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MHTN Proj. No. 2009510

# 2010

## Proposed Dental Building Facility Plan

University of Utah | U of U Proj. No. 0999-12909

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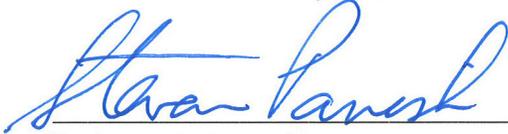
We have reviewed the **Proposed Dental Building Facility Plan** and warrant that it adequately represents our request for a facility to fulfill our mission and programmatic needs. All appropriate parties representing the University have reviewed it for approval.



G. Lynn Powell, DDS  
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10-28-10

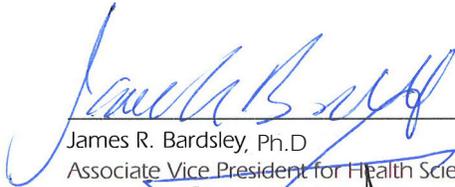
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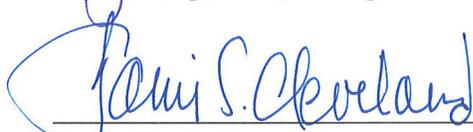
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# 01

## Executive Summary

Proposed Dental Building Facility Plan | University of Utah

## Introduction

The Proposed Dental Building Facility Plan is the second planning study for a proposed new dental school building on the University of Utah campus. The first study, a master plan prepared in 2006, established the approximate size and preliminary project budget for the building. The objectives of this facility plan are to:

- Refine and confirm the preliminary space analysis of the 2006 Master Plan.
- Evaluate potential sites for the new building.
- Provide updated, site-specific cost estimates for the project.

Project participants included representatives from the Dental Education Programs, Health Sciences Campus administration, Campus Design & Construction, Campus Planning, and the Utah Dental Association.

## Process

The facility plan process included the following:

Formation of a **Project Steering Committee**, with representation from different project areas of interest.

Establishment of a weekly meeting schedule. **Weekly meetings** were used to formulate project progress, direction and decisions.

Visits to **each proposed site**, documented by a photographic record of site conditions, appearance and views.

Input on **parking and transportation issues** from campus parking and transportation representatives.

Input on **utility access and capacity** for each of the sites from campus utilities representatives.

**Refinement of the 2006 Master Plan preliminary space analysis**, with input from a national dental school planning consultant.

**Creation of a building massing prototype** for use in evaluating sites.

**Creation of an electronic 3D model of each site**, in order to perform building and parking test fits.

**Preliminary evaluation of the sites**, using a matrix formulated by the planning consultants and the Project Steering Committee.

**Detailed cost analysis** for each of the sites being evaluated.

During the study process, Dental Education Program representatives prepared or presented several elements closely related to the Facility Plan, listed below.

- Strategic Academic Plan for the proposed Dental School.
- Written summary of the impact of the prospective dental school location on opportunities for interaction and collaboration with other Health Sciences programs and community members.
- Photographs from site visits to other dental schools.

In addition, the University conducted a Traffic Impact Analysis for sites A and D, from the fall of 2009 through the summer of 2010. The Analysis is in Appendix H.

## Facility Plan Conclusions

1. The proposed dental school requires approximately 70,000 gross square feet. It will contain: 100 operatories in public dental clinics; clinic support labs and spaces; lecture halls and conference / seminar rooms; student casual study/ support space; administrative and faculty offices; faculty research labs; and general building support spaces. Although initially planned for 50 students per year for four years (200 total students), it will have capacity for program growth to 60 students per year (240 total students).
2. The proposed building will require approximately 172 parking spaces for faculty, staff and patients (33, 44 and 95 respectively). If a potential site contains existing parking spaces, the project is required to replace them, in addition to the spaces required for the building program.
3. Six potential building sites were evaluated as part of the facility planning process. Three were found to be suitable early in the study and received more extensive analysis and evaluation, found in Section 3. These sites are:

Site A, HSEB  
 Site D, Wakara Way  
 Site E, Foothill

4. Of the six sites originally considered, three were found to be unsuitable early in the study process. They received only preliminary analysis, found in the Appendix. These sites are:

Site B, Ambulatory Care Complex (ACC)  
 Site C, Dumke Building  
 Site F, Center for Advanced Medical Technologies (CAMT)

5. The opinion of probable cost for the three evaluated sites is:

Site	Construction Cost	Total Project Cost
Site A, HSEB - Parking Option 1	\$31 million	\$42 million
Site A, HSEB - Parking Option 2	\$27 million	\$37 million
Site A, HSEB - Parking Option 3	\$26 million	\$36 million
Site D, Wakara	\$23 million	\$31 million
Site E, Foothill	\$18 million	\$26 million

The Facility Plan is organized as follows:

**Section 2 (Needs Analysis)** contains the preliminary space analysis, parking analysis, and building prototype (configuration and organization).

**Section 3 (Site Analysis)** contains analysis and evaluation for the three suitable sites: A-HSEB, D-Wakara Way and E-Foothill.

**Section 4 (Cost Analysis)** contains summary and detailed cost information for the three suitable sites.

**Section 5 (Appendix)** contains:

- Background information
- Elements related to the Facility Plan prepared by Dental Education representatives
- Preliminary analysis of the three unsuitable sites: B-ACC (Ambulatory Care Complex), C-Dumke, and F-CAMT (Center for Advanced Medical Technologies).
- Traffic Impact Analysis



# 02

## Needs Analysis

Proposed Dental Building Facility Plan | University of Utah

## Introduction

In order to evaluate the suitability of potential sites, space and parking needs for the proposed new dental school had to be determined. The needs are represented in this section:

1. **Building Spaces.** The project team worked with a dental school planning consultant to refine preliminary space needs outlined in the 2006 Dental School Master Plan. This resulted in a total square footage estimate for the building and an understanding of the sizes and relationships of the dental school's primary space groupings.
2. **Building Configuration.** From their understanding of space and relationship needs, the planning consultants developed a prototype building. The prototype was used to test the size and configuration of the sites under consideration.
3. **Parking.** The planning consultants worked with dental school representatives to determine the quantities of faculty, staff and patients that would be using the new building. This information formed the base of an analysis of the parking quantity needs.

## Building Spaces

The following pages contain a spreadsheet which lists the spaces and corresponding net square foot amounts needed for the proposed dental school. The spreadsheet uses a multiplier to calculate area needed for the building's common spaces, resulting in the projected total gross square feet for the building.

Spreadsheet terminology definitions are below. The area summary page, opposite, represents the overall building space listing. The following pages contain information about the individual spaces that are needed, organized by major space groupings.

## Spreadsheet Definitions

**NASF:** Net Assignable square Feet; area as measured inside surrounding walls or furniture panels.

**Efficiency Factor:** Multiplier which accounts for area for surrounding walls/furniture panels and immediate circulation access.

**DGSF:** Department Gross Square Feet, defined as NASF plus area for surrounding walls/furniture panels and immediate circulation access.

**GSF Factor:** Multiplier which accounts for building common spaces and elements, such as major circulation paths; toilet rooms; stairs; elevators; vestibules; mechanical, electrical and communications spaces; custodial closets; exterior walls.

**GSF:** Gross Square Feet, or the total area of a building measured from the outside surfaces of exterior walls.

## Building General Notes

- A. Dental School class size will initially be fifty student per year for four years, or 200 total students. As represented in this space list, the school is being planned with the capacity to grow to sixty students per year, or 240 total students. There should be a range of 1.5 to 2 operatories per student, or 90 to 120 for 60 students. The proposed Dental School will have 100 operatories.
- B. Basic science classes will be taught by existing Medical School faculty in existing classrooms. The new Dental School building will not provide classrooms for basic science classes or offices for the faculty that teach them.
- C. Even though a building expansion is not expected in the foreseeable future, the building should be planned for expansion capability.
- D. The building will require an emergency back-up power generator, although it will not need to be high-capacity.
- E. Code Issues. There was a brief discussion about code issues, which will require further investigation in a future phase. The sedation quantity capacity affects the rating of the building and the amount of emergency power required. An amalgam separator will be required.
- F. The building should have a minimum 15'-4" floor to floor height.
- G. The University allows location of the mechanical equipment on the building's roof, if it is enclosed in a penthouse.
- H. The Dental School will be used for continuing education. This has a planning impact and will need to be taken into consideration during design.

### Summary of Space Requirements

Code	Building Summary	NASF	Qty.	Total NASF	Effic'y Factor	DGSF	GSF Factor	GSF
<i>Clinic / Public Areas</i>								
101	Building Lobby	1,200	1	1,200	1.15	1,380	1.30	1,794
102	Reception Area	400	1	400	1.33	532	1.30	692
103	Waiting Room	900	1	900	1.25	1,125	1.30	1,463
104	Clinic, Main	100	80	8,000	1.40	11,200	1.30	14,560
105	Clinic, Oral	100	6	600	1.40	840	1.30	1,092
106	Clinic, Pediatrics	100	6	600	1.40	840	1.30	1,092
107	Clinic, Diagnosis	100	8	800	1.40	1,120	1.30	1,456
				12,500		17,037		22,148
<i>Clinic Support</i>								
201	Sterilization Room	1,200	1	1,200	1.15	1,380	1.30	1,794
202	Clinic Dispensary	800	1	800	1.25	1,000	1.30	1,300
203	Clinic Storage	200	1	200	1.33	266	1.30	346
204	Instructor Station	100	1	100	1.40	140	1.30	182
205	3D Equipment	120	1	120	1.33	160	1.30	207
206	Film Viewing	100	2	200	1.40	280	1.30	364
				2,620		3,226		4,193
<i>Labs / Teaching Space</i>								
301	Clinic Support Lab	600	1	600	1.25	750	1.30	975
302	Technique Lab	20	60	1,200	1.40	1,680	1.30	2,184
303	Technique Support Lab	500	1	500	1.25	625	1.30	813
304	In-House Lab	300	1	300	1.33	399	1.30	519
305	Lecture Halls	1,500	3	4,500	1.10	4,950	1.30	6,435
306	Conference/Seminar Rooms	300	6	1,800	1.35	2,430	1.30	3,159
				8,900		10,834		14,084
<i>Student Space</i>								
401	Casual Learning Space	1,000	1	1,000	1.15	1,150	1.30	1,495
402	Student Lounge	1,200	1	1,200	1.15	1,380	1.30	1,794
403	Student Lockers	1,000	1	1,000	1.15	1,150	1.30	1,495
				3,200		3,680		4,784
<i>Administration</i>								
501	Dean's Office	240	1	240	1.33	319	1.30	415
502	Waiting Area	120	1	120	1.33	160	1.30	207
503	Faculty and Staff Offices	120	48	5,760	1.33	7,661	1.30	9,959
504	Shared Office	150	2	300	1.33	399	1.30	519
505	Open Office Areas	64	16	1,024	1.40	1,434	1.30	1,864
506	Research Labs	300	8	2,400	1.33	3,192	1.30	4,150
507	Faculty/Staff Support	150	3	450	1.33	599	1.30	778
				10,294		13,763		17,892
<i>Building Support</i>								
601	Dental Mechanical Room	300	1	300	1.33	399	1.30	519
602	Dental Store	500	1	500	1.25	625	1.30	813
603	General Building Storage	1,500	1	1,500	1.10	1,650	1.30	2,145
604	Service / Receiving	400	1	400	1.33	532	1.30	692
				2,700		3,206		4,168
<b>Totals</b>				<b>40,214</b>		<b>51,745</b>		<b>67,269</b>

The reception and waiting area should be located near the main clinic, and accessed directly from the Building Lobby. There may need to be an additional smaller reception area near the specialized clinics.

The Reception Area must include space for shared office equipment (copier, fax, printers) and patient files. The area should be planned for a movable aisle file system with heavy floor loading, unless the clinic may use a paperless system.) Back-up of electronic records will likely be in a centralized campus server.) There must be space for a cashier at each reception area. Business office functions that will occur here include scheduling, insurance / finance / cashiering, and quality assurance.

The waiting area is sized for 45 to 60 seats at 15-20 nsf / seat, depending on the size and spacing of the chairs. Furniture should be movable to accommodate wheelchairs.

Each student will receive one patient per 3-hour clinic session. The waiting area is used at the beginning of the clinic hours only.

The Dental School will have a total of 100 operatories. The Main Clinic will have 80, which should be located in one large area. There will be several smaller, specialty clinics as well, which can be adjacent to the Main Clinic or in a separate location, as building space and configuration allows. Specialty clinic possibilities discussed during the facility planning included: Screening; Diagnosis (includes Urgent Care); Pediatric; Oral Surgery; Group Practice; Surgery; Special Care; Demonstration; and Geriatrics. The project team decided that the specialty clinics represented in the study's space list should be Oral, Pediatrics and Diagnosis.

### 100. Clinic / Public Areas

Code	Building Summary	NASF	Qty.	Total NASF	Effic'y Factor	DGSF	GSF Factor	GSF
<i>Clinic / Public Areas</i>								
101	Building Lobby	1,200	1	1,200	1.15	1,380	1.30	1,794
102	Reception Area	400	1	400	1.33	532	1.30	692
103	Waiting Room	900	1	900	1.25	1,125	1.30	1,463
104	Clinic, Main	100	80	8,000	1.40	11,200	1.30	14,560
105	Clinic, Oral	100	6	600	1.40	840	1.30	1,092
106	Clinic, Pediatrics	100	6	600	1.40	840	1.30	1,092
107	Clinic, Diagnosis	100	8	800	1.40	1,120	1.30	1,456
				<i>12,500</i>			<i>17,037</i>	<i>22,148</i>

Most operatories will be about 9' x 8.5', or 76.5 net square feet. They are 100 net square feet in the space list to allow for surrounding aisles, which should be 5'-6' in width.

Some specialized operatories may need to be larger: special care, where patients may be on gurneys or in wheelchairs; surgical operatories may need to be 120-140 net square feet, and enclosed with doors. (Specialized care may occur in the hospital, rather than the Dental Clinic – to be determined during future programming phase.) Demonstration operatories may also need to be larger.

Most operatories will be semi-open, with cabinets or partial-height partitions separating them. There should be a cabinet-mounted shared sink for each pair of operatories.

There should be a small number of enclosed operatories, to contain sound or provide privacy. Some should be located near the pediatric area.

Alcoves at the ends of operatory aisles could be used for small-item storage. This would provide convenient supply access and an alternate to obtaining supplies from the dispensary. In the clinic, patients arrive at the same time and students access the dispensary for supplies at the same time, which causes a dispensary crowding issue. Alcove storage could help to mitigate this.

Students receive patients five or six half-days per week, with one patient per student per 3-hour clinic session. Typically, there is one instructor for a group of 8 operatories. Students are not assigned to particular operatories, but rotate throughout the clinic.

The clinic should have hard-surface flooring.

There should be small patient-use toilet rooms within or easily accessed from the clinic.

There should be enclosed rooms within or near the clinic for patient consultations, which sometimes require privacy. These can also be used for case presentations and confidential patient health history interviews. There should be about four for 80 operatories; they should be about the same size as the operatories. These are not included in the space list; the area for them should come from the Conference / Seminar Rooms (space no. 306).

The facility planning process included a discussion of the possible use of portable x-ray equipment, or the desired ratio of operatories that should include this equipment built-in. A conclusion was not reached, so this will need to be resolved in the future programming phase. X-ray availability has an impact on the efficiency of the clinic operation, so it is an important consideration. There was a similar discussion regarding nitrous, which will need a future decision.

## 200. Clinic Support

Code	Building Summary	NASF	Qty.	Total NASF	Effic'y Factor	DGSF	GSF Factor	GSF
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### *Clinic Support*

201	Sterilization Room	1,200	1	1,200	1.15	1,380	1.30	1,794
202	Clinic Dispensary	800	1	800	1.25	1,000	1.30	1,300
203	Clinic Storage	200	1	200	1.33	266	1.30	346
204	Instructor Station	100	1	100	1.40	140	1.30	182
205	3D Equipment	120	1	120	1.33	160	1.30	207
206	Film Viewing	100	2	200	1.40	280	1.30	364
				2,620		3,226		4,193

These spaces are closely integrated with the clinic operation and must be located with or directly adjacent to the clinics.

The Sterilization Room is a lab space where equipment is sterilized in large-capacity autoclaves. The set-up may require separation of the incoming, contaminated items from outgoing, clean items. The Sterilization Room should be located with the main clinic. It will contain an 80 nsf Detergent Room.

The Clinic Dispensary is used for the storage and dispensing of material and supplies used in the clinic. The room must lock.

### 300. Labs / Teaching Space

Code	Building Summary	NASF	Qty.	Total NASF	Effic'y Factor	DGSF	GSF Factor	GSF
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#### *Labs / Teaching Space*

301	Clinic Support Lab	600	1	600	1.25	750	1.30	975
302	Technique Lab	20	60	1,200	1.40	1,680	1.30	2,184
303	Technique Support Lab	500	1	500	1.25	625	1.30	813
304	In-House Lab	300	1	300	1.33	399	1.30	519
305	Lecture Halls	1,500	3	4,500	1.10	4,950	1.30	6,435
306	Conference/Seminar Rooms	300	6	1,800	1.35	2,430	1.30	3,159
				<b>8,900</b>		<b>10,834</b>		<b>14,084</b>

The Clinic Support Lab provides a support function for the clinic operation materials and equipment preparation. It should have millwork cabinets with countertop; hard surface flooring; and utilities for equipment.

The Technique Lab will contain shared workstations where first and second year students will practice dental techniques. There should be sixty workstations, 5-6' wide x 2' deep plus a 1' chase space between stations. That station size would be large enough to accommodate possible future simulation equipment. The room should have hard-surface flooring. There may need to be an instructor station in the lab.

The Technique Support Lab provides space for materials and equipment preparation for the Technique Lab. It should have millwork cabinets with countertop; hard surface flooring; and utilities for equipment.

The In-House Lab is prep and holding space for incoming and outgoing crowns, dentures, etc. It also accommodates a limited amount of in-house fabrication of these items. In typical dental practices, this work is sent out to specialty labs, so there will not be a strong focus on this type of work in the school.

The three Lecture Halls should have sloping floors. Each will have capacity for 75 students. Two should be separated by a movable partition. Approximately 66-75% of lecture hall classes will be specifically for dental students; others will be for medical school students also. The project team noted that HSEB 3515B has very pleasing lighting and general appearance.

The equipment will include: HSEB lectern; fixed tables with integral power; movable chairs; white boards; tack surface; built-in projection equipment; projection screen. These should be interior rooms, to avoid natural light / audio-visual conflicts. Easily controllable lighting is very important for these spaces.

The Conference / Seminar Rooms will have capacity for 20 people. They will have white boards, projection screens, and built-in projection equipment. They can be interior rooms, to avoid natural light / audio-visual conflicts. Some should be located near the clinic to be used for functions such as patient consultations and rounds, and two should be on the upper, administrative level. Two rooms will be used for small group learning and should be located accordingly. A greater quantity of rooms, with some at a smaller size, may be needed.

## 400. Student Space

Code	Building Summary	NASF	Qty.	Total NASF	Effic'y Factor	DGSF	GSF Factor	GSF
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### *Student Space*

401	Casual Learning Space	1,000	1	1,000	1.15	1,150	1.30	1,495
402	Student Lounge	1,200	1	1,200	1.15	1,380	1.30	1,794
403	Student Lockers	1,000	1	1,000	1.15	1,150	1.30	1,495
				3,200		3,680		4,784

Casual Learning is open space configured for small group discussions. It should be adjacent to the clinic and other learning spaces. There could be some outdoor space of this type.

The Student Lounge should contain a kitchenette without plumbing: millwork cabinets / countertop, microwave, refrigerator and vending machines. It should also offer lounge seating and recreation opportunities such as table tennis, foosball, pool, etc.

The building should contain 200 full-height, 12" x 12" lockers for student use. The locker quantity should be expandable for the future when there will be 240 students.

### 500. Administration

Code	Building Summary	NASF	Qty.	Total NASF	Effic'y Factor	DGSF	GSF Factor	GSF
<i>Administration</i>								
501	Dean's Office	240	1	240	1.33	319	1.30	415
502	Waiting Area	120	1	120	1.33	160	1.30	207
503	Faculty and Staff Offices	120	48	5,760	1.33	7,661	1.30	9,959
504	Shared Office	150	2	300	1.33	399	1.30	519
505	Open Office Areas	64	16	1,024	1.40	1,434	1.30	1,864
506	Research Labs	300	8	2,400	1.33	3,192	1.30	4,150
507	Faculty/Staff Support	150	3	450	1.33	599	1.30	778
				<i>10,294</i>			<i>13,763</i>	<i>17,892</i>

All administrative office space should be located together, with the exception of the Clinic Director and Assistant Director, who must be located near the clinic.

There will be at least two office sizes in the building. The space list contains a 120 nsf office size as an average. The size and quantity of offices will be broken out in the future programming phase. Offices will be used for faculty (35-37 qty.) and senior staff. Adjunct clinical staff will use shared offices (150 nsf, with 4 desks).

the following administrative functions will require space, although they are not listed specifically at this point: admissions/recruitment, data processing, finance (procurement, grants, contracts, HR), academic affairs (class scheduling, clinic schedule), continuing education director, advancement/development, community liaison, department secretary, business office, biomedical equipment tech (responsible for dental chairs & hand pieces – will require a small workshop space), in-house IT (clinic management, patient software, hardware support), and maintenance.

The Dean's Office should be large enough to accommodate small meetings. It should have a small waiting room adjacent.

There should be an open office area for approximately half of the staff, who do not have private offices or designated work space (85 total faculty, minus 51 office, minus 3 reception / dispensary staff = 31, divided by 2 = 16).

The research labs are for faculty use and should be located adjacent to the faculty offices. Out of eight total, three would be functional initially, with five shelled for later use.

The Faculty / Staff Support space is a kitchenette, with millwork cabinets / countertop, kitchen sink, microwave, refrigerator, coffee machine, vending machines, and coat storage space. The space list assumes there would be one of these rooms on each floor of the building.

The building should provide lockers for clinic staff who will not have offices or cubicles; these should be near their workspace.

## 600. Building Support

Code	Building Summary	NASF	Qty.	Total NASF	Effic'y Factor	DGSF	GSF Factor	GSF
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### *Building Support*

601	Dental Mechanical Room	300	1	300	1.33	399	1.30	519
602	Dental Store	500	1	500	1.25	625	1.30	813
603	General Building Storage	1,500	1	1,500	1.10	1,650	1.30	2,145
604	Service / Receiving	400	1	400	1.33	532	1.30	692
				2,700		3,206		4,168

The Dental Mechanical room will house compressors and vacuums, possibly two of each. The dental vacuum system will require redundancy, perhaps a 3-pump, rotating system. The vacuum system is noisy and requires sound insulation. It must be below the main clinic floor level and could be located near other building mechanical equipment.

The Dental Store will be used for bulk storage of materials and supplies, which are broken down and dispensed from the Dispensary for use in the clinics and labs. The Dental Store size is somewhat dependant on the frequency of ordering. Some equipment is large / bulky (nitrous tanks, wheelchairs, gurneys, etc.).

General Building Storage is space for miscellaneous items such as equipment, furnishings, files, and building maintenance supplies and equipment.

The Service / Receiving area is an interior space directly adjacent to the service dock used for the staging of incoming supplies and equipment and outgoing materials, including recyclables.

## Parking Quantity

Parking Type	Peak Occupancy	Average Occupancy Factor	Average Occupancy	Mass Transit Ridership	Mass Transit Factor	Parking Spaces
--------------	----------------	--------------------------	-------------------	------------------------	---------------------	----------------

Faculty	45	0.8	36	8%	0.92	33
Staff	58	1	58	21-25%	0.75	44
Patients	100	1	100	5%	0.95	95

Total

172

An important consideration in evaluating potential sites for the Dental School was whether the sites were sufficiently large and had configurations suitable to satisfy project parking needs. The University requires each new project to provide the parking spaces needed for its users. Project planners determine the quantity of needed parking by analyzing the functions and occupant loads of the future building.

Student parking was not considered in the parking demand study, as it is not typically available on the Health Sciences Campus and is not required to be provided by a project.

During the facility planning process, the project team developed an estimate of the parking quantities needed for the proposed dental building. Parking needs were divided into three categories: faculty, staff and patient.

The parking estimate process included:

1. Identifying the maximum quantity of faculty, staff and patients that would come to the building every day ("Peak Occupancy" in the chart above).
2. Assessing whether the Peak Occupancy quantities could justifiably be reduced to obtain an "Average Occupancy" amount. Project team members thought faculty parking could be reduced to 80% of Peak Occupancy, due to staggered teaching schedules. Staff and patient quantities were maintained at 100% of Peak Occupancy.
3. Obtaining Mass Transit Ridership rates from Campus Transportation for the three parking categories. The ridership rates are based on historic campus data for bus and TRAX usage. They were used to reduce the Average Occupancy quantities and finalize the count of needed Parking Spaces that were used in the Facility Plan's test fits.

# Prototype 1-3 Story

## Introduction

Although it is not within the purpose of this Facility Study to provide a design for the proposed new Dental School, a prototype footprint and mass representing a possible building configuration has been developed for use in testing the viability of each site being analyzed. The size and configuration of this prototype is based on assumptions developed during a workshop conducted during the process of preparing this Study.

## Floor Area

The area of the prototype footprint is approximately 22,650 square feet. This area results from rounding the projected gross area requirement for the School to 68,000 square feet and then dividing this area by three, assuming a three-story building would be appropriate for the area of each of the sites. A 22,650 square foot floor plate provides a comfortable fit allowing logical functional and departmental stacking relationships while not becoming so large that travel distances within the building are burdensome.

## Organization

The strong circulation spine and core organization of the Eccles Health Sciences Education Building forms the basis of the model used for developing the organization of the prototype. This organizational strategy provides clear way-finding in its primary circulation system while permitting a straightforward zoning strategy of public to private spaces. In the HSEB, classroom and laboratory spaces are clearly accessed from the primary circulation spine while faculty and staff areas, although easily accessible to the public, benefit from the increased privacy permitted by secondary circulation access.

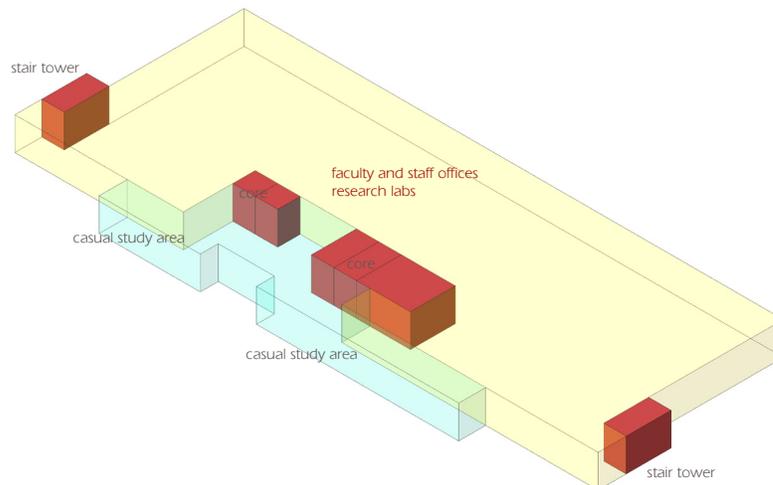
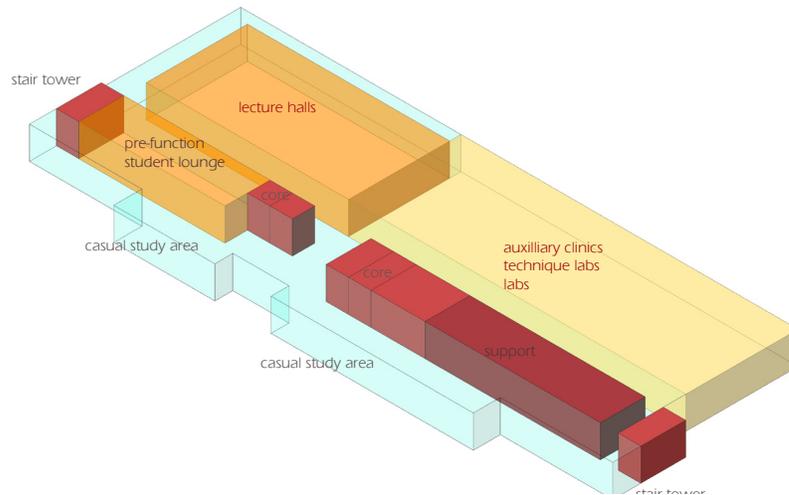
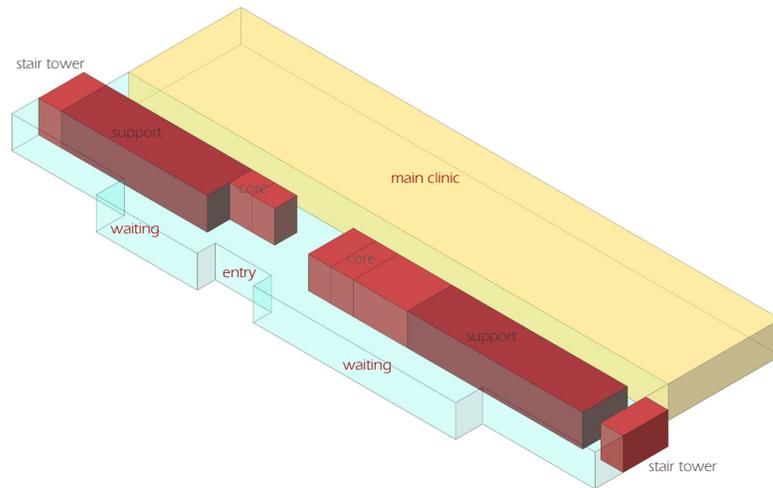
Since one of the sites (Site A) under consideration in this Study is adjacent to the Eccles Health Sciences Education Building, this organizational pattern could be logically extended to the proposed new Dental School, creating a clear transition from the existing building to the new building. In the case of Site A, this circulation spine, which parallels the Health Sciences Academic corridor, would also provide an interior connection to the Eccles Health Sciences Library at its northern terminus.

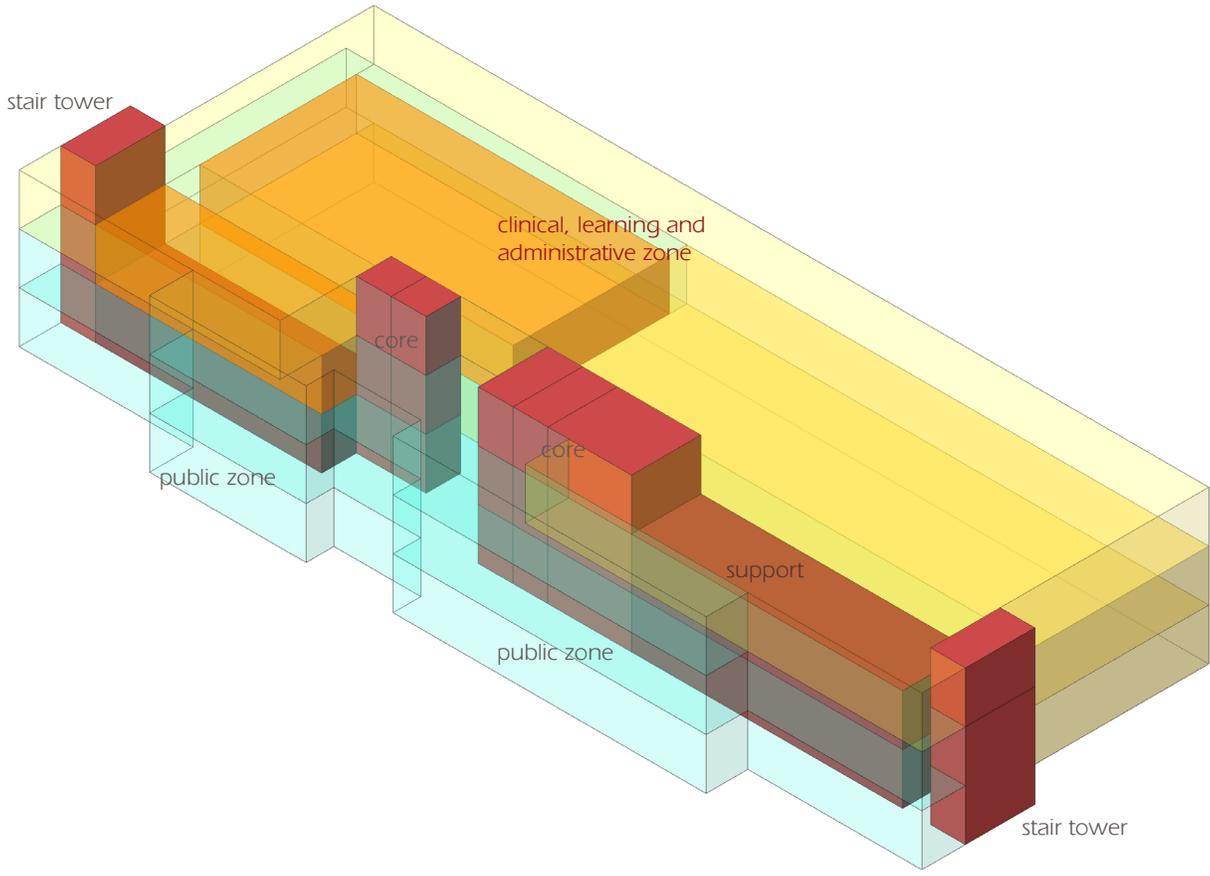
A further advantage of the strong spine organization is that serendipitous encounters of students and faculty as well as casual study can occur in the spine element, which transforms it from mere circulation space to meaningful public and social space. This strategy also permits some single-loading of the spine which opens up view opportunities and introducing daylight.

