. Development to date has been predicated upon retaining a 58' building setback in order to accommodate these existing trees. Pedestrian scale lighting should be supplemented along the sidewalk on this side of Wheeling.

The east side of this 30' drive presently has a 7'-6" street lawn along with an 8' wide sidewalk. The building setback should be that of an urban street wall. Street trees within the lawn should be of a single species planted within a formal 30' spacing. Lighting shall be of a vehicular scale placed in line with street trees.

Fixtures should be selected from Package A of Section II.11 of this document.

Tertiary Ways

A tertiary Way is defined as any street functioning as a service drive. Service roads should not be utilized for primary pedestrian travel.

Appropriate service access should be accommodated in the design of all new campus buildings. Service access should typically be consolidated to only one location for each building and should be shared whenever possible.

The sights, sounds and possible smells of the service area location should be minimized from pedestrian pathways through the use of landscaping, topography or other visual barriers.

Lighting along tertiary ways should be vehicular in scale, located on only one side of the roadway.

Perimeter Roadways

Perimeter roadways are the primary vehicular routes surrounding the campus.

Fitzsimons Parkway, Peoria Street, and Colfax are perimeter roadways forming the boundaries of the 578-acre Site-Wide development. Their function is to facilitate connections to and from the surrounding urban fabric of the City of Aurora.

As these roadways are owned and maintained by the City of Aurora, any and all improvements must conform to the standards and requirements of the City of Aurora, Public Works Department.

It is the intent that these perimeter roadways be designed with a formal row of trees and landscaping lining the edges of the road. Landscaping elements should not obscure sight lines.

The north side of Colfax should be less formal in nature with plantings sympathetic to the character General's Park.

Sidewalks should be provided along the entire length of the road. Road beds should be separated from pedestrian paths by concrete curbs and elevation changes.

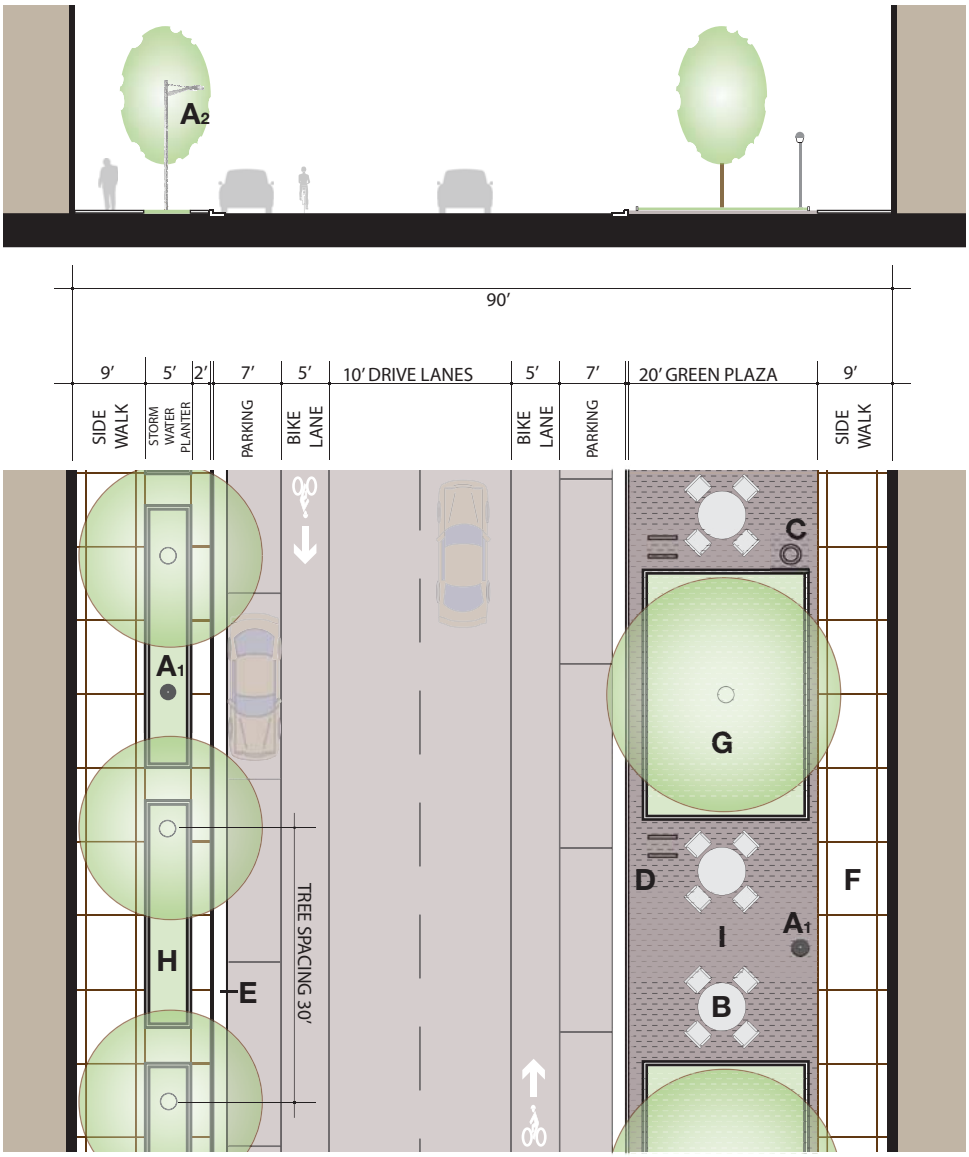
There is no on-street parking planned for any of these arterial roadways.

Intersections

Crosswalks should be located and designed to alert drivers to the presence of pedestrians and to contribute to pedestrian safety when crossing streets and roadways. Two standard crosswalk details are provided for use on campus.

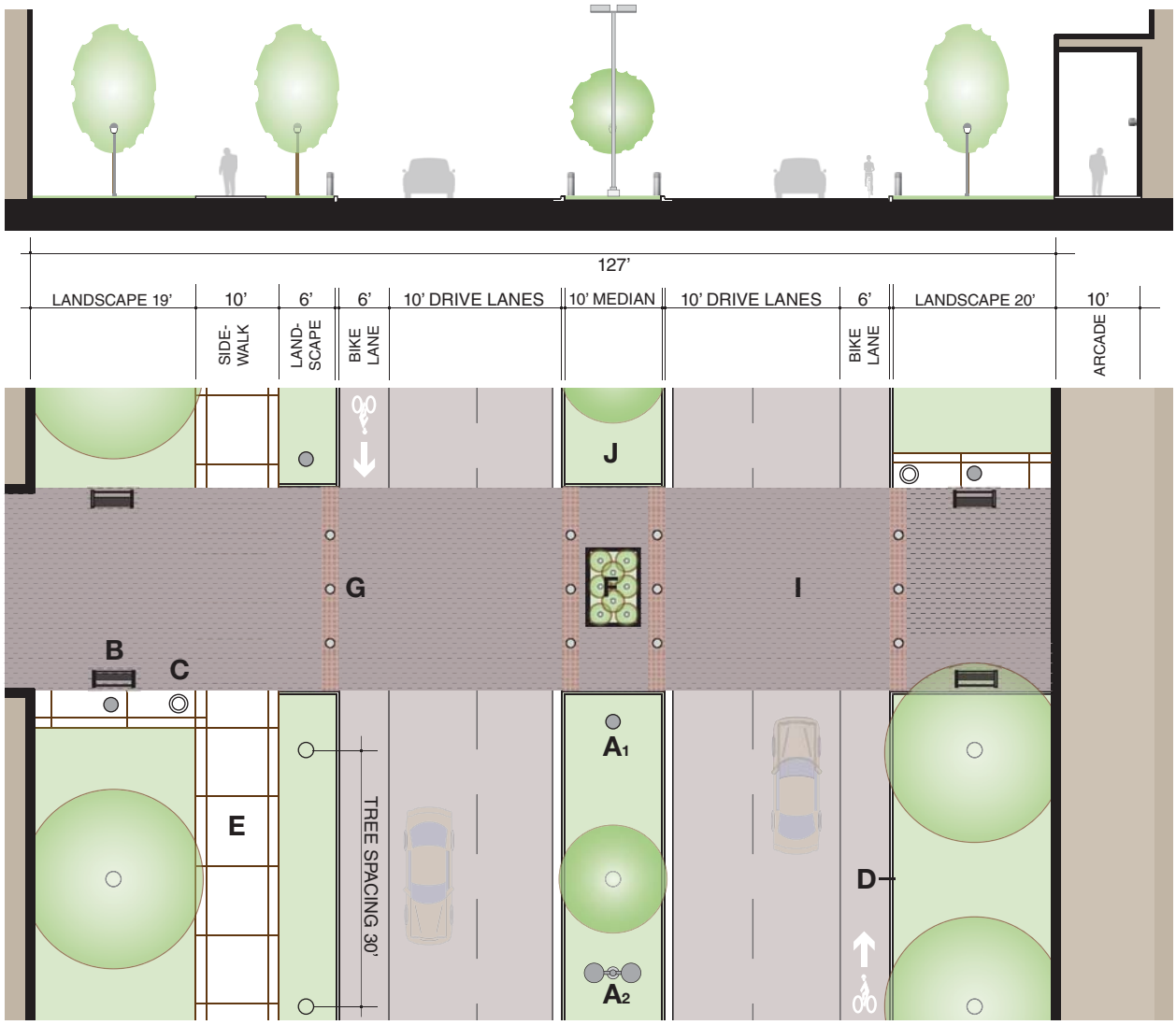
Typical crosswalks should be located at the majority of pedestrian crossings. Enhanced crosswalks should be located at major crossing locations where high pedestrian activity is anticipated.

Major ceremonial crossings are unique to their particular circumstances and will require design approval on an individual basis. Refer to the 2012 Facility Master Plan for the location of each type of crossing.



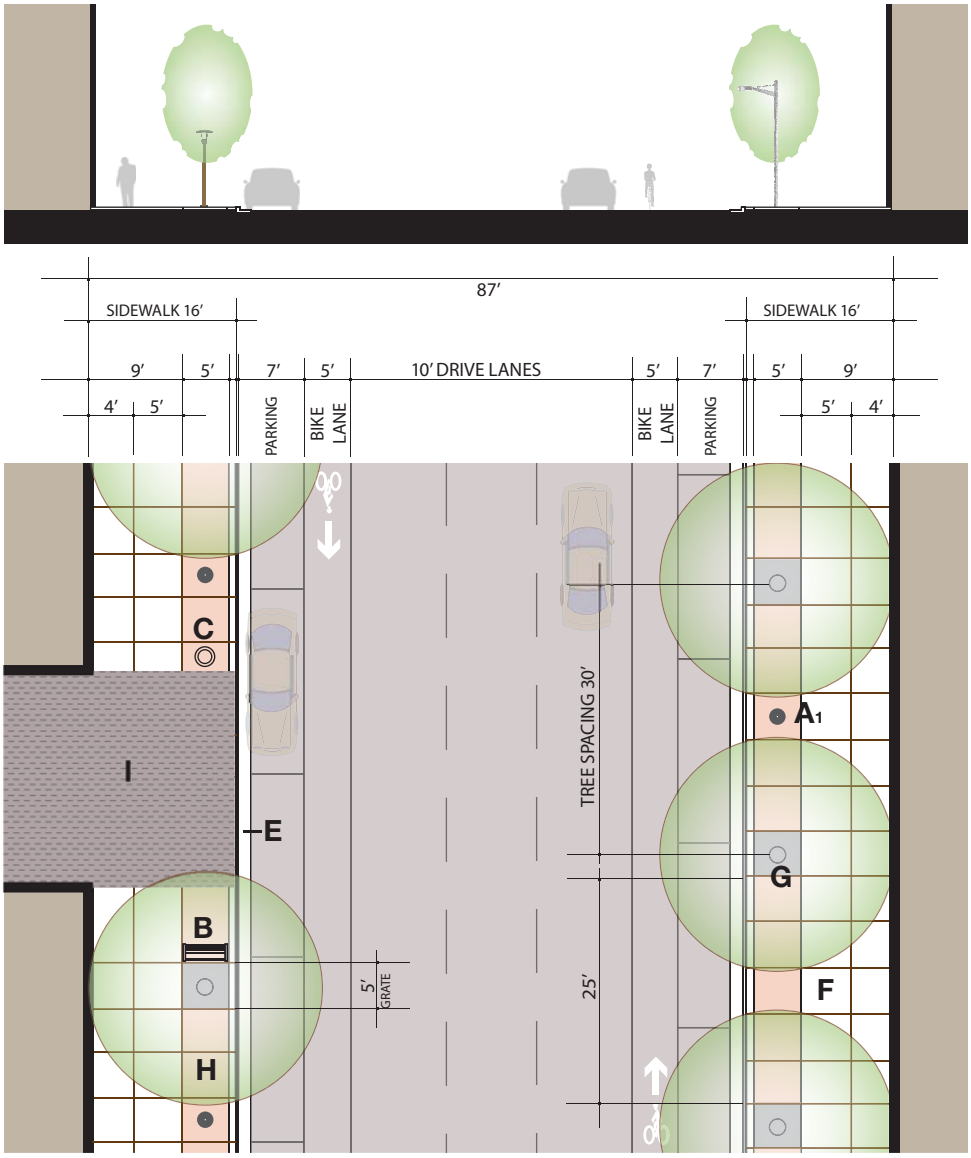
A1 Pedestrian scale lighting fixtures. Vocablary A (Vocabulary B at Montview)
A2 Vehicular scale lighting fixtures at intersections. Vocablary A
B A variety of public seating conditions and configuration between planters.
C Trash receptable surface mounted at edge of paving. One per building entry
D Embedded bike racks. Two per building enterance.
E 2' wide cast in place concrete curb and gutter.
F Cast in place concrete with medium broom finish. Saw cut scoring at 9' intervals.
G Infiltration, storm water planter.
H Continuous infiltration, storm water planter (w/ 3'W breaks for parking access).
I Porous plaza paving.

Figure II.3A - Green Street (Uvalda as mirror image of above)



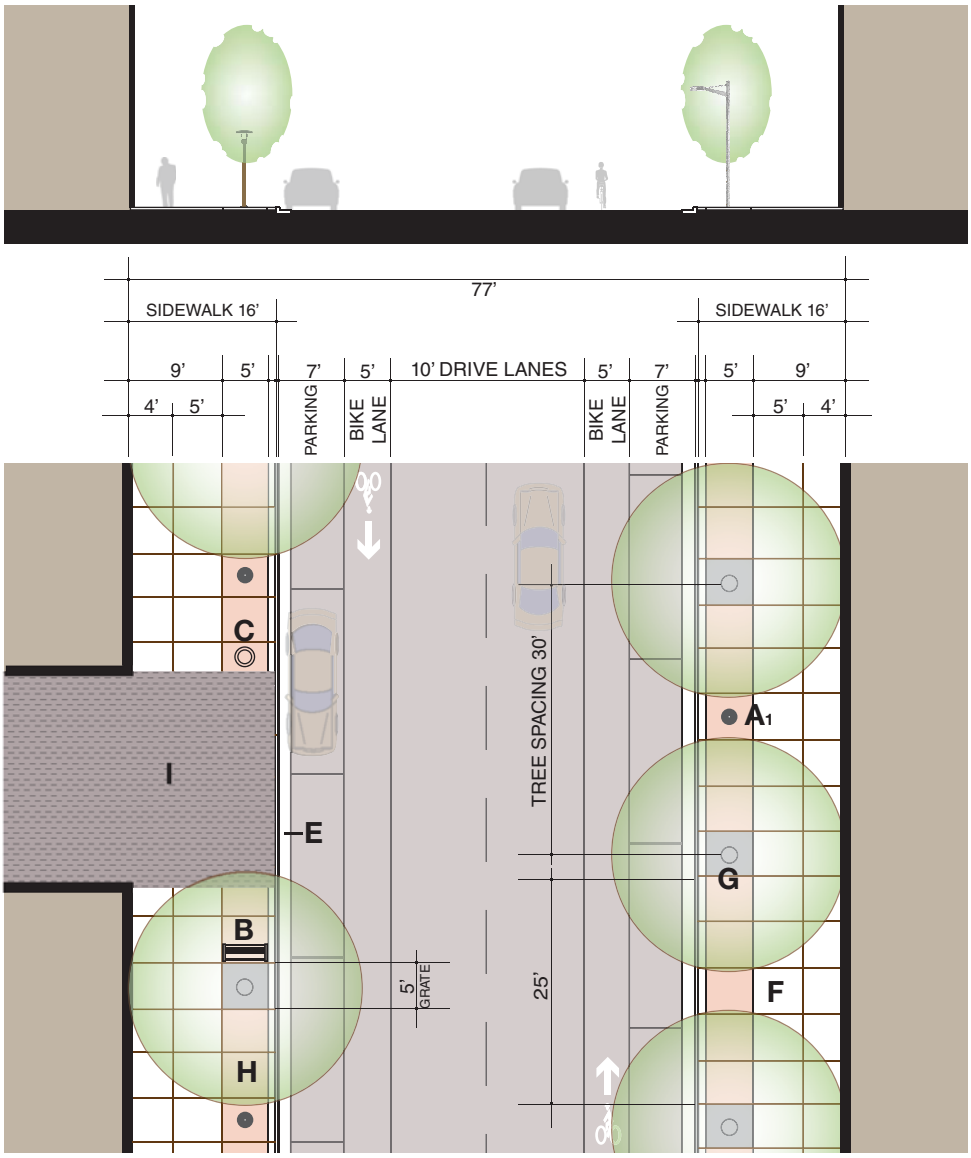
A1 Pedestrian scale lighting fixtures. Vocablary A
A2 Vehicular scale lighting fixtures. Vocablary A
B Bench within crosswalk paving zone. One per building entry.
C Trash receptable surface mounted at edge of paving. One per building entry
D 2' wide cast in place concrete curb and gutter.
E Cast in place concrete with medium broom finish. Saw cut scoring at 10' intervals.
F Raised Planter: Perenial plantings
G Illuminated bollards.
I Special paving at pedestrian crosswalks. Tactile bands at roadway borders.
J Ornamental trees at 20' O.C along median with perenial plantings throughout.