The organization of the prototype suggests that building support areas such as vertical circulation and mechanical/electrical services can be consolidated in a support core which parallels the primary circulation spine. This frees the remainder of the footprint from vertical penetrations which creates a high level of flexibility within the building.

## Stacking

The stacking strategy employed in the prototype suggests a transition from public and clinical space on the main level to teaching and research functions on the second level and finally concluding in more private faculty and staff spaces on the upper level.







# 03

## Site Analysis

Proposed Dental Building Facility Plan | University of Utah

## Introduction

One of the key objectives of this facility study is to test the viability of multiple sites on the Health Sciences campus and in Research Park for locating the proposed Dental School Building.

Of the six sites that were evaluated as part of the site analysis, three were determined to be suitable for placement of the proposed new school; these include Site A, Site D and Site E. An evaluation of these three sites is included in this section of the facility study since they are all deemed to be viable locations for the new building. This evaluation was based on several criteria used to determine each site's suitability. These criteria include site size and configuration; views; access and way-finding; adjacency to other facilities used as part of the School's program; campus considerations; availability of utilities; sustainability issues; schedule considerations; and constructability issues. A Site Evaluation Matrix which tabulates each site's performance is included in this section.

The remaining three sites that were considered as part of this study presented significant enough development challenges that they were removed from consideration as viable locations for the school. These include Site B, Site C and Site F. For information purposes, these three sites are briefly described in the index.

## Site Overview

### Site A

Site A, currently in use as surface parking, occupies the one of the southern-most remaining development sites identified in the 2008 Campus Master Plan. Along with the site for the proposed new L.S. Skaggs Pharmacy Research Building, this site completes the terminus of the Health Sciences Academic Corridor and provides an important access point to the Health Sciences Center from Medical Drive South.

### Site B

At Site B, the Dental School would become part of a proposed new Ambulatory Care Center complex which would be primarily occupied by the ambulatory clinics currently residing in the University and Primary Children's Medical Centers.

### Site C

This site is currently occupied by the Dumke Building which houses the Dialysis Center associated with the University Hospital and research programs. The Campus Master Plan indicates that this site may become available for other uses in the future.

### Site D

This site is located in Research Park near the intersection of Wakara Way and Foothill Boulevard. Positioned on undeveloped land between the University of Utah Orthopaedic Center and the Health Education Professions Building, this site is easily visible as one enters the Park from the west.

### Site E

Site E occupies a level plateau above a sloped berm rising east of Foothill Boulevard in Research Park. This site is sizable enough for the placement of a large building footprint and, assuming a three story building, can also accommodate all of the parking required for the new Dental School on grade.

### Site F

Site F occupies a parcel in Research Park to the west of the Center for Advanced Medical Technology and parallel to Arapeen Drive.



## Evaluation Matrix

As part of the site analysis process, the planning consultants, working in conjunction with the project team, developed a list of criteria to be used in comparing and evaluating the sites under consideration. The criteria were grouped into categories and organized into a matrix format similar to those used on other projects by campus Facilities Planning.

The planning consultants placed brief summaries of information gathered throughout the study into the appropriate matrix cells. After reviewing the matrix information beforehand on an individual basis, project team members used a two-hour meeting to discuss and arrive at a consensus on values to be assigned to the criteria for each of the three sites. At a later date, after the initial matrix was formulated, the planning consultants added Constructability Issues to the matrix, at the request of the project team.

The completed matrix is represented on these pages. The key:

- (+) Item has a positive impact on the project
- (=) Item is neutral; has no impact on the project
- (-) Item has a negative impact on the project

If there was a clear direction for an entire category, a plus, minus or equal sign was assigned to it (in the red category header bar). If a category's individual criteria results were mixed, an overall category evaluation was not given.

The project team did not assign weightings or priorities to the matrix categories or criteria. That may be done in the future by University Facilities Planning or Health Sciences Center administrators.

The matrix was a helpful tool in clarifying issues, but did not lead to any conclusions regarding a clearly preferred site.

Priority	Evaluation Criteria	A	D	E
		HSEB	Wakara	Foothill
	<b>SIZE/ CONFIGURATION</b>	-	+	+
	<b>Parking construction, use and operation</b>	Depth of parking structure may make construction difficult; parking structure ventilation required (-)	Partially-open parking structure easy to construct; ventilation likely not required	Surface parking easy to construct and maintain
	<b>Possible building footprint and configuration</b>	Possible footprint will support functions; 4 stories (=)	Possible footprint will support functions; 3 stories	Possible footprint will support functions; 3 stories
	<b>Future building expansion</b>	Possible expansion to south; 4 stories (-)	Possible expansion on site; 3 stories	Possible expansion on site; 3 stories
	<b>Future parking expansion</b>	Must be in separate master-planned structure to the east (--)	Will have excess parking within a 3-level parking structure	Site has room for future parking expansion if structured
	<b>VIEWS</b>	=	+	+
	<b>Site views</b>	Good views to south & west; south views blocked by future addition	Good views all directions	Good views east, south, west
	<b>ACCESS/ WAYFINDING</b>			
	<b>Way-finding for first-time visitors</b>	Site is in the campus interior; routes may not be obvious (-)	Research Park location is generally well-known in community; site requires one turn off a major street; effective signage possible (+)	Research Park location is generally well-known in community; site is three turns of a major street; building access is not obvious, but effective signage could mitigate that; building and building signage could be highly visible from Foothill (+)
	<b>Private vehicle access</b>	Traffic congestion during school day (-)	Two turns off a major street (+)	Three turns off a major street (+)
	<b>Mass transit access - TRAX</b>	TRAX stop within 10-15 minute walk (=)	TRAX stop within 20-25 minute walk (-)	TRAX stop within 25-30 minute walk (-)
	<b>Mass transit access - UTA bus</b>	Bus lines from north, southeast, south, west; 5-15 minute walk from stop (+)	Bus lines from north, southeast, south, west; 5 minute walk from stop (+)	Bus lines from north, southeast, south, west; 5 minute walk from stop (+)
	<b>Access - campus shuttle (staff, faculty, students)</b>	Bus lines from north, southeast, south, west; 5-15 minute walk from stop (+)	Bus lines from north, southeast, south, west; 5 minute walk from stop (+)	Bus lines from north, southeast, south, west; 5 minute walk from stop (+)
	<b>Pedestrian access (after vehicle or transit access)</b>	HSC: 2-5 minutes; main campus: 10-15 minutes; Research Park: 15-20 minutes (-)	HSC: 15-20 minutes; main campus: 20-30 minutes; Research Park: 5-10 minutes (+)	HSC: 20-25 minutes; main campus: 25-35 minutes; Research Park: 5-10 minutes (=)

Priority	Evaluation Criteria	A	D	E
		HSEB	Wakara	Foothill
	<b>ADJACENCIES</b>	+	-	-
	<b>General medical/science educational facilities access</b>	General medical-science education facilities are adjacent (+)	5-minute walk to RP educational facilities; 10-15 minute walk to main campus general medical-science educational facilities (-)	5-10 minute walk to RP educational facilities; 15-20 minute to main campus general medical-science educational facilities (-)
	<b>Site neighbors compatibility with Dental mission (academic, clinical, research)</b>	Immediate neighbors include academic, research and clinical functions (+)	Some academic, clinical, and research functions adjacent in RP (-)	Some academic, clinical, and research functions adjacent in RP (-)
	<b>CAMPUS CONSIDERATIONS</b>	=	+	+
	<b>Approved use for site</b>	CMP identifies site as "future medical/ research facility" (+)	Complies with RP M-Plan: "Provide building space...for U's possible need for growth & expansion" (+)	Complies with RP M-Plan: "Provide building space...for U's possible need for growth & expansion" (+)
	<b>Project's impact on adjacent traffic ways</b>	Considerable (-)	Minimal (+)	Minimal (+)
	<b>UTILITIES</b>	+	+	+
	<b>Utility availability and capacity</b>	Utilities available in sufficient capacity adjacent to site (+)	Utilities available in sufficient capacity in adjacent street (+)	Utilities available in sufficient capacity in adjacent street (+)
	<b>SUSTAINABILITY</b>	-	+	+
	<b>Building orientation</b>	Long axis is northwest to southeast (northeast-southwest orientation); orientation fixed - cannot alter to optimize energy req'ts	Long axis is southwest to northeast, with southwest-facing wing (northwest-southeast-southwest orientation); parking structure below building would improve opportunities to orient for energy efficiency	Long axis is northwest to southeast (northeast-southwest orientation); could orient building to optimize energy req'ts, but this would limit parking options
	<b>SCHEDULE</b>	+	+	-
	<b>Ability of project to move forward at its own pace</b>	No known conflicts / impediments	No known conflicts / impediments	Site currently leased by adjacent tenant; another wants to acquire lease for development
	<b>CONSTRUCTABILITY ISSUES</b>	-	+	+
	<b>Contractor access &amp; parking; lay-down space; on-site storage</b>	No available contractor site space	Ample available contractor site space	Ample available contractor site space



# 03a

## Site Analysis

Proposed Dental Building Facility Plan | University of Utah

## Introduction

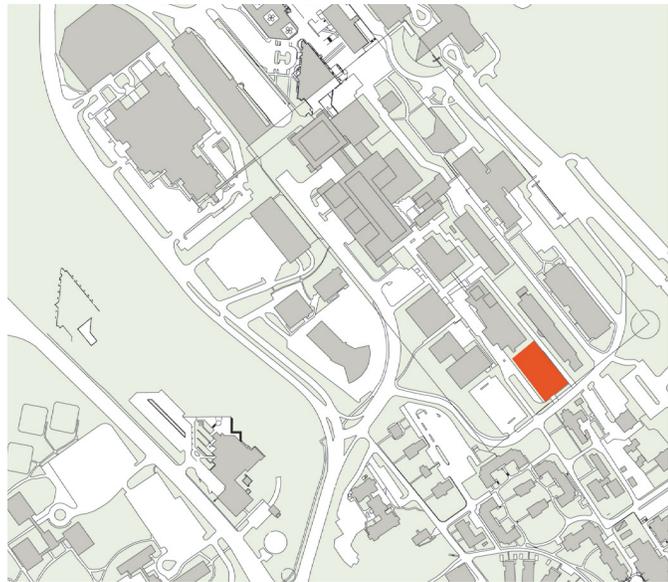
With commanding views of the Salt Lake valley to the west and the Wasatch Range to the south and east, Site A borders the southernmost edge of the University of Utah's Health Sciences campus. This site completes the terminus of the Health Sciences Academic Corridor and provides an important access point to the Health Sciences Center from Medical Drive South.

## Overall Information

### Site Location, Use & Characteristics

Site A occupies the eastern bench of the Salt Lake valley's Wasatch Mountains and is oriented longitudinally from northwest to southeast. The site experiences a grade change of approximately ten feet dropping in elevation from east to west. Site A is currently in use as surface parking for 80 cars.

Bounded by the Health Sciences Education Building to the north, the location of Site A presents a destination for possible expansion of the Health Sciences campus via the extension of a primary circulation spine currently in place in the Eccles Health Sciences Education Building. The Biomedical Polymers Research Building located to the east creates a significant architectural edge. Medical Drive South defines the southern boundary of the site and provides vehicular access. The western edge of the site is limited by the vehicle ramp which provides access to the parking deck located below the Eccles Health Sciences Education Building. Immediately west of the vehicle ramp is the Health Sciences Academic corridor. The future expansion of the L.S. Skaggs Pharmacy Research Building will create a four-story mass directly west of the Corridor.



Site A 



## Views

Views to the north and east are impeded by the Eccles Health Sciences Education Building and the Biomedical Polymers Research Building. Views to the southeast are blocked by the Student Apartment Towers 1 and 2 but open up to reveal the Wasatch Mountains and the Salt Lake Valley as one turns to the south. Although the Salt Lake Valley and Oquirrh range are currently visible to the west, it is anticipated that the mass of the new L.S. Skaggs Pharmacy Research Building will block most of these views upon completion.



Views 

## Access / Wayfinding

### Vehicular Access & Parking

The University maintains a policy of requiring any new facility to replace any surface parking spaces displaced by new construction. In addition, any new parking loads the new facility creates above and beyond the displaced on-grade parking must also be accommodated in the new construction. The Health Sciences Center currently experiences a shortage of parking which further reinforces the need for any new building on this site to support its own parking demand. Vehicular access to parking for the proposed new facility on this site is limited to locations where replacement and new parking can be provided. Any other adjacent parking structures and/or surface parking areas in the vicinity of Site A cannot be considered viable destinations in terms of consistency with the University's overall parking plan. The new Dental School will generate a need for 172 new parking spaces, and the project will need to replace the 80 existing surface spaces on the site, for a total of 252 spaces. This facility plan explores three options for the provision of the 252 cars required for this site.

In the first option, the new facility would provide the total parking requirement in a 4-level, below-grade parking structure underneath the building. Vehicular access for the parking would be via the existing drive cut in Medical Drive South and the existing parking ramp currently serving the Eccles Health Sciences Education Building.

In the second and third options, a portion of the parking requirement would be provided in below-grade structured parking underneath the building (two levels for Option 2 and one level for Option 3). As in the first option, the proposed new below-grade parking would share the existing parking ramp with the Eccles Health Sciences Education Building. The remaining required spaces would be provided in proposed new structured parking to be constructed in the area of existing surface parking located east of the E.E. Jones Medical Science Building. Per the University's parking strategy, this new structured parking would need to replace any existing surface parking displaced by construction.

Fire and service access for the new facility on Site A would be maintained on the Health Sciences Academic Corridor, the paved corridor immediately east of the site, and on Medical Drive South.

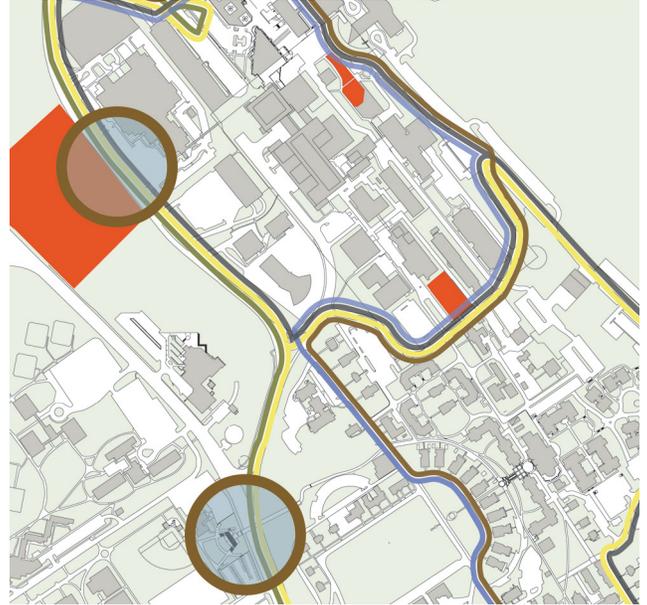
### Public Transportation

Transit services to and within the University of Utah campus are provided by two agencies: UTA and University Commuter Services.

The University campus shuttle service provides access between the main campus and Health Sciences campus via several routes that connect Medical Drive South with the main campus perimeter. The shuttle service also provides convenient connections to several destinations on the Health Sciences Campus along routes which encircle the Health Sciences Campus via Mario Capecchi Drive and Medical Drive North, East and South. This loop includes the north University Hospital drop-off, the Huntsman Cancer Center, the Dumke Building, the Comparative Medicine Center / Radiobiology Lab and the E.E. Jones Medical Science Building. Further shuttle access is provided to Fort Douglas, Research Park and married student housing. The Utah Transit Authority operates a route that traverses Mario Capecchi Drive and arrives at the University Hospital via the north drop-off zone.



UTA: trax



Campus shuttle



UTA: bus



- UTA - Trax 
- UTA - Bus 
- Campus Shuttle 

### Pedestrian Access

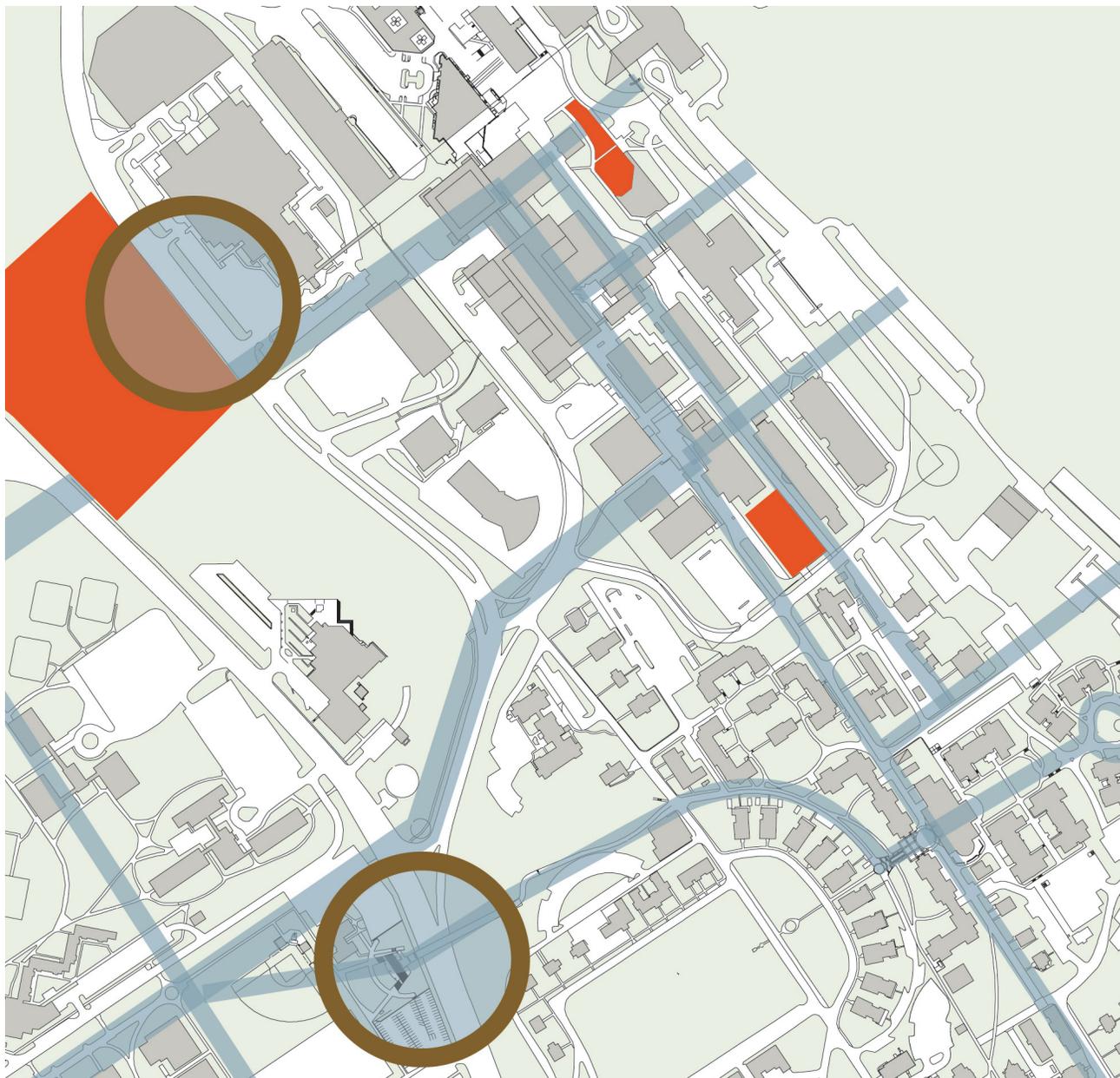
Within the vicinity of the Health Sciences Campus, the Health Sciences Academic Corridor provides pedestrian access to the School of Medicine, the Eccles Health Sciences Library, the Eccles Health Sciences Education Building, the College of Nursing and the College of Pharmacy. A wide pedestrian and service vehicle access corridor parallels the site to the east and provides pedestrian connections to the Biomedical Polymers Research Building, and the Eccles Institute of Human Genetics. Pedestrian access to the Health Sciences Parking Center is available to both the north and the south of the Biomedical Polymers Research Building. A continuous, paved walk provides pedestrian access to the site from the surface parking area located to the east of the E.E. Jones Medical Science Building.

Currently, there is limited pedestrian connection to the main campus. Although the Legacy pedestrian bridge represents a major improvement in terms of the safety of pedestrians crossing Wasatch Drive, there is not continuous sidewalk in place connecting the site with the bridge. Currently, the sidewalk that parallels Medical Drive South terminates at the intersection of Fort Douglas Drive and Wasatch Drive, effectively leaving the pedestrian to traverse an unpaved path over lawn in order to reach the Legacy bridge. However, once the pedestrian crosses the bridge, good access to the main campus becomes available via the HPER mall.

# 03a

Site Analysis

Proposed Dental Building Facility Plan | University of Utah



Pedestrian 

## Adjacencies

With respect to collaboration with the Medical School, the location of the proposed Dental School on the Health Sciences campus will work well. As noted in the discussions of Wayfinding and Access above, pedestrian, vehicular and public transportation access is provided to most destinations on the Health Sciences Campus. Because the proposed Dental School will utilize facilities in Research Park as well as on the Health Sciences campus, transportation issues will be a factor in analyzing the viability of this Site in terms of access for collaboration. Although there is pedestrian access between the Health Sciences Campus and Research Park, it is circuitous and could present special access challenges during the winter months. However, vehicular and campus shuttle connections permit reasonable access between the two campuses.

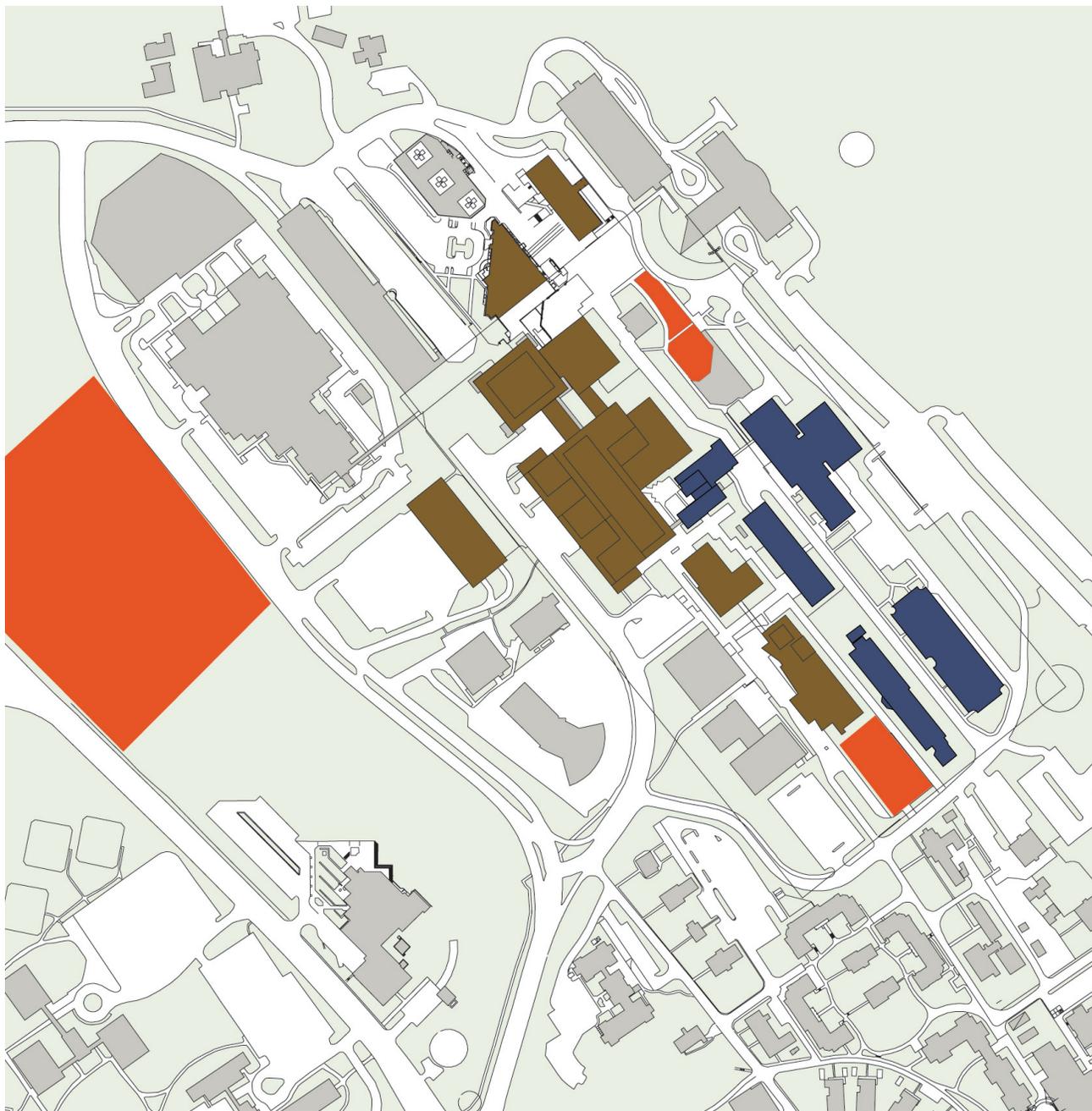
## Campus Considerations

The Campus Master Plan recognizes the coherence that the Health Science Academic Corridor brings to the Health Sciences Campus. The Plan notes that the Eccles Health Sciences Education Building contributes to this coherence because of its shared nature and optimized location. Placement of the proposed Dental School on Site A would further reinforce this coherence by concentrating additional Health Science education, research and clinical space around the core HSEB facility. In “Chapter 7: Implementation”, the Campus Master Plan designates this site as a Medical Research Lab location. The program of the proposed Dental School includes research as well as teaching and clinical functions and would be consistent with the intent of the Master Plan.

# 03a

Site Analysis

Proposed Dental Building Facility Plan | University of Utah

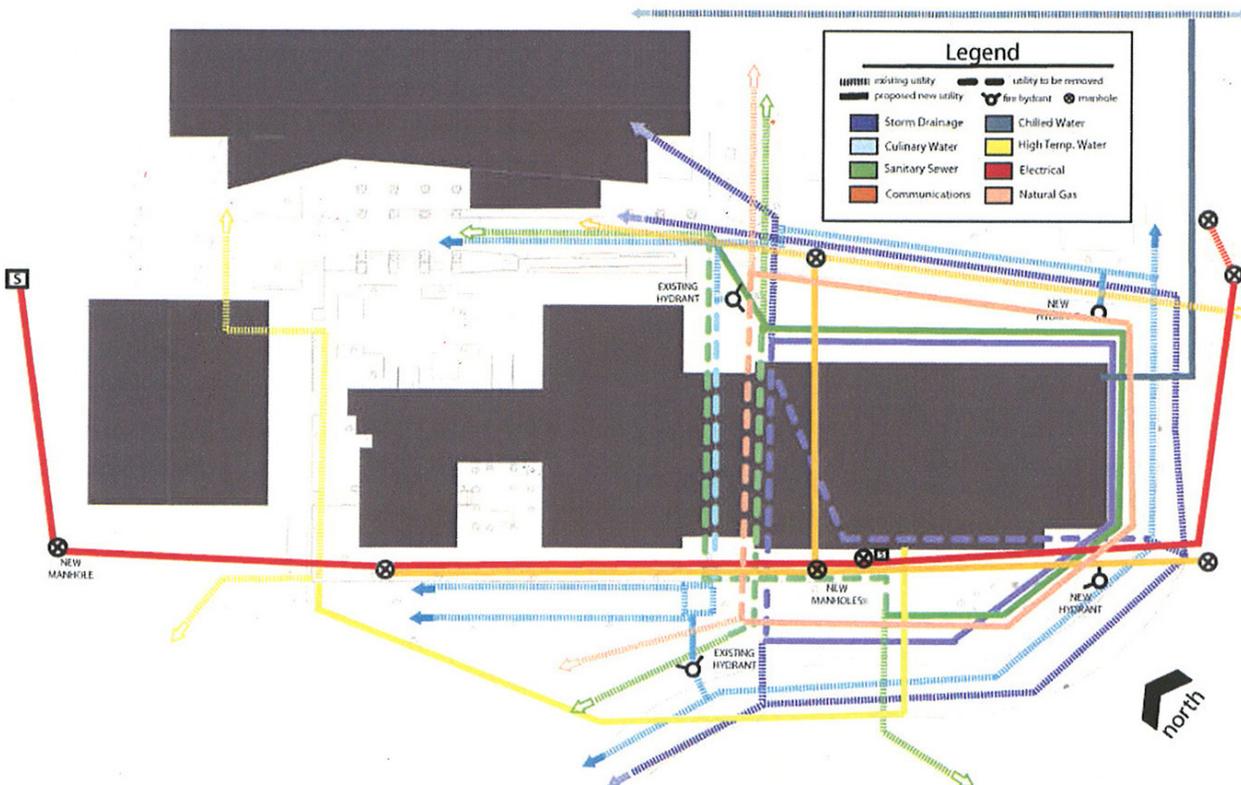


- Potential Sites 
- Research Labs 
- School of Medicine 

## Utilities

Currently, many of the utilities available in the vicinity of Site A follow a utility zone which runs east and west in an area to the south of the existing L.S. Skaggs Pharmacy and Eccles Health Sciences Education Buildings. These include storm drainage, culinary water, sanitary sewer, and natural gas. Another utility zone, running roughly parallel to the Health Sciences Academic Corridor, contains culinary water, storm drainage, and natural gas. Additionally, there are culinary water and storm drainage lines which run generally parallel with Medical Drive South near the south boundary of the site. Electrical service is available at a manhole located in Medical Drive South near the intersection with 2000 East Street. High temperature water service currently terminates directly north of the existing plaza located between the existing L.S. Skaggs Pharmacy and Eccles Health Sciences Education Buildings.

The construction of the proposed L.S. Skaggs Pharmacy Research Building will have a significant impact on the utilities in this area. The storm drainage, culinary water, sanitary sewer, and natural gas which lie in the east-west utility zone will be abandoned and will require relocation around the south perimeter of the proposed building.



## Sustainability & Environment

Although the site enjoys southern exposure unencumbered by adjacent structures, the site's longest side is oriented generally northwest to southeast which is not optimal for solar exposure. Sun shading devices on the east, south and west faces of any future building development on this site can help to address the solar gain and glare to be expected with the site's orientation.

Prevailing winds for this site come out of the Wasatch Mountains from the northeast, with occasional moderate gusts from the south. The mountain winds often occur in the early morning and at night due to cooling.

## Schedule

Construction on Site A could begin immediately since there are no existing structures to decant of occupants and demolish. Additionally, there are no utilities in place on this site which would require relocation before construction on a new building could begin. There are currently eighty cars in surface parking on this site which would require replacement as part of any new construction which might occur. During construction activity, the University would experience the loss of these parking spaces until replacement parking spaces could be built as part of new construction.

The existing curb cut and drive which serve the surface parking area also serve the parking ramp and structured parking below the Eccles Health Sciences Education Building. During any proposed new construction on Site A, this access would need to remain in service. This could have an impact on the configuration of any proposed building footprint contemplated for this site.

## Constructability

The Dental Building footprint will fill nearly all the available space on Site A and there is no open space adjacent to the site. The lack of on-site storage or contractor lay-down space will make construction on this site difficult. Construction logistics such as sequencing and the scheduling of deliveries will require careful coordination, and construction cost items such as crane time will likely be increased. Access and parking for construction crews will be difficult, and will likely increase construction costs as well.

## Site A Test Fit

### Introduction

Site A, currently in use as surface parking, occupies one of the southernmost remaining development sites identified in the Campus Master Plan for the Health Sciences Center. Along with the site for the proposed new L.S. Skaggs Pharmacy Research Building, this site completes the terminus of the Health Sciences Academic Corridor and provides an important access point to the Health Sciences campus from Medical Drive South. Locating the proposed new Dental School on this site would provide the benefit of direct pedestrian proximity to the School of Medicine, College of Pharmacy and College of Nursing, completing a core for Health Sciences learning and research at the University.

### Eccles Health Sciences Education Building Expansion

This site has previously been considered the location for the planned expansion of the Eccles Health Sciences Education Building. Currently, more seminar rooms and teaching spaces are needed in the HSEB. If the proposed Dental School Building is constructed in this location, there are several possibilities for providing additional space for the Eccles Health Sciences Education Building. These include constructing extra seminar rooms in the proposed new Dental School Building for use by the HSEB; converting existing Dental program space in the HSEB to seminar rooms; and converting existing HSEB Bioinformatics space into classroom space. It should be noted that the space list in the 2006 Dental Master Plan did not include any extra seminar rooms or other teaching spaces.

### Donor Identity

The donors for the Dental Building have not expressed a need to have a building with a separate, unique identity; therefore housing the Dental program in a new facility that would be architecturally consistent with the existing Eccles Health Sciences Education Building would be a viable development option.

### Test Fit

A large part of the appeal of locating the proposed new Dental School building on this site is the ability to extend the primary circulation spine currently in place in the Eccles Health Sciences Education Building southward to form the organizational backbone of the new facility. A bridge linking the two buildings could link the spine, allowing continuous circulation. Further adding to the appeal of this site is the opportunity to share the existing parking ramp, which services the parking below the HSEB, for access to the proposed below-grade parking required by the Dental School.

Site A is somewhat smaller than the other sites under consideration in this study. Therefore, the test fit for this site is based on using a four-story building prototype with a mechanical penthouse shown above the fourth floor. This allows lateral expansion of the building to the south to accommodate future growth of the school. Another option for expansion would be to construct a four-story building with a larger footprint and “shell” one of the floors for future build-out. However, this would substantially increase initial costs; therefore the diagrams included in this study indicate the smaller footprint and south expansion option.

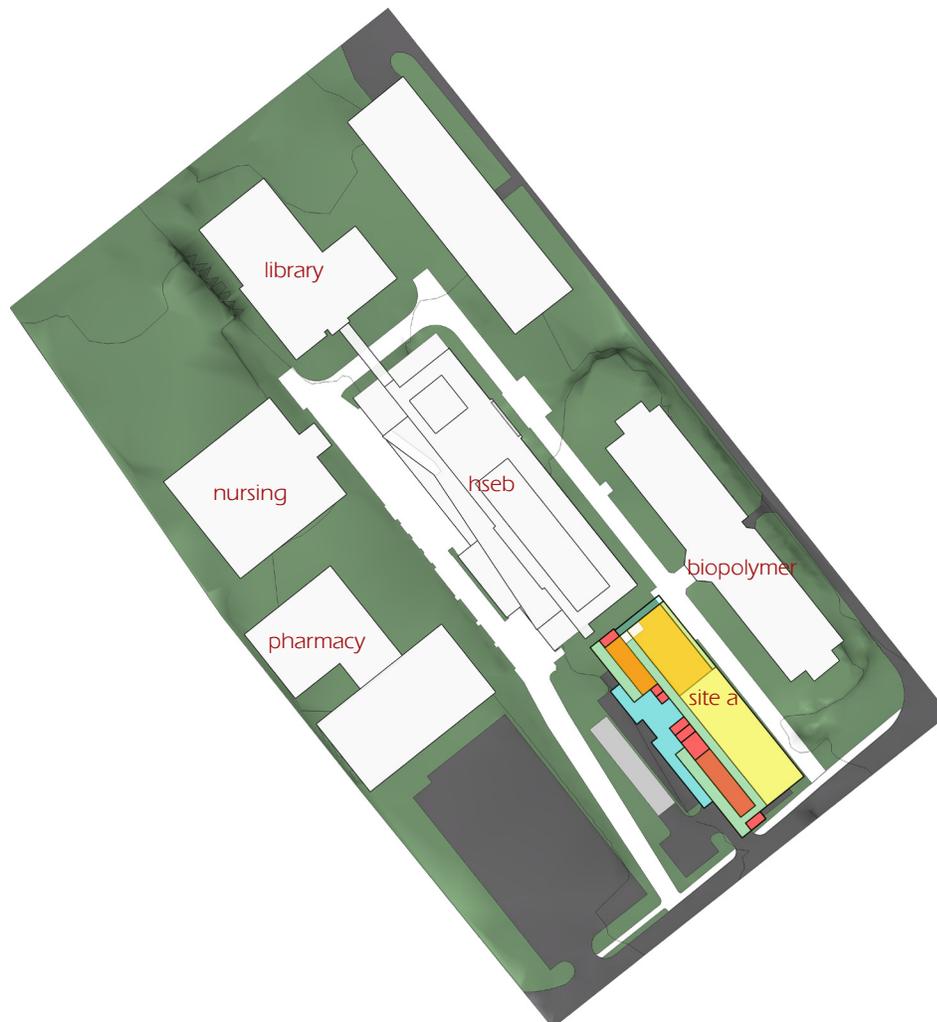
Placement of the north edge of the prototype footprint is based on maintaining an appropriate distance from the Health Sciences Education Building to permit maintaining natural light availability to the existing windows on its south facade. This distance will be a function of the area of the windows in the north wall of the new building as defined by the International Building Code and will need to be determined in the design phase. It should be noted that the existing cooling tower in this area will need to be relocated to permit access from the existing parking structure under the HSEB to the proposed new below-grade parking structure under the Dental School.

The eastern edge of the footprint is determined by leaving room to place shoring immediately to the west of the existing access pavement that parallels the Biomedical Polymers Research Building. This will permit uninterrupted fire apparatus access to the Health Sciences campus during construction of the proposed new Dental School.

Maintaining the existing parking ramp serving the Health Sciences Education Building determines the limit of the building footprint on the west side of the site.

To the south, the footprint must allow adequate distance to accommodate vehicle turning movements to the HSEB parking ramp as well as the proposed future expansion.

Should this site be selected for development for the new Dental School, care should be taken during design to insure that the upper floor level remains below 75 feet above grade, to avoid high-rise classification as defined by the International Building Code.



## Parking

As shown in the parking demand table in Section Two of this study, the new Dental School will generate a need for 172 parking spaces to serve clinic patrons, faculty and staff. Construction of the proposed new Dental School on Site A displaces 80 existing parking spaces which must be replaced by the new facility, for a total of 252 parking spaces that must be provided on Site A. Consistent with current Health Sciences Center practice, this does not include provision for student parking.

The facility study considered three options for fulfilling the Site A parking requirement.

*Parking Option 1:* This option accommodates the required parking in a 4-level parking structure below the building. Conceptual planning indicates that four full parking levels will provide 296 spaces, resulting in an extra 44 spaces being provided in this option.

*Parking Option 2:* This option proposes two levels of parking below the Dental School, placing the remainder of the required spaces in a new stand-alone, self-contained parking structure. The stand-alone structure would be directly east of the E.E. Jones Medical Science Building (to the east of Site A), in a location consistent with the Campus Master Plan. As this location is currently being used for surface parking, the Dental School project would need to increase its parking requirement to include replacement spaces for those displaced by the new structure. The displaced parking spaces are estimated to be 102, increasing the total parking requirement for Option 2 to 356 spaces. Two levels of parking below the proposed Dental School building would accommodate 148 parking spaces, leaving 208 to be accommodated in the standalone structure.

*Parking Option 3:* This option is identical to Option 2, except that only one level of parking, accommodating 74 spaces, would be constructed below the new Dental School building. The standalone parking structure to the east of the site would provide the 282 remaining spaces.

Parking fees earned by any replacement spaces built by the project will be paid to campus parking services.

*Eccles Plaza Parking Structure:* In the initial discussion phase of this facility study, a new parking structure located in the area currently occupied by the Eccles Plaza was considered for meeting the Dental School parking demand. Although the Campus Master Plan identifies this location for a potential parking structure, it is unlikely that it will be built for another ten years, and therefore does not provide a viable parking alternative for the Dental School project.

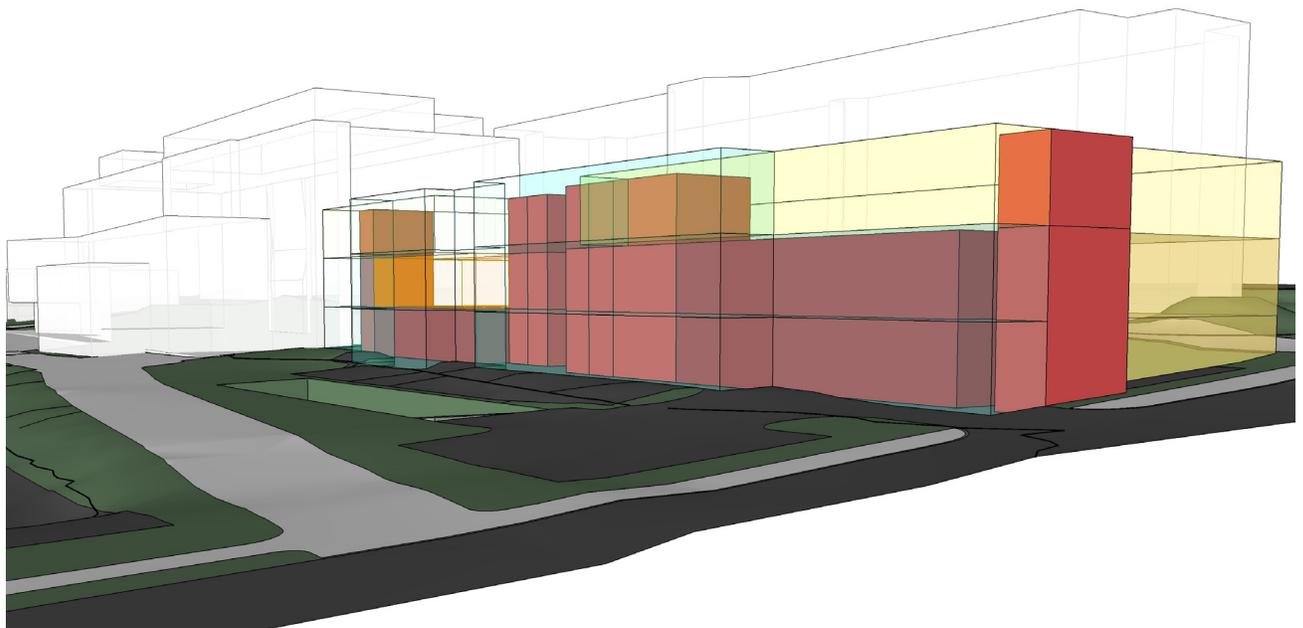
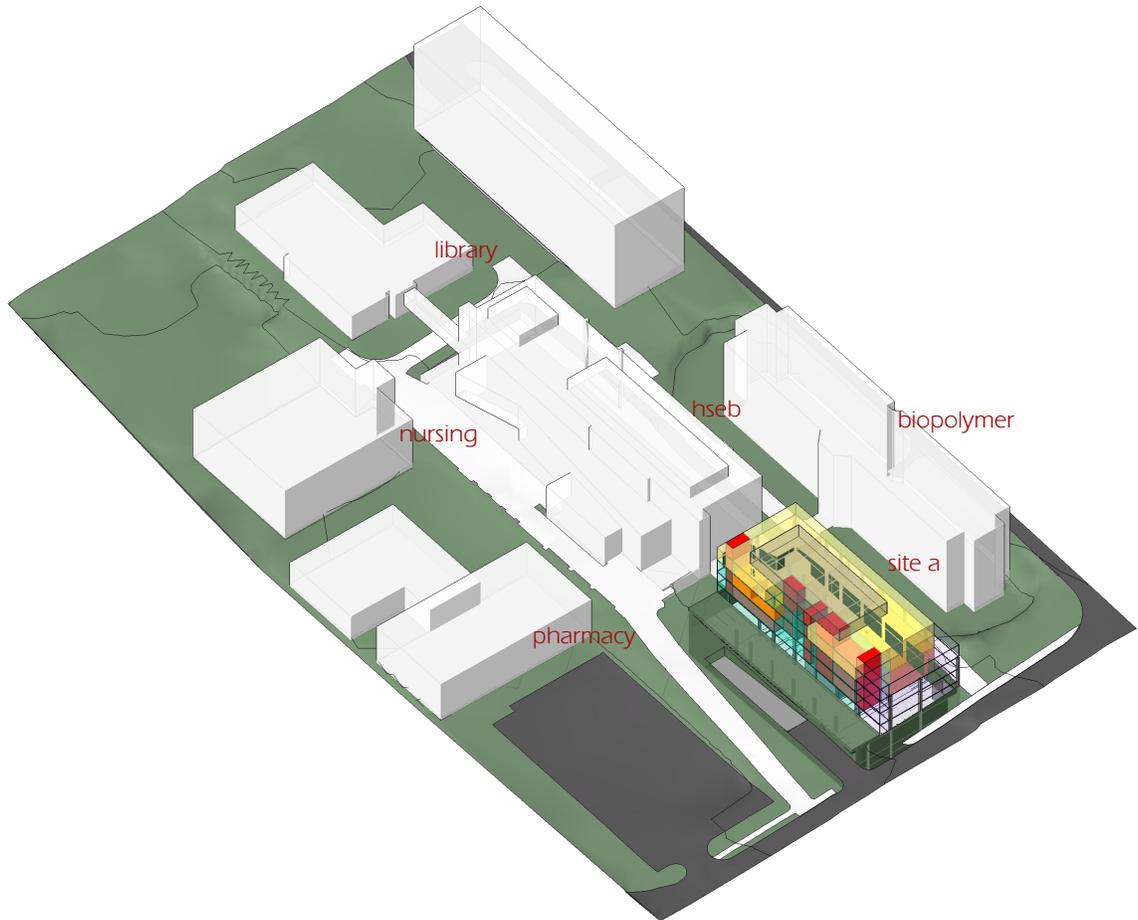
## Traffic

During the facility study process, the University decided to undertake a traffic study to identify the impact of the proposed Dental School on the heavily trafficked roadways leading to Site A. The resulting Traffic Impact Analysis is included in Appendix H.

## Expansion

The four story building prototype that has been used to evaluate this site accommodates expansion by allowing area on the site for a thirty foot bay to be added to the south of the proposed building. This bay adds approximately 2,700 square feet per floor, multiplied by four floors for a total of 10,800 square feet overall.

The additional parking load generated by this expansion should be considered when determining the number of parking spaces to be included in the proposed new parking structure indicated east of the E.E. Jones Medical Science Building in the Campus Master Plan.



## Cost

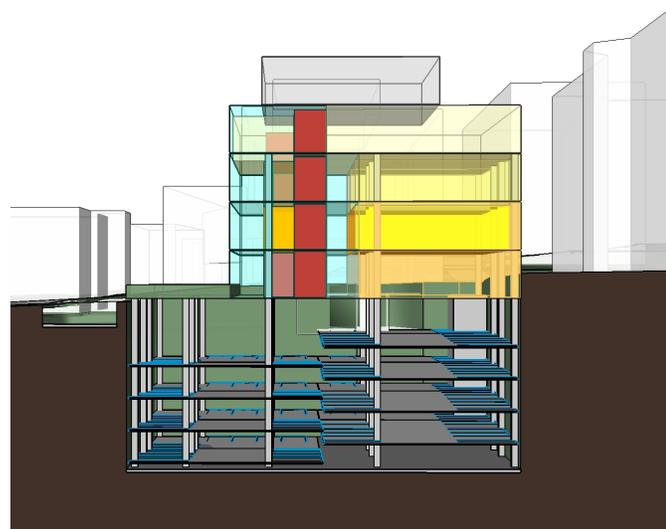
The Capital Budget Estimate included in this study reflects the cost associated with the four-story construction required by this site. This cost is slightly higher than for the three-story prototype used to evaluate the other sites under consideration and reflects increases in gross area to accommodate the additional elevator lobby, primary circulation, mechanical shafts and other core elements necessitated by the fourth floor. Additional special cost considerations for Site A include the shoring necessary to construct the below-grade parking structure and the lack of contractor staging space available within the tight perimeter of the site.

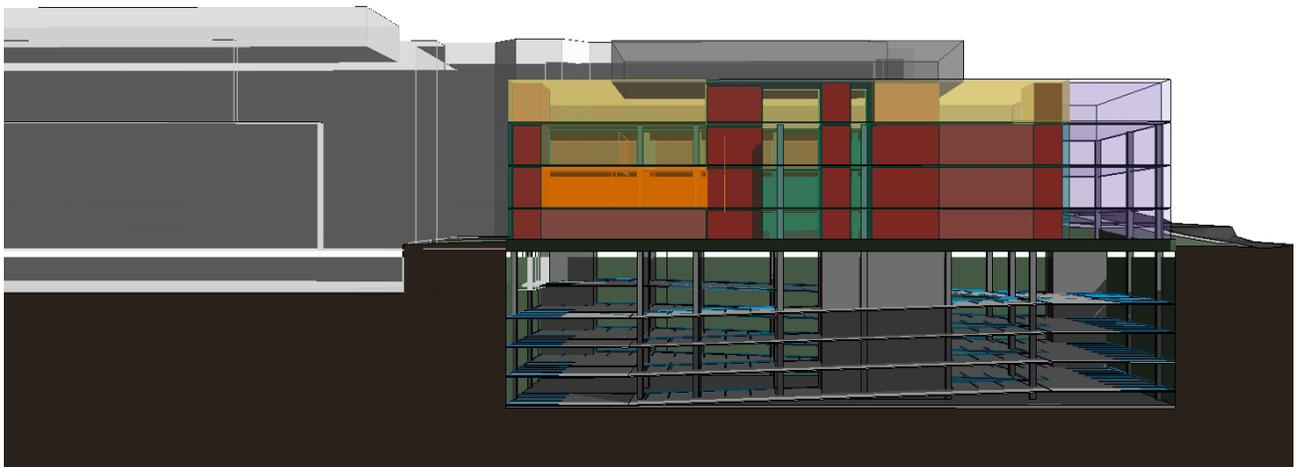
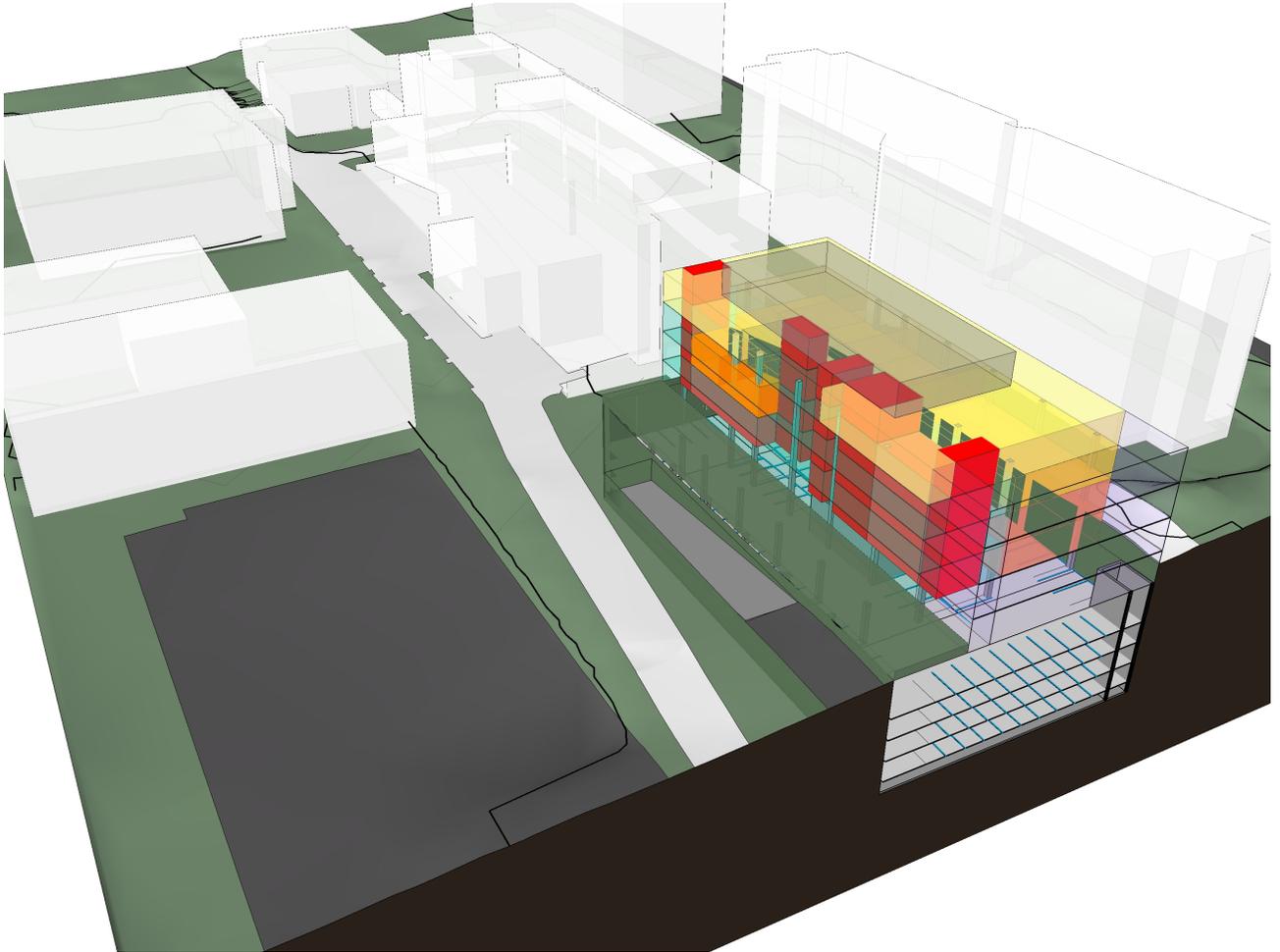
**Parking Option 1:** All required parking for the new school is provided below the building. Below-grade, multi-level structured parking of this type is estimated to cost up to \$50,000 per stall, so this represents a \$4-5 million cost to the project. The Capital Budget Estimate for Site A, Option 1 reflects this cost.

**Parking Option 2:** Two levels of parking are proposed below the Dental School, with the remainder of the required parking in a new standalone structure to be located east of the E.E. Jones Medical Science Building. Construction of the standalone parking structure would also require reconfiguring the access road currently serving the surface parking in this area. The Capital Budget Estimate for Site A, Option 2 reflects this cost.

**Parking Option 3:** Only one level of parking is proposed below the Dental School, with the remainder of the required parking in a new standalone structure to be located east of the E.E. Jones Medical Science Building. As in Option 2, construction of this parking structure would require reconfiguring the access road currently serving the surface parking in this area. The Capital Budget Estimate for Site A, Option 3 reflects this cost.

There is no funding currently available for the University to supplement the project budget so that the new parking structure can be constructed as part of the proposed Dental School project.









# 03d

Site Analysis

Proposed Dental Building Facility Plan | University of Utah

## Introduction

Located in the University's Research Park, Site D is positioned on undeveloped land between the University of Utah Orthopaedic Center and the Health Education Professions Building. This location, on Wakara Way near the intersection with Foothill Boulevard, is easily visible as one enters the Park from the west. Given this visibility, a new facility in this location could augment the teaching and clinical missions of its immediate neighbors to create a potential academic and clinical "gateway" at the western entrance to Research Park.

# Overall Information

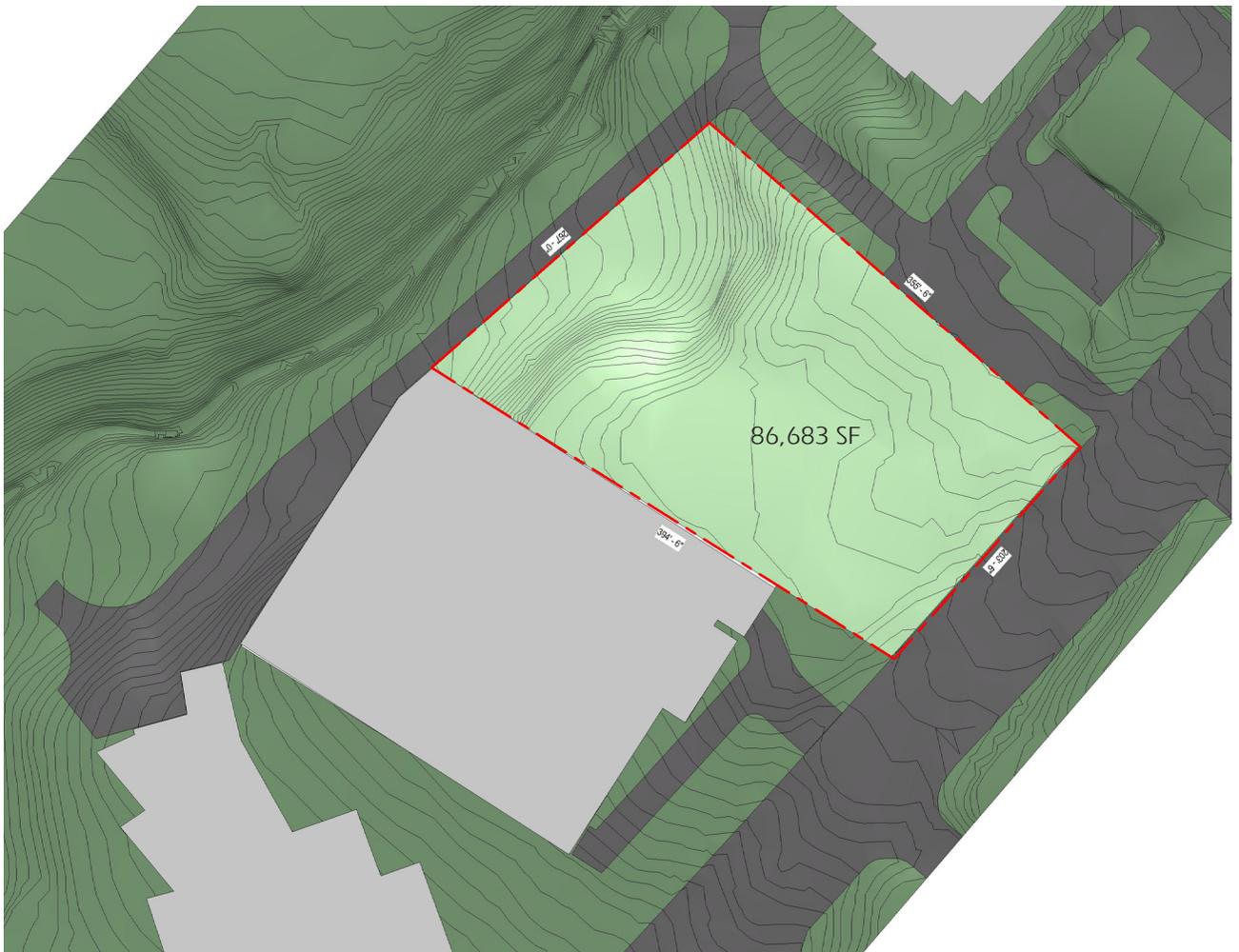
## Site Location, Use & Characteristics

Site D enjoys a relatively level surface with very little slope from east to west over its predominant exposure along Wakara Way. There is considerable slope on the northern edge of the site as it descends from south to north to match grade with Red Butte Creek. While the level area of the site currently supports very little plant life in the form of trees and shrubs, the north embankment is heavily vegetated in Gambel Oak.

The site is bounded on the north by a service drive which leads to the shipping/receiving dock of the Orthopaedic Center and parallels Red Butte Creek. This drive experiences considerable drop from east to west as it approaches the dock area. The east edge of the site is formed by a drive which services the parking and service areas of the Health Education Professions Building. The southern boundary of the site is created by Wakara Way and the west boundary of the site is created by the parking structure of the Orthopaedic Center.

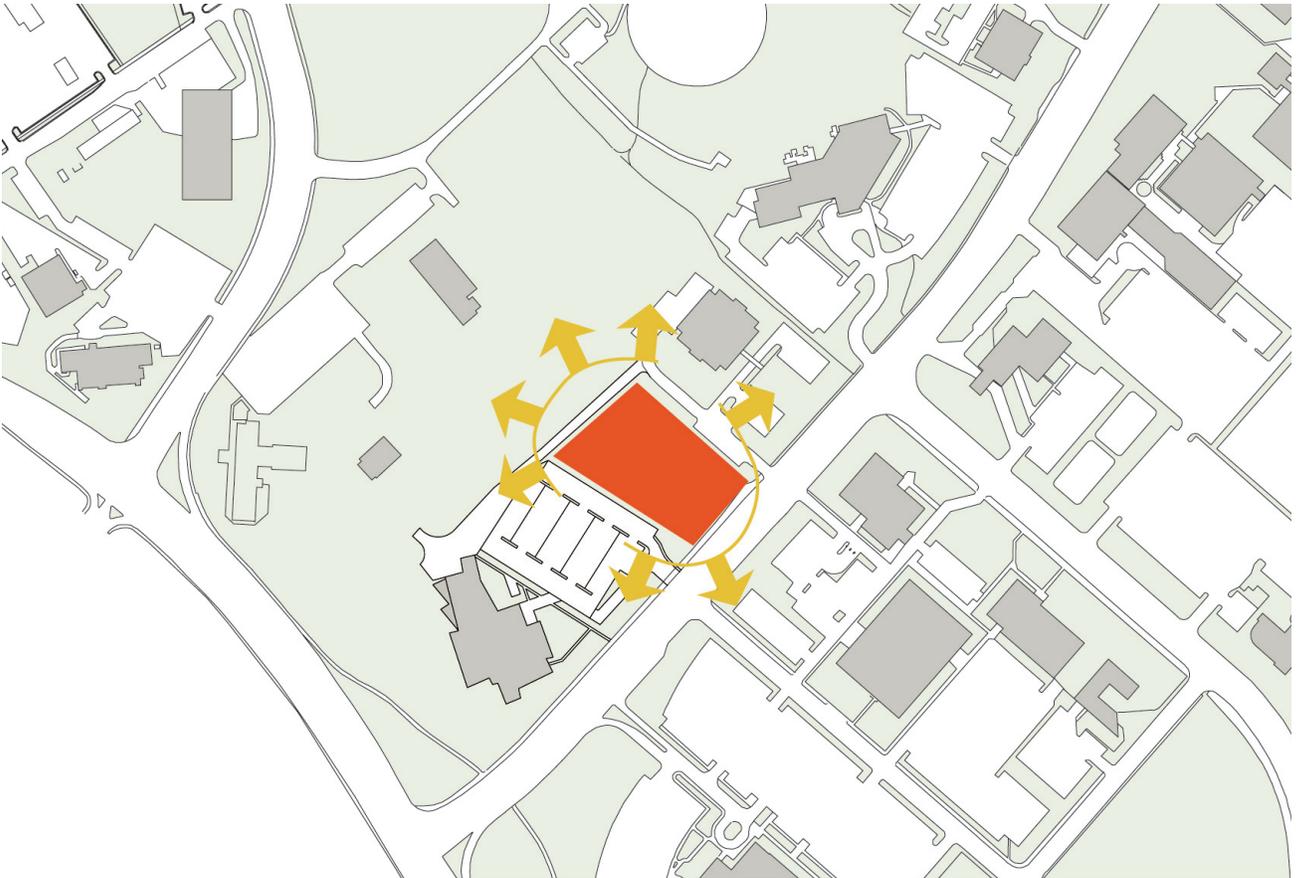


Site D 



## Views

Any new building located on Site D would be distant enough from adjacent buildings to allow virtually unimpeded views in all directions with the exception of views directly to the west which are blocked by the Orthopaedic Center. Even this, however, is mitigated somewhat by the fact that Site D is slightly higher in elevation than the Orthopaedic Center site and the upper floors of a new building may still enjoy pleasant views of the Salt Lake Valley. It may be the view to the south that could be considered the most impressive, with Mt. Olympus rising in its full exposure on a directly southward axis.