Figure II.3B - 17th Avenue (looking east)



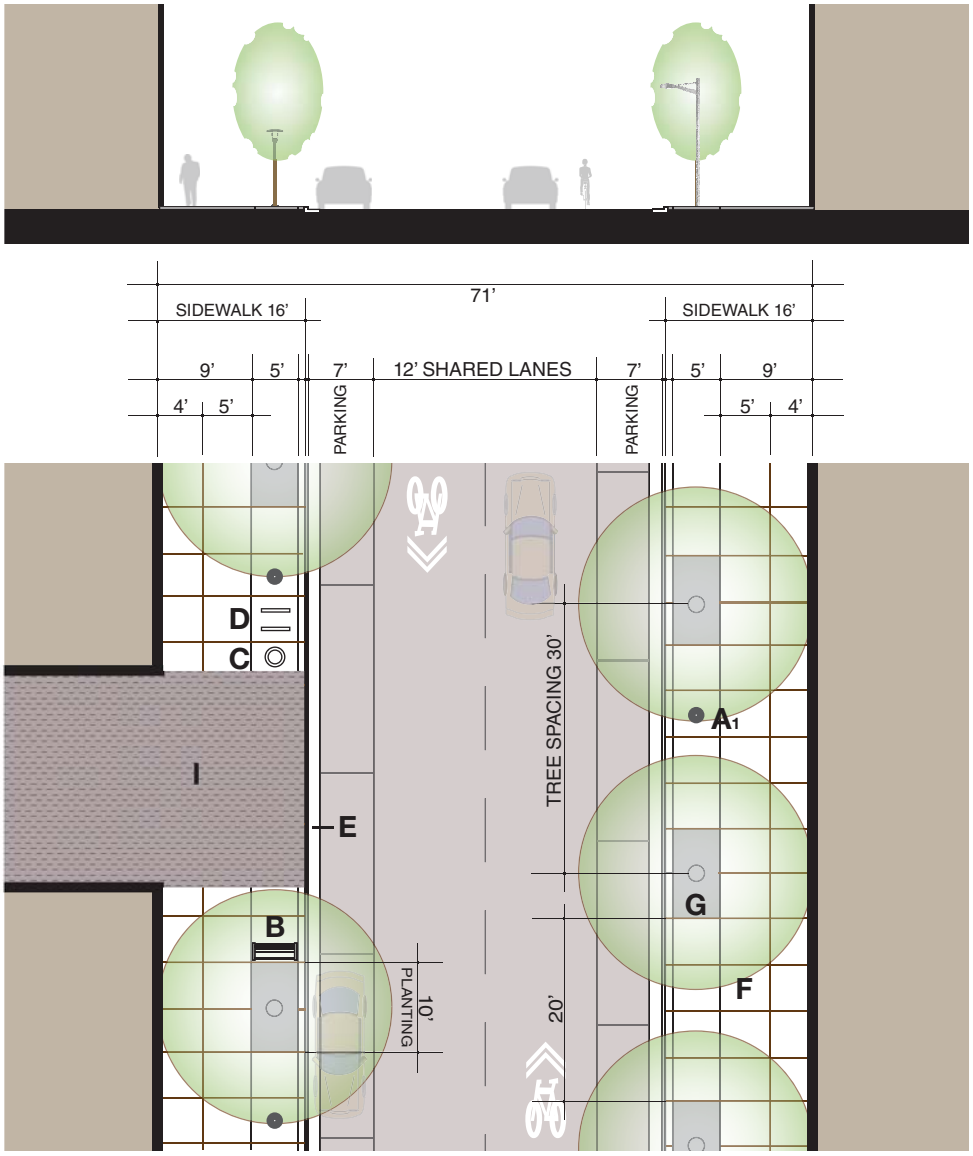
A1 Pedestrian scale lighting fixtures. Vocablary B.
A2 Vehicular scale lighting fixtures at intersections. Vocablary B.
B Bench to back planting bed. One per building entry.
C Trash receptable surface mounted at edge of paving. One per building entry
D Bike Racks not included.
E 2' wide cast in place concrete curb and gutter.
F Cast in place concrete with medium broom finish. Saw cut scoring at 5' intervals.
G Tree Grate: Deciduous trees in a 5'x5' tree grate.
H Colored/textured concrete.
I Special paving at primary building enterances. Pattern and materials reflective of building enterance are encouraged.

Figure II.3C - Montview Boulevard



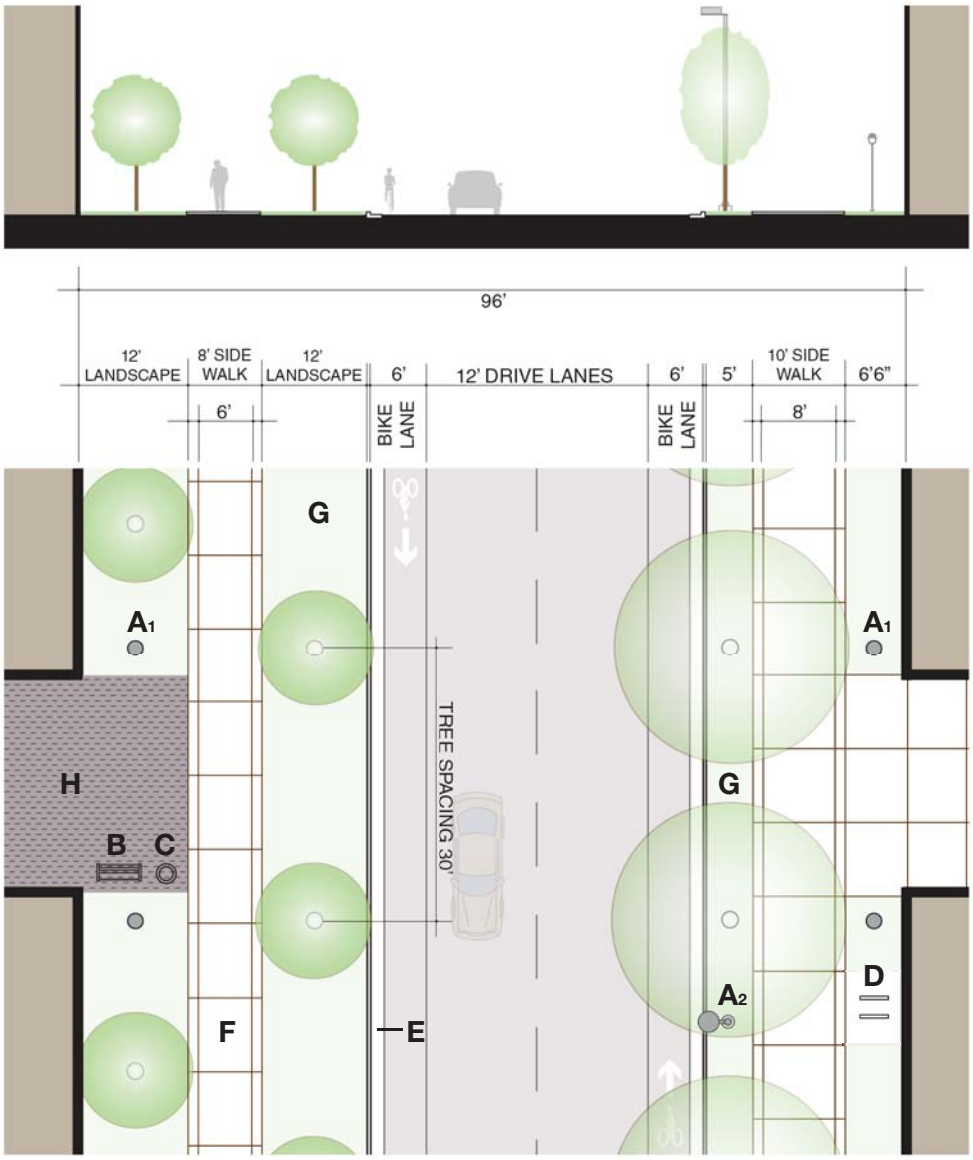
A1 Pedestrian scale lighting fixtures. Vocablary B.
A2 Vehicular scale lighting fixtures at intersections. Vocablary B.
B Bench to back planting bed. One per building entry.
C Trash receptable surface mounted at edge of paving. One per building entry
D Bike Racks not included.
E 2' wide cast in place concrete curb and gutter.
F Cast in place concrete with medium broom finish. Saw cut scoring at 5' intervals.
G Tree Grate: Deciduous trees in a 5'x5' tree grate.
H Colored/textured concrete.
I Special paving at primary building enterances. Pattern and materials reflective of building enterance are encouraged.

Figure II.3D - Primary Street



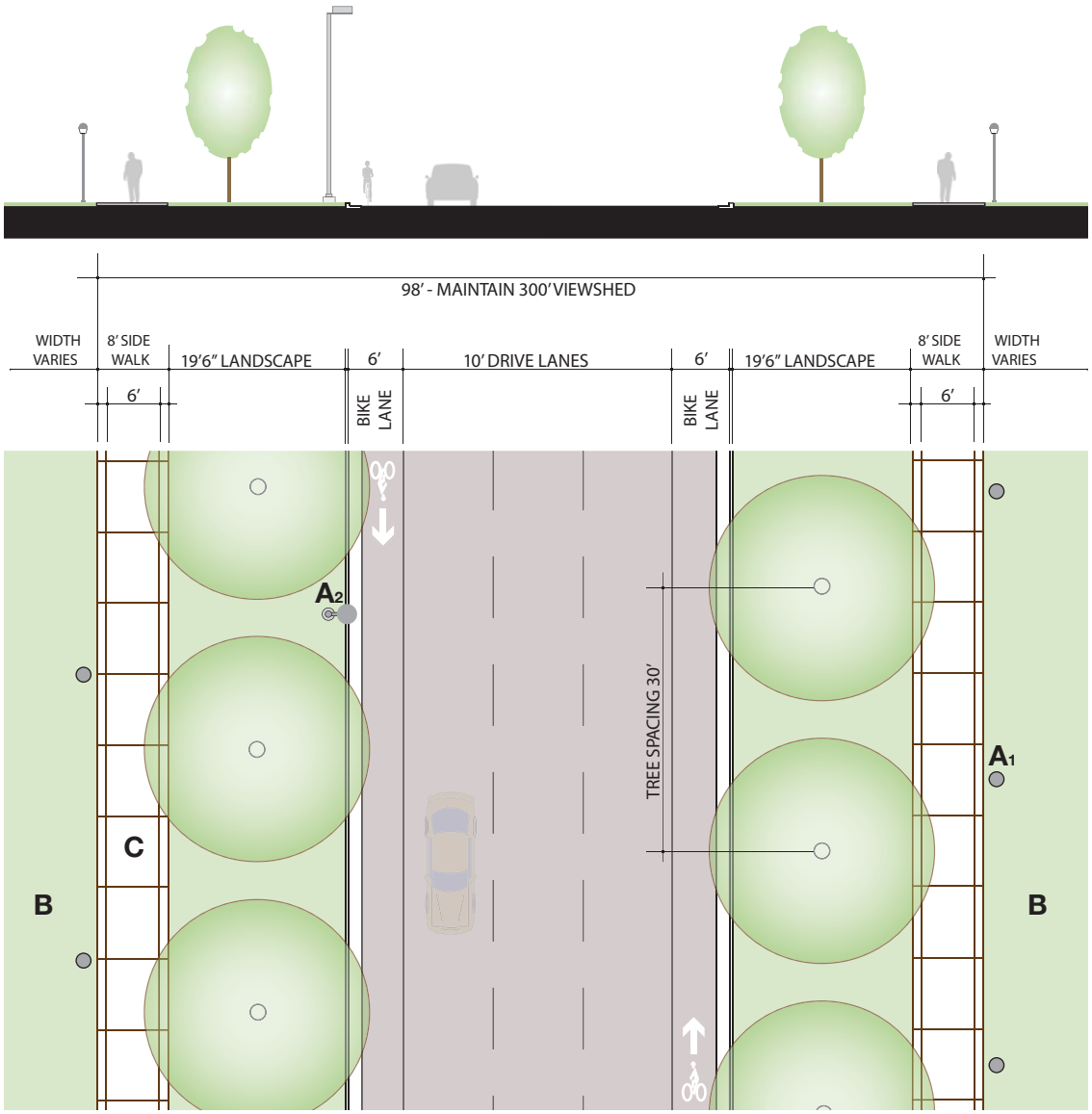
A1 Pedestrian scale lighting fixtures. Vocablary B.
A2 Vehicular scale lighting fixtures at intersections. Vocablary B.
B Bench to back planting bed. One per building entry.
C Trash receptable surface mounted at edge of paving. One per building entry
D Embedded bike rack, centered on scoring pattern. Two per building entry.
E 2' wide cast in place concrete curb and gutter.
F Cast in place concrete with medium broom finish. Saw cut scoring at 5' intervals.
G Planting Bed: Deciduous trees in 5'x10' tree well w/ landscape plantings.
H Colored/textured concrete not included.
I Special paving at primary building enterances. Pattern and materials reflective of building enterance are encouraged.

Figure II.3E - Secondary Street



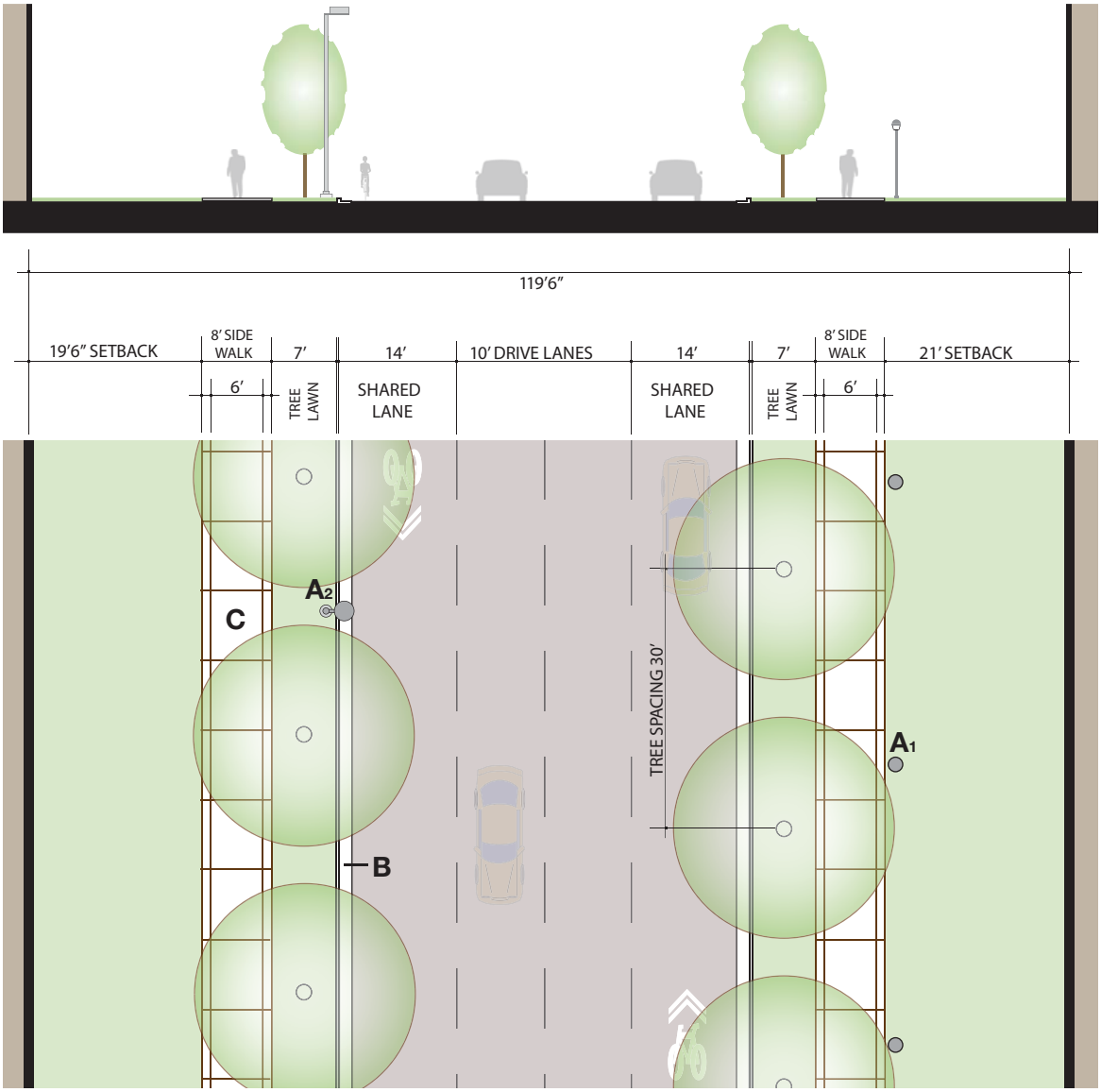
A1 Pedestrian scale lighting fixtures. Vocablary A
A2 Vehicular scale lighting fixtures. Vocablary A
B Bench to back planting bed. One per building entry.
C Trash receptable surface mounted at edge of paving. One per building entry
D Embedded bike rack, centered on scoring pattern. Two per building entry.
E 2' wide cast in place concrete curb and gutter.
F Cast in place concrete with medium broom finish. Saw cut scoring at 5' intervals.
G Continuous tree lawn.
H Special paving at primary building enterances. Pattern and materials reflective of building enterance are encouraged.

Figure II.3F - 19th Avenue (looking east)



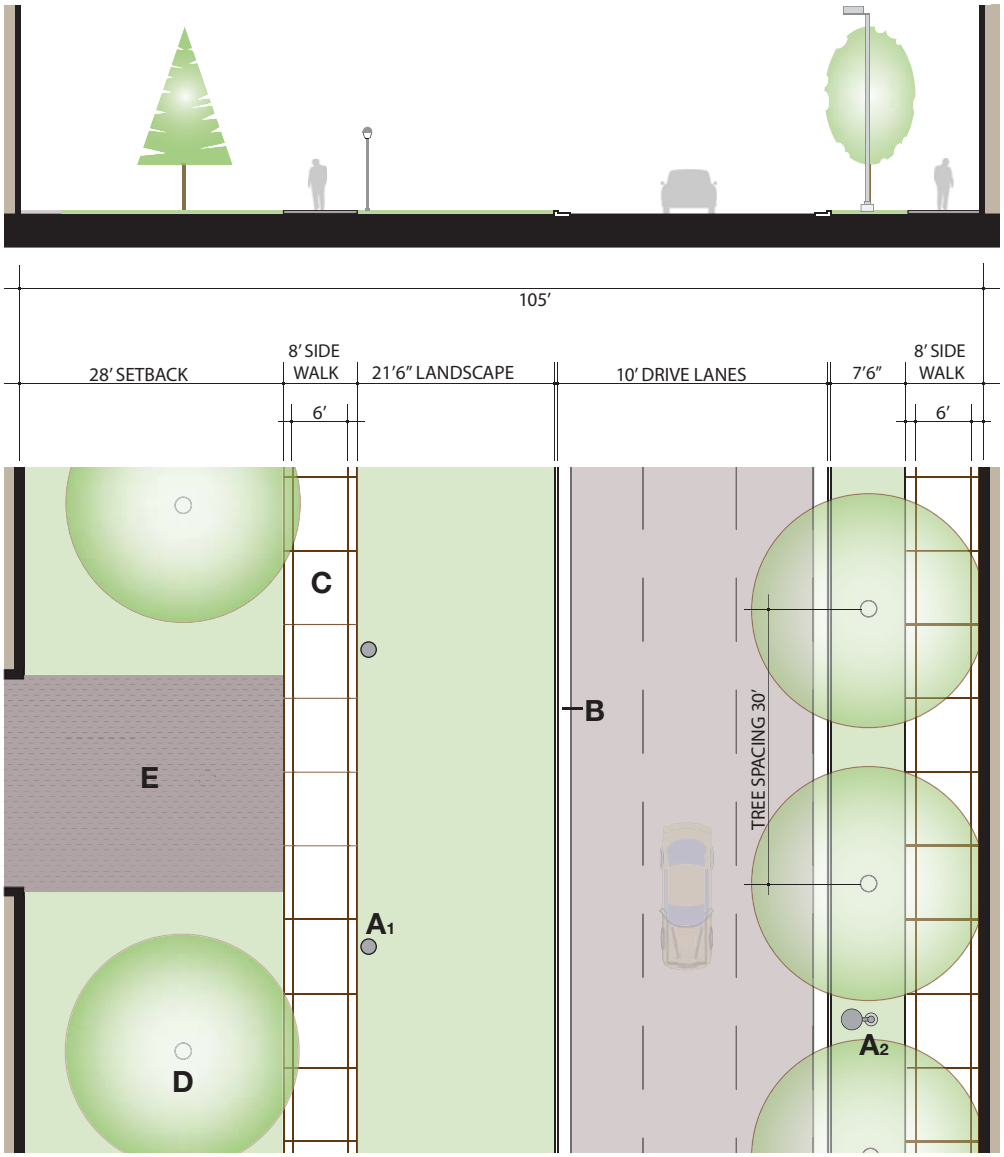
A1 Pedestrian scale lighting fixtures. Vocablary A
A2 Vehicular scale lighting fixtures. Vocablary A
B Naturalistic prairie landscape
F Cast in place concrete with medium broom finish. Saw cut scoring at 8' intervals.

Figure II.3G - Aurora Court (looking north)



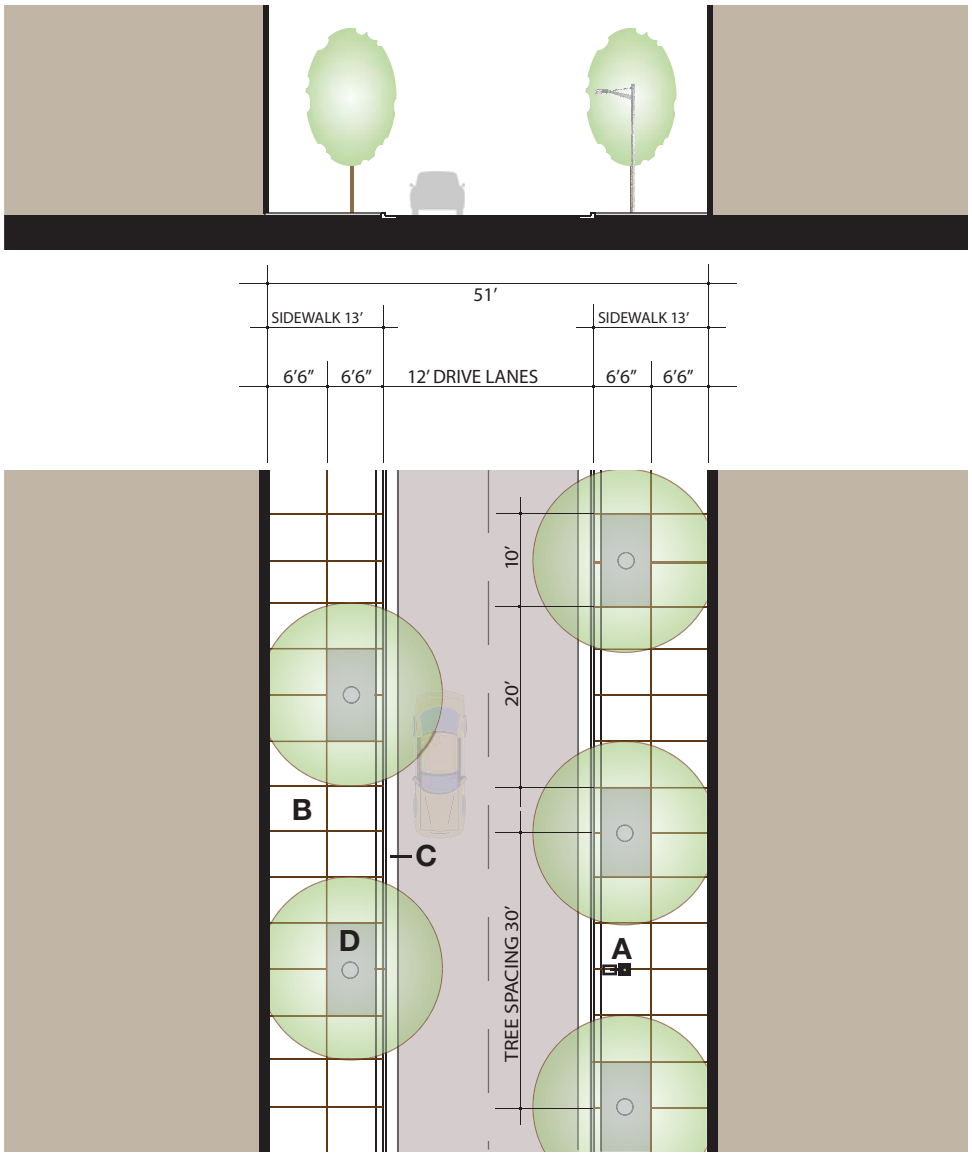
A1 Pedestrian scale lighting fixtures. Vocablary A
A2 Vehicular scale lighting fixtures. Vocablary A
B 2' wide cast in place concrete curb and gutter.
C Cast in place concrete with medium broom finish. Saw cut scoring at 8' intervals.

Figure II.3H - Victor Street (looking north)



A1 Pedestrian scale lighting fixtures. Vocablary A
A2 Vehicular scale lighting fixtures. Vocablary A
B 2' wide cast in place concrete curb and gutter.
C Cast in place concrete with medium broom finish. Saw cut scoring at 8' intervals.
D Exiting mature conifers to remain
E Special paving at primary building enterances. Pattern and materials reflective of building enterance are encouraged.

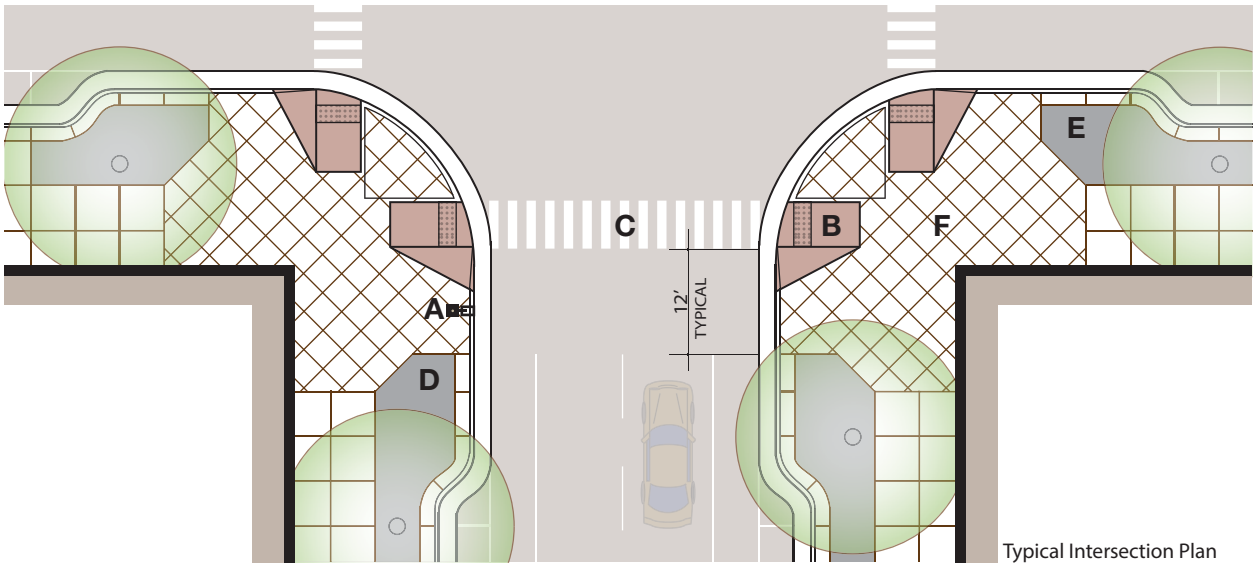
Figure II.3I - Wheeling Street (looking north)



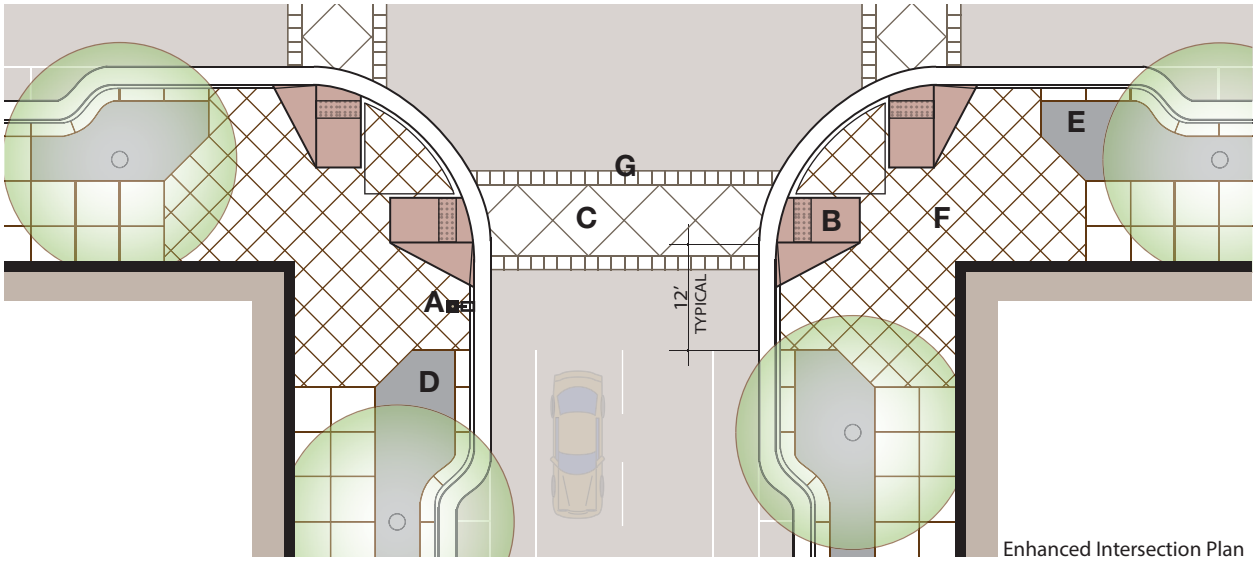
A Vehicular scale lighting fixtures. Vocablary B.
B Cast in place concrete with medium broom finish. Saw cut scoring at 5' intervals.
C 2' wide cast in place concrete curb and gutter.
D Planting Bed: Deciduous trees in 5'x10' tree well w/ landscape plantings.

Trash receptacles - one shall be located at parking garage pedestrian entry and exit and at secondary building enterances.

Figure II.3J - Tertiary Way



Typical Intersection Plan



Enhanced Intersection Plan

A Vehicular scale lighting fixtures.

B City of Aurora Standard handicap ramp.

C Typical: City of Aurora Standard crosswalk stripping.
Enhanced: 8' wide concrete crosswalk, tooled scoring at 4' x 4' intervals at a 45 degree angle to the road centerline.

D Planting bed. Edge of bed should stop 12' from ramp.