Views 

## Access / Wayfinding

### Vehicular Access & Parking

With its immediate access to Wakara Way, Site D benefits from convenient vehicular service via Foothill Boulevard. Approaching the site traveling eastbound along Wakara Way requires a left turn at the service road leading to the Health Education Professions Building. This is due to the median in Wakara Way which separates east and west traffic. Vehicular access from the service road would avoid the U-turns in Wakara Way that would be required to access the site from its southern perimeter. Alternately, traveling westbound on Wakara Way, the visitor would be able to make right turns onto either the service road or an access point on the southern site boundary. This route would accommodate drivers arriving from Sunnyside Avenue via Chipeta Way.

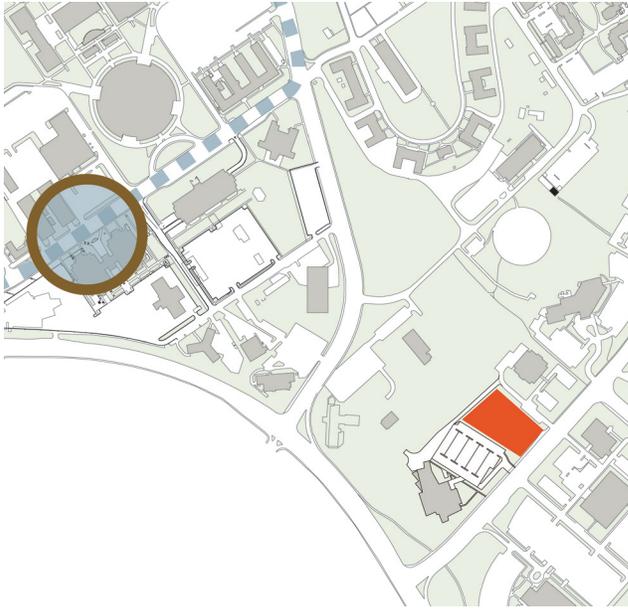
Fire apparatus and service vehicles would access the site using the same routes as normal vehicular traffic. Care would need to be taken however, to insure fire apparatus access along the west perimeter of the site adjacent to the Orthopaedic Center parking structure.

### Public Transportation

Both the Utah Transit Authority and University Commuter Services provide service to Research Park as well as service between the Park, the Health Sciences Center and the Main Campus.

The University campus shuttle service provides access between Research Park, the Health Sciences Center and the Main Campus via routes that connect Wakara Way with Foothill Boulevard, Wasatch Boulevard, Mario Capecchi Drive and Medical Drive North, East and South. The shuttle service provides convenient connections to several destinations on the Health Sciences campus from routes which service the north University Hospital drop-off, the Huntsman Cancer Center, the Dumke Building, the Comparative Medicine Center / Radiobiology Lab and the E.E. Jones Medical Science Building. Further shuttle access is provided to the Main Campus and married student housing via several routes.

The Utah Transit Authority operates bus routes that provide access to Research Park from both Foothill Boulevard and Sunnyside Avenue via Wakara Way and Chipeta Way. One route connects Research Park to the Health Sciences Center via Wasatch Boulevard and Mario Capecchi Drive and arrives at the University Hospital via the north drop-off zone, providing several stops en route. These include stops from which the Health Sciences campus site can be accessed.



UTA: trax



Campus shuttle



UTA: bus



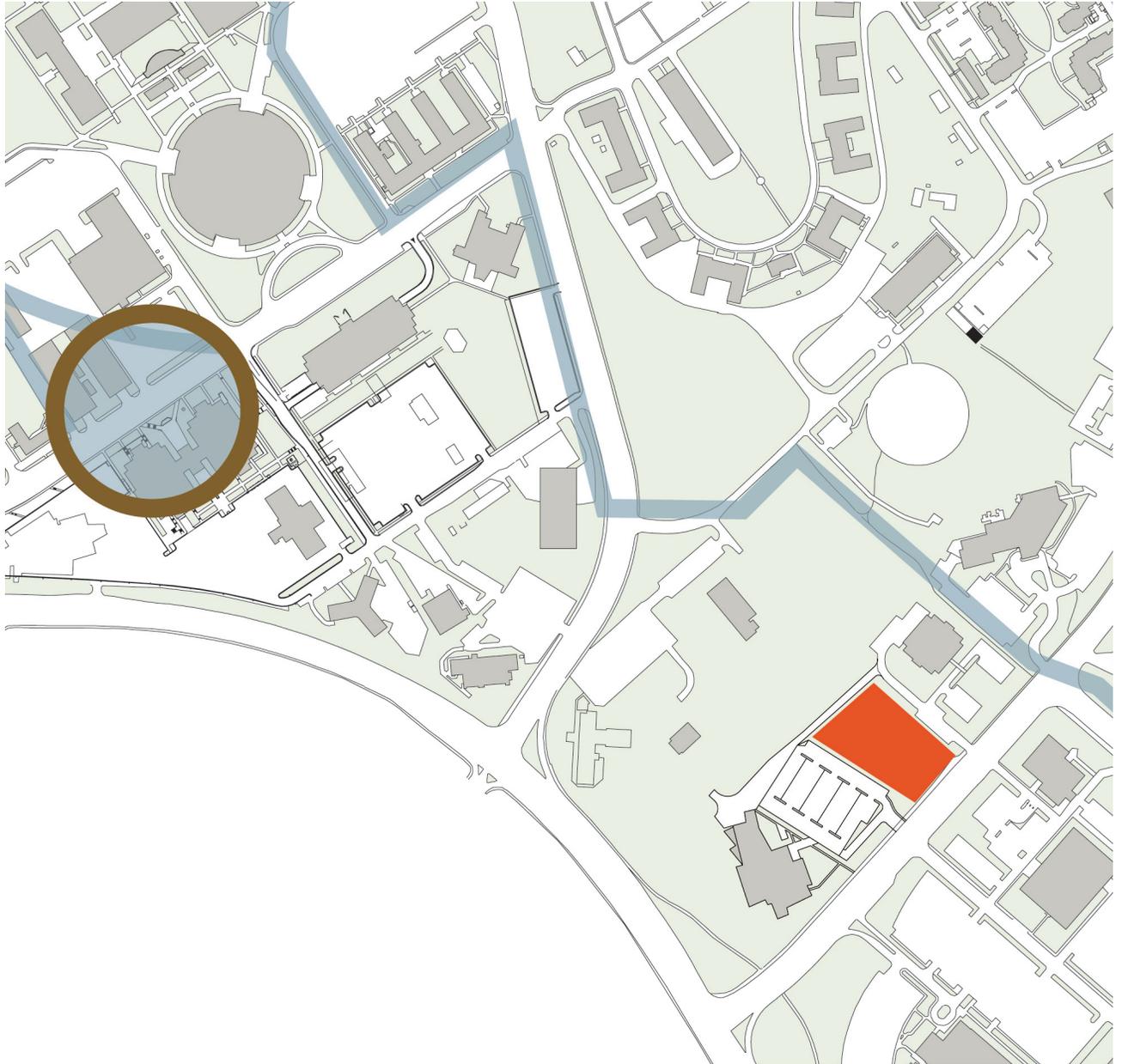
- UTA - Trax 
- UTA - Bus 
- Campus Shuttle 

### Pedestrian Access

Within Research Park, a paved sidewalk adjacent and parallel to Wakara Way connects Foothill Boulevard with Chipeta Way and provides convenient pedestrian access to the adjacent structures along the north edge of the Park. Access to the Park on the south side of Wakara Way is rendered more challenging due to the fact that pedestrians must cross the wide and busy street with non-signalled crosswalks. Once across Wakara Way, the pedestrian is further challenged by the lack of a sidewalk along the south side of the street. This condition reflects the fact that Research Park was originally conceptualized as a commuter park with ample surface parking serving each building destination. In response to the Park's increasing density, the University is currently undertaking a program to install more sidewalks to accommodate increasing pedestrian usage.

Pedestrian linkage with the Health Sciences campus is tenuous but possible along a route that traverses Fort Douglas, eventually arriving at the Health Sciences Center near the intersection of Medical Drive South and 2000 East Street.

Pedestrian connection to the main campus is impeded not only by the distance which must be traveled, but also by the lack of paved pathways. Pedestrians traveling this route would be required to traverse a substantial unpaved distance along Foothill Boulevard only to encounter the barriers created by crossing the heavily-utilized vehicular corridors of Wasatch Boulevard and South Campus Drive before reaching the main campus.



Pedestrian 

## Adjacencies

Site D offers the benefit of being adjacent to both the Orthopaedic Center and the Health Education Professions Building. Dental education shares research functions with the Orthopaedic Center and this adjacency would enhance collaboration. The Health Education Professions Building houses the Gross Anatomy component of the University's Health Science education curriculum, which is a fundamental aspect of Dental Education. Since the proposed Dental School will utilize facilities on the Health Sciences campus as well as in Research Park, transportation issues will be a factor in analyzing the viability of this site in terms of access for collaboration. Although there is pedestrian access between the Health Sciences campus and Research Park, it is circuitous and could present special access challenges during the winter months. However, vehicular and campus shuttle connections permit reasonable access between the two campuses.

## Campus Considerations

As noted in the Campus Master Plan, development within Research Park is guided by a Master Plan which seeks to "provide an attractive physical environment that will attract and promote the growth of research oriented, high technology industry to assist the economic development of Utah and in the future, provide building space and financial resources to accommodate the University's possible need for growth and expansion." Growth within the Park reflects this goal and has included the development of a number of teaching and research facilities with ties to the Health Sciences Center. Locating the proposed Dental School on Site D would be consistent with this trend.

The Campus Master Plan Chapter 7: Implementation does not indicate development on this site and therefore does not assign a usage recommendation.

## Utilities

Because Research Park was conceived as a contemporary office park, its initial development included the placement of all necessary utilities in its infrastructure corridors. This includes the Wakara Way infrastructure corridor which services Site D.

Unlike the Health Science Center and Main Campus however, Research Park does not have access to high temperature and chilled water from a central plant. Any new construction in Research Park must therefore be self-supporting in terms of heating and cooling service. Additionally, since utilities service fees in Research Park are paid directly to either Salt Lake City or private utilities providers, the Operating and Maintenance Budgets for any new buildings in the Park must account for these on-going costs.

## Sustainability & Environment

Site D enjoys southern exposure unencumbered by adjacent structures. The site would allow building placement and configuration with its longest side facing south, which is considered ideal for controlling heat gain and glare. Horizontal sun shading devices and light shelves on the longer south exposure permitted by this site could help to improve energy performance. Heat gain and glare on the east and west building faces could be addressed by reducing fenestration and using screening devices to help control solar exposure on these facades.

Prevailing winds for this site come out of the Wasatch Mountains from the northeast, with occasional moderate gusts from the south. The mountain winds often occur in the early morning and at night due to cooling.

## Schedule

Construction on Site D could begin immediately since the site lies completely fallow. Only normal clearing and grubbing of the site would be necessary before excavation and foundation work could commence. Additionally, there is adequate staging and lay-down space on this site so that construction activity would not be impeded by any unusual staging and sequencing requirements.

## Constructability

Site D does not present any constructability issues. It is readily accessible and appears to have sufficient space for contractor lay-down and on-site storage. It is likely that contractor parking could be accommodated either on the site itself or in one of the adjacent parking lots



- Potential Sites 
- Research Labs 
- School of Medicine 

## Site D Test Fit

### Introduction

This site is located in Research Park near the intersection of Wakara Way and Foothill Boulevard which would place the proposed new Dental School near the western “gateway” to Research Park. Positioned on undeveloped land between the University of Utah Orthopaedic Center and the Health Education Professions Building, this site is easily visible as one enters the Park from the west. Placement of the Dental School in this location would benefit from proximity to the Orthopaedic Center and the Health Education Professions Building. The School shares research interests with the Orthopaedic Center and utilizes the Gross Anatomy lab contained in the Health Education Professions Building. Given the shared clinical, research and teaching missions of these facilities, the new Dental School could augment its immediate neighbors to create a potential academic and clinical “gateway” at the western entrance to Research Park.

### Test Fit

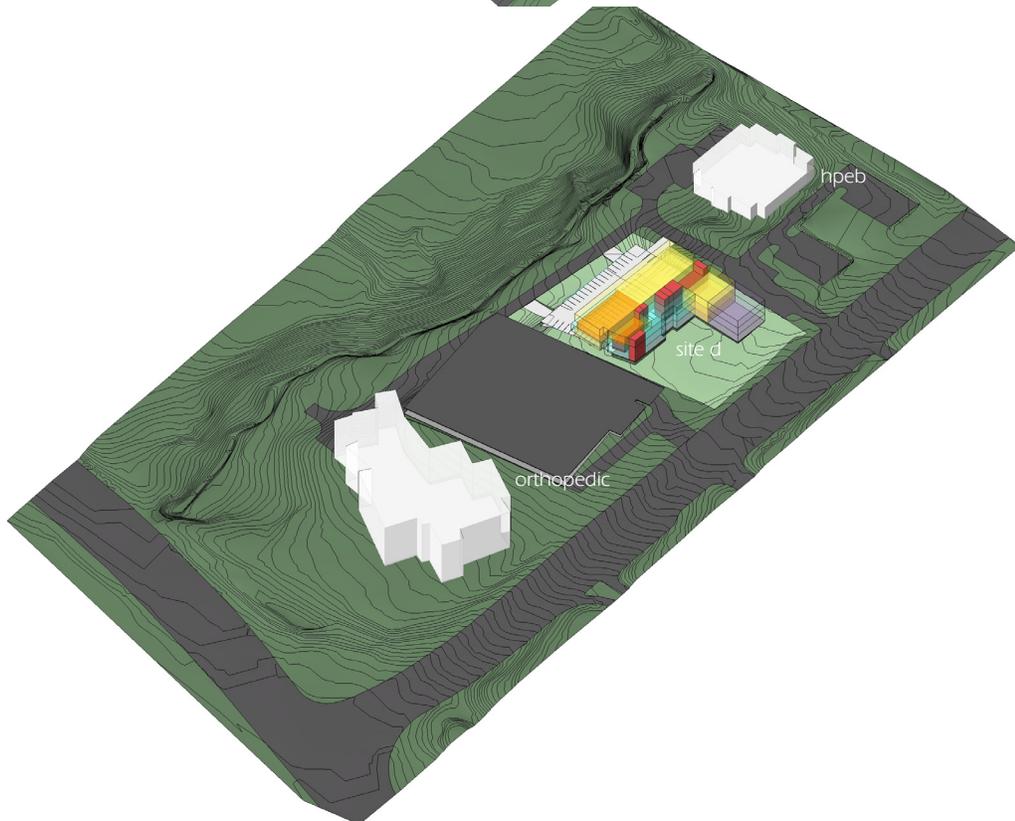
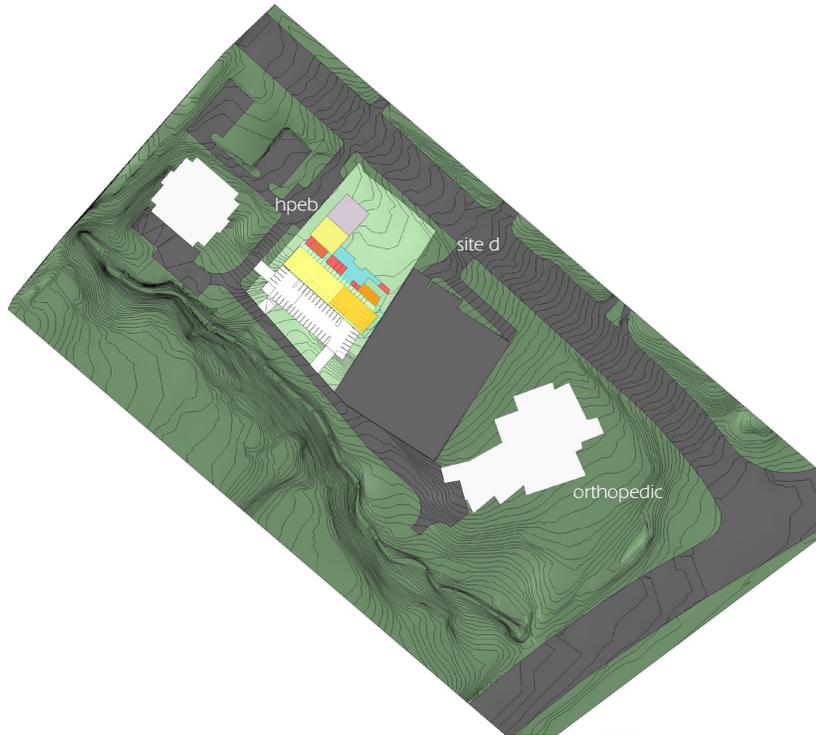
Site D is of adequate size to house the proposed Dental School program in a three story building, provided that structured parking is considered. If a south-facing orientation is desired, the north to south width of the site suggests an L-shaped building. The L-shaped three story building prototype with a roof-top mechanical penthouse has therefore been used as the basis for the test fit on this site.

Placement of the north edge of the prototype footprint is based on taking advantage of the natural grade to provide access to the parking structure. The Dental School building proper is then located adjacent to the structure for direct access into the building from parking. Since it is recommended that the upper deck of the structure be covered, a “class-A” condition is created where clinic patrons, students, faculty and staff enjoy protection from the weather while entering the School.

The eastern edge of the footprint is determined by leaving enough distance from an assumed property line along the service road to permit appropriate openings in the east facade. This distance-to-opening area is defined by the International Building Code and needs to be determined during the design phase.

The southern limit of the building is flexible since shifting the building to the north for best parking structure placement leaves considerable development area on the south side of the site. This area could be used for surface parking, patient drop-off or as a landscaped courtyard.

Like the eastern edge, the western edge of the footprint is determined by leaving enough distance from an assumed property line concurrent with the east wall of the Orthopaedic Center parking structure to meet International Building Code requirements.



## Parking and Traffic

Since there is no parking on this site, the concerns with existing parking replacement that are associated with Site A are not present. This leaves the required parking for this site at 172 cars. This could be provided by a combination of structured parking on the north side of the proposed building location and surface parking on the south adjacent to Wakara Way. However, access to surface parking from Wakara Way would be primarily available to west-bound traffic because the street median blocks left-hand turns for east-bound traffic. A curb cut on Wakara Way to access surface parking may create a temptation for east-bound motorists to use U-turns at the Health Education Professions Building service road turn lane.

The area available for structured parking suggests the need for two suspended decks and one on-grade level to provide enough parking for the program and permit some excess to account for future expansion. The natural slope on the north side of the site creates an ideal situation for the introduction of an open, three-level parking structure. The slope of the service road to the east and north of the site is ideal for permitting separate access points to each of the three levels, thus eliminating the need for either speed ramps or internal ramping. This grade configuration also permits a substantial amount of the structure to be open, potentially eliminating the need for mechanical ventilation.

Campus Design and Construction has suggested that the upper deck of the structure be covered to eliminate the need for snow removal and to increase the useful life of the structure.

## Expansion

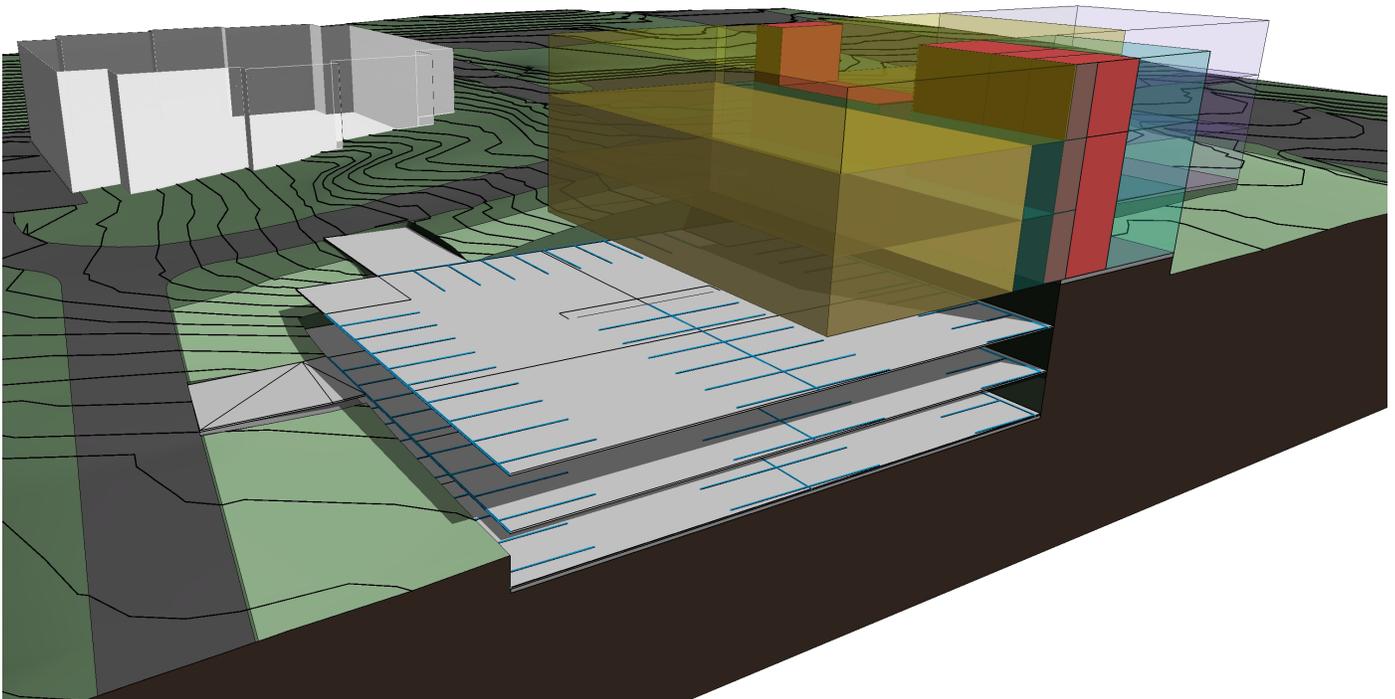
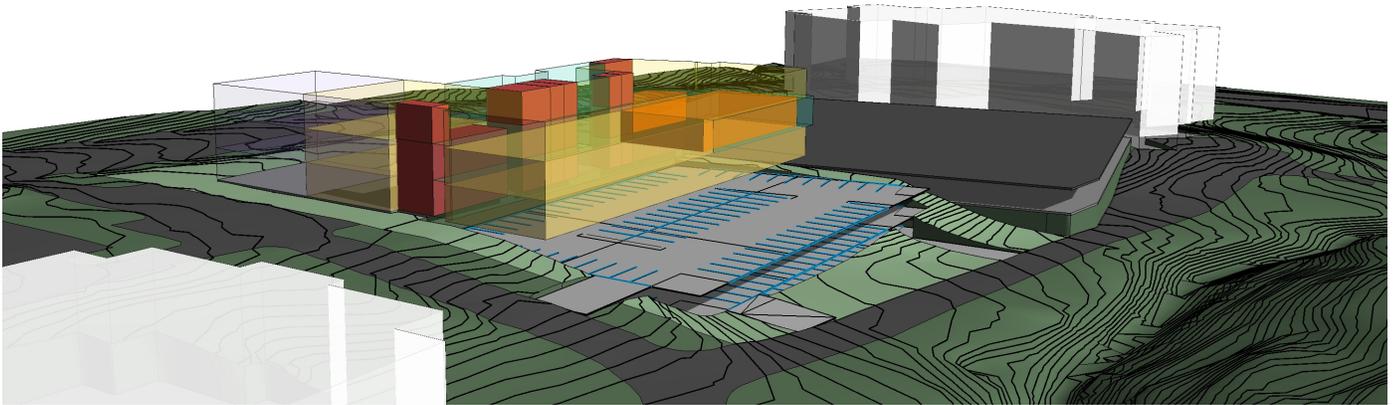
The three story building prototype that has been used to evaluate this site accommodates expansion by adding a bay in the southward direction to the short leg of the L-shaped footprint. This adds 3,600 square feet per floor multiplied by three floors for a total of 10,800 square feet overall.

The graphic representation of the parking structure for this site indicates three levels of parking which would provide parking in excess of the required 172 stalls. This excess could absorb the additional parking demand generated by the expansion, potentially eliminating the need for future expansion of the parking deck

## Cost

The Construction Budget Estimate included in this feasibility study for Site D reflects the cost associated with the three-story construction allowed by the size of this site. This cost is slightly less than for the four-story prototype used to evaluate Site A due to somewhat decreased gross area, since the additional elevator lobby, primary circulation, mechanical shafts and other core elements associated with the fourth floor are not required.

The Construction Budget Estimate also reflects the cost of a three-level open parking structure with grade access to each of the three levels. This configuration eliminates the need for mechanical ventilation and ramped parking.







# 03e

Site Analysis

Proposed Dental Building Facility Plan | University of Utah

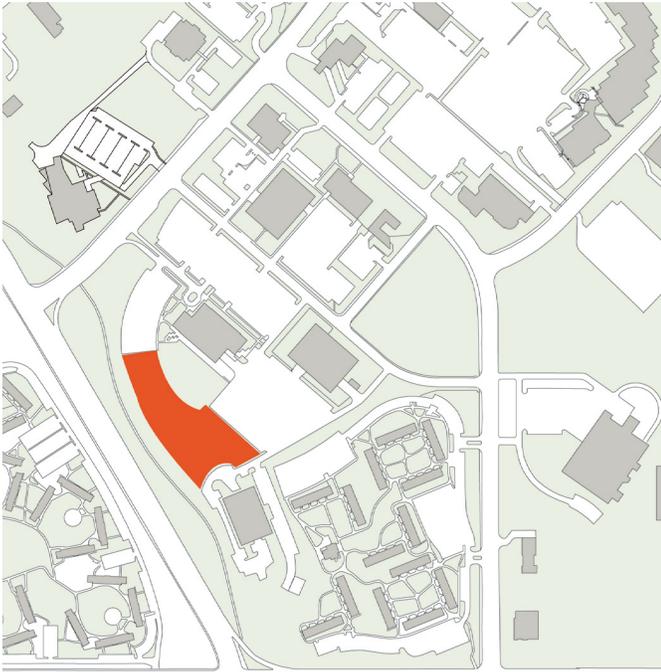
## Introduction

Site E occupies an undeveloped parcel positioned between the 600 Komas and 770 Komas buildings on the western perimeter of Research Park. A substantial slope rises from Foothill Boulevard to create a level plateau very well-suited to the placement of a large building footprint. The grade relationship of this parcel to Foothill Boulevard would insure great visibility of any building located on the site to passing motorists.

# Overall Information

## Site Location, Use & Characteristics

Occupying a large, generally level area, Site E is unoccupied by any existing structures or surface parking. A pair of large deciduous trees and several coniferous trees dot the site and are its only current occupants. The site is accessed from Komas Drive via a shared right-of-way with the 770 Komas Building which forms its southern boundary. The north edge of the site is established by the 600 Komas Building while the eastern boundary is defined by the surface parking located west of the 650 Komas Building. Together, the 600 Komas and 650 Komas Buildings frame the view into the site from Komas Drive. A serpentine pedestrian walk creates the western limit of the site. From this walk, the grade slopes downward to the west to meet Foothill Boulevard.

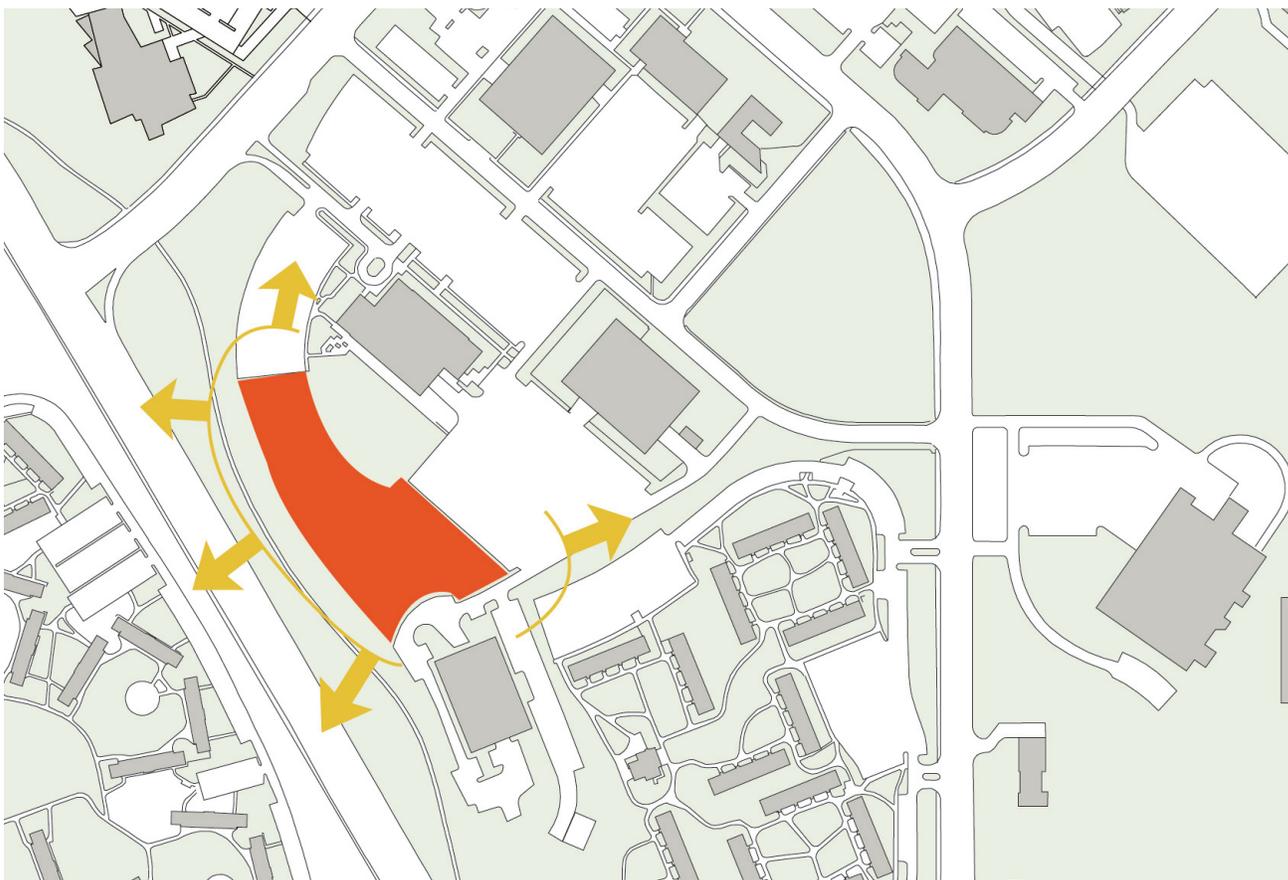


Site E 



## Views

The plateau-like configuration of Site E, with its sloping western edge combined with its elevation on the East Bench, creates an ideal location for maximizing views of the Salt Lake Valley and Wasatch Range. Impressive views are available in all directions. The Komas 600 and 650 Buildings affect the view to the east somewhat, although this impact is almost insignificant given the height of the Wasatch beyond. Although the Komas 770 Building creates an impediment to the southern view, this represents only a small part of the total southern panorama.