E Planting bed edge at 45 degree angle to match scoring.

F Cast in place concrete with medium broom finish. Scoring at 45 degrees, saw cut at 3' x 3' intervals.

G Enhanced: 18" wide concrete band, tooled scoring at 18" intervals.

Figure II.3K - Intersections

II.4 OPEN SPACE

Open spaces on campus should contribute to a sense of "wellness" and "healing". Landscaping should visually unify the campus while simultaneously providing interest. It should enhance comfort and provide shelter for people using exterior spaces. By creating unique qualities, patterns, and character with the landscape, it can serve as a way-finding mechanism by helping to orient and direct individuals to their destination. Open spaces are to be planned and designed to contribute to energy conservation and, as a consequence, lower utility costs. Landscapes should respond to sun and climate in such a way as to create distinctive spaces. They should enhance the image of the campus.

The campus is to be a safe and enjoyable environment. For security reasons, shrubs and other site elements that obscure views are to be used sparingly. The highest levels of illumination are to be at building entrances and at entrances to exterior spaces, with the next highest level of lighting occurring around the perimeter of open spaces. Such a lighting concept creates a sense of safety and well-being. To further encourage the use of exterior spaces, furnishings are to be ample, but carefully located to relate to views, programmatic needs, and pedestrian and vehicular circulation. Fixed seating located around the edges of exterior spaces provides views to the center as well as amenities to passing pedestrian traffic. Some flexibility should be designed into courtyard seating areas to allow users to manipulate the space to accommodate a variety of gathering conditions.

Open spaces are to be designed to encourage multiple uses. Landscaping, site features, and functions that distract from this flexibility are strongly discouraged. Grading design and the placement of trees, lighting, and furnishing are to accommodate a variety of short and long-term uses. Appropriate design minimizes hard surfaces, barriers, and other obstacles within large open spaces that compromise flexibility. Vehicular access, services areas, storage, parking, and other uses that conflict with pedestrian enjoyment are also to be minimized or landscaping is to be used to mitigate such conflicts. Landscaping is to enhance building facades and building entrances.

Campus edges, corners, and entrances are critical in establishing a positive first impression and a memorable sense of place. Landscaping along edges is to be simple but elegant, with emphasis on major visitor's entrances and prominent corners. To relate the campus to the surrounding community, the landscaping of campus edges is to compliment edges of surrounding properties including the native landscape of nearby Sand and Tollgate Creeks as well as General's Park.

The following is a list of considerations that should be accounted for in the design of any open space planned for the campus regardless of where it falls within the defined character zones:

- The ability to allow movement through the space is an important design element and should not adversely impact the desired primary planned activity.
- The relationship between the planned open scape and the surrounding buildings and significant landscape features should be the most important consideration in the design.
- Stairs should be minimized.
- Views to and from the space should be accommodated.
- Texture of surfaces should be used to define spaces and suggest intended activity.
- Sculpture or other "hard" elements should be interactive and stimulating.
- Seating arrangements should consider a variety of activities – intimate discussions, people watching, quiet study, group gathering, etc.
- The design should consider the micro-climate of the area including sun exposure and seasonal conditions.
- Spaces should be strategically lite and attractive in the evening as well as in daylight.
- In larger spaces, power should be provided for the occasional outdoor event.
- An appropriate number of trash and recycling bins should be provided in strategic places around the perimeter.
- Slopes of paved plazas or other open gathering areas should be 1% minimum for drainage but not more than 2% for accessibility.

Site Programs

Recreation

The physical layout of the campus should be designed to promote health and wellness for a diversity of users and physical capabilities. The intent is to encourage as much activity as possible, in as many spaces as possible. Therefore, open spaces must be designed for flexibility; establishing both formal and informal spaces to encourage a variety of interactions amongst students, faculty and staff.

Recreation spaces should also compliment the functions of surrounding buildings.

In order to accommodate the diversity of users on the campus, the following design criteria has been established.

- Formal recreation shall continue to occur at the Parade Grounds.
- Informal recreation is currently centered within the Academic Quadrangle. It is anticipated that informal recreation could similarly occur within a redesigned Campus Green.
- Jogging paths wrap the campus and connect with other site-wide and regional trails.
- Trees are to be planted at the edges of turfed areas to delineate open areas to be used for informal recreation.

Commencement | Convocation

Several of the open spaces established on campus can be used for formal events such as commencements and convocations. The Anschutz Medical Campus has developed a variety of spaces to allow the entire academic community to gather in one area for commencement and to then disperse to other more intimate spaces for convocations.

While establishing the commencement plan, several principles have been established:

- Spaces have been identified where commencement for all schools may occur with enough open area to accommodate faculty, graduates, friends and family (3,000 people). They are the Education Quadrangle and potentially within a redesigned Campus Green.
- A hierarchy of spaces have been planned where convocations of a variety of sizes can occur simultaneously.
- Walking distances between commencement and convocations spaces have been minimized.
- Spaces have been oriented to take advantage of topography (slopes no greater than 3%) and solar angle: Stages should face to the south or to the east.

Figure II.4 - Open Space | Site Programs

II.5 WALKWAYS

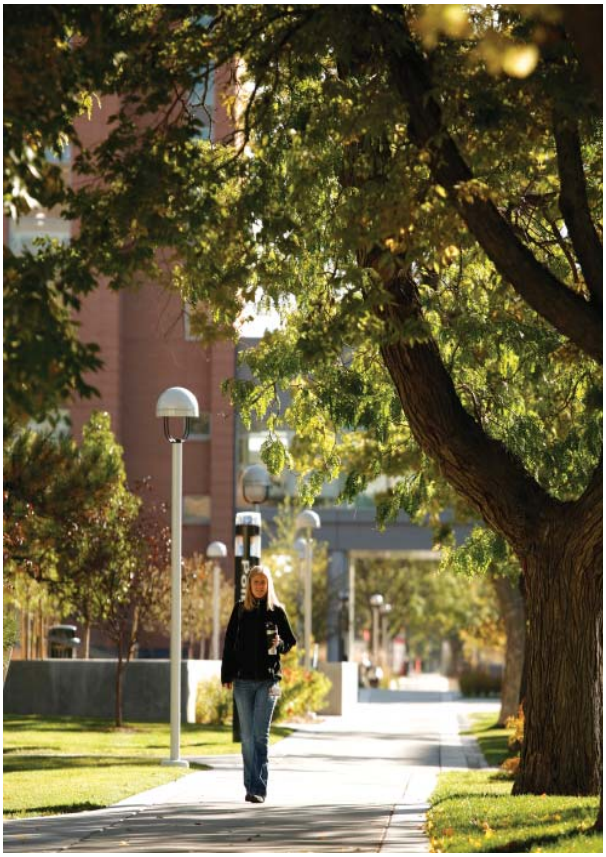
Pedestrian walkways currently constitute the major circulation network within the C1 | Academic Village district and can also be found within the C3 | Hospital district.

Walkways should enhance the pedestrian experience providing safe, convenient, and enjoyable passage throughout the campus. They should generally follow the natural "desire line" between destinations.

All walkways should be wheelchair accessible however the use of other alternative modes of transportation, such as bicycles, roller blades, etc., are discouraged from using the walkway network. These form of transport are encouraged to travel by way of dedicated lanes made available to them on the majority of campus streets.

Primary Walkways

- A primary walkway will typically follow a direct line between two major destinations. These pathways will often lead to the entrance of major buildings, to and from heavily used open spaces, transportation hubs, large parking lots or structures, or - in the case of promenades - form an organizational spine linking to other pathways.
- The width of any walkway should be evaluated in terms of the amount of traffic to be accommodated. Primary pathways should be 10'-0" in width. In no case should a major path be less than 8'-0" in width.
- A walkway may need to double as a fire lane. Rather than widening the paved area, the use of turf reinforcing systems on one or both sides of the walkway is encouraged at these locations.
- The intersection of primary walkways should emphasize and accommodate seating areas, lighting, special plantings, and way-finding elements.
- Primary walkways should be made of concrete. They should be designed to be sympathetic with other major campus paths to maintain a comprehensive whole.
- Primary walkways are to be handicap assessable and stairs should be avoided.
- Trash and recycling bins should be located along the path at regular intervals and major intersections.
- Walkways should be well lit and encourage a feeling of safety and security. This needs to be accommodated in a manner that consistent with the Universities' commitment to light pollution reduction. Blue phones (emergency phones) should be installed at strategic locations along major paths.
- Walkways should merge when approaching streets to reduce the number of crossings to a minimum. When a primary walkways cross vehicular roadways, it should always be at right angle with and open view of the street.



The Anschutz Medical campus Art Walk provides the central spine of our pedestrian walkway network.

Secondary Walkways

Secondary walkways accommodate fewer pedestrians than primary walkways. They might connect a major destination with a minor destination, or lead to a primary walkway or to a secondary entrance to a building.

Attempts should be made to reduce the number of secondary walkways whenever possible. The location of each walkway should be carefully evaluated to maximize its efficiency in allowing pedestrians to reach their desired destinations.

- The preferred width of a secondary walkway is 8'-0". In some limited cases the walk may be reduced to 6'-0" in width. It should be assumed that most walkways will require plowing by a truck having a min. 6' wide plow blade.

- Secondary walkways should follow desire lines to their destination. In cases where the desire line is not feasible or appropriate, an alternate route can be provided with landscaping features to encourage the use of the alternate route.

- Secondary walkways will accommodate less pedestrian traffic than primary walkways and the surrounding landscape should accommodate smaller, more intimately scaled features.

- Paths should be well lite and encourage a feeling of safety and security. Bollard lighting or pedestrian scale light poles should be utilized. Lighting needs to be accommodated in a manner consistent with the universities' commitment to light pollution reduction.

- Stairs should be discouraged as part of the secondary walkway system.

- Secondary walkways should accommodate trash and recycling bins near building entrances.

A quiet place to rest and reflect along a secondary walkway.

Walkways should follow "desire lines" between destinations.

II.6 PARKING

The experience of arriving to and departing from campus by car is to be a positive experience. It is encouraged that parking be located towards the perimeter of the campus and accessed primarily by streets contiguous with off-site roadways thus reducing traffic on interior roads.

On-street parking is to be incorporated into the design of streetscapes throughout the Urban Campus district as well as along the 17th Avenue - Translational Corridor.

As facilities are developed over the new 10 years, the reservoir of existing parking will be diminished as new roadways are constructed and surface parking areas are claimed as sites for new development. As demand continues to increase it may become necessary, where programmatically appropriate, to construct parking structures and/or provide parking as an integral component of new buildings.

- Entryways and vehicular circulation should be accessed with safe viewing angles for oncoming traffic. Clear signage should be provided at each main entrance.
- Lots should have the appropriate number of service and handicapped spaces to accommodate the surrounding buildings.
- Pedestrian access to and from lots should be carefully considered to minimize vehicular-pedestrian conflicts.

Surface Parking

- Concrete curb should be installed along the edge of all lots.
- Consideration should be given to the use of natural drainage systems with porous surfaces to maintain local groundwater.
- A minimum of 5% of surface parking area should be vegetative landscaping. Landscaping should be used to break up parking rows that exceed 15 spaces. Terminal islands should be placed at the end of every row.
- Surface lots larger than 120 spaces should have median rows at least ten feet wide and occurring at least every three rows.
- Rows at surface lots should be oriented perpendicular to building facades whenever possible.
- Each surface lot should minimize the number of curb cuts in order to maintain the continuous streetscape character of adjacent streets.
- Lots should be appropriately lit for safety. Lights should be directional to reduce glare and limit light pollution.
- Where parking lots border sidewalks or campus roads, the edges of lots should be landscaped to provide a min. 5’ wide buffer zone with vegetative screening.
- The layout of surface parking lots should allow for efficient plowing and provide locations to store snow.

Sustainable Strategies for Parking

The following strategies should be considered for all future and redesigned surface lot projects:

- Minimize the dimensions of parking spaces. Current spaces on campus are approx. 8’-6” wide by 18’ in length with drive aisle being approx. 23’ in width. Consideration should be given to future parking being designed with 45-degree double parking bays with line-way drive aisles allowing for the potential reduction in hardscape lot areas by 25%.
- The current university ratio of population to provided parking space is 2.3 to 1. The National average for Higher Education institutions throughout the US is currently 2.8 to 1. A reduction of spaces down to the National average would result in the elimination of approximately 2,300 spaces from our current 2013 inventory.
- Pervious concrete, pervious pavers, grass paving blocks and gravel pave systems should be considered as alternatives that provide environmental benefits over asphalt.
- Bio-swales, infiltration basins and rain gardens should be considered to help reduce runoff and instead allow water to recharge into the soil and area groundwater.
- High albedo surfaces should be considered (with solar reflectance rates of 25% or higher).
- Maximize tree canopies: The environmental benefits of having trees in parking areas include reduced

II.7 ENVIRONMENTAL CONDITIONS

Solar Orientation

Appropriate solar orientation in Auroras high plains climate, with its lack of humidity and moderate temperatures, is a critical consideration in the creation of comfortable interior and exterior spaces.

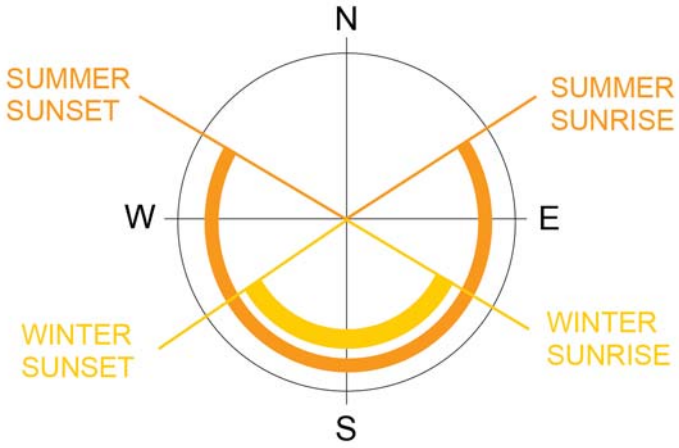
Exterior spaces oriented to receive winter sun allow some outdoor use during most days of the year. In Colorado, snow typically melts quickly in sunny areas. Melting snow may result in greater than average amounts of icing in shading areas.

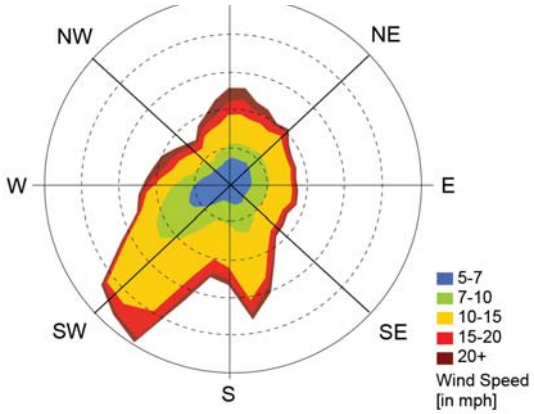
Pedestrian paths, building entries and outdoor areas should be configured to have their greatest exposure from the south, thereby encouraging daylight and snow melting to occur naturally. Larger more formally defined outdoor spaces should attempt to allow solar penetration into the southern corners and edges of outdoor areas. Buildings defining southern perimeters of open spaces should consider architectural setbacks at upper-levels to allow for the maximum amount of sunlight to reach as deep as possible into shaded areas.

The use of protected sidewalks and attached or integral building arcades should be considered in the design of buildings that are located on the south side of major open spaces or streets and therefore would protect pedestrian circulation routes.

Wind

Warm (Chinook) winds and cool summer breezes air generally from the southwest. Cold winter winds are predominately from the north and northwest.





II.8 SITE DRAINAGE

Site drainage must accommodate efficient movement of surface water across pavement, turf or planting beds towards an inlet or drainage system; or allow subsurface water movement through the soil to a drainage system.

An efficient stormwater drainage system is to be maintained.

- Stormwater management is subject to the recommendations of the Fitzsimons Redevelopment Authority.
- Sites to drain into site wide detention/retention ponds
- Grading for each project to meet existing grades at project boundaries.
- Building location and site planning to respect existing grades at project boundaries.
- Avoid adverse impact of stormwater on adjacent parcels.
- On site stormwater retention and treatment strategies are encourage for all new developments regardless of the district in which they occur.
- Utilization of surface water runoff for supplemental irrigation is encouraged.

Stormwater drainage areas are to be attractive and easily maintainable.

- Stormwater drainage areas should be located and shaped for ease of maintenance.
- Landscape for detention/retention areas should be functionally appropriate.
- All sites shall slope to drain.
- Sites should drain away from sidewalks and plazas.
- The use of impervious materials should be minimized.

Sites should be graded to appear that natural contours have not been disturbed.

- Minimize grading.
- Berms are to have gradual, natural appearing undulating slopes.
- Avoid slopes greater than 2 to 1
- Streets and surface parking should closely match with topography.

Lawns and shrub beds should be sloped for proper drainage.

- Lawn should be sloped between 1.5% and 25%
- Minimum 2% surface slopes should be provided in planting beds relying on surface drainage.
- Minimum 3% surface slope in turf areas that rely on surface runoff.
- Embankments greater than 25% should be planted with shrubs or ground cover.

Subsurface drainage should be accommodated in raised planters and tree pits.

- Provide subsurface drainage in raised planters where a 2% slope is not possible.
- Subsurface drainage should be provided beneath all tree grates and trees in paved areas.
- Provide subsurface drainage where landscaping abuts building walls.

II.9 HEIGHTS OF STRUCTURES

Building height should be sympathetic to the scale of adjacent structures and to the streets and open spaces surrounding them. In cases where buildings must be significantly taller than surrounding structures, the use of set-backs should be considered for portions of the building above the height of adjacent structures.

Care should be taken to limit the casting of shadows on open spaces or public ways. The potential for ice and/or snow accumulation on sides of buildings should be analyzed as part any design and appropriately mitigated.

In general, future buildings should be constructed between 4 and 6 stories in height. The 4 story minimum is intended to ensure adequate stewardship of campus resources, understanding that our land is finite and that this minimum level of density is necessary to avoid future sprawl. The 6 story maximum is set to encourage safety and economy in construction. The 2009 edition of the International Building Code defines high-rise construction as any building with an occupied floor located more than 75 feet above the level of fire department access. The 6 story limit is intended to avoid having to respond to the additional requirements and financial implications associated with high-rise construction.

In instances where program, site constrains, or other factors require a structure greater than 6 stories in height, an Environmental Impact report (EIR) should be undertaken to evaluate the impact of the structure on vehicular and pedestrian circulation, parking, utility infrastructure, views from existing and future structures, natural light, wind, noise, and air quality. The Character Guideline tables include the upper limits of construction for each of the Character Districts with EIR approval.

Guidelines and procedures to assist in the preparation of an EIR report can be obtained from the University of Colorado Anschutz Medical Campus, Office of Institutional Planning web site:

http://www.ucdenver.edu/about/departments/InstitutionalPlanning/Pages/AboutUs.aspx

The orientation of Research Towers 1 & 2 allow sunlight into the Research Common throughout the year.

II.10 BUILDING ENTRANCES

Major public entrances to buildings should be welcoming, easily identifiable, and accessible. They should be located off of primary streets or primary walkways at major open spaces. Building entrances and lobby spaces are gathering places for those using the building and should be designed to encourage interaction. They should be readily visible, prominent and contribute to the life and vitality of the adjacent streetscape or open space.

It is highly encouraged that the activities occurring within buildings, as appropriate, be visible from the exterior. Windows should be placed to maximize the availability of natural light to the interior as well as views outward.

- The main entrance to any building should be handicap accessible with direct access to an elevator provided near the lobby.
- Building identification signage should be located near the main entrance of the building in view of the closest major pathway.
- Landscaped areas should be located near the building entrance as an amenity to building occupants during lunch breaks, between classes, etc.
- Appropriately scaled landscaping should frame the building and lead to the entrance doors.
- Service entrances should not be located in view of the main entrance. Locate service areas near tertiary or secondary entrances.

The Health and Wellness Center presents a clearly articulated entry condition along an activated streetscape.

- Bicycle parking should not be located adjacent to, or should be shielded from view of, primary building entrances. Locate bike racks near secondary entrances.
- Outdoor transition space, such as porte cochers and canopies, should be provided for protection from snow and rain. Their design should relate to the materials, scale, and articulations used on the buildings exterior and have some relation to those of the interior lobby.

The University of Colorado Hospital provides a welcoming entry sequence for both vehicles and pedestrians.

II.11 LIGHTING

Lighting shall be designed to enhance the pedestrian experience and provide an element of continuity throughout the site. Sufficient light levels shall be provided for pedestrian and vehicular safety and comfort. Over-lighting shall be avoided with upward facing luminaires prohibited and light trespass minimized.

Fixture placement shall reinforce the special and conceptual definition of open spaces. Lighting should be used to help define spaces and to allow for people to find their way. Lighting should highlight building entries and should enhance the pedestrian experience by offering visual interest. Entries shall be defined by lighting that balances with interior lobby illumination creating a sense of visual hierarchy. Facades may be softly illuminated at the top to provide a subtle skyline presence. Additional lighting may also be provided to highlight or accent particular architectural details and open spaces when deemed appropriate.

Lighting will play a key role in producing a campus environment that is safe and enjoyable. Orientation is enhanced by lighting destinations such as building and parking area entrances. Lighting of other landscape elements, entry walls and signs can further assist orientation and way-finding.

In most instances, pedestrian and vehicles will share a roadway. Lighting must be designed to honor the safety and security of users and to distinguish various areas of the campus as vehicular, mix of vehicular and pedestrian, and pedestrian only.

In all cases, the campus will offer safe and secure lighting for pedestrians at night. Lighting will be designed to minimize glare and potential light pollution.

Vehicular Lighting

The links between the campus and Colfax Avenue and Peoria Street form significant gateways into the campus environment. Highlighting signs and other entry features in an inviting manner will clearly indicate the edges of the campus environment.

Collector Roadways

Light Levels: Between .6 and 1.2 foot-candles per IES recommendations.

Fixtures located on both sides of streets with a staggered arrangement

- Pole mounted fixtures with heads at approximately 18'-25' high.
- Metal Halide color corrected lamps, 3500K, 82CRI
- Estimated Wattage 250W - exact wattage to be determined through photometric study.
- Approximately 75' on center, staggered spacing – to be coordinated with landscape layout.
- Approximately 66' on center – to be coordinated with landscape layout.
- Approximately 40'-60' on center – to be coordinated with landscape layout.

Primary & Secondary Streets

Light Levels: Between .4 and .8 foot-candles per IES recommendations.

Fixtures located on both sides of streets with a staggered arrangement.

- Pole mounted fixtures with heads at approximately 18'-20' high.
- Metal Halide color corrected lamps, 3500K, 82CRI
- Estimated Wattage 175W - exact wattage to be determined through photometric study.
- Approximately 75' on center, staggered spacing – to be coordinated with landscape layout.

Tertiary Ways

Light Levels: Between .3 and .6 foot-candles per IES recommendations.

Fixtures at these locations shall be located on a single side of the street. Fixture locations shall be carefully coordinated with building entries, service locations, adjacent surface parking lightning and tree spacing. Consideration shall be given to service truck access when locating fixtures to provide ample clearance for truck maneuvering. Building mounted fixtures may be used when pole mounted fixtures are not feasible or when narrow conditions would warrant as a means of simplifying the ground plane. If typical light patterns are interrupted

for loading docks, service entries, etc., then they should be replaced in these instances with building mounted lights.

- Pole mounted fixtures with heads at approximately 18'-20' high.
- Metal Halide color corrected lamps, 3500K, 82CRI
- Estimated Wattage 70W - exact wattage to be determined through photometric study.
- Approximately 75' on center, staggered spacing – to be coordinated with landscape layout.

Intersections

Intersections shall maintain relatively higher light levels through the use of symmetric fixture arrangements at all corners. Staggered fixture arrangements will resolve their alignment to be symmetrical at all intersections.

Surface Parking Areas

Fixtures at parking lot locations shall be located in a grid layout with poles matching adjacent fixtures. Fixtures shall meet minimum light level requirements and also provide color rendition, uniformity, and minimum glare for enhanced security. Light trespass shall be minimized and internal "house-side" shield shall be used when required.

- Pole mounted fixtures with heads at approximately 18'-20' high.
- Metal Halide color corrected lamps, 3500K, 82CRI
- Estimated Wattage 175W - exact wattage to be determined through photometric study.
- Approximately 66' on center – to be coordinated with landscape layout.

Mixed Vehicular and Pedestrian Lighting

Lighting should emphasize the pedestrian zone first and motorists second.

Roadway lighting shall be confined to one side of the roadway with pedestrian lighting on the opposing side to indicate the preferred pedestrian path of travel. Wall mounted fixtures may also be used in arcaded pedestrian areas. At crosswalk locations, the lighting emphasis should change from street lighting to pedestrian bollard lighting.

Pedestrian Walkways & Open Space Lighting

Along heavily used pedestrian walkways, lighting must not only guide the pedestrian from one point to the next but must also provide the lighting required for safety and security.

Plazas and quadrangles are unique, being surrounded by key academic buildings. Building entry and facade lighting should play a key role in how these spaces are perceived at night. Buildings should look inviting and be a welcome boundary to these spaces. Pedestrian pole lighting can be kept to a minimum if the building facade lighting is well designed. This can help to emphasize the openness of the plaza or quadrangle by minimizing lighting equipment located in the space. Formal landscape features should be well lite within plazas. This will not only increase the sense of security but also provide a pleasing visual vista for the pedestrian only areas.

Fixtures shall be located in a manner responding to architectural and landscape design elements. Lower fixtures should be utilized to emphasize the pedestrian scale. Feature lighting of landscape and art elements should be utilized to provide a safe, warm and inviting atmosphere. Where building entries occur adjacent to open spaces, the lighting should help define the entry and the connection to the open space. Lighting may be integrated in site walls or landscape areas to minimize the appearance of fixtures. Fixture styles may respond to the architectural and landscape design elements occurring within the immediate context.

- Pole mounted fixtures with heads at approximately 10' high.
- Metal Halide color corrected lamps, 3500K, 82CRI
- Estimated Wattage 70W - exact wattage to be determined through photometric study.
- Approximately 40'-60' on center – to be coordinated with landscape layout.

Pedestrian lighting and signage within the Academic Village.

Fixture Vocabulary A

Vehicular Luminaire

Gardco “Round Form 10” CA Style

Material: Aluminum, RAL7038

Height: 30’ (RA5)

*See University of Colorado Denver Design & Construction Standards, Section 26 56 00 for additional Information

Pedestrian Luminaire

Gardco “Round Form 10” MP Style

Material: Aluminum, RAL7038

Height: 10’ (RA4)

*See University of Colorado Denver Design & Construction Standards, Section 26 56 00 for additional Information

Bollard Lighting

Gardco “Round Form 10” MP Style

Material: Aluminum, RAL7038

Size: 16” Diameter

*See University of Colorado Denver Design & Construction Standards, Section 26 56 00 for additional Information

Exterior Building Wall Lighting

Gardco “Bollard 10” BR160

Material: Aluminum

Color: RAL 7038

*See University of Colorado Denver Design & Construction Standards, Section 26 56 00 for additional Information

Fixture Vocabulary B

Vehicular Luminaire

WE-EF Lighting, SH3

Material: Aluminum, “Classic Silver”

Height: 20’-6”’

Pedestrian Luminaire

WE-EF Lighting, SH3

Material: Aluminum, “Classic Silver”

Height: 12’

Bollard Lighting

XEDA IP65

Material: Aluminum

Color: “Classic Silver”

Exterior Building Wall Lighting

WE-EF Lighting, SH5

Material: Aluminum

Color: “Classic Silver”

II.12 SITE FURNISHINGS

Site furnishings for streetscapes and open spaces have been developed to delineate the nature of the various Character Districts and, in some instances, provide a unifying vocabulary between them. Elements include benches, bike racks, trash receptacles, and tree grates. These amenities further animate the site at a human scale and establish the design continuity necessary to create unique sense of place.

Vocabulary A

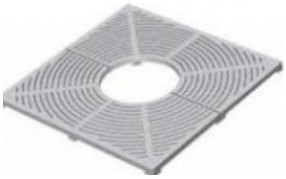
Tree Grates

Supplier: Neenah Foundry

Model: No. R8712

Sizes: 60” x 60”

Material: Standard raw cast gray iron



Bike Rack

Supplier: Huntco BRP Series

Model: BRP7, in-ground

Sizes: 97” X 36”

Material: Hot dipped galvanized metal

Streetscape Bench

Supplier: Landscape Forms

Model: “Stay” backed, surface mount

Sizes: 69” length

Material: Powder coated steel

Color: Silver

Streetscape Trash Receptacle

Supplier: Landscape Forms

Model: “Chase Park”

Sizes: 36 Gallon, 24” dia x 40”h

Public Space Bench

Supplier: Landscape Forms
Model: “Scarborough”, backed w/ 2 arms
Horizontal strap seat
Sizes: 72”
Material: Powder coated steel
Color: Stormcloud

Public Space Chair

Supplier: Landscape Forms
Model: “Scarborough”, backed w/ 2 arms
Sizes: 24”
Material: Powder coated steel
Color: Stormcloud

Public Space Table

Supplier: Landscape Forms
Model: “Catena”
Sizes: 30” dia.
Material: Powder coated steel
Color: Stormcloud

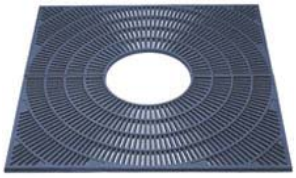
Public Space Trash Receptacle

Supplier: Landscape Forms
Model: “Scarborough” vertical straps
Sizes: 25”dia x 40”h
(side opening , surface mount)
Material: Powder coated aluminum
Color: Stormcloud

Vocabulary B

Tree Grates

Supplier: Urban Accessories
Model: “Fan”
Sizes:
Material: Standard raw cast gray iron



Bike Rack

Supplier: Landscape Forms
Model: “Ring”
Sizes:
Material: Stainless Steel

Streetscape Bench

Supplier: Landscape Forms
Model: “Stay” backed, surface mount
Sizes: 69” length
Material: Powder coated steel
Color: Silver

Public Space Bench

Supplier: Landscape Forms
Model: “Bancal”
Sizes:
Material: Powder coated steel, Ipe wood seat and back
Color: Silver

Trash Receptacle

Supplier: Landscape Forms
Model: “Chase Park”
Sizes: 36 Gallon, 24” dia x 40”h

II.13 LANDSCAPING, TREES AND IRRIGATION

A comprehensive Landscape Master Plan will be developed by the university in the near future and will include a recommended plant list inclusive of trees, shrubs, perennials, vines, grasses, etc.. This collaborative effort will be undertaken in conjunction with neighboring institutions and stakeholders in order to ensure that a rich and environmentally appropriate pallet of materials and planting strategies get established for implementation throughout the square mile site.

The following guidelines are meant to inform designers of the university's general goals and objectives for landscaping throughout the campus.

High quality and well-designed landscaping is desired in all areas not covered by buildings and streets. Landscaping areas are to be continuous from one parcel to the next and should incorporate materials that are comparable with building use, site improvements, street scapes, drainage corridors and easements.

Landscape should strive to create cohesiveness between the various character districts while simultaneously enhancing the unique characteristics of each.

All plants shall be selected from the Recommended Plant List following minimum spacing recommendations.

- Campus edges and corners are to be visually defined and present positive impressions to visitors and the surrounding community.
- Landscaping is to be environmentally sensitive and reactive to the impact of sun and shadow.
- All trees and shrubs shall be non-invasive species well suited for the central plains of Colorado.
- It is encouraged to reduce overall water usage by incorporating drought tolerant species aiding in the creation of durable landscapes.
- To reduce maintenance needs, the campus encourages the use of plants that do not require heavy ongoing pruning.
- Trees or shrubs that produce fruit should be located far enough away from pedestrian walkways that fruit does not fall on to sidewalks.
- Landscape, graphics, and lighting should be coordinated to create a positive impact and should not interfere with the intended function of each.
- Landscape placement should enhance views and axes.
- Accent landscaping should be used in front of uniform masses of plant material.

Landscaping is to be environmentally responsive.

- Landscaping should be used to shade buildings, parked cars, and appropriate outdoor functions.
- Landscaping should be used to reduce erosion.
- Position landscaping to screen cold winter winds and channel summer breezes. South side of buildings should be shaded with deciduous trees to conserve energy. North sides of buildings to be planted with evergreens to conserve energy.
- Avoid over-planting of "mono-cultures" susceptible to disease, insects, etc.

Planting are to fit appropriate spacing when mature.