Views 

## Access / Wayfinding

### Vehicular Access & Parking

Vehicle access to Site E is available via an existing right-of-way which would be shared with the Kommas 770 Building. This right-of-way connects with Kommas Drive south of the Kommas 650 Building. Access to Kommas is possible from either Wakara Way to the north or Arapeen Drive to the south. Although a new building on this site would be highly visible to visitors arriving by car from Foothill Drive, once in the Park the visitor would be presented with a way-finding challenge since the route to the entrance to the new building would not be immediately apparent from either Wakara Way or Arapeen Drive. Once the visitor recognizes that vehicular access to the building is gained from Kommas, the length of the right-of-way road will continue to somewhat obscure the building entrance. This concern would primarily affect visitors to the clinical functions of the school; students, faculty and staff will quickly overcome the way-finding issues after the initial discovery of the route.

Fire apparatus and service vehicles would access the site using the same routes as described above. Design of surface parking areas would need to include accommodation for fire apparatus to serve the building perimeter.

### Public Transportation

Both the Utah Transit Authority and University Commuter Services provide service to Research Park as well as service between the Park, the Health Sciences Center and the Main Campus.

The University campus shuttle service provides access between Research Park, the Health Sciences Center and the Main Campus via routes that connect Kommas Drive with Foothill Boulevard, Wasatch Boulevard, Mario Capecchi Drive and Medical Drives North, East and South. The shuttle service provides convenient connections to several destinations on the Health Sciences Center from routes which service the north University Hospital drop-off, the Huntsman Cancer Center, the Dumke Building, the Comparative Medicine Center / Radiobiology Lab and the E.E. Jones Medical Science Building. Further shuttle access is provided to the Main Campus and married student housing.

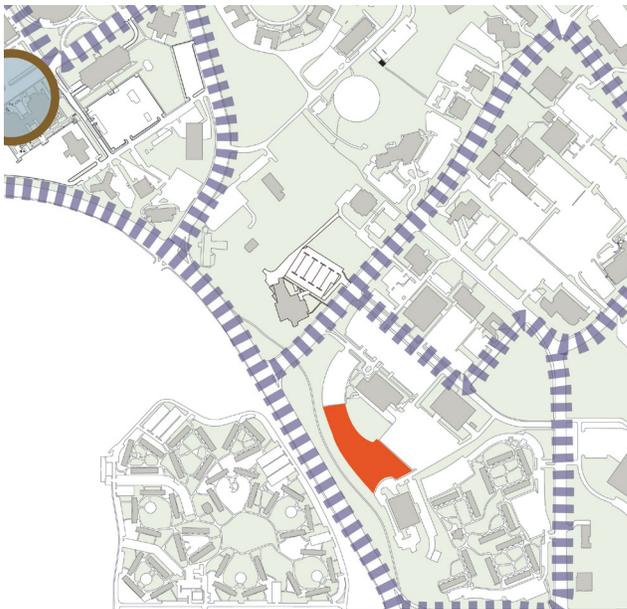
The Utah Transit Authority operates bus routes that provide access to Kommas Drive from both Foothill Boulevard via Wakara Way and Sunnyside Avenue via Arapeen Drive. At least one route connects Research Park to the Health Sciences Center via Wasatch Boulevard and Mario Capecchi Drive. The bus arrives at the University Hospital via the north drop-off zone, after several stops en route from which the Health Sciences campus can be accessed.



UTA: trax



Campus shuttle



UTA: bus



- UTA - Trax 
- UTA - Bus 
- Campus Shuttle 

### Pedestrian Access

Due to its undeveloped nature, there is effectively no paved pedestrian access to this site from the north, east and south. The serpentine walk which borders the site on the west leads to Sunnyside Avenue to the south and to Wasatch Drive to the north where it ultimately terminates at Hempstead Road, but does not connect the site to either the Health Sciences Center or the Main Campus. Development of this site as a location for the proposed Dental School could include paved walks to improve connectivity with the Park, especially from Komas Drive which serves as a destination for UTA service.

The University is currently considering increasing the network of pedestrian paths in Research Park to improve walkability within its boundaries. If Site E is developed for use by the Dental School, a path could be established to provide linkage with the route that connects Research Park with the Health Sciences Center along the route that traverses Fort Douglas, eventually arriving at the HSC near the intersection of Medical Drive South and 2000 East Street.

The combination of sporadic paved walks and the substantial distance which separates Research Park from the Main Campus creates a significant challenge for pedestrians wishing to travel between the two destinations. In addition to surmounting the barriers created by Wasatch Boulevard and South Campus Drive, a considerable amount of new walkway would need to be added to create a linkage between Site E and the Main Campus.



Pedestrian 



## Adjacencies

Site E does not offer immediate adjacency to the destinations that the Dental School shares in its collaboration with the Health Sciences. Although the Dental School shares research functions with the Orthopaedic Center, and gross anatomy learning experiences with the Health Education Professions Building, the locations of these two facilities on the north side of Wakara Way, combined with the lack of paved walks, makes pedestrian access challenging.

Pedestrian and vehicular connections with the Health Sciences campus are of importance to the success of the Dental School, since the School shares many facilities in that location. Although there is pedestrian access between the Health Sciences Center and Research Park, it is circuitous and could present special access challenges during the winter months. However, vehicular and campus shuttle connections permit reasonable access between Site E and the Health Sciences Center.

## Campus Considerations

In Chapter 5: Plan Elements, the Campus Master Plan notes that “there is an important opportunity at Research Park to infill gaps in the building and landscape fabric”. Site E, like Site D, is an ideal candidate for continuing the goal of infilling gaps in the Park’s development fabric. Placing the proposed Dental School on this site would participate in this infill and provide a use that is consistent with the Park’s mission.

Site E is not included as a development site in Chapter 7: Implementation of the Campus Master Plan. As with Site D, the Plan does not provide a recommendation for the usage of this site.

## Utilities

Because Research Park was conceived as a contemporary office park, its initial development included the placement of all necessary utilities in its infrastructure corridors. This includes the Komasa Drive infrastructure corridor which services the Komasa 600, 650, and 770 Buildings.

Unlike the Health Science Center and Main Campus however, Research Park does not have access to high temperature

and chilled water from a central plant. Any new construction in Research Park must therefore be self-supporting in terms of heating and cooling service. Additionally, since utilities service fees in Research Park are paid directly to either Salt Lake City or private utilities providers, the Operating and Maintenance Budgets for any new buildings in the Park must account for these on-going costs.

## Sustainability & Environment

Site E is oriented longitudinally north to south and laterally east to west. This configuration favors a building placement with its longer sides facing east and west which is not ideal in terms of solar exposure. Although views to the east and west are impressive, care would need to be exercised in designing fenestration for any building located on this site to minimize the impact of heat gain and glare, particular on its western facade.

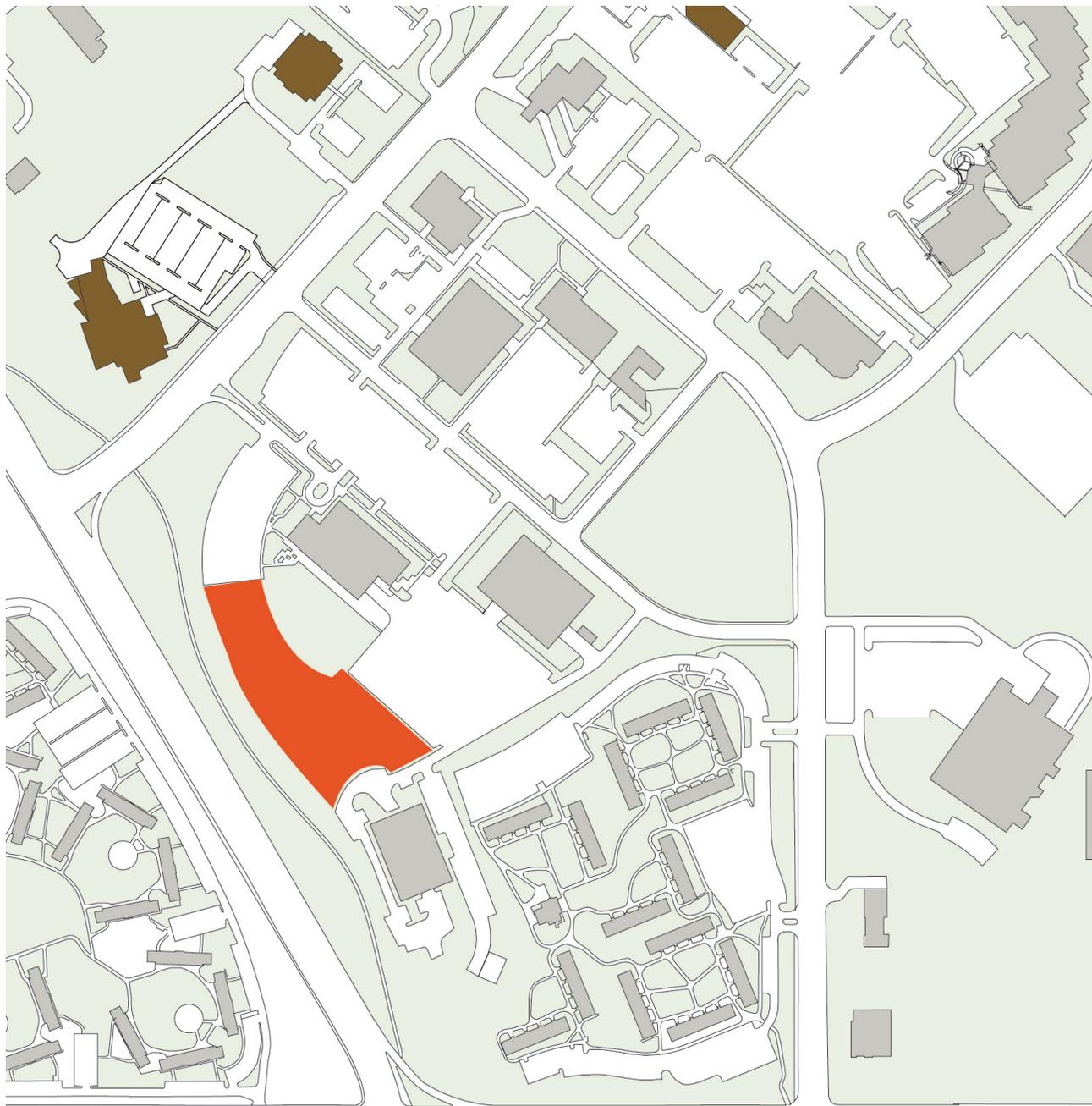
Prevailing winds for this site come out of the Wasatch Mountains from the northeast, with occasional moderate gusts from the south. The mountain winds often occur in the early morning and at night due to cooling.

## Schedule

Construction on Site E could begin immediately since the site lies completely fallow. Only normal clearing and grubbing of the site would be necessary before excavation and foundation work could commence. Additionally, there is adequate staging and lay-down space on this site so that construction activity would not be impeded by any unusual staging and sequencing requirements.

## Constructability

Site E does not present any site-related constructability issues. It is readily accessible and appears to have sufficient space for contractor lay-down and storage. It is likely that contractor parking could be accommodated either on the site itself or in one of the adjacent parking lots



- Potential Sites 
- Research Labs 
- School of Medicine 

## Site E Test Fit

### Introduction

Site E occupies a level plateau above a sloped berm rising east of Foothill Boulevard in Research Park. This site is sizable enough for the placement of a large building footprint and, assuming a three story building, can also accommodate all of the parking required for the new Dental School on grade. The high visibility of this site would be a great asset in terms of reinforcing the identity of the School in the community, especially considering its role in providing clinical services. Finding the building's entrance would present a way-finding challenge to first-time users however and this might mitigate the advantages of the high visibility from Foothill Boulevard.

### Test Fit

Site E is of adequate size to house the proposed Dental School program in a three story building while accommodating all required parking on-grade. If a west-facing orientation is considered acceptable, the simple, rectangular prototype footprint will fit comfortably. Therefore, the rectangular three story building prototype with a roof-top mechanical penthouse has been used as the basis for the test fit on this site.

The location of the prototype footprint is based on placing the building generally in the center of the assumed available site. The building is oriented parallel to the north to south longitudinal configuration of the site which also parallels the site contour.

This central location on the site provides adequate distance from the assumed property lines to permit unlimited openings on all building sides. It can also be inferred from this location that the distances from the building to the assumed property lines might allow the future design team to take advantage of provisions in the International Building Code that ease Construction Type requirements.

Site E is generous enough in proportion to permit great flexibility in building shape and placement and the orientation suggested in this Study represents only one of many configurations that could be possible on this site.

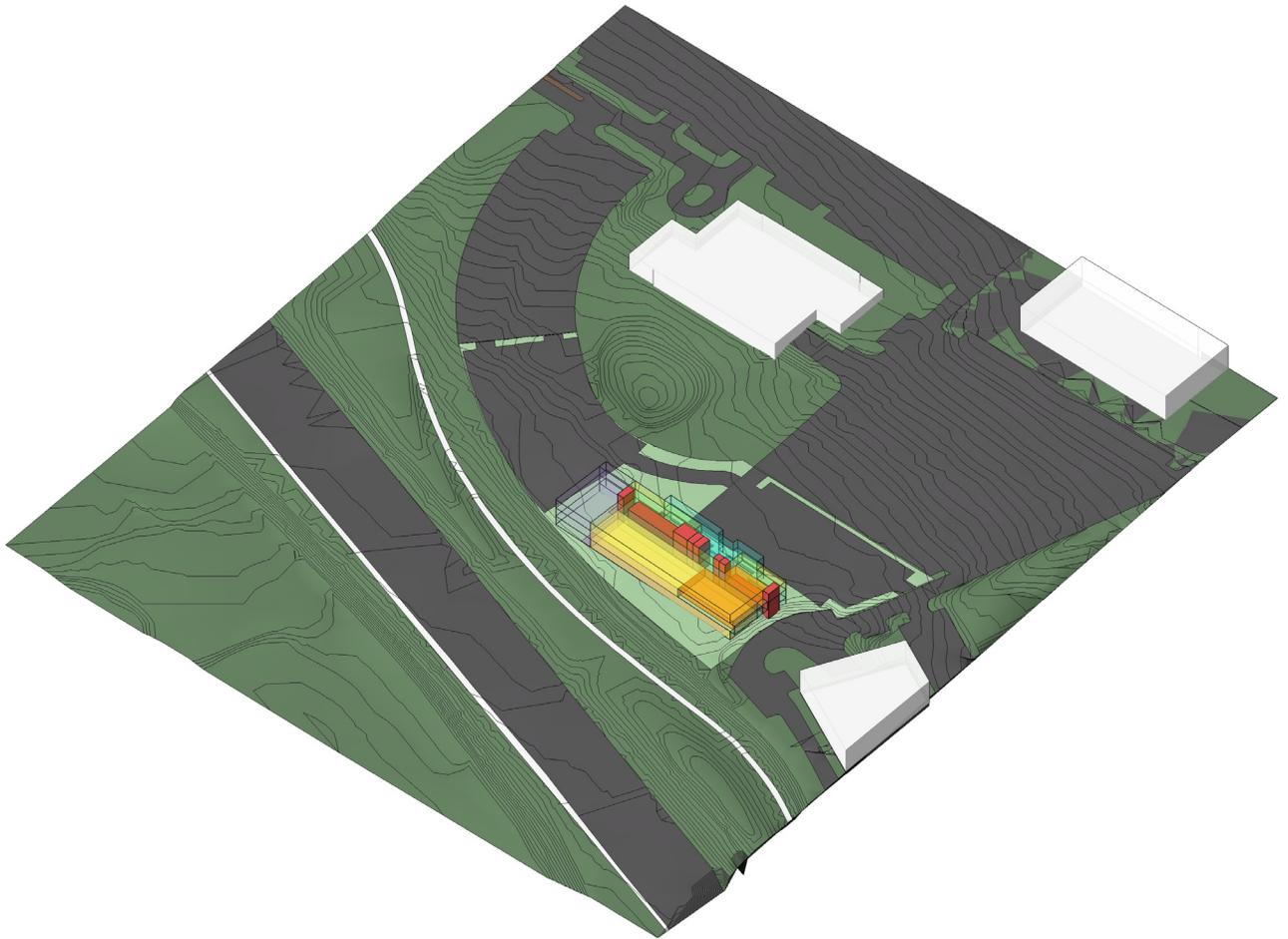
### Parking and Traffic

Since there is no parking on this site, the concerns with existing parking replacement that are associated with Site A are not present. This reduces the required parking for this site to 172 cars. This could be easily provided on this site by surface parking only. The graphic plan included in this study shows parking distributed evenly around the prototype footprint to maintain reasonable walking distances. Once in the design phase, it would be possible to develop a parking zoning strategy that places clinic and visitor parking adjacent to the main public entrance which faces east in the site diagram. The remainder of the faculty, staff and student parking could then be arrayed around the other sides of the building

### Expansion

The three story building prototype that has been used to evaluate this site accommodates expansion by adding a bay in the northward direction. This adds approximately 5,000 square feet per floor multiplied by three floors for a total of 15,000 square feet overall.

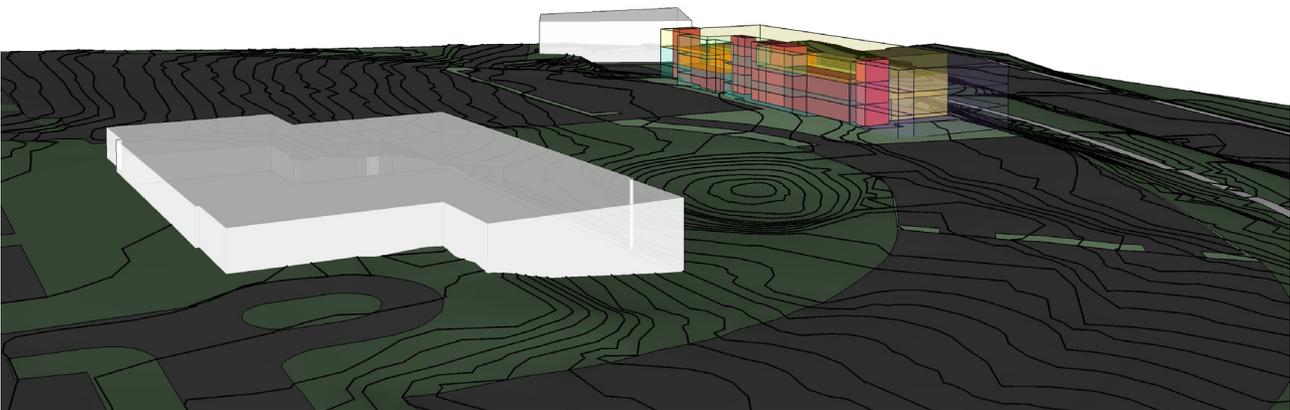
The graphic representation of the surface parking for this site indicates approximately 200 spaces which would provide parking in excess of the required 172 stalls required for the current program. This excess could absorb the additional parking demand generated by the future expansion, potentially eliminating the need for future expansion of surface parking. Alternately, the initial construction could accommodate immediate program needs only, with additional parking to be added at a later date as the building expands.



## Cost

The Site E Construction Budget Estimate included in this study reflects the cost associated with the three-story construction allowed by the size of this site. This cost is slightly less than for the four-story prototype used to evaluate Site A, due to somewhat decreased gross area since the additional elevator lobby, primary circulation, mechanical shafts and other core elements associated with the fourth floor are not required.

The Construction Budget Estimate also reflects the cost of surface parking only since the site is large enough to eliminate the need for structured parking.





# 04

## Cost Analysis

Proposed Dental Building Facility Plan | University of Utah

## Introduction

Section 4 contains:

1. A **Cost Summary** showing the costs for the sites and parking options considered during development of the facility plan.
2. **Capital Budget Estimate (CBE) forms** for Site A, Options 1 and 2, and Sites D and E. (The costs for Site A, Option 3, were extrapolated from those of Options 1 and 2; there is no CBE form for Option 3.) The CBE is a document used by the Utah State Division of Facilities Construction and Management and the University of Utah to establish and track construction project budgets. The CBE calculates the estimated total cost for construction of a facility, inflated to the assumed mid-point of construction. It identifies the building construction and site development costs, as well as related project “soft” costs: site improvements; hazardous materials abatement; architectural design fees; furnishings/equipment; information technology; percent for art program; testing/inspections; moving/occupancy; Campus Design & Construction management costs.

The planning consultants prepared a pre-construction cost opinion for the dental school building and inserted the cost figure into the CBE form to calculate the total Dental Building project costs. The pre-construction cost opinion was based on the anticipated building size of 70,000 GSF, as well as the desired quality level (equivalent to that of the University's Eccles Health Sciences Education Building).

## Cost Summary

The summary on the opposite page represents the opinion of probable cost for the different sites and parking options studied during the facility planning process.

Building and parking costs were separated so that team members could assess the impact of particular sites and parking configurations on overall project costs.

For information regarding each site's parking requirements and proposed configurations, see the Test Fit paragraphs of the individual Site Analysis sections.

### Cost Impact of Constructability Issues

It is estimated that the construction cost of a building on Site A will be higher than that of Sites D and E by approximately 10%, for two reasons:

1. The smaller Site A size requires a four-story building, rather than the three-story prototype used to evaluate the sites under consideration in this study. A four-story building will have more gross area to accommodate the additional elevator lobby, primary circulation, mechanical shafts and other core elements necessitated by the fourth floor, resulting in an increased building cost.
2. Construction on Site A will be more difficult due to the site's small size and the relatively crowded conditions of this area of campus. The lack of open space on the site or in surrounding areas will allow little or no space for contractor staging or on-site storage. Logistics, such as construction sequencing and the scheduling of deliveries, will require careful coordination, and construction items such as crane time will likely need to be increased. Adjacent existing building foundations will require shoring during construction of the proposed new building. Access and parking for construction crews will be difficult on this site.

## Cost Summary

### Site A - HSEB, Option # 1

Option A Building and Site	70,000 sf	\$263	\$18,431,626
Parking Under the Building, 4 Levels (296 Cars)	109,000 sf	\$118	\$12,869,792
<b>Total Construction Cost</b>			<b>\$31,301,418</b>
			CBE for Building
			\$26,991,443
			CBE for Parking
			\$14,873,373
			<b>Total CBE</b>
			<b>\$41,864,816</b>

### Site A - HSEB, Option # 2

Option A Building and Site	70,000 sf	\$263	\$18,431,626
Parking Under the Building, 2 Levels	148 Cars	\$33,576	\$4,969,211
Upper Campus Parking Structure	208 Cars	\$19,200	\$3,993,600
<b>Total Construction Cost</b>			<b>\$27,394,437</b>
			CBE for Building
			\$26,991,443
			CBE for parking under building
			\$5,771,902
			CBE for Upper Campus Parking Structure
			\$4,569,027
			<b>Total CBE</b>
			<b>\$37,332,373</b>

### Site A - HSEB, Option # 3

Option A Building and Site	70,000 sf	\$263	\$18,431,626
Parking Under the Building, 1 Level	74 Cars	\$29,954	\$2,216,577
Upper Campus Parking Structure	282 Cars	\$19,200	\$5,414,400
<b>Total Construction Cost</b>			<b>\$26,062,602</b>
			CBE for Building
			\$26,991,443
			CBE for parking under building
			\$2,770,689
			CBE for Upper Campus Parking Structure
			\$6,178,593
			<b>Total CBE</b>
			<b>\$35,940,724</b>

### Site D - Wakara Way

Option D Building and Site	70,000 sf	\$251	\$17,597,797
Parking Structure	219 Cars	\$24,462	\$5,357,097
<b>Total Construction Cost</b>			<b>\$22,954,894</b>
			CBE for Building
			\$25,431,773
			CBE for Parking
			\$6,040,572
			<b>Total CBE</b>
			<b>\$31,472,345</b>

### Site E - Foothill Drive

Option E Building and Site	70,000 sf	\$259	\$17,753,210
All parking is on grade	220 to 250 Cars		\$357,800
<b>Total Construction Cost</b>			<b>\$18,111,010</b>
			CBE for Building
			\$25,431,773
			CBE for Parking
			\$512,555
			<b>Total CBE</b>
			<b>\$25,944,327</b>

## CBE Cost Summary - Site A (Option 1)

<b>Project Name:</b>		<b>U of U School of Dentistry Site A, Option 1 (4 Parking Levels under the Building)</b>	
<b>Agency/Institution:</b>		University of Utah	
<b>Project Manager:</b>		0	
<b>Cost</b>			
<b>Cost Summary</b>	<b>\$ Amount</b>	<b>Per SF</b>	<b>Notes</b>
Facility Cost	\$ 31,301,330	\$174.87	
Additional Construction Cost	\$ -	\$0.00	
Site Cost	\$ -	\$0.00	
High Performance Building	\$ 469,520	\$2.62	
<b>Total Construction Cost</b>	<b>\$ 31,770,850</b>	<b>\$177.49</b>	
<b>Soft Costs:</b>			
Hazardous Materials	\$ -		
Pre-Design/Planning	\$ 231,511		
Design	\$ 1,957,507		
Property Acquisition	\$ -		
Furnishings & Equipment	\$ 5,336,298		
Information Technology:	\$ -		
Utah Art (1% of Construction Budget)	\$ 317,708		
Testing & Inspection	\$ 313,013		
Contingency	\$ 1,436,731		
Moving/Occupancy	\$ 100,000		
Builder's Risk Insurance (0.15% of Construction Budget)	\$ 47,656		
Legal Services (0.2% of Construction Budget)	\$ 63,542		
DFCM Management	\$ 200,000		
User Fees	\$ -		
Commissioning	\$ 70,000		
Other Costs	\$ 20,000		
<b>Total Soft Costs</b>	<b>\$ 10,093,966</b>	<b>\$56.39</b>	
<b>TOTAL PROJECT COST</b>	<b>\$ 41,864,816</b>	<b>\$233.88</b>	
<b>Previous Funding</b>	\$ -		
<b>Other Funding Sources</b> (Identify in note)	\$ -		
<b>REQUEST FOR STATE FUNDING</b>	<b>\$41,864,816</b>		
<b>Project Information</b>			
Gross Square Feet	179,000	Base Cost Date	2-Apr-09
Net Square Feet	-	Estimated Bid Date	1-Jun-11
Net/Gross Ratio	0%	Est. Completion Date	0-Jan-00
		Last Modified Date	0-Jan-00
		Print Date	6/4/2009

### CBE Cost Detail - Site A (Option 1)

<b>Project Name:</b>	<b>U of U School of Dentistry Site A, Option 1 (4 Parking Levels under the Building)</b>				
<b>Agency/Institution:</b>	<b>University of Utah</b>				
<b>Project Manager:</b>					
<b>Description</b>	<b>Explanation</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Cost</b>	<b>Escalated Cost</b>
<b>Facility Cost</b>	site option A all parking under building on site	GSF			
<b>New Facility Cost Details:</b>					
	building	70,000	\$ 263.31	\$ 18,431,700	\$ 18,431,700
	parking under building	109,000	\$ 118.07	\$ 12,869,630	\$ 12,869,630
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
<b>Subtotal - New Facility Costs</b>		<b>179,000</b>		<b>\$ 31,301,330</b>	<b>\$ 31,301,330</b>
<b>Remodel Facility Cost Details:</b>				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
<b>Subtotal - Remodel Facility Costs</b>		-		\$ -	\$ -
<b>TOTAL FACILITY COST</b>		<b>179,000</b>		<b>\$ 31,301,330</b>	<b>\$ 31,301,330</b>
<b>Additional Construction Cost Details:</b>					
Connection Fees				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
<b>TOTAL ADDITIONAL CONSTRUCTION COST</b>				<b>\$ -</b>	<b>\$ -</b>
<b>Site Cost Details:</b>				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
	should parking go here			\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
<b>TOTAL SITE COST</b>				<b>\$ -</b>	<b>\$ -</b>
<b>HIGH PERFORMANCE BUILDING</b>	If N/A, change YES to NO. To supercede 1-1/2% calculation enter amount in unit cost	<b>YES</b>		<b>\$ 469,520</b>	<b>\$ 469,520</b>
<b>TOTAL CONSTRUCTION COST</b>				<b>\$ 31,301,330</b>	<b>\$ 31,770,850</b>
<b>OTHER PROJECT INFORMATION:</b>					
Total Net Square Feet:					
Base Cost Date:			4/2/2009		
Estimated Bid Date:			6/1/2011		
Estimated Completion Date:					
Last Modified Date:					
Inflation Escalation Factor Included:			0.00%		
Location Factor Included:			0.00%		
<b>Hazardous Materials Cost Details:</b>					
Pre-Construction Survey				\$ -	\$ -
				\$ -	\$ -
Plan and Monitoring				\$ -	\$ -
				\$ -	\$ -
Abatement/Removal				\$ -	\$ -
				\$ -	\$ -
<b>TOTAL HAZARDOUS MATERIALS COST</b>				<b>\$ -</b>	<b>\$ -</b>

## CBE Cost Detail - Site A (Option 1)

<b>Pre-Design/Planning:</b>					
Planning Fund Reimbursement				\$	-
				\$	-
Programming		0.65%	\$ 31,770,850	\$	206,511
				\$	-
Environmental Assessment				\$	15,000
				\$	-
Geotechnical Investigation/Surveys				\$	10,000
				\$	-
<b>TOTAL PRE-DESIGN/PLANNING COST</b>				<b>\$</b>	<b>231,511</b>
<b>Design Costs:</b>					
<u>A/E Design Fees</u>					
		6.0%	\$ 31,301,330	\$	1,878,080
				\$	-
				\$	-
				\$	-
<b>Total A/E Design Fees</b>				<b>\$</b>	<b>1,878,080</b>
<b>Additional Printing Costs</b>				\$	-
High Performance Design	If N/A, change YES to NO. To supercede 1/4% calculation enter amount in unit cost	<b>YES</b>		<b>\$</b>	<b>79,427</b>
Value Management Costs				\$	-
				\$	-
<b>TOTAL DESIGN COST</b>				<b>\$</b>	<b>1,957,507</b>
<b>Property Acquisition:</b>					
				\$	-
				\$	-
				\$	-
				\$	-
<b>TOTAL PROPERTY ACQUISITION COST</b>				<b>\$</b>	<b>-</b>
<b>Furnishings &amp; Equipment Costs:</b>					
<u>Furnishings Detail:</u>					
				\$	-
normal f f & e		6%	\$ 18,431,700	\$	1,105,902
				\$	-
dental equipment		1	sum	\$	4,000,000
				\$	-
				\$	-
				\$	-
<b>Total Furnishings</b>				<b>\$</b>	<b>5,105,902</b>
<u>Equipment Detail:</u>					
				\$	-
				\$	-
wiring and data ports		1.3%	\$ 18,431,700	\$	230,396
				\$	-
				\$	-
				\$	-
<b>Total Equipment</b>				<b>\$</b>	<b>230,396</b>
FF&E Design Costs				\$	-
				\$	-
<b>TOTAL FURNISHINGS &amp; EQUIPMENT COSTS</b>				<b>\$</b>	<b>5,336,298</b>
<b>Information Technology Costs:</b>					
				\$	-
				\$	-
				\$	-
				\$	-
<b>TOTAL INFORMATION TECHNOLOGY COST</b>				<b>\$</b>	<b>-</b>

## CBE Cost Detail - Site A (Option 1)

<b>UTAH ART</b>	If N/A, change YES to NO. To supercede 1% calculation enter amount in unit cost	<b>YES</b>		<b>\$ 317,708</b>		
<b>Testing &amp; Inspection Costs:</b>						
Building Code Inspection			\$ 31,301,330	\$ -		
Material Testing		0.50%		\$ 156,507		
Special Inspections		0.50%		\$ 156,507		
				\$ -		
<b>TOTAL TESTING &amp; inspection COSTS</b>				<b>\$ 313,013</b>		
<b>Moving/Occupancy Costs:</b>						
		1	sum	\$ 100,000		
				\$ -		
				\$ -		
				\$ -		
<b>TOTAL MOVING/OCCUPANCY COSTS</b>				<b>\$ 100,000</b>		
<b>DFCM Management:</b>						
	u of u facilities			\$ -		
				\$ 200,000	175000	25-30
				\$ -	150000	15 -25
				\$ -		
<b>TOTAL DFCM MANAGEMENT</b>				<b>\$ 200,000</b>		
<b>User Fees:</b>						
				\$ -		
				\$ -		
				\$ -		
				\$ -		
<b>TOTAL USER FEES</b>				<b>\$ -</b>		
<b>Commissioning:</b>						
	commissioning	70,000	\$ 1.00	\$ 70,000		
		-	\$ -	\$ -		
				\$ -		
				\$ -		
<b>TOTAL COMMISSIONING COSTS</b>				<b>\$ 70,000</b>		
<b>Other Costs:</b>						
Energy Study	\$7.5K if within RMP area, \$20K otherwise			\$ 20,000		
				\$ -		
				\$ -		
				\$ -		
<b>TOTAL OTHER COSTS</b>				<b>\$ 20,000</b>		
<b>Previous Funding:</b>						
(Only show state appropriated funding & include costs covered by that funding in appropriate category.)						
				\$ -		
				\$ -		
<b>TOTAL PREVIOUS FUNDING</b>				<b>\$ -</b>		
<b>Other Funding Sources:</b>						
(List and describe each source)						
				\$ -		
				\$ -		
				\$ -		
				\$ -		
<b>TOTAL OTHER FUNDING SOURCES</b>				<b>\$ -</b>		