- Plant groundcovers and low shrubs in areas less than 5'-0" wide.
- Provide turf at least 5' wide for effective irrigation and maintenance.
- Minimize the need for excessive pruning by selecting species whose growth suits the limitations of proposed locations.
- Space large shrubs 8'-0" to 10'-0" apart.
- Space medium shrubs 5'-0" to 8'-0" apart.
- Space small shrubs 3'-0" to 4'-0" apart.

Native ornamental grasses used to enhance an architectural balustrade.

At-grade planting beds are to be contained.

- Contain at-grade planting beds by steel edging, concrete mow bands or adjacent concrete pavement. Plastic or rubber edgings are not permitted.
- Mulch all planting beds with shredded wood mulch to a depth of 3 inches.

Perennials and annuals are to be planted to enhance specific sites.

- Select species suitable to soil conditions.
- Meet or exceed campus minimum size for materials.
- Only plant annuals in designated pots or planting beds.
- Annuals require higher maintenance and watering needs; locate where irrigation can be supplemented.
- Locate perennials and annual in areas where easy maintenance can be provided.

Trees

The legacy of the existing site development is in the trees, many of which date from a landscape enhancement program initiated by the Army in the mid-twenties. This legacy is to be preserved and enhanced in future campus development.

All plants shall be selected from the Recommended Plant List following minimum spacing recommendations.

Major existing trees are to be preserved.

- Building or utility construction near existing trees shall be constructed in such a manner as to ensure their survival.
- Existing trees 6" caliper or larger are to be noted on site plans and are not to be removed without prior approval.

Trees are to fit appropriately when mature.

- Spacing for deciduous trees is 30'-0" minimum.
- Spacing for columnar trees is 15'-0" minimum.
- Spacing for ornamental trees is 12'-0" minimum.
- Minimum 3" caliper when trees are planted in grates.
- Near traffic, branch trees no less than 13'-6" above grade.
- Minimum branching height for pedestrian is 8'-0" above sidewalk.
- Trees are not to be located closer than 36" from face of curb.
- Minimum distance between trees and street lighting is 10'-0"
- Minimum planting strip for shrubs at building foundation is 5'-0" wide.
- Trees should not be planted within 10 feet of steam lines, electric lines, water, sewer or drainage lines.

Trees shall not interfere with traffic movement.

- Do not plant trees within 15'-0" of the corner of street intersections.
- Do not plant trees within 10'-0" of the corner of service drive intersections.
- Trees shall not interfere with the views of traffic control devices or signage.
- Tree grates shall be used when trees are planted in paved areas.

Trees are to be used in pavement where appropriate

- Install grates or removable pavers around trees planted in pavement.
- Install campus standard tree grates measuring at least 5'-0" by 5'-0".
- Plant trees of at least 3" caliper.
- Provide root zones with sub-drains and separate zoned drip irrigation.

Irrigation

Landscape areas must include a properly designed, automatic irrigation system that provides full coverage on all plants. Supplemental irrigation to be supplied to exiting trees or vegetation that has had water diverted or eliminated due to site development or construction.

Campus standard irrigation equipment is to be used.

- Select irrigation equipment suited to the design of the irrigation zones, where plants are grouped based upon similar watering needs, and growing conditions.
- Provide and replace sprinkler heads using standardized parts that will maintain the desired level of irrigation.
- Provide controls to irrigate shrubs, flowers, and trees separately from turf. Utilize controllers with timing systems that permit use of low-volume systems over

longer cycles.

- Use pop-ups with low-pressure, low-volume spray heads. Irrigate shrubs and trees with drip or low-volume heads. Pop-up heads in turf areas are to have risers at least 4 inches high.
- Irrigate groundcovers with fixed risers or shrub high pop-ups, bubblers, or drip systems.

Spray Patterns are to be adjusted to fit site conditions.

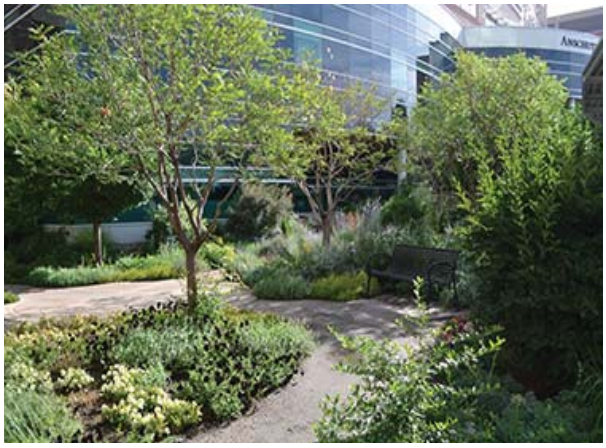
- Coordinate foundation planting with irrigation to provide at least 5-foot offset for spray irrigation and 3-foot offset for drip irrigation from face of building.
- Operate irrigation when pedestrians are not likely to be present.
- Confine normal spray patterns to mass vegetated areas or root zones of trees. Provide 100 percent overlap in these areas.
- Avoid spraying walks, courtyards, plazas, roadways, buildings and fences. If spraying of walks and bike-ways cannot be avoided, the controller must be timed to spray at night.

*See University of Colorado Denver Design & Construction Standards, Section 32 84 00 for addition irrigation requirements.

II.14 LANDSCAPE ADJACENT TO BUILDINGS

Plantings should not obscure building entrances but rather enhance its clarity and frame views toward the building.

- Residual spaces, adjacent to and between buildings, should be designed and planted to be part the total composition of development and not as an afterthought.
- Plantings should be located far enough from building facades so as to allow for air movement.
- Planting should not obstruct important views from windows. Plants located near windows may be used to filter glare and bright sunlight, but should be distant enough from the facade to maintain views outward.
- Planting should not be located in a way to create unsafe environments and should not create darkened areas near entrances or along walkways.
- Provide gravel borders or mulch planting beds around buildings to protect foundations and facades from lawnmower damage.



Discovered space in front of UCH Inpatient Tower

Courtyard garden in front of Education 1.

II.15 GATEWAYS & SIGNAGE

Gateways

Gateways celebrate entry, providing symbolic thresholds onto the Campus. They create a strong first impression upon visitors in relation to the goals, principals and ideals at the heart of the institutions making up the Anschutz Medical Center.

The university is in the process of developing a vocabulary of gateway markers to be unitized at key entry conditions onto the campus.

Signage

Signage and way-finding not only provide direction and orientation, but also enhance the campus identity through consistent use of color, typography and materials.

Through a future comprehensive planning study, the Anschutz Medical Campus shall establish prescriptive design guidelines for present and future implementation of campus signage.

The goals and objectives for this future campus signage study are summarized below:

- Signage shall clearly, concisely and consistently communicate; providing identification, directional, regulatory and operational information.
- Signage shall perpetuate the identity of the University of Colorado | Anschutz Medical Center by adhering to established graphic standards for logo, shape, colors, scale and typography.
- Signage shall provide a vehicle with which to distinguish the various districts and programmatic functions of the campus using shape, color or other means of coding.
- Signage shall complement the established palette of architectural and landscape materials and colors.
- It shall provide tools with which those navigating the campus may establish and maintain their orientation by reinforcing their proximity to campus landmarks.
- Signage shall reflect the character of a high quality campus environment.
- It shall accommodate and enhance existing and future programs and the needs of those navigating throughout the campus, while remaining sensitive to the site and environment.
- Signage shall be durable, economical and designed to have the flexibility to accommodate future growth and change.
- A hierarchy of signage shall be established, communicating directions to campus landmarks, thereby requiring fewer signs to efficiently direct visitors.
- Signage shall be appropriately designed to function both during the day and in the evenings.

Proposed signature gateway onto campus at Aurora Court and Colfax Avenue.

UCH gateway signage in the median of Tony Ruiz Plaza and Colfax Avenue.

II.16 PUBLIC ART, DONOR RECOGNITION|MEMORIALS & INTERPRETIVE SIGNAGE

Public Art

The Art in Public Places Program (AIPP) was established by the Colorado Legislature in 1977. Under the program, 1 percent of the cost of building or renovation of any state facility must go toward the purchase or creation of public art near the facility. Works of art purchased through this program are located in publicly accessible spaces inside and outside of state buildings.

These art installations form the state art collection and are developed and administered by Colorado Creative Industries. The works selected through this program represent great diversity in style, imagery, materials and techniques. By uniting artists, architecture, and host institutions, AIPP integrates the art experience into the built environment and civic spaces

The University of Colorado Anschutz Medical Campus presently contains over $1.2 million in public art making it the largest public art program in the state.

Public art enriches the physical and intellectual environment and should be sited in strategic locations throughout the campus. Art should give physical form to the goals and values of the university. The following criteria shall be used to evaluate works of art:

- The aesthetic significance of an individual work of public art.
- Appropriateness to site, including (for outdoor sites) appropriateness to the site's adjacent architecture, hardscaping, and landscaping.
- The contribution an individual work of art can be expected to make to the University's educational mission, as well as to the existing collection of public art.
- The significance of the artist or artists.
- The relative uniqueness of the work of art, including factors of originality and authenticity.
- The University's ability to assure the proper long-term care of the individual work of public art, including security, conservation, and maintenance.
- The safety of the work of public art, as well as the safety of users interacting with it.
- Where works of art come as donations, the University's ability to manage effectively the long-term stewardship of donor relationships.

Corpus Callosum by Thomas Sayre along the 17th Place Art Walk.

Donor Recognition|Memorials

Due to the unique history of the campus and its physical design, a range of donation and memorial opportunities exist. The university will be undertaking a comprehensive study to identify options for types and locations for such opportunities. The ideas established in this study are to be expanded by committees established to integrate appropriate memorial and donor opportunities within the future development of the campus. The key principals are as follows:

- Guidelines shall be developed for memorials and donor recognition opportunities appropriate to the role and mission of the Anschutz Medical Campus.
- A memorial committee will identify a hierarchy of suitable memorials.
- Significant historical memorials currently existing on campus shall be preserved.
- The history of the Fitzsimons site shall be acknowledged through memorials.
- Memorials and donor recognitions shall create a consistent identity throughout the campus.
- Memorials shall be displayed within the landscape of the campus.

Origin by Kendra Fleischman within the Education 1 courtyard

II.17 SITE SAFETY

Design should adhere to three basic environmental design principles concerning crime prevention:

1) Natural Access Control - a design concept aimed at reducing the opportunity for crime. The intent is two-fold. One is to deny access to a potentially vulnerable situation. The second is to create a perception of risk in potential offenders.

2) Surveillance Strategy - a concept that encourages "eyes" on a space without physically being in the space. For example, through placement of windows or low shrubs, people in a building can observe an adjacent open space.

3) Territorial Reinforcement Strategies - the creation of boundaries identifying public, semi-private and private spaces. By marking private space in particular, the campus community is encouraged to develop ownership of the space.

Emergency Telephones

Blue phones are a communication tool for emergency situations allowing an individual to reach the University Police as quickly as possible. In order to ensure that phones are located were needed, the following principles shall be adhered to:

- Devices shall be readily visible and accessible to pedestrians, bicyclists, joggers, drivers, and bus riders.
- Sight lines between emergency phones must be maintained and not obscured by trees, shrubs or light poles.
- A system of placement shall be established, not exceeding 500' apart, allowing users to identify devices and anticipate reasonable distances between devices.
- Surface parking lots will have a minimum of one phone per lot, sited near entry points at pedestrian walkways.
- Emergency telephones shall be signed as "police" rather than "emergency telephones".

II.18 SUSTAINABILITY

The Anschutz Medical Campus recognizes that a sustainable approach to creating and maintaining the campus is the only way that we will be able to continue to provide a high quality environment for current and future users.

Sustainability can be defined in many different ways, but commonly refers to using physical resources in a wise and efficient way today so that those resources will be here for future generations. The energy we use to heat and cool our buildings, the water we use for our lawns and indoor plumbing, the fuel we use for our vehicles are all finite resources and the quantity and quality of those resources will dissipate if we do not take action now to conserve them.

As a signatory of the ACUPCC, the university is required to develop a comprehensive Action Plan (CAP). This plan requires the university to conduct a greenhouse gas emissions inventory to measure and define its years contribution to climate change. The results of this inventory revealed the following:

•University GHG Emissions for 2006/2007 were 164,000 metric tons/CO2 equivalent.

•Approximately 75% of our GHG emission come from energy use in our buildings.

•Energy use in university research facilities is intensive.

Based upon these findings, the Chancellor's Advisory Task Force on Sustainability is developing a CAP that will provide a 20 percent reduction from the 2006/2007 baseline through:

•Energy efficiency projects in university buildings.

•Renewable energy development.

•Education and communications.

•Appropriate Funding mechanisms for projects.

•Integration of CAP into all aspects of campus activities.

The following is a list of protocols guiding sustainability at the Anschutz Medical Campus:

American College and University Presidents Climate Commitment (ACUPCC), 2007

- Signed by Chancellor in 2007
- Requires bi-annual inventory of Greenhouse Gas Emissions (GHGs) and development of comprehensive plan to reduce GHG emissions
- Climate Action Plan completed in 2010 with goals to significantly reduce GHG emissions in incremental periods over 40 years – 20% by 2020, 50% by 2030, 80% by 2050

Governor's Greening of Government Executive Orders, 2007

- Created by Governor Ritter to enact resource efficiency programs at state agencies and higher education institutions
- Requires reductions in the use of energy, water, waste, vehicle fuel consumption, and to seek a zero-waste goal in construction projects

High Performance Certification Program, 2007

- Requires construction projects achieve the highest possible LEED certification with the goal being LEED Gold
- The new facility, addition, or renovation project contains 5,000 or more building square feet; and
- The project includes an HVAC system; and
- In the case of a renovation project, the cost of the renovation exceeds 25% of the current value of the property

University of Colorado Board of Regents Sustainability Resolution, 2010

- Recognizes Regents supports for system-wide sustainability efforts
- Directs incorporation of LEED standards in university buildings
- Supports ACUPCC commitments for climate action planning and GHG reductions
- Supports Greening of Government goals

Sustainability Tracking, Assessment & Rating System, 2012

- A transparent, self-reporting framework for colleges and universities to measure their sustainability performance
- Rating looks at sustainability in Academics & Research, Operations, Administrative & Community Engagement
- CU Denver/Anschutz received a Silver rating in 2012
- Marketing opportunities to have rating showcased in Princeton Review

II.19 MAINTENANCE, MANAGEMENT AND OPERATIONS

The Campus landscape is to be assessed annually

- Retain horticulturist and landscape architect to access planting areas and make recommendations concerning spacing, massing, size and to determine:

    1. Health of plants
    2. Appropriateness of plant selection for location
    3. Recommended maintenance and management practices
    4. Recommended replacement of plants if necessary
    5. Irrigation management and watering needs of plants

Landscape maintenance and warranty contracts are to be maintained.

- 2-year warranty and contractor maintenance for all woody plant material installed as part of a Campus construction project.

Excessive planting shearing is to be minimized.

- Where shearing is necessary, shear shrubs together and concisely for form a hedge. Do not prune individual plants.
- Plants requiring shearing should be easily accessible

PART III BUILDING DESIGN GUIDELINES

III.1 CONTEXT

Buildings are to be compatible with the Facilities Master Plan and should reinforce the quality, character, and cohesiveness of the individual districts in which they are located as well as that of the campus as whole.

Facades should relate to surrounding conditions and help to create a unified compositional identity. Buildings should reinforce the integrity of adjacent open spaces and support the structural organization of the character zone in which they are located. They should be sympathetic to adjacent facades, major datum, cornice lines, etc.. Secondary facades should be of comparable quality as the primary facade with walls, windows, doors and facade articulations designed to accentuate human scale.

Building massing and facades should exhibit a rationality reflective of the organizational structure within.

Buildings should be designed to be responsive to environmental conditions; incorporating solar orientation studies and dynamic wind analyses in the most early phases of the design process.

Building 500 exhibits a richness in architectural detail

The School of Dental Medicine Building relates well in terms of scale and materiality with the adjacent Art Walk.

The curtainwall articulations on the UCH Anschutz Center for Advanced Medicine respond well to a human scale.

A cohesive composition of interrelating masonry buildings define the Education Quadrangle.

III.2 EXTERIOR CLADDING MATERIALS

In the last decade, the campus has developed a primary vocabulary of brick buildings to define a general character of permanence and fortitude. Materials complimentary to brick, such as natural stone, have also be used successfully. While not required, the campus has a strong preference for masonry as the material of choice for exterior cladding.

Materials conveying a "high-tech" quality, such as metal panels and glazed curtainwall assemblies, have helped define the character of our research quadrangle and Hospital district. Their ability to communicate an image of a modern, state-of-the-art academic health science community makes the use of these materials particularly suitable in these applications.

Any choice of exterior materials should strive to achieve an impression of quality and durability. Considerations of texture, and richness of detail should occur within the context of adjacent structures and the scale of surrounding open spaces.

Cladding materials are to be cost effective over the life-cycle of the building. They are to reinforce order and a consistency of architectural character with neighboring buildings and open spaces.

The use of materials and/or systems new to the market will only be considered if the architect can provide product data sufficient to convince the university's facilities staff of their durability, reliability, and relevance to the design. Sustainable materials, systems, and processes should be given special consideration whenever possible.

Glazing

Windowless, inward-looking buildings are to be discouraged. It is highly encouraged that the activities, when appropriate, occurring within buildings be visible from the exterior. Reflective or highly tinted glass should therefore be avoided. Building fenestration should respond to solar orientation and include glazing that maximizes energy efficiency.

Roofing Types and Materials

Sloped and flat roof types are acceptable as design approaches however all roofs should be designed to augment and enhance color and material selections and the overall aesthetic expression of the building.

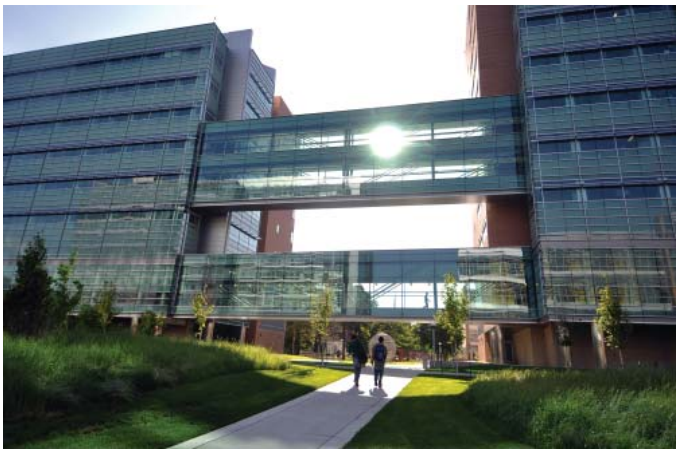
Building massing and roof silhouettes should be responsive to the functional and symbolic nature of the building as well as its relative location on campus.

Exposed roofs should be consistent with the buildings architectural expression in scale, surface material and general color. Rooftop mechanical equipment should be enclosed in structures that are integrated with the building design.

Flat roofs visible from surrounding buildings, either in the present or potentially in the future, must be orderly and coherent in design.

Flat roofs should be a ballast type construction where the inside of parapets are sympathetic to the exterior skin and ballast is of either a complimentary color to the off white gray or reddish brown dominant colors of the established campus palette.

Roofs should be organized to present their best possible appearance from above.



Research 2 Towers, while diverging from a primarily masonry vocabulary, still relate well to the human scale of the campus.

III.3 SITE SELECTION

In the effort to devise a systematic methodology for evaluating the most appropriate site for future buildings, the following process has been established. The intent is to provide university leadership with a clear and concise means of understanding the pros and cons inherent in any number of potential building sites in relation to a project's intended program, user population, and environmental impact.

Step 1

Goal: To establish a program plan allowing university leadership the ability to evaluate economic, programmatic, and strategic perimeters of the proposed project.

- Define program
- Establish primary user groups for the building
- Identify governing parameters of the buildings program (EMI, vibration, etc.)
- Identify any Institutional adjacency requirements
- Define primary typological spaces

Step 2

Goal: Research programmatic precedents to gain an understanding of how similar projects have responded to the needs and requirements identified in Step 1.

With the conclusion of Steps 1 & 2, a minimum of three sites shall be proposed to leadership as potential building opportunities.

Step 3

These three potential sites shall then be evaluated and ranked in accordance with their relationship to the following:

1) Where does the potential site exist in relation to the campus core?

In order to encourage greater density within the core of the campus, potential building sites will be ranked in accordance to their relative distances from Building 500. A site located within a one minute walk from the center of Building 500 will be awarded the maximum raking of 10 points. 1 point will be deducted from the 10 for each 1 minute walking distance that a potential site falls outside of the initial 1 minute ring.

2) Is the site located along the 17th Avenue Translational Corridor?

To encourage greater density of development along the 17th Avenue, 10 points will be awarded to sites located along, and fronting on to, the Translational Corridor.

3) Are site utilities present or will they need to be extended?

To avoid unnecessary added infrastructure costs for future projects, higher points will be awarded for sites located within the boundaries of 19th Avenue to the north, Victor Street to the east, 17th Avenue to the south, and Racine Street to the west. These are the major utility pathways for campus infrastructure housing the "utility loop" for the campus. A reduction in total points will be awarded to site falling outside of this loop proportionate to their relative distances from it.

4) Are parking needs accommodated within acceptable distances?

These points are in addition to the mandatory requirement that handicap parking spaces be located near building entrances and accessible pedestrian routes.

- Patient parking within 300 feet of destination
  10 points if applicable to program
- Visitor parking within 300 feet of destination
  5 points if applicable to program
- Physician parking within 300 feet of primary destination
  5 points if applicable to program
- Staff parking within 1000 feet of primary destination
  5 points if applicable to program
- Student parking within 1000 feet of primary destination
  5 points if applicable to program
- Service vehicle parking within 100 feet of destination
  5 points
- Potential for car pool spaces at close-in locations to encourage participation
  5 points

5) Does the proposed scale of the development fit within the existing context?

This is a simple "yes" or "no" evaluation of a potential site with an affirmative earning an additional 10 points with no earning none. An example would be the potential for a 10 story structure (with an approved EIR report)

Figure 2.3A - Site Selection, Campus Core Point Zones

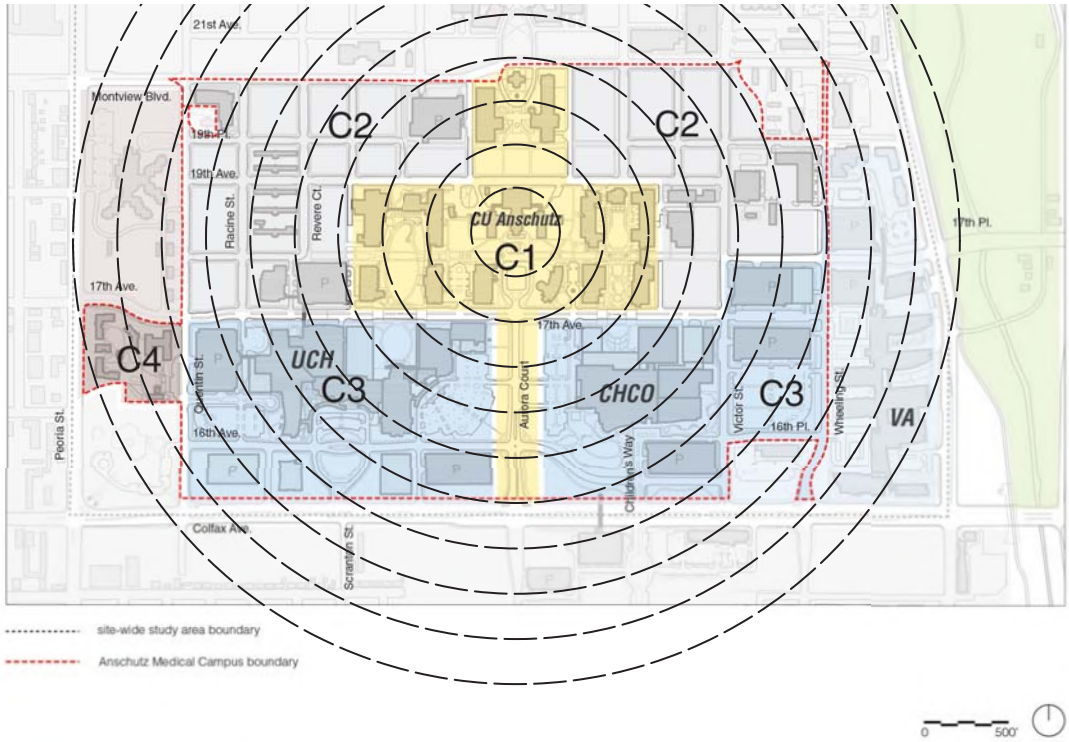


Figure III.3A - Site Selection | Campus Core Point Zones

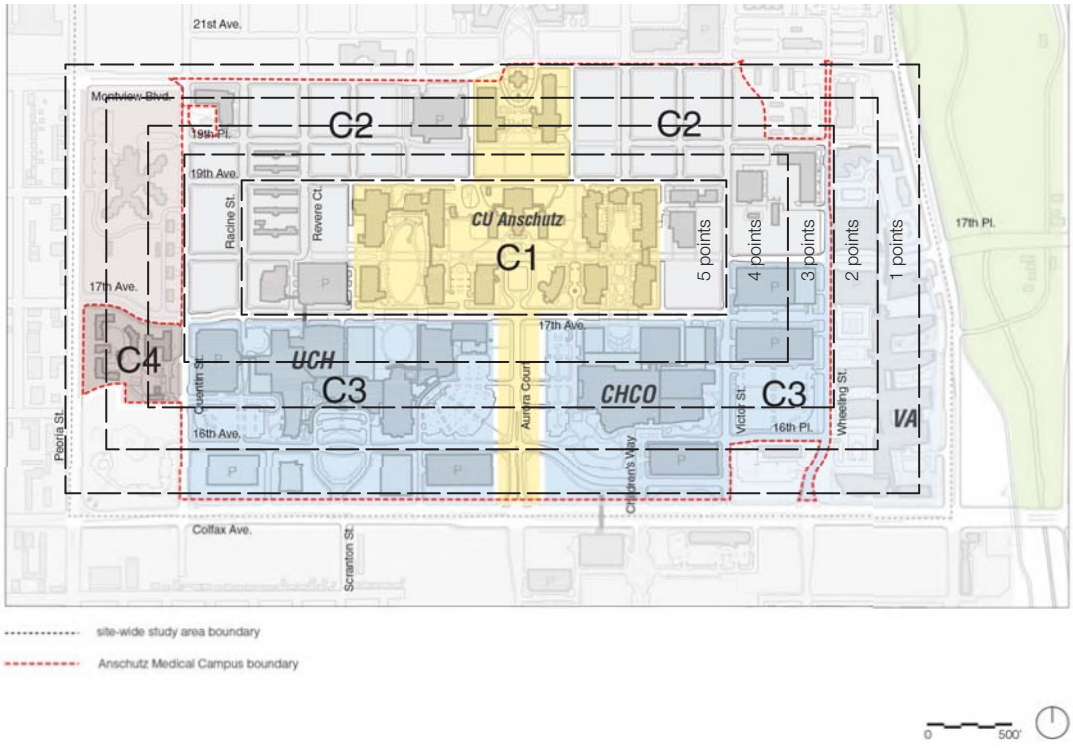


Figure III.3B - Site Selection | Utility Point Zones

being constructed north and adjacent to the education quadrangle as opposed to on 17th Avenue near the research quadrangle. The former would receive no additional points while the latter would achieve ten points.

6) Does the character zone support or detract from programmatic requirements?

This is a simple "yes" or "no" evaluation of a potential site with an affirmative earning an additional 10 points and "no" earning none.

C1 | Academic Village - Is the proposed building collegiate in program, having a low visitor to student/faculty ratio and subsequently do users have a high familiarity navigating within the zone?

C2 | Urban Campus - Is the proposed building program enhanced by a connectivity with the Colorado Science and Technology Park at Fitzsimons? Is this a mixed-use development with a relatively high potential for reprogramming and occupant turn-over (flexibility). Is on-street visitor parking beneficial?

C3 | Hospital District - Is patient/visitor access the primary driver?

Final points are then tallied and presented to university leadership for consideration.

III.4 STRUCTURED PARKING

Mixed use functions should be considered for incorporation into all structured parking developments. When feasible, ground floors fronting open space should be activated by public uses.

All structured parking facades should be designed to be compatible with the pattern, articulation, scale and massing of surrounding structures.

Special attention should be given to the design and articulation of the ground floor fenestration, particularly how it integrates with the design of the adjacent sidewalks and streetscape to create a quality pedestrian environment.

Lighting should be bright enough to provide a proper level of safety and security but should be properly controlled to not spill out beyond the exterior walls.

Emphasis should be placed upon the design and articulation of elevator lobbies and stair towers as components of the pedestrian experience, and should be properly separated from vehicular ingress and egress locations.

Internal vehicle ramps should be located off of a tertiary way or relegated to the center of garages with three or more parking bays. Whenever possible, garage entrances should be located on a secondary street or tertiary way and avoid vehicular entrances across from public open spaces.

III.5 FUNCTIONAL AND MECHANICAL FACILITIES

Functional and mechanical areas devoted exclusively to building services, deliveries, trash removal, or mechanical equipment access or service, should be located away from public areas and be designed to be as visually unobtrusive as possible. Any negative environmental effects such as noise or a potential reduction in air quality on the surrounding environment should be carefully considered and mitigated to the greatest extent possible within the projects budget.

III.6 ACCESSIBILITY

The Anschutz Medical Campus is committed to providing an environment in which everyone is respected and valued and to providing equal and dignified access to those with disabilities. All new construction must comply with the Americans with Disabilities Act (ADA). Renovations to historic buildings should strive to improve access in a manner compatible with their historic integrity.

III.7 SUSTAINABILITY

Pursuant to the goals, objectives, a protocols noted in Section 2.19 of these Guidelines, all new construction projects, as well as significant renovations, should achieve the highest possible LEED certification with the goal being LEED Gold or equivalent.

The Sustainability Checklist, included in Appendix I of these Guidelines, is intended to aid design teams in the creation of high performing, healthy, durable, and environmentally sound buildings. It is an edited version of the Checklist adopted by the Colorado Science and Technology Park at Fitzsimons as part of their August 27, 2008 Urban Design Guidelines and, as such, should help to support consistency between the university, its affiliates, and its public/private neighbors to the north.

The Checklist is divided into 10 sections, each representing a different aspect of design and construction. They are as follows:

1. Transportation
2. Landscape & Site
3. Stormwater management
4. Construction Waste
5. Materials
6. Indoor Environmental Quality
7. Energy Optimization
8. Water Efficiency
9. Recycling & Solid Waste
10. Management

Individual credits in each of these section are broken down in 3 categories:

1. Included
2. Mandatory
3. Recommended

Included Credits

These are credit already included within the Master Plan and automatically earned by any development within the borders of the Anschutz Medical Center.

Mandatory Credits

These credits have been deemed most important for effective sustainable design and must be complied with. When these credits are combined with the included credits, the project should be comparable to a USGBC LEED Silver rating.

Recommended Credits

While not all of these credits are required in order to meet present sustainability goals, designers are highly encouraged to comply with as many as are found to be feasible within the programmatic and budgetary requirements of the project. By meeting all included and mandatory credits, projects should be comparable to a USGBC LEED Gold Rating if they meet 30% of these recommended credit.

III.8 MAINTENANCE, MANAGEMENT & OPERATIONS

The Facilities Condition Index or FCI is based on a systematic methodology to audit a building condition by breaking it into components. The components include foundation, skin, floors, roof, ceilings, interior partitions, windows, doors, heating, ventilating, cooling, plumbing, conveying and safety. Each system is evaluated and rated based against its new or original condition. If a part of the building has a deficiency, it is assigned a reduction value. The goal of the State Building program is to keep buildings at an FCI 80% or better. The State provides Controlled maintenance funding to address the building deficiencies based on most critical needs and availability of funds for academic or generally funded buildings. The large majority of the buildings located on the University of Colorado Anschutz Medical Campus are above the 80% FCI rating and a serving the campus mission and function.

All building are to be reviewed annually each summer and their FCI reported to the Office of the State Architect. Critical controlled maintenance needs are identified and ranked each year for potential funding to fix deficiencies.