## CBE Cost Summary - Site A (Option 2)

<b>Project Name:</b>		U of U Dental School Site A - Option 2 (Parking under Building and in ea	
<b>Agency/Institution:</b>		University of Utah	
<b>Project Manager:</b>		0	
<b>Cost Summary</b>			
	<b>\$ Amount</b>	<b>Cost Per SF</b>	<b>Notes</b>
Facility Cost	\$ 18,431,700	\$263.31	
Additional Construction Cost	\$ -	\$0.00	
Site Cost	\$ -	\$0.00	
High Performance Building	\$ 276,476	\$3.95	
<b>Total Construction Cost</b>	<b>\$ 18,708,176</b>	<b>\$267.26</b>	
<b>Soft Costs:</b>			
Hazardous Materials	\$ -		
Pre-Design/Planning	\$ 146,603		
Design	\$ 1,152,672		
Property Acquisition	\$ -		
Furnishings & Equipment	\$ 5,336,298		
Information Technology:	\$ -		
Utah Art (1% of Construction Budget)	\$ 187,082		
Testing & Inspection	\$ 184,317		
Contingency	\$ 846,016		
Moving/Occupancy	\$ 100,000		
Builder's Risk Insurance (0.15% of Construction Budget)	\$ 28,062		
Legal Services (0.2% of Construction Budget)	\$ 37,416		
DFCM Management	\$ 175,000		
User Fees	\$ -		
Commissioning	\$ 70,000		
Other Costs	\$ 20,000		
<b>Total Soft Costs</b>	<b>\$ 8,283,467</b>	<b>\$118.34</b>	
<b>TOTAL PROJECT COST</b>			
	<b>\$ 26,991,643</b>	<b>\$385.59</b>	
<b>Previous Funding</b>			
	\$ -		
<b>Other Funding Sources (Identify in note)</b>			
	\$ -		
<b>REQUEST FOR STATE FUNDING</b>			
	<b>\$26,991,643</b>		
<b>Project Information</b>			
Gross Square Feet	70,000	Base Cost Date	2-Apr-09
Net Square Feet	-	Estimated Bid Date	1-Jun-11
Net/Gross Ratio	0%	Est. Completion Date	0-Jan-00
		Last Modified Date	0-Jan-00
		Print Date	6/4/2009



## CBE Cost Detail - Site A (Option 2)

<b>Pre-Design/Planning:</b>				
Planning Fund Reimbursement				\$ -
				\$ -
Programming	0.65%	\$ 18,708,176		\$ 121,603
				\$ -
Environmental Assessment				\$ 15,000
				\$ -
Geotechnical Investigation/Surveys				\$ 10,000
				\$ -
<b>TOTAL PRE-DESIGN/PLANNING COST</b>				<b>\$ 146,603</b>
<b>Design Costs:</b>				
<b>A/E Design Fees</b>				
	6.0%	\$ 18,431,700		\$ 1,105,902
				\$ -
				\$ -
				\$ -
Total A/E Design Fees				\$ 1,105,902
<b>Additional Printing Costs</b>				
High Performance Design	If N/A, change YES to NO. To supercede 1/4% calculation enter amount in unit cost	<b>YES</b>		\$ 46,770
Value Management Costs				\$ -
				\$ -
<b>TOTAL DESIGN COST</b>				<b>\$ 1,152,672</b>
<b>Property Acquisition:</b>				
				\$ -
				\$ -
				\$ -
				\$ -
<b>TOTAL PROPERTY ACQUISITION COST</b>				<b>\$ -</b>
<b>Furnishings &amp; Equipment Costs:</b>				
<b>Furnishings Detail:</b>				
				\$ -
	6%	\$ 18,431,700		\$ 1,105,902
				\$ 4,000,000
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
Total Furnishings				\$ 5,105,902
<b>Equipment Detail:</b>				
				\$ -
				\$ -
wiring and data ports	1.3%	\$ 18,431,700		\$ 230,396
				\$ -
				\$ -
				\$ -
				\$ -
Total Equipment				\$ 230,396
<b>FF&amp;E Design Costs</b>				
				\$ -
				\$ -
<b>TOTAL FURNISHINGS &amp; EQUIPMENT COSTS</b>				<b>\$ 5,336,298</b>
<b>Information Technology Costs:</b>				
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
<b>TOTAL INFORMATION TECHNOLOGY COST</b>				<b>\$ -</b>

### CBE Cost Detail - Site A (Option 2)

<b>UTAH ART</b>	If N/A, change YES to NO. To supercede 1% calculation enter amount in unit cost	<b>YES</b>		<b>\$ 187,082</b>	
<b>Testing &amp; Inspection Costs:</b>					
Building Code Inspection			\$ 18,431,700	\$ -	
Material Testing		0.50%		\$ 92,159	
Special Inspections		0.50%		\$ 92,159	
<b>TOTAL TESTING &amp; inspection COSTS</b>				<b>\$ 184,317</b>	
<b>Moving/Occupancy Costs:</b>					
		1	sum	\$ 100,000	
<b>TOTAL MOVING/OCCUPANCY COSTS</b>				<b>\$ 100,000</b>	
<b>DFCM Management:</b>					
	u of u facilities			\$ -	
				\$ 175,000	175000
				\$ -	150000
<b>TOTAL DFCM MANAGEMENT</b>				<b>\$ 175,000</b>	
<b>User Fees:</b>					
<b>TOTAL USER FEES</b>				<b>\$ -</b>	
<b>Commissioning:</b>					
	commissioning	70,000	\$ 1.00	\$ 70,000	
<b>TOTAL COMMISSIONING COSTS</b>				<b>\$ 70,000</b>	
<b>Other Costs:</b>					
Energy Study	\$7.5K if within RMP area, \$20K otherwise			\$ 20,000	
<b>TOTAL OTHER COSTS</b>				<b>\$ 20,000</b>	
<b>Previous Funding:</b>					
(Only show state appropriated funding & include costs covered by that funding in appropriate category.)					
<b>TOTAL PREVIOUS FUNDING</b>				<b>\$ -</b>	
<b>Other Funding Sources:</b>					
(List and describe each source)					
<b>TOTAL OTHER FUNDING SOURCES</b>				<b>\$ -</b>	

## CBE Cost Summary - Site D

<b>Project Name:</b>		U of U Dental School Site D Wakara Way	
<b>Agency/Institution:</b>		University of Utah	
<b>Project Manager:</b>		0	
<b>Cost Summary</b>			
	<b>\$ Amount</b>	<b>Cost Per SF</b>	<b>Notes</b>
Facility Cost	\$ 22,389,400	\$318.94	
Additional Construction Cost	\$ -	\$0.00	
Site Cost	\$ -	\$0.00	
High Performance Building	\$ 335,841	\$4.78	
<b>Total Construction Cost</b>	<b>\$ 22,725,241</b>	<b>\$323.72</b>	
<b>Soft Costs:</b>			
Hazardous Materials	\$ -		
Pre-Design/Planning	\$ 172,714		
Design	\$ 1,400,177		
Property Acquisition	\$ -		
Furnishings & Equipment	\$ 5,275,855		
Information Technology:	\$ -		
Utah Art (1% of Construction Budget)	\$ 227,252		
Testing & Inspection	\$ 223,894		
Contingency	\$ 1,027,673		
Moving/Occupancy	\$ 100,000		
Builder's Risk Insurance (0.15% of Construction Budget)	\$ 34,088		
Legal Services (0.2% of Construction Budget)	\$ 45,450		
DFCM Management	\$ 150,000		
User Fees	\$ -		
Commissioning	\$ 70,000		
Other Costs	\$ 20,000		
<b>Total Soft Costs</b>	<b>\$ 8,747,104</b>	<b>\$124.60</b>	
<b>TOTAL PROJECT COST</b>	<b>\$ 31,472,345</b>	<b>\$448.32</b>	
<b>Previous Funding</b>	\$ -		
<b>Other Funding Sources</b> (Identify in note)	\$ -		
<b>REQUEST FOR STATE FUNDING</b>	<b>\$31,472,345</b>		
<b>Project Information</b>			
Gross Square Feet	70,200	Base Cost Date	2-Apr-09
Net Square Feet	-	Estimated Bid Date	1-Jun-11
Net/Gross Ratio	0%	Est. Completion Date	0-Jan-00
		Last Modified Date	0-Jan-00
		Print Date	6/4/2009

## CBE Cost Detail - Site D

<b>Project Name:</b>	<b>U of U Dental School Site D Wakara Way</b>				
<b>Agency/Institution:</b>	<b>University of Utah</b>				
<b>Project Manager:</b>					
<b>Description</b>	<b>Explanation</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Cost</b>	<b>Escalated Cost</b>
<b>Facility Cost</b>		<b>GSF</b>			
<b>New Facility Cost Details:</b>					
	building	70,000	\$ 251.40	\$ 17,598,000	\$ 17,598,000
	parking structure	200	\$ 23,957.00	\$ 4,791,400	\$ 4,791,400
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
<b>Subtotal - New Facility Costs</b>		<b>70,200</b>		<b>\$ 22,389,400</b>	<b>\$ 22,389,400</b>
<b>Remodel Facility Cost Details:</b>				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
<b>Subtotal - Remodel Facility Costs</b>		<b>-</b>		<b>\$ -</b>	<b>\$ -</b>
<b>TOTAL FACILITY COST</b>		<b>70,200</b>		<b>\$ 22,389,400</b>	<b>\$ 22,389,400</b>
<b>Additional Construction Cost Details:</b>					
Connection Fees				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
<b>TOTAL ADDITIONAL CONSTRUCTION COST</b>				<b>\$ -</b>	<b>\$ -</b>
<b>Site Cost Details:</b>				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
				\$ -	\$ -
<b>TOTAL SITE COST</b>				<b>\$ -</b>	<b>\$ -</b>
<b>HIGH PERFORMANCE BUILDING</b>	If N/A, change YES to NO. To supercede 1-1/2% calculation enter amount in unit cost	<b>YES</b>		<b>\$ 335,841</b>	<b>\$ 335,841</b>
<b>TOTAL CONSTRUCTION COST</b>				<b>\$ 22,389,400</b>	<b>\$ 22,725,241</b>
<b>OTHER PROJECT INFORMATION:</b>					
Total Net Square Feet:					
Base Cost Date:	4/2/2009				
Estimated Bid Date:	6/1/2011				
Estimated Completion Date:					
Last Modified Date:					
Inflation Escalation Factor Included:	0.00%				
Location Factor Included:	0.00%				
<b>Hazardous Materials Cost Details:</b>					
Pre-Construction Survey				\$ -	\$ -
				\$ -	\$ -
<b>Plan and Monitoring</b>				\$ -	\$ -
				\$ -	\$ -
<b>Abatement/Removal</b>				\$ -	\$ -
				\$ -	\$ -
<b>TOTAL HAZARDOUS MATERIALS COST</b>				<b>\$ -</b>	<b>\$ -</b>

## CBE Cost Detail - Site D

<b>Pre-Design/Planning:</b>				
Planning Fund Reimbursement				\$ -
				\$ -
Programming	0.65%	\$ 22,725,241		\$ 147,714
				\$ -
Environmental Assessment				\$ 15,000
				\$ -
Geotechnical Investigation/Surveys				\$ 10,000
				\$ -
<b>TOTAL PRE-DESIGN/PLANNING COST</b>				<b>\$ 172,714</b>
<b>Design Costs:</b>				
<b>A/E Design Fees</b>				
	6.0%	\$ 22,389,400		\$ 1,343,364
				\$ -
				\$ -
				\$ -
Total A/E Design Fees				\$ 1,343,364
<b>Additional Printing Costs</b>				
High Performance Design	If N/A, change YES to NO. To supercede 1/4% calculation enter amount in unit cost	<b>YES</b>		\$ 56,813
Value Management Costs				\$ -
				\$ -
<b>TOTAL DESIGN COST</b>				<b>\$ 1,400,177</b>
<b>Property Acquisition:</b>				
				\$ -
				\$ -
				\$ -
				\$ -
<b>TOTAL PROPERTY ACQUISITION COST</b>				<b>\$ -</b>
<b>Furnishings &amp; Equipment Costs:</b>				
<b>Furnishings Detail:</b>				
				\$ -
	6%	\$ 17,598,000		\$ 1,055,880
dental equipment				\$ 4,000,000
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
Total Furnishings				\$ 5,055,880
<b>Equipment Detail:</b>				
				\$ -
				\$ -
wiring and data ports	1.3%	\$ 17,598,000		\$ 219,975
				\$ -
				\$ -
				\$ -
				\$ -
Total Equipment				\$ 219,975
<b>FF&amp;E Design Costs</b>				
				\$ -
				\$ -
<b>TOTAL FURNISHINGS &amp; EQUIPMENT COSTS</b>				<b>\$ 5,275,855</b>
<b>Information Technology Costs:</b>				
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
<b>TOTAL INFORMATION TECHNOLOGY COST</b>				<b>\$ -</b>

## CBE Cost Detail - Site D

<b>UTAH ART</b>	If N/A, change YES to NO. To supercede 1% calculation enter amount in unit cost	<b>YES</b>		<b>\$ 227,252</b>	
<b>Testing &amp; Inspection Costs:</b>					
Building Code Inspection			\$ 22,389,400	\$ -	
Material Testing		0.50%		\$ 111,947	
Special Inspections		0.50%		\$ 111,947	
<b>TOTAL TESTING &amp; inspection COSTS</b>				<b>\$ 223,894</b>	
<b>Moving/Occupancy Costs:</b>					
		1	sum	\$ 100,000	
<b>TOTAL MOVING/OCCUPANCY COSTS</b>				<b>\$ 100,000</b>	
<b>DFCM Management:</b>					
	u of u facilities			\$ 150,000	175000
<b>TOTAL DFCM MANAGEMENT</b>				<b>\$ 150,000</b>	
<b>User Fees:</b>					
<b>TOTAL USER FEES</b>				<b>\$ -</b>	
<b>Commissioning:</b>					
	commissioning	70,000	\$ 1.00	\$ 70,000	
<b>TOTAL COMMISSIONING COSTS</b>				<b>\$ 70,000</b>	
<b>Other Costs:</b>					
Energy Study	\$7.5K if within RMP area, \$20K otherwise			\$ 20,000	
<b>TOTAL OTHER COSTS</b>				<b>\$ 20,000</b>	
<b>Previous Funding:</b>					
(Only show state appropriated funding & include costs covered by that funding in appropriate category.)					
<b>TOTAL PREVIOUS FUNDING</b>				<b>\$ -</b>	
<b>Other Funding Sources:</b>					
(List and describe each source)					
<b>TOTAL OTHER FUNDING SOURCES</b>				<b>\$ -</b>	

## CBE Cost Summary - Site E

<b>Project Name:</b>		UU Dental - Site E (Foothill)	
<b>Agency/Institution:</b>		University of Utah	
<b>Project Manager:</b>		0	
<b>Cost Summary</b>			
	<b>\$ Amount</b>	<b>Cost Per SF</b>	<b>Notes</b>
Facility Cost	\$ 17,598,000	\$251.40	
Additional Construction Cost	\$ -	\$0.00	
Site Cost	\$ -	\$0.00	
High Performance Building	\$ 263,970	\$3.77	
<b>Total Construction Cost</b>	<b>\$ 17,861,970</b>	<b>\$255.17</b>	
<b>Soft Costs:</b>			
Hazardous Materials	\$ -		
Pre-Design/Planning	\$ 141,103		
Design	\$ 1,100,535		
Property Acquisition	\$ -		
Furnishings & Equipment	\$ 5,275,855		
Information Technology:	\$ -		
Utah Art (1% of Construction Budget)	\$ 178,620		
Testing & Inspection	\$ 175,980		
Contingency	\$ 807,748		
Moving/Occupancy	\$ 100,000		
Builder's Risk Insurance (0.15% of Construction Budget)	\$ 26,793		
Legal Services (0.2% of Construction Budget)	\$ 35,724		
DFCM Management	\$ 150,000		
User Fees	\$ -		
Commissioning	\$ 70,000		
Other Costs	\$ 20,000		
<b>Total Soft Costs</b>	<b>\$ 8,082,357</b>	<b>\$115.46</b>	
<b>TOTAL PROJECT COST</b>			
	<b>\$ 25,944,327</b>	<b>\$370.63</b>	
<b>Previous Funding</b>	\$ -		
<b>Other Funding Sources (Identify in note)</b>	\$ -		
<b>REQUEST FOR STATE FUNDING</b>		<b>\$25,944,327</b>	
<b>Project Information</b>			
Gross Square Feet	70,000	Base Cost Date	2-Apr-09
Net Square Feet	-	Estimated Bid Date	1-Jun-11
Net/Gross Ratio	0%	Est. Completion Date	0-Jan-00
		Last Modified Date	0-Jan-00
		Print Date	9/29/2010



## CBE Cost Detail - Site E

Environmental Assessment				\$ -	
				\$ 15,000	
Geotechnical Investigation/Surveys				\$ 10,000	
				\$ -	
<b>TOTAL PRE-DESIGN/PLANNING COST</b>				<b>\$ 141,103</b>	
<b>Design Costs:</b>					
<b>A/E Design Fees</b>					
		6.0%	\$ 17,598,000	\$ 1,055,880	
				\$ -	
				\$ -	
				\$ -	
<b>Total A/E Design Fees</b>				<b>\$ 1,055,880</b>	
<b>Additional Printing Costs</b>				\$ -	
High Performance Design	If N/A, change YES to NO. To supercede 1/4% calculation enter amount in unit cost	<b>YES</b>		<b>\$ 44,655</b>	
<b>Value Management Costs</b>				\$ -	
				\$ -	
<b>TOTAL DESIGN COST</b>				<b>\$ 1,100,535</b>	
<b>Property Acquisition:</b>					
				\$ -	
				\$ -	
				\$ -	
				\$ -	
<b>TOTAL PROPERTY ACQUISITION COST</b>				<b>\$ -</b>	
<b>Furnishings &amp; Equipment Costs:</b>					
<b>Furnishings Detail:</b>					
				\$ -	
		6%	\$ 17,598,000	\$ 1,055,880	
dental equipment				\$ 4,000,000	
				\$ -	
				\$ -	
				\$ -	
				\$ -	
<b>Total Furnishings</b>				<b>\$ 5,055,880</b>	
<b>Equipment Detail:</b>					
				\$ -	
				\$ -	
wiring and data ports		1.3%	\$ 17,598,000	\$ 219,975	
				\$ -	
				\$ -	
				\$ -	
<b>Total Equipment</b>				<b>\$ 219,975</b>	
<b>FF&amp;E Design Costs</b>				\$ -	
				\$ -	
<b>TOTAL FURNISHINGS &amp; EQUIPMENT COSTS</b>				<b>\$ 5,275,855</b>	
<b>Information Technology Costs:</b>					
				\$ -	
				\$ -	
				\$ -	
				\$ -	
<b>TOTAL INFORMATION TECHNOLOGY COST</b>				<b>\$ -</b>	
<b>UTAH ART</b>	If N/A, change YES to NO. To supercede 1% calculation enter amount in unit cost	<b>YES</b>		<b>\$ 178,620</b>	
<b>Testing &amp; Inspection Costs:</b>					
Building Code Inspection			\$ 17,598,000	\$ -	
				\$ -	
Material Testing		0.50%		\$ 87,990	
				\$ -	
Special Inspections		0.50%		\$ 87,990	
				\$ -	
<b>TOTAL TESTING &amp; inspection COSTS</b>				<b>\$ 175,980</b>	
<b>Moving/Occupancy Costs:</b>					
		1	sum	\$ 100,000	
				\$ -	

## CBE Cost Detail - Site E

				\$	-		
				\$	-		
<b>TOTAL MOVING/OCCUPANCY COSTS</b>				<b>\$</b>	<b>100,000</b>		
<b>DFCM Management:</b>							
				\$	-		
	u of u facilities			\$	150,000	175000	25-30
				\$	-	150000	15 -25
				\$	-		
<b>TOTAL DFCM MANAGEMENT</b>				<b>\$</b>	<b>150,000</b>		
<b>User Fees:</b>							
				\$	-		
				\$	-		
				\$	-		
				\$	-		
<b>TOTAL USER FEES</b>				<b>\$</b>	<b>-</b>		
<b>Commissioning:</b>							
	commissioning	70,000	\$ 1.00	\$	70,000		
		-	\$ -	\$	-		
				\$	-		
				\$	-		
<b>TOTAL COMMISSIONING COSTS</b>				<b>\$</b>	<b>70,000</b>		
<b>Other Costs:</b>							
Energy Study	\$7.5K if within RMP area, \$20K otherwise			\$	20,000		
				\$	-		
				\$	-		
				\$	-		
<b>TOTAL OTHER COSTS</b>				<b>\$</b>	<b>20,000</b>		
<b>Previous Funding:</b>							
(Only show state appropriated funding & include costs covered by that funding in appropriate category.)							
				\$	-		
				\$	-		
<b>TOTAL PREVIOUS FUNDING</b>				<b>\$</b>	<b>-</b>		
<b>Other Funding Sources:</b>							
(List and describe each source)							
				\$	-		
				\$	-		
				\$	-		
				\$	-		
<b>TOTAL OTHER FUNDING SOURCES</b>				<b>\$</b>	<b>-</b>		





# 05

Appendix

Proposed Dental Building Facility Plan | University of Utah

## Contents

- a. UU Campus Master Plan Image
- b. Sites under Initial Consideration:
  - Site B, Ambulatory Care Complex
  - Site C, Dumke
  - Site F, CAMT
- c. UU Proposed Dental School 2006 Master Plan
- d. Facility Plan Meeting Reports
- e. Dental School Photos
- f. U of U School of Dentistry Strategic Planning Session Report - Draft Copy, May 19, 2009
- g. Collaboration - Dental School Building
- h. UU School of Dentistry Traffic Impact Analysis





**Master Plan Vision**

THE UNIVERSITY OF UTAH | CAMPUS MASTER PLAN



## Sites B, C and F

### Site B

At Site B, the Dental School would become part of a proposed new Ambulatory Care Center complex which would be primarily occupied by the ambulatory clinics which currently reside in the University and Primary Children's Medical Centers. The Campus Master Plan indicates a possible expansion of the Moran Eye Center to the south of this site. The USTAR complex, to be located to the west of the site, is currently in the design stages.

The University has undertaken a Facility Study to begin to define a footprint and stacking concept for the proposed Ambulatory Care Center. At this time, the ACC Facility Study does not indicate space designated for any functions in addition to the ambulatory functions at the core of the building's proposed use. If the Dental School were to be absorbed into this building, additional space would need to be anticipated. Should the Dental School become part of this project, its planning and design would need to be combined with that of the Ambulatory Care Center, with the entire complex planned as a single facility.

The ACC Facility Study indicates all parking required to support its function planned underneath the new buildings. Were the Dental School to join this complex, the capacity of the proposed parking structure would need to be increased accordingly.

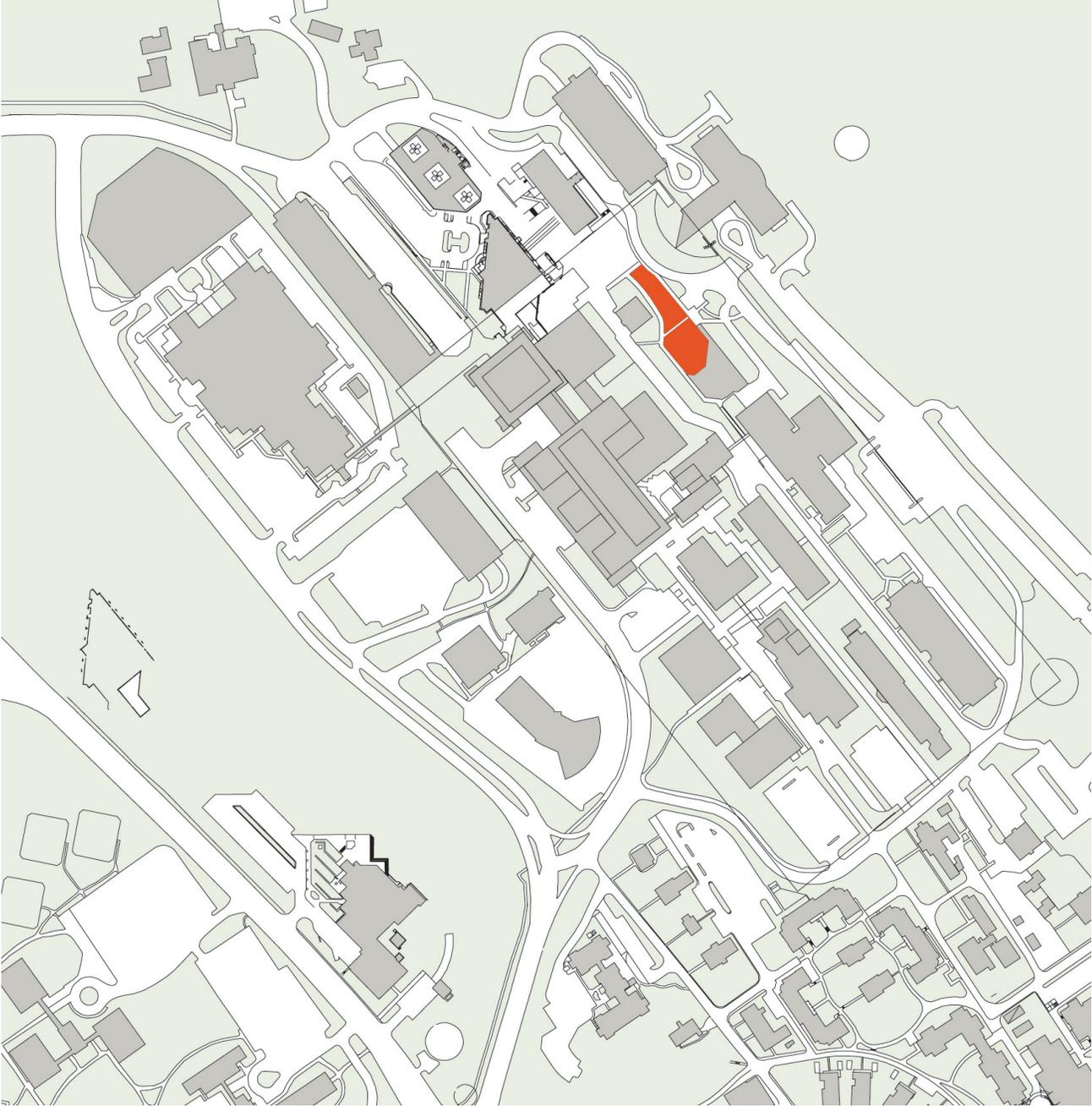
Development of the proposed Ambulatory Care Center is dependent on commitments by its development partner, Intermountain Health Care. The schedule for moving this facility forward is undetermined at this time and not under the control of the University. It is also uncertain how the area needed by the Dental program would fit with the preliminary planning for the facility and site. Because of these complexities, Site B has been removed from consideration for the Dental School at this time.

### Site C

This site is currently occupied by the Dumke Building which houses the Dialysis Center associated with the University Hospital and research programs. The Campus Master Plan indicates that this site may become available for other uses in the future.

At this time, there is no provision for the relocation of the Dialysis Center, which would need to occur before this site would become available for another use. Also competing for area in this location is a possible expansion of the Vivarium, which is currently filled to capacity. An alternate plan for Vivarium expansion would need to be developed in order for this site to become available.

Although the University would like to replace the Dumke Building because of its high maintenance costs, the Dialysis Center relocation and Vivarium expansion issues must first be resolved. Since the timeline for resolving these issues has not yet been established, Site C has been removed from consideration for the Dental School at this time.



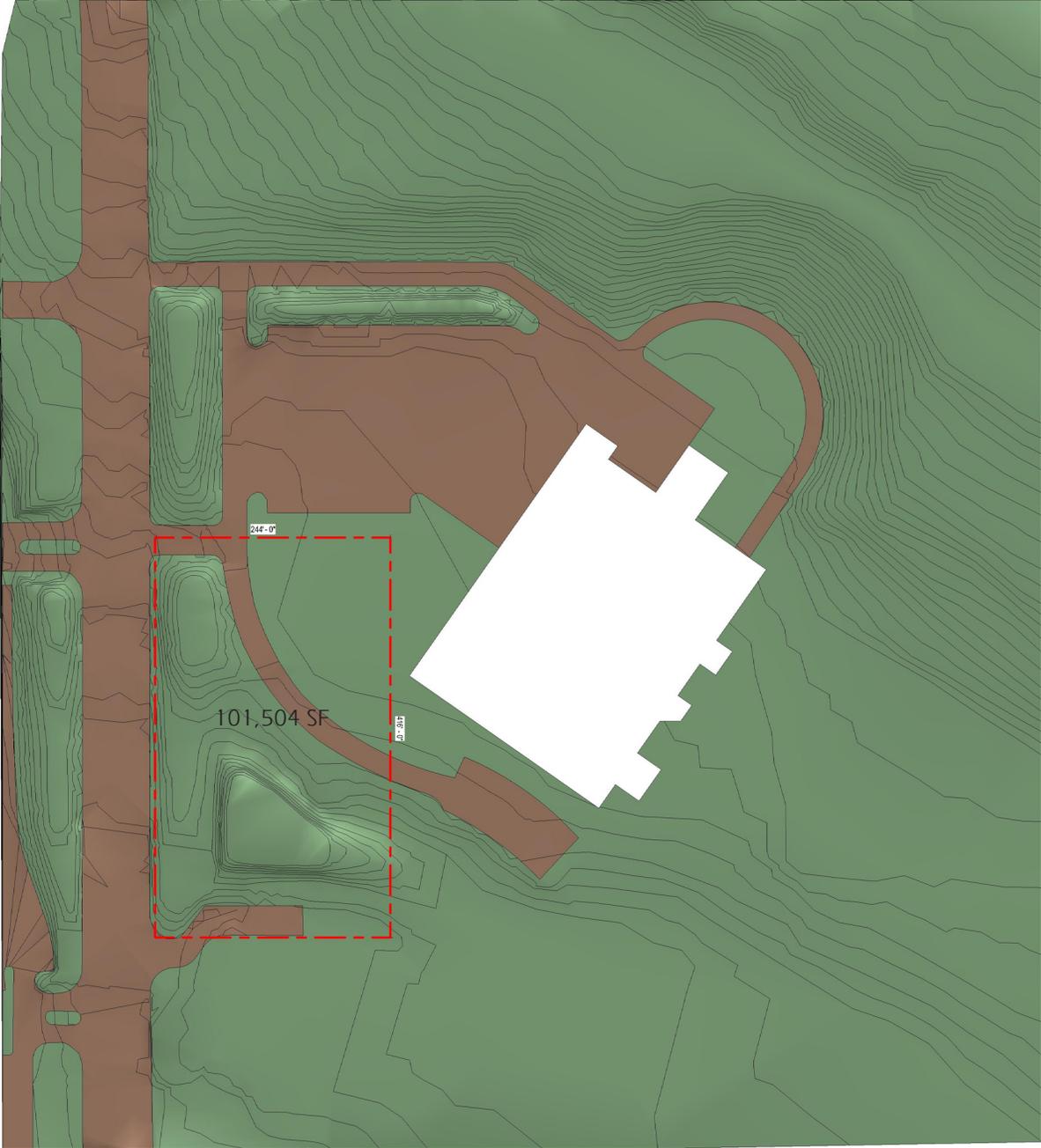
Site C 



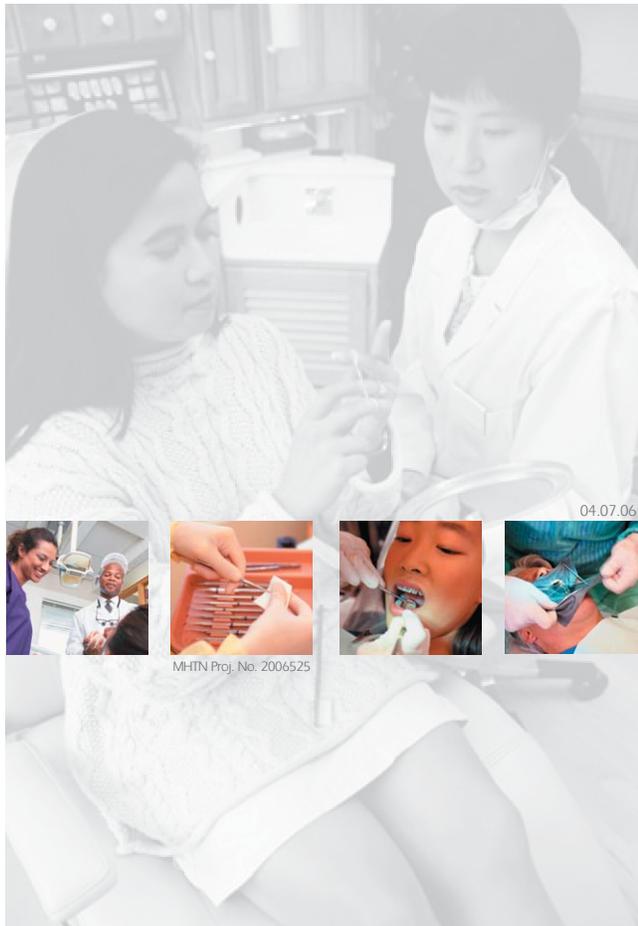
### Site F

Site F occupies a parcel in Research Park to the west of the Center for Advanced Medical Technology and parallel to Arapeen Drive. The proposed new Dental School is shown placed in the location of the existing CAMT staff parking area in the diagrams. Parking for the Dental School would be accommodated by expanding the existing visitor parking to the southwest of the CAMT and by the development of new parking to be constructed in the location of the existing solar panel array.