APPENDIX I - SUSTAINABILITY CHECKLIST

	Description	LEED Credit
1 - TRANSPORTATION		
Included		
☐ Alternative Transportation - Public Transportation Access	Locate the Project within a short distance of pre-existing public transit infrastructure, such as bus or light rail routes, to reduce the energy and pollution associated with employees or building occupants commuting to the site.	SS c4.1
Mandatory		
☐ Bicycle Facilities / storage and changing areas	Provide bike racks and showers/changing facilities to encourage building occupants to bike to work, reducing the amount of energy and pollution associated with transportation.	SS c4.2
☐ Parking capacity, reduced parking footprint	Reduce the parking footprint around a building to the minimum required by local zoning in order to reduce stormwater runoff, mitigate heat island effect, and encourage the use of public transportation.	SS c4.4
Recommended		
☐ Preferred parking for Low-Emitting & Fuel- Efficient Vehicles	Reduce pollution and land development impacts from automotive use. Provide preferred parking for fuel efficient vehicles for 5% of the total vehicle parking capacity of the site.	SS c4.3
2 - LANDSCAPE & SITE		
Included		
☐ Site Selection	No project shall be built upon previously undeveloped land, prime agricultural land, land below the 100 year floodplain, within 100 feet of wetlands or 50 feet of bodies of water,	SS c1
☐ Development Density and Community Connectivity	Increase the density of building projects and encourage the use of existing infrastructure to help reduce the land use and embodied energy of the project.	SS c2
☐ Brownfield Redevelopment	Build upon remediated brownfield sites to avoid the use of undeveloped land and help improve the environmental conditions of previously contaminated sites.	SS c3
Mandatory		
☐ Minimize site disturbance during construction	Preserve existing landscapes and wildlife habitat. Particular attention should be given to activities which may induce erosion or the release of dust into the air.	SS p1
☐ Xeriscaping and drought tolerant plants - no potable use or no irrigation	Encourage water conservation. Potable water should not be used for irrigation.	WE c1.1, c1.2
☐ Native Landscaping	Plant material should be well-adapted to local climate and weather conditions; thus reducing the amount of resources and maintenance required.	WE c1.1, c1.2
Recommended		
☐ Shade producing trees and vines - Shaded parking lots	Shade producing trees reduce the amount of water lost to evaporation and reduce the impacts of heat island effect.	SS c7.1
☐ Slow release fertilizers on new landscaping	Slow release fertilizers yield lesser impact upon stormwater runoff and surrounding vegetation.	SS c6.2
☐ Lawn avoided or restricted to within 20 feet of buildings 5 feet of parking, driveways and walkways (in zone C3)	Limiting lawn to areas within close proximity of human interaction helps to reduce the water consumption of such landscapes.	WE c1.1, c1.2
☐ Heat island effect - non roof	Limit the amount of ground area covered by dark, heat absorptive materials such as asphalt; thereby lowering summer cooling loads and providing a more comfortable outdoor environment	SS c7.1
☐ Protection of Biodiversity	Limit site disturbance to preserve surrounding natural habitats and promote biodiversity	SS c5.1
☐ Minimize site disturbance through sympathetic design	Preserve existing tree canopies, native vegetation, and existing pervious surfaces.	SS c5.1
3 - STORMWATER MANAGEMENT		
Included		
☐ Stormwater Design - Quantity Control	Maintain equal or lower stormwater runoff rates as compared to initial site conditions. Methods include an increase in pervious area, including retention systems, etc.	SS c6.1
☐ Stormwater Design - Quality Control	Reduce the impact of building upon the site by limiting impervious areas within the site, increasing stormwater infiltration, and managing stormwater runoff.	SS c6.2
Mandatory		
☐ Erosion and sedimentation control	Preserve step slopes with native vegetation to reduce stormwater related erosion	SS p1
☐ Inert roofing materials	Utilize non-toxic exterior roofing materials to reduce the amount of pollutants carried away in stormwater	SS c6.2
☐ Outdoor hazardous waste pollution prevention	Use non-toxic exterior cladding and site materials to reduce the amount of pollutants carried away in stormwater	SS c6.2
Recommended		
☐ Walkway and roof drain biofiltration systems	Include biofiltration systems to reduce the amount of particulates immersed in stormwater runoff.	SS c6.1
☐ Parking lot filters and bioswales	Utilize filters and bioswales to reduce stormwater runoff quantity as well as to reduce the amount of contaminates contained within the runoff.	SS c6.1
☐ Porous pavement for parking lots and walkways	Reduce stormwater runoff quantities by encouraging onsite absorption	SS c6.1
☐ Reduce stormwater runoff rates	Reduce stormwater runoff quantities below the site's original levels	SS c6.1
4 - CONSTRUCTION WASTE		
Mandatory		
☐ Divert 75% of construction waste from disposal	Reduce the environmental impact associated with construction waste by recycling or reuse.	MR c2.1, c2.2
Recommended		
☐ Building reuse - Maintain 50% of existing walls, floors & roof components	Reuse of building materials to reduce environmental impact of waste in renovation projects	MR c2.1, c1.2
☐ Building reuse - Maintain 100% of existing walls, floors & roof components	Reuse of building materials to reduce environmental impact of waste in renovation projects	MR c2.1, c1.2

MATERIALS

Mandatory			
☐	Recycled content - 10% (post-consumer + 1/2 pre-consumer	Utilize recycled content materials to lessen environmental impact	MR c4.1
☐	Regional Materials - 10% extracted, processed and manufactured regionally	Utilize materials sourced from 500 miles away or closer to reduce energy used and pollution created in transporting materials over long distances.	MR c5.1
Recommended			
☐	Recycled content - 20% (post-consumer + 1/2 pre-consumer	Utilize recycled content materials to lessen environmental impact	MR c4.2
☐	Recycled content insulation	Utilize recycled content materials to lessen environmental impact	MR c4.1, c4.2
☐	Recycled content gypsum board	Utilize recycled content materials to lessen environmental impact	MR c4.1, c4.2
☐	Material reuse, 1%	Reuse of materials to lessen environmental impact	MR c3
☐	Regional Materials - 20% extracted, processed and manufactured regionally	Utilize materials sourced from 500 miles away or closer to reduce energy used and pollution created in transporting materials over long distances.	MR c5.2
☐	Recycled light gauge steel, rebar and structural steel	Utilize recycled content materials to lessen environmental impact	MR c4.1, c4.2
☐	Recycled content roofing materials	Utilize recycled content materials to lessen environmental impact	MR c4.1, c4.2
☐	Finish materials from reclaimed or remilled wood, excluding flooring	Utilize reclaimed wood to reduce the environmental impacts associated with the manufacturing and processing of virgin lumber	MR c3
☐	Certified wood	Source wood from sustainably harvested forests.	MR c6
☐	Natural materials	Utilize bio-based products having comparably lower environmental impacts.	MR c5.1, c5.2
☐	Adaptability	Plan for adaptability with structures to reduce waste associated with renovation work examples: raised floors, pre-wired data and communications cabling, etc.	

5 - INDOOR ENVIRONMENTAL QUALITY

Mandatory			
☐	Minimum IAQ Performance	Comply with minimum indoor air quality standards established by ASHRAE 62-2004	IEQ p1
☐	Environmental Tobacco Smoke Control	Smoking and/or tobacco use is prohibited anywhere within the boundaries of the University of Colorado |Anschutz Medical Center	IEQ p2
☐	Construction IAQ management plan	Any construction/renovation project must include an approved indoor air quality control plan	IEQ c3
☐	Low-emitting materials - adhesives & sealants	Reduced VOCs to promote healthier environments	IEQ c4.1
☐	Low-emitting materials - paints & Coatings	Reduced VOCs to promote healthier environments	IEQ c4.2
☐	Low-emitting materials - carpet systems	Reduced VOCs to promote healthier environments	IEQ c4.3
☐	Low-emitting materials - composite wood & agrifiber products	Reduced VOCs to promote healthier environments	IEQ c4.4
☐	Design for thermal comfort	Establish comfort criteria per ASHREA Standard 55-2004	IEQ c7
Recommended			
☐	Outdoor air delivery monitoring	Provide capacity for ventilation system monitoring to help sustain occupant comfort	IEQ c1
☐	Daylight & views - daylight at 75% of spaces	Provide connections between indoor spaces and the outdoors	IEQ c8.1
☐	Daylight & views - views at 90% of spaces	Provide connections between indoor spaces and the outdoors	IEQ c8.2
☐	Indoor chemical & pollutant source control	Reduce the impacts of pollutant and particle entry into the building as well as properly manage hazardous activities within.	IEQ c5
☐	Increased ventilation	Exceed ASHRAE 62.1-2004 standards by 30% or more	IEQ c2
☐	Pre-occupancy construction IAQ management plan	Follow USGBC flushing and/or air filtering requirements	IEQ c3

7 - ENERGY OPTIMIZATION

Mandatory			
☐	14% Whole building performance improvement over ASHRAE 90.1-2004	Design for enhanced energy efficiency throughout the entire life cycle of the building	EA p2,c1
☐	Energy modeling of design alternatives	Provide computer simulations to evaluate design options	EA p2,c1
Recommended			
☐	31.5% Whole building performance improvement over ASHRAE 90.1-2004	Design for enhanced energy efficiency throughout the entire life cycle of the building	EA p2,c1

BUILDING ENVELOPE

Mandatory			
☐	Roof Insulation	Roof shall exceed the thermal requirements of ASHRAE 90.1-2004 by a min. of 10%	EA p2,c1
☐	Infiltration		EA p2,c1
☐	High performance Glazing		EA p2,c1
☐	Low slope cool roofs	Provide highly reflective "cool" roofing to mitigate heat island effect	EA p2,c1
Recommended			
☐	Passive heating & cooling	Orient buildings and glazing locations to maximize passive heating and cooling opportunities	EA p2,c1
☐	Wind mitigation measures	Siting, orientation, and landscaping should reduce potentially harmful impacts of wind; i.e. snow or sand deposition, thermal loss, drafts, and building deterioration.	EA p2,c1

SPACE CONDITIONING

Mandatory			
☐	Fundamental refrigerant management	No Chlorofluorocarbons (CFCs) permitted	EA p3
☐	Mechanical systems energy efficiency		EA p2,c1
☐	Variable speed motors or drives for pumps and fans		EA p2,c1
☐	Low Nox, low CO boilers		EA p3,c4
☐	High efficiency air filtration		EA p2,c1
☐	Enhanced refrigerant management		EA c4
Recommended			
☐	Mechanical ventilation with high efficiency fans & carbon monoxide sensors at subterranean garages	In order to provide safe and healthy environments, mechanical ventilation is required. To minimize energy consumption, high efficiency fans shall be utilized with the system controlled by CO2 sensors	IEQ c1
☐	Design for cross ventilation	Incorporate natural ventilation strategies	EA p2,c1
☐	Premium efficiency electric motors		EA p2,c1
☐	Staged Heating and cooling systems	Utilize multiple heating & cooling systems of a variety of sizes to reduce inefficiencies incurred when running oversized systems at part-load	EA p2,c1
☐	Fan assisted natural ventilation		EA p2,c1
☐	Operate inlet air dampers for natural ventilation	Mechanical systems should be equipped to utilize natural ventilation and other passive strategies when possible.	EA p2,c1

LIGHTING

Mandatory			
☐	Common area fluorescent, hard-wired compact fluorescent or HID lamps	Incandescent lamps are not permitted.	EA p2,c1
☐	No radioactive elements in exit signage or other lighting		EA p2,c1
☐	Light pollution reduction	Exterior lighting shall be designed to minimize light trespass	SS c8
☐	Super T8 lamps & electronic ballasts	To be specified where appropriate	EA p2,c1
Recommended			
☐	Automatic light shutoff in office common spaces	Provide occupancy sensors in spaces having low or transient occupancy	EA p2,c1
☐	Photocell controls on all common area exterior, site & landscape fixtures		EA p2,c1

WATER HEATING

Mandatory			
☐	Energy efficient water heating	Utilize efficient water heating technologies to reduce energy consumption	EA p2,c1
Recommended			
☐	Tankless gas water heaters		EA p2,c1
☐	Centralized water heating systems	Centralized water heating systems are more efficient than smaller, individual units	EA p2,c1
☐	Waste heat recovery	Consider the capturing of waste heat from water heaters to preheat incoming water or to supplement space heating.	EA p2,c1
☐	Heat pump water heaters	Consider heat pumps as a means of heating water as well as space heating and cooling.	EA p2,c1
☐	Condensing water heaters	Condensing water heaters and boilers run with greater efficiencies than traditional water heaters, thru reducing building energy consumption.	EA p2,c1
☐	Condensing water heaters	Condensing water heaters and boilers run with greater efficiencies than traditional water heaters, thru reducing building energy consumption.	EA p2,c1

RENEWABLE & ALTERNATIVE ENERGY SOURCES

Recommended			
☐	Conduit to roof, unobstructed roof areas & roof framing plan for future photovoltaics	Provide the infrastructure necessary to accommodate future PV installations	EA c2
☐	Green power purchase	Purchase renewable sources of electricity	EA c6
☐	Solar space heating system	Incorporate passive solar heating strategies within the design of buildings	EA p2,c1
☐	Solar water heating		EA p2,c1
☐	Photovoltaic landscape/parking lot lighting		EA c2
☐	Photovoltaics	PV can be integrated into building structures to provide a dual function as sun shades or roofing membranes	EA c2
☐	Dedicated space for on-site distributed energy system	Reserving space for future energy generation systems may prove beneficial amid uncertainty of national energy resources. Dedicated space for on-site energy systems provides flexibility for the future.	
☐	On-site power generation	Options include micro turbines, fuel cells, combined heat and power systems, etc.	
☐	On-site renewable energy	On-site renewable energy reduces harmful emissions while increasing power access reliability. Options for on-site renewables include photovoltaics, wind turbines, solar hot water heaters, etc.	EA c2

CONTROLS & FEEDBACK

Mandatory

☐ Fundamental commissioning	Proper commissioning increases the likelihood that new buildings meet their clients expectations	EA p1
☐ Thermal comfort, design	Comply with ASHRAE 55-2004	IEQ c7
☐ Enhanced feature setback thermostats	Thermostats with setback controls allow temperatures to float during unoccupied periods within the building.	IEQ c6

Recommended

☐ Daylight sensors	Proper daylighting controls save energy without significant changes to occupant comfort	EA p2, c1
☐ Enhanced commissioning		EA p2, c1, c3
☐ Controllability of systems - lighting	Providing occupant with greater control of their local environments can lead to greater productivity, comfort and well-being.	IAQ c6
☐ Controllability of systems - thermal control	Providing occupant with greater control of their local environments can lead to greater productivity, comfort and well-being.	IAQ c6
☐ On-demand energy & water feedback & control	Information on energy and water consumption allows building occupants to connect their actions to the resource consumption levels of the building and increases individual awareness	
☐ Measurement and verification	Measurement and verification of building performance can help diagnose problems more quickly and keep systems running properly	EA c5

8 - WATER EFFICIENCY

Mandatory

☐ High efficiency plumbing fixtures	All buildings shall have high efficiency fixtures to reduce water waste and decrease overall consumption.	WE c3.1, c3.2
☐ Water use reduction - 30% reduction		WE c3.2

Recommended

☐ Energy Star rated appliances	Energy Star rated appliances should be specified when available.	WE c3.1, c3.2
☐ Automatic irrigation systems set to early morning and evening	Conserve water by reducing evaporative losses	WE c1.1
☐ Automatic shutoff faucets	Faucets equipped with automatic shutoffs reduce water waste and should be specified where appropriate	WE c3.1, c3.2
☐ Weather-based evapotranspiration (ET) irrigation controllers	Weather based irrigation controllers automatically adjust to change in weather conditions to minimize weather related evaporative water losses	WE c1.1
☐ Drip or soaker-based irrigations	Drip irrigation conserved water by more effectively delivering it to desired locations.	WE c1.1
☐ Waterless or ultra-low flush urinals	Contributes to lower water consumption and lessens the strain on water infrastructure	WE c3.1, c3.2
☐ Greywater and stormwater reuse	For toilet flushes and site irrigation, strategies can contribute to reduced water waste	WE c1.1, c1.2, c3.1, c3.2

9 - RECYCLING & SOLID WASTE

Mandatory

☐ Storage and collection of recyclables	At a minimum, provide for the storage and collection of glass, plastic, office paper, newspaper, cardboard and metals.	MR p1

Recommended

☐ Hazardous waste disposal	Providing proper disposal infrastructure for hazardous waste reduces the amount of hazardous waste and potentially harmful material included in standard waste receptacles.	MR p1

10 - MANAGEMENT

Mandatory

☐ Tenant design and construction guidelines	Provide tenants with descriptive tools that both educate and help implement sustainable design and construction features of the building	SS c9

















ANSCHUTZ MEDICAL CAMPUS 2012 FACILITIES MASTER PLAN

view online at http://www.ucdenver.edu/about/departments/InstitutionalPlanning/Pages/Anschutz-Medical-Campus-2012-Facilities-Master-Plan.aspx