This location would present way-finding challenges for clinical patients since it is not highly visible from the Research Park perimeter thoroughfares of Foothill Boulevard and Sunnyside Drive. Additionally, the placement of a new building of significant size in this location would impact the visibility of the Center for Advanced Medical Technology and would create potential vehicular and service access conflicts between the CAMT and the Dental School. Due to these concerns, Site F has been removed from consideration for the Dental School at this time.



Site F



04.07.06



MHTN Proj. No. 2006525

# 2006

Master Plan . Phase I

University of Utah | Proposed Dental School . U of U Proj. No. 0999-12909

## 01 Executive Summary

Process  
Conclusions

## 02 Program

## 03 Project Cost Opinion

CBE (Construction Budget Estimate)  
Cost Opinion Detail

## 04 Appendix

- a. Proposed Dental School, 3/7/2006. Document prepared by G. Lynn Powell, Asst. Dean, Dental School of Medicine and Cathy Anderson, Assoc. Dean of Finance, School of Medicine.
- b. Dental School Proposal, Letter of Intent for Program Review Committee
- c. Information regarding the Lazzara Center for Oral-Facial Health at the CU School of Dentistry, from Christopher Carvell Architects.
- d. Program information from Creighton University

04.07.06

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### Acknowledgements

This document was prepared by the following:

#### University of Utah

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John McNary, Project Manager, Campus Design & Construction  
Tami Cleveland, Campus Development Planner, Facilities Planning

#### MHTN Architects, Inc.

Mick Gaviglio, Principal-in-Charge  
Eric Migacz, Planning Architect  
Glen Beckstead, Cost Estimator  
Sarah Miller, Programming Architect



# 01

## Executive Summary

University of Utah | Proposed Dental School

### Introduction

The dental education programs at the University of Utah are requesting approval to establish a fully accredited dental school at the University of Utah Health Sciences Center (see Appendix, items A and B). This document contains recommendations regarding the projected size and total costs of the facility needed to house the program.

## Process

Administrators of the University of Utah dental education programs have made a preliminary investigation into the needed size and budget for a dental school facility, by studying recently completed dental schools (see Appendix, C). After recording their projections (see Appendix, item A), they hired a local architectural firm with expertise in architectural programming and conceptual cost estimating to validate the projections.

The architectural consultants used the initial dental education program projections as a starting point, confirming or modifying space sizes and quantities as appropriate. They listed the spaces needed in a typical architectural program format, which totals needed net square feet, and then calculates area needed for building common spaces such as corridors, toilet rooms, custodial closets, stairs, elevators, and mechanical, electrical and data spaces. This resulted in a projection of the total gross square feet needed for the building. The architectural program summary is contained in Section 2.

The architectural consultants also developed a cost projection for the building, based on the spaces needed and the University's desired quality level (equivalent to the recently completed University of Utah Health Sciences Education Building). The building cost projection was inserted into the Utah State DFCM (Division of Facilities Construction and Management) CBE (Capital Budget Estimate) form, which calculates total project costs. The total project costs include the construction cost for the building, as well as related project costs. See Section 3 for the CBE and the building construction cost opinion.

## Conclusions

Based on the information and assumptions contained in this document, the new dental school building needs approximately 66,000 gross square feet and the total project costs will be \$31 million.



## 02 Program

University of Utah | Proposed Dental School

### Introduction

Section 02 contains an architectural program summary which lists the spaces and corresponding net square footage needed for the proposed dental school. The spaces are listed in a typical architectural program format, which uses net square feet to calculate area needed for building common spaces such as corridors, circulation, toilet rooms, custodial closets, stairs, elevators, and mechanical, electrical and data spaces. This results in the projected total gross square feet needed for the building.

The first page contains overall building information and spreadsheet terminology definitions. Pages two through four contain information about the individual spaces that are needed.

## General Notes

A. Dental School class size will initially be 50 students per year for 4 years = 200 total students; with potential to grow to 60 students per year for a total of 240 students.

B. Target dates are: Fall of 2008 for the first entering class; spring of 2010 for building completion and occupation, or sooner if possible.

C. Building and site must accommodate patients coming to the clinic by car or public transportation; up to 100 patients at one time.

D. Basic science classes will be taught by existing Medical School faculty in existing classrooms. Basic science faculty offices will be in current facilities; there will not be classrooms or offices for these in the Dental School.

E. Assume there there will be 32 - 35 full-time faculty and 50 staff for Dental School.

F. Assume a building exterior and interior quality and finish level equivalent to the HSEB (Health Sciences Education Building).

## Definitions

NASF: Net Assignable Square Feet, or the area inside surrounding walls or furniture panels.

GASF: Gross Assignable Square Feet, or NASF plus area for surrounding walls / furniture panels and immediate circulation access.

GSF: Gross Square Feet, or the total area of a building, including exterior walls and shared building common spaces such as major circulation pathways; toilet rooms; stairs; elevators; vestibules; mechanical, electrical and communications spaces; custodial closets; etc.



## 02 Program

University of Utah | Proposed Dental School

### Summary of Space Requirements

Code	Building Summary	NASF	Qty.	Total NASF	Efficcy Factor	GASF	GSF Factor	GSF
Clinic / Public Areas								
101	Reception Area	400	1	400	1.35	540	1.30	702
102	Waiting Room, Clinic	900	1	900	1.30	1,170	1.30	1,521
103	Clinic Operation	100	120	12,000	1.40	16,800	1.30	21,840
104	Support Lab, Clinic	600	1	600	1.30	780	1.30	1,014
105	Clinic Dispensary	400	1	400	1.35	540	1.30	702
106	X-Ray Room	25	10	250	1.40	350	1.30	455
107	X-Ray Developer Room	25	4	100	1.40	140	1.30	182
				14,650		20,320		26,416
Lab / Teaching / Meeting Areas								
201	Technical Lab	24	60	1,440	1.40	2,016	1.30	2,621
202	Technical Support Lab	600	1	600	1.30	780	1.30	1,014
203	Sterilization Room	600	1	600	1.30	780	1.30	1,014
204	Research Labs	300	10	3,000	1.35	4,050	1.30	5,265
205	Lecture Halls	1,500	3	4,500	1.20	5,400	1.30	7,020
206	Conference Rooms	300	3	900	1.35	1,215	1.30	1,580
				11,040		14,241		18,513
Office / Support Areas								
301	Dean's Office	240	1	240	1.35	324	1.30	421
302	Faculty and Staff Offices	120	50	6,000	1.35	8,100	1.30	10,530
303	Open Office Areas	64	16	1,024	1.40	1,434	1.30	1,864
304	Faculty / Staff Support	150	3	450	1.35	608	1.30	790
305	Student Lounge	1,200	1	1,200	1.25	1,500	1.30	1,950
306	Student Lockers	1,000	1	1,000	1.25	1,250	1.30	1,625
307	Dental Store	500	1	500	1.30	650	1.30	845
308	General Building Storage	1,000	1	1,000	1.25	1,250	1.30	1,625
309	Service / Receiving	400	1	400	1.35	540	1.30	702
				11,814		15,655		20,352
	Totals			37,504		50,216		65,281

#### 101. Reception Area.

Reception function for clinic operation.

3 staff, who work at reception counter at beginning of clinics, and then move to Clinic Dispensary after clinic has started.

Space for shared equipment (fax machine, printers, copier) and patient files.

Plan for movable aisle file system (heavy floor loading).

25 to 30 patients per student per year.

#### 102. Waiting Room, Clinic.

Waiting area function for clinic operation.

Each student receives 1 patient per 3-hour clinic session. Waiting area used at beginning of clinic hours only.

Capacity for 45 to 60 seats at 15-20 sf / seat, depending on spacing and size of chairs.

#### 103. Clinic Operation.

Students receive patients 5 or 6 half-days per week.

1 patient per student per 3-hour clinic session.

9' x 10' stations, enclosed by partial walls on 3 sides.

5-6' aisles between station rows.

Main clinic area will have 100 stations; other, smaller clinics will include children's, oral surgery and possibly others.

Hard surface flooring.

#### 104. Support Lab, Clinic.

Support function for 101 Clinic Operation materials and equipment preparation.

Millwork cabinets / countertop; hard surface flooring; utilities for equipment.

Equipment included in Equipment Budget.

#### 105. Clinic Dispensary.

Storage / dispensing function for materials and supplies used in clinic.

2 to 3 employees from Reception Desk will staff Dispensary Counter, which will be accessed by those working in Clinic.

Accessible from Reception Desk.

Locking room.

#### 106. X-Ray Room.

X-Ray station, 5' x 5'.

#### 107. X-Ray Developer Room.

Room for x-ray development equipment.



02  
Program

University of Utah | Proposed Dental School

100. Clinic / Public Areas

Code	Space	NASF	Qty.	Total NASF	Effic'y Factor	GASF	GSF Factor	GSF
100	Clinic / Public Areas							
101	Reception Area	500	1	500	1.35	675	1.30	878
102	Waiting Room, Clinic	900	1	900	1.30	1,170	1.30	1,521
103	Clinic Operation	100	120	12,000	1.40	16,800	1.30	21,840
104	Support Lab, Clinic	600	1	600	1.30	780	1.30	1,014
105	Clinic Dispensary	400	1	400	1.35	540	1.30	702
106	X-Ray Room	25	10	250	1.40	350	1.30	455
107	X-Ray Developer Room	25	4	100	1.40	140	1.30	182
	Subtotal:			14,750		20,455		26,592

#### 201. Technical Lab.

Shared workstations where students practice dental techniques.

4' wide x 2' deep stations, plus chair space.

4' x 6' space x 60 stations.

Hard surface flooring.

Each station shared by 2-3 first and second-year students.

#### 202. Technical Support Lab.

Support function for 201 Technical Lab materials and equipment preparation.

Millwork cabinets / countertop; hard surface flooring; utilities for equipment.

Equipment included in Equipment Budget.

#### 203. Sterilization Room.

Lab space where equipment is sterilized in large capacity autoclaves.

Need to determine size and quantity of equipment.

May need to separate incoming, contaminated items from outgoing, clean items.

#### 204. Research Labs.

Faculty research labs; up to 10 labs at approximately 300 nsaf each.

Assume 4 will be fully outfitted and 6 will be constructed as shell space.

Flexible infrastructure for future / changing lab needs.

#### 205. Lecture Halls.

Assumption.

1 lecture hall with sloping floor

2 lecture halls with flat floors separated from each other by movable partition with high sound rating

Each lecture hall has capacity for 75 students

Equipment: HSEB lectern; fixed tables; movable chairs; white boards; tack surface; built-in projection equipment; projection screen. Interior room (to avoid natural light / audio-visual conflicts)

#### 206. Conference Rooms.

Conference room with capacity for 20 people.

White board, projection screen, built-in projection equipment. Interior room (to avoid natural light / audio-visual conflicts).



02  
Program

University of Utah | Proposed Dental School

200. Lab / Teaching / Meeting Areas

Code	Space	NASF	Qty.	Total NASF	Efficcy Factor	GASF	GSF Factor	GSF
200	Lab / Teaching / Meeting Areas							
201	Technical Lab	24	60	1,440	1.40	2,016	1.30	2,621
202	Technical Support Lab	600	1	600	1.30	780	1.30	1,014
203	Sterilization Room	600	1	600	1.30	780	1.30	1,014
204	Research Labs	300	10	3,000	1.35	4,050	1.30	5,265
205	Lecture Halls	1,500	3	4,500	1.20	5,400	1.30	7,020
206	Conference Rooms	300	3	900	1.35	1,215	1.30	1,580
	Subtotal:			11,040		14,241		18,513

**301. Dean's Office.**

Individual HVAC controls.

**302. Faculty and Staff Offices**

Individual HVAC controls for each office.

**303. Open Office Areas.**

Open office workstations for approximately half of staff that do not have private offices or designated work spaces (85 total faculty / staff, minus 51 offices, minus 3 reception / dispensary staff = 31, divided by 2 = 16)

**304. Faculty / Staff Support.**

Kitchenette.

Millwork cabinets / countertop with kitchen sink, microwave, refrigerator, coffee machine; vending machines; coat storage space.

May need more than one if a multi-story building.

**305. Student Lounge.**

Kitchenette without plumbing.

Millwork cabinets / countertop, microwave, refrigerator; vending machines.

Recreation equipment: table tennis, foosball, pool table, etc.

Lounge seating.

**306. Student Lockers.**

200 full-height lockers, 12" wide x 12" deep.

Locker room must be designed to expand in the future, when program increases from 50 to 60 students.

**307. Dental Store.**

Bulk storage of materials and supplies, which are broken down and dispensed from Dispensary for use in clinics and labs.

**308. General Building Storage.**

Storage for miscellaneous items such as equipment, furnishings, files, building maintenance supplies and equipment, etc.

**309. Service / Receiving.**

Building interior space directly adjacent to service dock for staging of incoming supplies and equipment, and outgoing materials including recyclables.



02  
Program

University of Utah | Proposed Dental School

### 300. Office / Support Areas

Code	Space	NASF	Qty.	Total NASF	Effic'y Factor	GASF	GSF Factor	GSF
300	Office / Support Areas							
301	Dean's Office	240	1	240	1.35	324	1.30	421
302	Faculty and Staff Offices	120	50	6,000	1.35	8,100	1.30	10,530
303	Open Office Areas	64	16	1,024	1.40	1,434	1.30	1,864
304	Faculty / Staff Support	150	3	450	1.35	608	1.30	790
305	Student Lounge	1,200	1	1,200	1.25	1,500	1.30	1,950
306	Student Lockers	1,000	1	1,000	1.25	1,250	1.30	1,625
307	Dental Store	500	1	500	1.30	650	1.30	845
308	General Building Storage	1,000	1	1,000	1.25	1,250	1.30	1,625
309	Service / Receiving	400	1	400	1.35	540	1.30	702
	Subtotal:			11,814		15,655		20,352



# 03

## Project Cost Opinion

University of Utah | Proposed Dental School

### Introduction

Section 03 contains:

1. **The CBE (Capital Budget Estimate)**, which is a document used by the Utah State DFCM (Division of Facilities Construction and Management) and the University of Utah to establish and track construction project budgets. The CBE calculates the estimated total cost for construction of a facility, inflated to the assumed mid-point of construction. The CBE identifies the building construction cost as well as related project costs (site improvements, hazardous materials abatement, architectural design fees, furnishings / equipment, information technology, percent for art program, testing / inspection, moving / occupancy, campus design and construction management).

2. **A pre-construction cost opinion** for the dental school building prepared by the architectural consultants, which was inserted into the CBE form as the base component of the total project cost. The pre-construction cost opinion was based on the programmed building size and the desired quality level (equivalent to the University of Utah Health Sciences Education Building).



## 03

### Project Cost Opinion

University of Utah | Proposed Dental School

## CBE Cost Summary

<b>Project Name:</b>	UNIVERSITY OF UTAH PROPOSED DENTAL SCHOOL		
<b>DFCM Project Number:</b>			
<b>U of U Project Number:</b>			
<b>Project Manager:</b>	JOHN MCNARY		
<b>Cost Summary</b>			
	<b>\$ Amount</b>	<b>Cost Per SF</b>	<b>Notes</b>
Facility Cost	\$ 20,375,976	\$312.13	
Additional Construction Cost	\$ 40,752	\$0.62	
Site Cost	\$ 249,095	\$3.82	
<b>Total Construction Cost</b>	<b>\$ 20,665,824</b>	<b>\$316.57</b>	
<b>Soft Costs:</b>			
Hazardous Materials	\$ 54,000		
Pre-Design/Planning	\$ 261,825		
Design	\$ 1,686,988		
Property Acquisition	\$ -		
Furnishings & Equipment	\$ 6,352,674		
Information Technology:	\$ 516,646		
Utah Art (1% of Construction Budget)	\$ 206,658		
Testing & Inspection	\$ 206,658		
Contingency	\$ 937,550		
Moving/Occupancy	\$ 6,200		
Builder's Risk Insurance (0.15% of Construction Budget)	\$ 30,999		
Legal Services (0.2% of Construction Budget)	\$ 41,332		
Management	\$ 103,329		
User Fees	\$ -		
Commissioning	\$ 86,824		
Other Costs	\$ 68,197		
<b>Total Soft Costs</b>	<b>\$ 10,559,879</b>	<b>\$161.76</b>	
<b>TOTAL PROJECT COST</b>	<b>\$ 31,225,703</b>	<b>\$478.33</b>	
<b>Previous Funding</b>	\$ -		
<b>Other Funding Sources (Identify in note)</b>	\$ -		
<b>REQUEST FOR STATE FUNDING</b>	<b>\$ 31,225,703</b>		
<b>Project Information</b>			
Gross Square Feet	65,281	Base Cost Date	1-Jun-06
Net Square Feet	37,504	Estimated Bid Date	1-Mar-09
Net/Gross Ratio	57%	Est. Completion Date	1-Sep-10
		Last Modified Date	12-Jul-05
		Print Date	4/6/2006

## CBE Cost Detail

<b>Project Name:</b>	<b>UNIVERSITY OF UTAH PROPOSED DENTAL SCHOOL</b>			
<b>DFCM Project Number:</b>				
<b>U of U Project Number:</b>				
<b>Project Manager:</b>	<b>JOHN MCNARY</b>			
<b>Description</b>	<b>Explanation</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Cost</b>
<b>Facility Cost</b>		<b>GSF</b>		
<b>New Facility Cost Details:</b>				
		65,281	\$ 284.87	\$ 16,700,870
		-	\$ -	\$ -
		-	\$ -	\$ -
		-	\$ -	\$ -
		-	\$ -	\$ -
		-	\$ -	\$ -
<b>Subtotal - New Facility Costs</b>		<b>65,281</b>		<b>\$ 16,700,870</b>
<b>Remodel Facility Cost Details:</b>				
		-	\$ -	\$ -
		-	\$ -	\$ -
		-	\$ -	\$ -
		-	\$ -	\$ -
		-	\$ -	\$ -
		-	\$ -	\$ -
<b>Subtotal - Remodel Facility Costs</b>		<b>-</b>		<b>\$ -</b>
<b>TOTAL FACILITY COST</b>		<b>65,281</b>		<b>\$ 16,700,870</b>
<b>Additional Construction Cost Details:</b>				
Pre-Construction Services	0.2% of Total Facility Cost	0.20%	\$ 16,700,869.89	\$ 33,402
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
<b>TOTAL ADDITIONAL CONSTRUCTION COST</b>				<b>\$ 33,402</b>
<b>Site Cost Details:</b>				
Site Improvements	1% of Escalated Facility + Addt. Const.	1.00%	\$ 20,416,728.33	\$ 204,167
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
<b>TOTAL SITE COST</b>				<b>\$ 204,167</b>
<b>TOTAL CONSTRUCTION COST</b>				<b>\$ 16,938,439</b>
<b>OTHER PROJECT INFORMATION:</b>				
Total Net Square Feet:	37,504			
Base Cost Date:	6/1/2006			
Estimated Bid Date:	3/1/2009			
Estimated Completion Date:	9/1/2010			
Last Modified Date:	7/12/2005			
Inflation Escalation Factor Included:	8.00%			
Location Factor Included:	0.00%			
<b>Hazardous Materials Cost Details:</b>				
Pre-Construction Survey		1	\$ 25,000.00	\$ 25,000
				\$ -
Plan and Monitoring		1	\$ 25,000.00	\$ 25,000
				\$ -
Abatement/Removal	Range \$100k - \$200K (1960s & 1970s)	1	\$ -	\$ -
				\$ -
<b>TOTAL HAZARDOUS MATERIALS COST</b>				<b>\$ 50,000</b>
<b>Pre-Design/Planning:</b>				
Planning Fund Reimbursement			\$ 50,000.00	\$ 50,000



## 03

### Project Cost Opinion

University of Utah | Proposed Dental School

## CBE Cost Detail

Programming		1.00%	\$ 20,665,823.61	\$ 206,658
Environmental Assessment		0.00%	\$ 20,665,823.61	\$ -
Geotechnical Investigation/Surveys	Allowance	0.03%	\$ 20,665,823.61	\$ 5,166
				\$ -
<b>TOTAL PRE-DESIGN/PLANNING COST</b>				<b>\$ 261,825</b>
<b>Design Costs:</b>				
A/E Design Fees		8.00%	\$ 20,665,823.61	\$ 1,653,266
			\$ -	\$ -
			\$ -	\$ -
			\$ -	\$ -
<b>Total A/E Design Fees</b>				<b>\$ 1,653,266</b>
Additional Printing Costs	\$0.20 per Total Facility GSF	65,281	\$ 0.20	\$ 13,056
				\$ -
Value Management Costs	0.1% of Escalated Construction Costs	0.1%	\$ 20,665,823.61	\$ 20,666
<b>TOTAL DESIGN COST</b>				<b>\$ 1,686,988</b>
<b>Property Acquisition:</b>				
				\$ -
				\$ -
				\$ -
<b>TOTAL PROPERTY ACQUISITION COST</b>				<b>\$ -</b>
<b>Furnishings &amp; Equipment Costs:</b>				
Furnishings Detail:	8% of Escalated Construction Costs	8.00%	\$ 20,665,823.61	\$ 1,653,266
				\$ -
				\$ -
<b>Total Furnishings</b>				<b>\$ 1,653,266</b>
Equipment Detail:	6-12% of Escalated Construction Costs	21.00%	\$ 20,665,823.61	\$ 4,339,823
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
<b>Total Equipment</b>				<b>\$ 4,339,823</b>
FF&E Design Costs	6% of Furnishings + Equipment	6.00%	\$ 5,993,088.85	\$ 359,585
				\$ -
<b>TOTAL FURNISHINGS &amp; EQUIPMENT COSTS</b>				<b>\$ 6,352,674</b>
<b>Information Technology Costs:</b>				
Cabling/Connections/NetCom (equip.)	2.5% of Escalated Construction Cost	2.50%	\$ 20,665,823.61	\$ 516,646
				\$ -
				\$ -
<b>TOTAL INFORMATION TECHNOLOGY COST</b>				<b>\$ 516,646</b>
UTAH ART	If N/A, change YES to NO. To supersede 1% calculation enter amount in unit cost	yes		\$ 206,658
<b>Testing &amp; Inspection Costs:</b>				
Building Code Inspection	0.5% of Escalated Construction Cost	0.50%	\$ 20,665,824	\$ 103,329
				\$ -
Material Testing	0.5% of Escalated Construction Cost	0.50%	\$ 20,665,824	\$ 103,329
				\$ -
Special Inspections				\$ -
				\$ -
<b>TOTAL TESTING &amp; INSPECTION COSTS</b>				<b>\$ 206,658</b>
<b>Moving/Occupancy Costs:</b>				
		0.03%	\$ 20,665,823.61	\$ 6,200
				\$ -
				\$ -
				\$ -
<b>TOTAL MOVING/OCCUPANCY COSTS</b>				<b>\$ 6,200</b>

## CBE Cost Detail

<b>CD&amp;C Management:</b>				
CD&C	2% for Non-State Projects	2.00%	\$ 5,166,455.90	\$ 103,329
				\$ -
<b>TOTAL CD&amp;C MANAGEMENT</b>				<b>\$ 103,329</b>
<b>User Fees:</b>				
				\$ -
				\$ -
				\$ -
<b>TOTAL USER FEES</b>				<b>\$ -</b>
<b>Commissioning:</b>				
	Lump Sum	1	\$ -	\$ -
	\$1.33 per Square Foot	65,281	\$ 1.33	\$ 86,824
				\$ -
<b>TOTAL COMMISSIONING COSTS</b>				<b>\$ 86,824</b>
<b>Other Costs:</b>				
Utility shut downs	Combined Total of FM Support	0.13%	\$ 20,665,824	\$ 26,866
campus orders	Combined Total of FM Support	0.20%	\$ 20,665,824	\$ 41,332
signage, locks, other FM support				\$ -
				\$ -
				\$ -
				\$ -
				\$ -
<b>TOTAL OTHER COSTS</b>				<b>\$ 68,197</b>
<b>Previous Funding:</b>				
(Only show state appropriated funding & include costs covered by that funding in appropriate category.)				
<b>TOTAL PREVIOUS FUNDING</b>				<b>\$ -</b>
<b>Other Funding Sources:</b>				
(List and describe each source)				
			0.00%	\$ 31,225,703
				\$ -
				\$ -
				\$ -
<b>TOTAL OTHER FUNDING SOURCES</b>				<b>\$ -</b>



## 03

### Project Cost Opinion

University of Utah | Proposed Dental School

## Cost Opinion Detail

University of Utah Proposed Dental School		Date	
MHTN ARCHITECTS		Apr-06	
STAGE OF COST OPINION: PRE-CONSTRUCTION (DETAIL)		TOTAL GSF	65,281

four levels and parking under building	COST PER SF	TOTAL
SITE WORK	\$ 41.50	\$ 2,747,342
CONCRETE	\$ 8.13	\$ 538,187
MASONRY / EXTERIOR SKIN	\$ 13.30	\$ 880,599
METALS	\$ 28.28	\$ 1,872,135
WOODS AND PLASTICS	\$ 3.70	\$ 244,814
THERMAL AND MOISTURE PROTECTION	\$ 11.48	\$ 760,298
DOORS AND WINDOWS	\$ 17.37	\$ 1,149,905
FINISH	\$ 24.41	\$ 1,615,948
SPECIALTIES	\$ 2.35	\$ 155,545
CONVEYING SYSTEMS	\$ 2.14	\$ 141,350
MECHANICAL	\$ 37.64	\$ 2,491,880
ELECTRICAL	\$ 19.93	\$ 1,319,389
	<b>\$ 210.23</b>	<b>\$ 13,917,392</b>
UNDEFINED BUILDING ELEMENTS	\$ 21.02	10.00% \$ 1,391,739
GENERAL CONDITIONS	\$ 10.51	5.00% \$ 695,870
BONDING	\$ 2.10	1.00% \$ 139,174
PROFIT AND OVERHEAD	\$ 8.41	4.00% \$ 556,696
CONSTRUCTION SUB TOTAL BID JAN 2007	<b>\$ 252.28</b>	<b>\$ 16,700,870</b>

THESE ARE CONSTRUCTION COSTS ONLY SEE CBE FOR PROJECT COST

BUILDING ONLY	\$ 202.48	\$ 13,404,059
PARKING ONLY	\$ 16.50	\$ 1,092,300
SITE IMPORVMENTS	\$ 11.10	\$ 734,871
SITE UTILITIES	\$ 22.20	\$ 1,469,640
	<b>\$ 252.28</b>	<b>\$ 16,700,870</b>

University of Utah Proposed Dental School

Date  
Apr-06  
TOTAL GSF 65,281

MHTN ARCHITECTS  
STAGE OF COST OPINION: PRE-CONSTRUCTION (DETAIL)

**DEMOLITION**

PAVING DEMOLITION	99300 SF	\$ 0.30	\$ 29,790
GRASS AND IRRIGATION	99300 SF	\$ 0.25	\$ 24,825
UTILITIES UPGRADE FOR THIS BUILDING	66200 SF	\$ 18.50	\$ 1,224,700

**EARTH WORK**

CLEAR AND ROUGH GRADE	99300 SF	\$ 0.10	\$ 9,930
ALLOW FOR SITE CUT AND FILL	3678 CY	\$ 8.00	\$ 29,422
CUT WORK AT BUILDING FOOTINGS	390 CY	\$ 8.00	\$ 3,120
CUT WORK AT BUILDING FLOOR	1226 CY	\$ 8.00	\$ 9,807
BACK FILL AT FOOTINGS	266 CY	\$ 8.00	\$ 2,129
STRUCTURAL FILL UNDER FLOOR SLAB	919 CY	\$ 18.00	\$ 16,550
HAUL OFF SITE	3065 CY	\$ 5.00	\$ 15,324

**SITE IMPROVEMENTS**

HARDSCAPE, PAVING 75% OF SITE	74475 SF	\$ 3.00	\$ 223,425
SOFTSCAPE, PLANTING 25% OF SITE	24825 SF	\$ 3.00	\$ 74,475
SITE EARTH RETAINING	99300 SF	\$ 0.25	\$ 24,825
SITE SPECIALTIES	99300 SF	\$ 0.20	\$ 19,860
PIPE BOLLARDS /ACCESS CONTROL	7 EA	\$ 205.00	\$ 1,527
SITE SIGNAGE DIRECTIONAL	65 EA	\$ 135.00	\$ 8,775
TREES 3" ALLOW 1 PER 5000 SF SITE	20 EA	\$ 345.00	\$ 6,852
ALLOW FOR PARKING UNDER BUILDING	16550 SF	\$ 55.00	\$ 910,250

**SITE UTILITIES**

WATER DISTRIBUTION	150 LF	\$ 32.00	\$ 4,800
FIRE LINE DISTRIBUTION AND HYDRANTS	150 LF	\$ 38.00	\$ 5,700
STORM SEWER	150 LF	\$ 28.00	\$ 4,200
SEWER	150 LF	\$ 30.00	\$ 4,500
FIRE HYDRANT AND PIPING (ALLOW)	2 EA	\$ 3,800.00	\$ 7,600
SITE DRAINAGE PAVING ONLY	74475 EA	\$ 0.30	\$ 22,343
WATER METER AND VAULT	66200 SF	\$ 0.07	\$ 4,634
FOUNDATION DRAINAGE	711 LF	\$ 22.00	\$ 8,529
ELECTRICAL DISTRIBUTION	150 LF	\$ 88.00	\$ 13,200
GAS DISTRIBUTION	150 LF	\$ 21.00	\$ 3,150
SITE LIGHTING	66200 SF	\$ 0.50	\$ 33,100
			<u>\$ 2,747,342</u>

**CONCRETE**

CONTINUOUS FOOTING	124 CY	\$ 265.00	\$ 32,829
SPOT FOOTINGS 8' X 8' X 18"	18 EA	\$ 725.00	\$ 13,332
INTERIOR FOOTINGS	124 CY	\$ 255.00	\$ 31,590
ELEVATOR PIT, CONCRETE	2 EA	\$ 1,500.00	\$ 3,486
SLAB ON GRADE 4" W/BASE REINFORCED	16550 SF	\$ 3.50	\$ 57,925
LOADING DOCK STRUCTURE (ALLOW)	66200 SF	\$ 0.30	\$ 19,860
FOUNDATION WALL 8" TO 12" THICK	2676 SF	\$ 18.00	\$ 48,165
CONCRETE SHEAR WALLS (ALLOW)	1324 SF	\$ 22.00	\$ 29,128
CONCRETE MECHANICAL PADS	662 SF	\$ 6.00	\$ 3,972
SUSPENDED SLAB. REINFORCED	49650 SF	\$ 6.00	\$ 297,900
			<u>\$ 538,187</u>



## 03

### Project Cost Opinion

University of Utah | Proposed Dental School

## Cost Opinion Detail

University of Utah Proposed Dental School		Date	
MHTN ARCHITECTS		Apr-06	
STAGE OF COST OPINION: PRE-CONSTRUCTION (DETAIL)		TOTAL GSF	65,281
<b>MASONRY / EXTERIOR FINISH</b>			
EXTERIOR FINISH (INFORMATION ABOVE)	25688 SF	\$ 18.90	\$ 485,507
PARAPET WALL 2' HIGH	1338 SF	\$ 23.90	\$ 31,976
INTERIOR MASONRY WALL (ALLOW) 25%	20688 SF	\$ 15.00	\$ 310,313
PRECAST OR BRICK SILL AT WINDOWS	2854 LF	\$ 18.50	\$ 52,804
			<u>\$ 880,599</u>
<b>METALS</b>			
COLUMNS WF SHAPES	86.20 TON	\$ 2,950.00	\$ 254,290
SUSPENDED FLOOR STRUCTURE WF	248.60 TON	\$ 2,950.00	\$ 733,370
ROOF STRUCTURE JOIST	59.65 TON	\$ 2,950.00	\$ 175,968
MISC. STEEL	132.40 TON	\$ 2,950.00	\$ 390,580
ROOF DECK	16550 SF	\$ 2.40	\$ 39,720
FLOOR DECK	49650 SF	\$ 2.40	\$ 119,160
GALVANIZED ANGLE AT EXTERIOR WALL	2676 LF	\$ 18.00	\$ 48,165
STEEL LADDER TO ROOF	60 LF	\$ 42.00	\$ 2,520
WALL CAP	669 LF	\$ 12.50	\$ 8,362
MAIN ENTRY STAIR	2 FLT	\$ 22,500.00	\$ 45,000
METAL STAIR AND RAILINGS	8 FLT	\$ 6,875.00	\$ 55,000
			<u>\$ 1,872,135</u>
<b>WOOD AND PLASTICS</b>			
WALL PLATES BOLTED AND SHAPED	669 LF	\$ 6.00	\$ 4,014
MISC. ROUGH CARPENTRY	66200 SF	\$ 0.25	\$ 16,550
FIXED DESK	450 LF	\$ 115.00	\$ 51,750
BUILT IN STORAGE	40 EA	\$ 175.00	\$ 7,000
FINISH CARPENTRY	66200 SF	\$ 0.50	\$ 33,100
MISC. CASEWORK	66200 SF	\$ 2.00	\$ 132,400
			<u>\$ 244,814</u>
<b>THERMAL AND MOISTURE PROTECTION</b>			
FOUNDATION INSULATION	2676 SF	\$ 2.00	\$ 5,352
WATERPROOF AT FOUNDATION WALL	10703 SF	\$ 6.00	\$ 64,220
WALL EXPANSION COVERS INT. & EXT.	128 LF	\$ 42.00	\$ 5,376
EXTERIOR WALL INSULATION R 19	25688 SF	\$ 0.60	\$ 15,413
SPRAYED ON STRUCTURAL FIREPROOF	16550 SF	\$ 2.00	\$ 33,100
SUN SHADES EXTERIOR METAL	1720 LF	\$ 170.00	\$ 292,400
SOUND INSULATION (ALLOW)	41375 SF	\$ 0.50	\$ 20,688
ROOFING	39720 SF	\$ 3.25	\$ 129,090
ROOF INSULATION RIGID	35748 SF	\$ 2.00	\$ 71,496
ROOF CRICKETS	3575 SF	\$ 2.50	\$ 8,937
ROOF HATCH	2 EA	\$ 980.00	\$ 1,622
ROOFING SPECIALTIES	35748 SF	\$ 0.10	\$ 3,575
ALLOW @ ROOF / MECHANICAL SCREEN	1338 SF	\$ 45.00	\$ 60,207
ALLOW FOR ENTRY COVERS, complete	497 SF	\$ 65.00	\$ 32,273
ALLOW FOR SEALANT	13240 LF	\$ 1.25	\$ 16,550
			<u>\$ 760,298</u>

University of Utah Proposed Dental School

Date  
Apr-06  
TOTAL GSF 65,281

MHTN ARCHITECTS  
STAGE OF COST OPINION: PRE-CONSTRUCTION (DETAIL)

**DOORS AND WINDOWS**

DOORS EXTERIOR STORE FRONT AND SIDE LITE				
COMPLETE HARDWARE, 6' X 7'	15 EA	\$ 4,625.00	\$	69,375
DOORS INTERIOR WOOD OR HOLLOW METAL				
COMPLETE HARDWARE, PAINTED	147 EA	\$ 890.00	\$	130,929
POWER OPERATOR (PAIR)	4 EA	\$ 5,280.00	\$	21,120
GARAGE DOORS	2 EA	\$ 3,890.00	\$	6,465
ALLOW FOR CEILING ACCESS PANELS	12 EA	\$ 75.00	\$	903
SOLID SOUND DIVIDER DOOR, AUDITORIUM	650 SF	\$ 60.00	\$	39,000
SMOKE DOORS AT ELEVATORS	8 EA	\$ 4,500.00	\$	36,000
INTERIOR GLASS AND GLAZING	3800 SF	\$ 30.00	\$	114,000
GLASS AND GLAZING	17125 SF	\$ 42.75	\$	732,114
				<u>\$ 1,149,905</u>

**FINISH**

EXTERIOR METAL STUDS 6" LOAD BEARING	25688 SF	\$ 7.00	\$	179,817
INTERIOR WALLS STUDS GYP. TWO SIDES	82750 SF	\$ 4.00	\$	331,000
GYP. SHEATHING AND BUILDING WRAP	25688 SF	\$ 1.25	\$	32,110
GYP FINISHED AT EXTERIOR WALL	25688 SF	\$ 1.25	\$	32,110
FLOOR FINISH MIXTURE	13050 SF	\$ 6.00	\$	78,300
FLOOR FINISH TERRAZO LOWER FLOOR	3500 SF	\$ 28.00	\$	98,000
FLOOR FINISH SHEET VINYL 20%	13240 SF	\$ 7.00	\$	92,680
FLOOR FINISH CERAMIC TILE 10%	6620 SF	\$ 11.00	\$	72,820
FLOOR FINISH V C T 10%	6620 SF	\$ 1.50	\$	9,930
WALL BUMPERS CORRIDORS (ALLOW)	2400 LF	\$ 12.50	\$	30,000
WALL FINISH UPGRADED 20% VINYL	16550 SF	\$ 8.00	\$	132,400
WALL FINISH CERAMIC TILE 5%	4138 SF	\$ 11.00	\$	45,513
WALL FINISH PAINT 65%	53788 SF	\$ 0.60	\$	32,273
WALL FINISH SOUND PANELS	1050 SF	\$ 55.00	\$	57,750
CEILING FINISH EXPOSED PAINTED 5%	3310 SF	\$ 1.50	\$	4,965
CEILING SUSPENDED GYPSUM 20%	6620 SF	\$ 7.00	\$	46,340
CEILING METAL PANELS	2500 SF	\$ 38.00	\$	95,000
CEILING SOUND PANELS	6620 SF	\$ 14.50	\$	95,990
CEILING FINISH LAY IN TILE 75%	49650 SF	\$ 3.00	\$	148,950
				<u>\$ 1,615,948</u>

**SPECIALTIES**

FIRE EXTINGUISHER IN CABINET	32 EA	\$ 245.00	\$	7,840
TOILET PARTITIONS / SPECIALTIES	17 EA	\$ 805.00	\$	13,323
BUILDING DIRECTORY	1 EA	\$ 1,875.00	\$	1,875
JANITOR SHELING	6 EA	\$ 250.00	\$	1,500
BREAK ROOM SPECIALTIES	4 EA	\$ 1,250.00	\$	5,000
LOCKERS	200 EA	\$ 205.00	\$	41,000
BUILDING SPECIALTIES	66200 SF	\$ 0.20	\$	13,240
WINDOW SHADES AT 50% OF WINDOWS	8563 SF	\$ 2.50	\$	21,407
TRAFFIC MATT	480 SF	\$ 32.00	\$	15,360
SIGNAGE ALLOW 1 PER 500 SF	1 sum	\$ 35,000.00	\$	35,000
				<u>\$ 155,545</u>



## 03

### Project Cost Opinion

University of Utah | Proposed Dental School

## Cost Opinion Detail

<b>University of Utah Proposed Dental School</b>		Date	
<b>MHTN ARCHITECTS</b>		Apr-06	
<b>STAGE OF COST OPINION: PRE-CONSTRUCTION (DETAIL)</b>		TOTAL GSF	65,281

### CONVEYING SYSTEMS

1

ELEVATOR FULL SERVICE PASSENGER TYPE AND SPEED NEEDED	66200 SF	\$ 1.75	\$ 115,850
ADD FOR MORE THAN 2 FLOORS	3.0 SUM	\$ 8,500.00	\$ 25,500
			<b>\$ 141,350</b>

### MECHANICAL

PLUMBING	66200 EA	\$ 4.00	\$ 264,800
HVAC, FULL BUILDING SYSTEM	66200 SF	\$ 26.50	\$ 1,754,300
FULL SYSTEM AIR GAS VAC	23400 SF	\$ 12.00	\$ 280,800
FIRE SPRINKLER	66200 SF	\$ 2.90	\$ 191,980
			<b>\$ 2,491,880</b>

### ELECTRICAL

POWER AND DISTRIBUTION	66200 SF	\$ 2.50	\$ 165,500
BRANCH CONDUIT AND WIRE	66200 SF	\$ 4.00	\$ 264,800
LIGHTING	66200 SF	\$ 5.00	\$ 331,000
BACKUP SYSTEMS -(generator)	66200 SF	\$ 2.50	\$ 165,500
COMPUTER PROJECTORS AND SOUND	3 EA	\$ 30,000	\$ 90,000
SECURITY CAMERA SYSTEM (ALLOW) 1 PER 5000 GSF	15 EA	\$ 3,500.00	\$ 52,500
PHONE AND DATA SYSTEM CONDUIT ONLY	66200 EA	\$ 1.00	\$ 66,200
PHONE SYSTEM HAND SETS	147 EA	\$ 350.00	\$ 51,489
FIRE ALARM AND SPECIAL SYSTEMS	66200 SF	\$ 1.00	\$ 66,200
SECURITY SYSTEMS	66200 SF	\$ 1.00	\$ 66,200
			<b>\$ 1,319,389</b>



# 04

Appendix

University of Utah | Proposed Dental School

- a. [Proposed Dental School, 3/7/2006](#). Document prepared by G. Lynn Powell, Asst. Dean, School of Medicine and Cathy Anderson, Assoc. Dean of Finance, School of Medicine.
- b. [Dental School Proposal, Letter of Intent for Program Review Committee](#)
- c. [Information regarding the Lazzara Center for Oral-Facial Health at the CU School of Dentistry](#), from Christopher Carvell Architects.
- d. [Program information from Creighton University](#)

### University of Utah Proposed Dental School

**Contact:** G. Lynn Powell, Assistant Dean of Dental Education, School of Medicine  
Phone: (801) 581-8951  
Fax: (801) 585-6485  
Email: [lynn.powell@hsc.utah.edu](mailto:lynn.powell@hsc.utah.edu)

Cathy Anderson, Associate Dean of Finance, School of Medicine  
Phone: (801) 585-6123  
Fax: (801) 585-2350  
Email: [cathy.anderson@hsc.utah.edu](mailto:cathy.anderson@hsc.utah.edu)

- Class Size: 50 students per year for 4 years = 200 total students  
Build for 60 students per year to allow for growth
- First entering class: Fall of 2008
- Building completed and occupied spring 2010
- Multi-story building with sufficient elevators
- Patients must be able to get to the clinic by car and public transportation
- Basic science classes will be taught by existing Medical school. Basic science faculty will be in current facilities, so there is no need to construct office or labs for them.
- 32-35 Full time faculty
- 50 staff



# 04.a

## Appendix

University of Utah | Proposed Dental School

### a. Proposed Dental School, 3/7/2006.

Document prepared by G. Lynn Powell, Asst. Dean, School of Medicine and Cathy Anderson, Assoc. Dean of Finance, School of Medicine.

### Dental School Space Requirements

Description	Detail	Total Estimated Square Footage
Clinic Operation	$9 \times (10+3) = 117 \times 120$	14,040
Technical Lab	$4 \times 6 = 24 \times 60$ students	1,440
Technical Support Lab	30 x 30	900
Support Lab Clinic	30 x 30	900
Waiting Room Clinic	30 x 30	900
Sterilization Room	30 x 30	900
Clinic Dispensary	30 x 20	600
Faculty & Staff Offices	$11 \times 11 = 121\text{SF} \times 50$ offices	6,050
Conference Rooms	$15 \times 22 = 330\text{SF} \times 3$ rooms	990
Lecture Halls	$4 \times 5 = 20 / \text{student} \times 75$ students 1,500 x 3 halls	4,500
Research Labs		4,000
Rest Rooms, Storage, Mechanical Rooms, Dental Store		5,000
<b>Total Space</b>		<b>40,220</b>

### Building Basics

Heat, light, water, natural gas, compressed air, restrooms, floor coverings, cabinets, countertops	60,000 sq ft (200 sq ft) =	\$12,000,000
--	----------------------------	--------------

### Dental Equipment

Operatories: chairs, lights, stools, delivery ????, mobile charts, view box Handpieces (4) + cabinets	120 x \$10,000	\$1,200,000
	120 x \$5000	\$600,000
X-Ray: Panorex	6 x \$20,000	\$120,000
Intra-oral	20 x \$5000	\$100,000
Developers	8 x \$5000	\$40,000
Student lab and support: Units		\$400,000
Equipment -mudd trim, vacuum, casting		\$400,000
Sterilization Equipment		\$500,000
	<b>Total</b>	<b>\$3,360,000</b>

### Offices

Desks, filing cabinets, chairs, computers, book shelf's		\$300,000
Furniture -waiting area, classrooms, conference rooms,		\$300,000
Computers -store room, appointments, billing		\$200,000
	<b>Total</b>	<b>\$800,000</b>



# 04.b

Appendix

University of Utah | Proposed Dental School

b. Dental School Proposal,  
Letter of Intent for Program Review Committee

## Letter of Intent for Program Review Committee Dental School Proposal

### 1.1. Program Description:

The dental education programs at the University of Utah request approval to establish a fully accredited dental school at the University of Utah Health Sciences Center. This four year, graduate education program will offer a Doctor of Dental Surgery (DDS) degree with the possibility of specialty training programs to be added in the future. The dental school will provide dental education for Utah residents who are currently forced to leave the state for their schooling. It will provide this education for considerably less that they currently pay to attend out-of-state schools.

### 1.2. Mission Fit:

The proposed dental school fits within the R312 description for the University of Utah. The dental school will grant a professional doctoral degree of Doctor of Dental Surgery (DDS). The teaching will be accomplished by qualified, professional faculty who will provide didactic instruction, supervise treatment of patients, and conduct research. Students will provide treatment of patients from the community in the dental schools clinics. In addition, community clinics will provide service to patients in their local area while enhancing the students' skills.

Research objectives and projects will range from clinical applications of dental materials to basic research of dental origin. The collaborative projects involving a multi-discipline approach, such as: early diagnosis of cancer, genetic related oral diseases, drug interaction and pain control, and development of new dental materials will be continued and expanded.

The school will help provide dental care for a segment of the population that currently is underserved. It will enhance the image of dentistry in the community. It will add a minimum of ten million dollars annually to the local economy and enhance the state and national economy through the graduating practitioners.

### 1.3. Current Faculty Preparedness:

Faculty to conduct the first year curriculum is already in place, credentialed and accredited as part of the existing Regional Dental Education Program (RDEP). This will serve as the basis for expanding into a full dental school faculty.

The central core of dental school administration currently is actively functioning in administering the RDEP, General Practice Residency (GPR), and dental research programs at the University of Utah Health Sciences. This administrative group, coupled with the existing financial resources, should be able to attract qualified personnel to complete the faculty for the four year education program and to conduct meaningful research.

**1.4. Market Demand:**

From all traditional sources, there is predicted to be a national shortage of dentists (significant decrease in the number of dentists/100,000 population as compared to the year 2000) by the year 2010. Indeed, many states are already feeling or proclaiming a shortage. Some government agencies and other individuals believe Utah will follow the national trend. The continued need for new practicing dental graduates has never been more evident. For the last twenty years (1985-2005) 20%-25% fewer dental students have graduated annually as compared to the preceding ten years (1975-1985) while the population of the United States has increased more than 50 million people during that time. The financial opportunities for dentists have never looked brighter. Since 1990 the average net income has been averaging an 8%-10% increase annually. The decrease in dental school graduates coupled with the increase in national population should promote a continued need for increased number of dentists and a continuation of economic prosperity.

**1.5. Student Demand:**

The number of Utah residents applying for the 10 state supported RDEP positions has increased steadily in the last 10-15 years from 56 applicants in 1990, to 232 applicants for 2004 and 256 applicants for 2006. Nationally, there were over 10,000 applicants for approximately 4600 first year positions last year and predicted 11,000 – 12,000 applicants this year for the same 4600 positions. There has been a dramatic increase in the number of applicants in the last 4-5 years. There are approximately 140 Utah residents admitted to dental schools annually. They pay out-of-state tuition or private school tuition of \$34,000 to \$57,000/year, plus fees of \$4,000 to \$10,000/year plus living expenses. Many states are beginning to restrict out-of-state students or not allow students to change state of residency.

There is no anticipated concern of having a sufficient number of qualified applicants from the State of Utah. In fact, we will not have sufficient space for all qualified applicants from the state and many will still need to be educated outside of the State of Utah.

**1.6. Five-Year Revenue and Expense Projections:**

The program revenue will come from existing state appropriations, student tuition and fees, clinic income and the University Hospital (Federal GME funds).

A six year revenue and expense report is attached. Outside review of the report was done by three different dental schools.

**1.7. Similar Programs Already Offered in the USHE:**

There are no existing dental schools in Utah. There are no existing dental schools in Idaho, Wyoming or Montana. The existing Utah Regional Dental Education program (RDEP) fully supports the establishment of the dental school and the faculty and courses will be used as the basis for the proposed first year curriculum.



# 04.c

## Appendix

University of Utah | Proposed Dental School

c. Information regarding the Lazzara Center  
for Oral-Facial Health at the CU School of Dentistry,  
from Christopher Carvell Architects.



1037 Cherokee Street  
Denver, Colorado 80204  
303 595-0491 telephone  
303 595-0282 facsimile  
www.carvell.com

April 20, 2005

Dr. G. Lynn Powell, DDS, Asst. Dean for Dental Education  
Dental Education, BC101 SOM  
**University of Utah**  
30 North 1900 East  
Salt Lake City, UT 84132-2801

Re: Project Information  
**The Lazzara Center for Oral-Facial Health**  
The University of Colorado Health Sciences Center at Fitzsimons

Dear Dr. Powell,

Based on a referral from Phil Smith at ADEC, we would like to take this opportunity to introduce our firm's experience as the prime architect for the **new School of Dentistry on the University of Colorado Health Sciences Center Campus at Fitzsimons**. Christopher Carvell Architects is well known for our high-tech laboratory and academic research projects throughout the Rocky Mountain West. We have an extensive history in Health Sciences projects including dental assisting and dental hygiene outpatient clinical facilities, and are now pleased to announce our success story regarding the New Lazzara Center for Oral-Facial Health.

Christopher Carvell Architects (CCA) completed a Micro-Master Plan for the Education Commons Eastern Precinct for the University of Colorado Health Sciences Center new Fitzsimons Campus late last year. This planning effort included siting the School of Dentistry's New Center for Oral-Facial Health, strategically positioned for public visibility at the southeast corner campus entry for patient drop-off. Therefore, the SOD's prominent position will serve as the "Gateway to the Commons" on campus. Directly south-flanking the Lazzara Center is the new \$400 million dollar Children's Hospital, a 1.4 million square foot complex now under construction as well. The SOD is uniquely positioned providing pediatric dental care for children, as well as out-patient surgery for University Hospital, located on the western portion of the medical center campus.

The Lazzara Center for Oral-Facial Health is the first new building being constructed within the Education Commons for the University of Colorado's New Medical Center Campus, and is the only ground-up, stand-alone, professional school building planned for the Fitzsimons Campus. The School of Dentistry design team's research was extensive including touring recently completed facilities, as well as utilizing the **latest in digital technology programming** for the University's new state-of-the-art \$30 million dollar facility.

**Key program components for the University of Colorado Health Science Center - Lazzara Center for Oral-Facial Health include:**

- Soiled, Clean, Sterile Processing
- General Emergency Surgical Operatories (Open / Closed) with Radiology
- Surgical Scrub, Recovery, Pathology Specimen
- Information Technology Core Area
- Geriatric and Special Care Operatories
- Main Clinic (Open / Closed) Demo Operatories with Audio / Visual
- Simulation Clinic with Support Laboratories
- Pre-Clinic Technique and Support Laboratories

- Orthodontics / Graduate Student Areas
- Pediatric / Family Practice Operatories
- Intra-Oral Films – Panoramic Ceph / CAT / Digitizing / Radiology – Viewing Rooms
- Dispensary / Sterilization / Flammable Storage Rooms
- Containment Waste / Radiology Dark Room
- Patient Consult / surgical Recovery
- Business / Cashier / Central Records
- Clinic Seminar, Lecture Hall, Faculty Office, Administration
- Student / Staff Lounge with Kitchen, Lockers, Changing, Toilets and Shower Rooms

Enclosed is a copy of CCA's company background summary and project description sheets for the New Lazzara Center for Oral-Facial Health, which is scheduled to complete construction next summer and be occupied for the 2005 Fall semester. We would be happy to share with you lesson's learned on this new state-of-art project. Please feel free to contact me or Mindy Davine, Director of Business Development, regarding any additional information you may desire.

Respectfully,



Chris A. Carvell, AIA, president

**CHRISTOPHER CARVELL ARCHITECTS, P.C.**



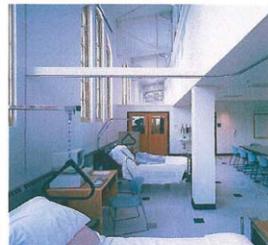
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Appendix

University of Utah | Proposed Dental School

## Health Sciences / Laboratory & Advanced Technology Buildings Academic Buildings

Christopher **Carvell**  
ARCHITECTS



Christopher Carvell established his private practice in Denver in 1982 as a founding Principal. In 1995, Mr. Carvell left C.W. Fentress J.H. Bradburn Associates, as Principal-in-Charge of Design and formed Christopher Carvell Architects, P.C. (CCA.) The firm's structure enables Mr. Carvell and senior members of the staff to be personally involved in all aspects of each project, including: programming, master planning, design, contract documents and construction administration. During 22 years of practice as a Principal, Mr. Carvell's firm's commissions have involved every aspect of the built environment. Major projects fall into five categories: new building design, historic preservation and adaptive re-use, interior design, urban design, and master planning. The firm also provides services in feasibility analysis, site selection, programming and research, and space planning. Over the years CCA has developed a

specific recognized expertise in Health & Human Sciences, Advanced Technology, Clinic and Laboratory Buildings for Teaching and Research Institutions or Higher Education & Medical Center Campuses throughout Colorado.

Christopher Carvell Architects' current staff of fourteen includes six registered architects. CCA is headed by Christopher A. Carvell, AIA, Principal-in-Charge of Design, Harvey Whitcomb, AIA, Associate Principal, Eric Hanson, AIA, Associate Principal, with Wayne Lee and Todd Welch as Senior Project Architects and Glenn Boardman as Senior Project Manager. The firm's staff has great depth of experience and knowledge and is able to offer our clients a great deal of flexibility and responsiveness. CCA's Auto-CAD based CADD system has proven itself a valuable tool with 16 workstations, improving the accuracy of its work

and for meeting Fast Track CM/GC delivery method time schedules.

Mr. Carvell and his associates have nearly 100 built projects completed. The firm's key personnel continue to be recognized for their innovative response to unique project challenges and success in translating the visions of their clients into compelling designs. CCA's list of significant design awards include: State of Colorado AIA, Denver AIA and Western Mountain Region Honor and Merit Awards; national, state and local historic preservation awards in Colorado and Utah; American Association of School Administrators (AASA); American Concrete Institute; Prestress Concrete Institute; Brick Institute of America; Best in the West Gold Nugget awards from Pacific Coast Builders Magazine; and Architectural Showcase Design Excellence winners from Athletic Business Magazine.

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**Health Sciences / Laboratory  
& Advanced Technology Buildings**  
Campus Planning / Urban Infill

Christopher Carvell  
ARCHITECTS



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# 04.c

## Appendix

University of Utah | Proposed Dental School

### Health Sciences / Laboratory & Advanced Technology Buildings Gateway Buildings

Christopher **Carvell**  
ARCHITECTS



#### DESIGN APPROACH

The firm believes that the most successful design projects are those, which have celebrated and reinforced the goals of the client rather than the signature of the Architect. Critical to this approach is an inherent ability to establish a close working relationship, a partnership with the client and to develop goals, program parameters, building solutions and management strategies in a framework which assigns high priority to collaboration.

Only a collaborative team approach can achieve a truly successful outcome. We

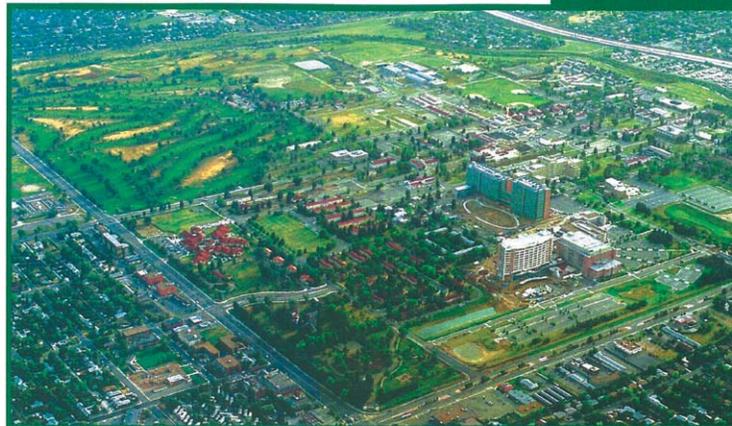
strongly recommend beginning the project with a programming and design charrette – a highly interactive planning and design work session with representatives of your organization in conjunction with our experienced staff. We listen to all the key stakeholders to get beneath the surface of each project. This important communication is critical to creating a facility that fulfills our client's visions and also builds an effective, supportive environment that enhances the rehabilitation process.

The work of Christopher Carvell Architects (CCA) demonstrates two equally important strengths. The first is the ability to produce

unique and powerful architectural images for institutions seeking a new or renewed progressive identity. Second, is the belief that architecture is a "healing" profession involving the application of design to the stabilization and reinforcement of existing institutions: expanding the traditions, the way in which they are perceived by patients, doctors, residents / students, healthcare providers, faculty, administrators, alumni, trustees, facilities managers, and the public in general, and the way in which they will be developed in the future. Both bear directly on the specific challenges posed for each individual project.

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**FITZIMONS** Health Care Campus  
of the Future



A supplement to Colorado Construction  
A publication of the McGraw-Hill Companies, Inc.

**Lazzara Center for Oral-Facial Health**

The CU School of Dentistry is the only school of dentistry in Colorado, and the \$20.2 million Lazzara Center for Oral-Facial Health building is unique in that it is being funded as part of a public/private business partnership. It will accommodate 200 dental students, 60 dental hygiene students, 32 orthodontic post-doctoral students and six general practice residents.

Howard Landesman, DDS, MEd and dean of the School of Dentistry, said the state-of-the-art building will have the clinical and educational technology to support patient care and the mission of the school.

The building is a unique combination of classrooms, labs, offices and patient care clinics that can support more than 40,000 patient visits a year.

"The quality of life and public spaces is extraordinary," Landesman said.

Christopher Carvell Architects designed the 95,000-sq-ft building to also include state-of-the-art audiovisual equipment. Chris Carvell, principal, said, "It's the most visible building on the Education Commons."

Saunders Construction will build the project, slated for completion in June 2005. Unique to the three-story building, according to Saunders' Jim Webber, is "that it's expandable for an additional floor. It's a very forward-thinking building, and all systems in the building are accommodated for growth."



RENDERING BY CHRISTOPHER CARVELL ARCHITECTS



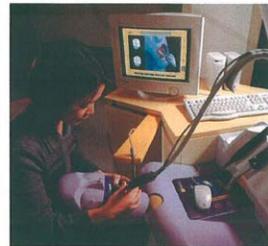
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Appendix

University of Utah | Proposed Dental School

## Health Sciences / Laboratory & Advanced Technology Buildings Outpatient / Laboratories / Dental Operatories

Christopher **Carvell**  
ARCHITECTS



### RELEVANT DIRECT EXPERIENCE FOR ADVANCED TECHNOLOGY, HEALTH SCIENCES & COMMUNITY HEALTH CLINICAL CARE FACILITIES

In recent years, design of facilities for higher education clients has accounted for over 50% of the firm's work. Much of our expertise has required a diversified approach with specialized knowledge in: Advanced Technology Facilities for Undergraduate and Graduate Level Teaching and Research Laboratory Design in the Physical and Life Sciences; Health Sciences / Allied Health; Clinical Training Facilities; Multi-media / Distance Learning

Classroom Facilities; Mathematics; Library; Dining and Conference Facilities; Wellness Training; Division II Athletics; Social Sciences; Visual and Performing Arts; Administrative office facilities; Kinesiology / Recreation and Mental health / Counseling and Medical Treatment within State and Federally subsidized low-income Residential Projects.

During the past 15 years, CCA has been actively engaged with 10 regional college campuses in the planning and design of campus facilities, such as the University of Colorado at Boulder and Denver, **University of Colorado Health Sciences**

**Center at Fitzsimons**, Colorado State University, The Colorado School of Mines, Western State College, the University of Southern Colorado, the University of Northern Colorado, Pueblo Community College, Weber State University in Ogden Utah, Northern Kentucky University, Arizona State University - West and colleges in the Mid-West.

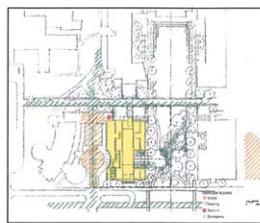
Of particular relevance is the fact that CCA has been the Architect on five (5) Health and Human Sciences, Outpatient Medical Treatment, Teaching and Research Buildings in the Physical, Applied and Life Sciences.

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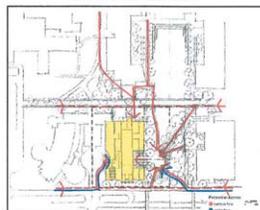
**Lazzara Center for Oral - Facial Health  
CU School of Medicine / School of Dentistry**

ChristopherCarvell ARCHITECTS

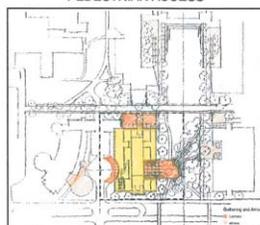
University of Colorado Health Sciences Center at Fitzsimons  
Aurora, Colorado



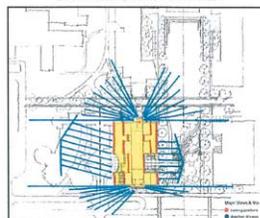
VEHICULAR ACCESS



PEDESTRIAN ACCESS



GATHERING AND ARRIVAL



MAJOR VIEWS



- ▲ Exterior Color Rendering, looking north west
- ◀ Massing Model Education Precinct, including Children's Hospital, looking northwest

The development of the Lazzara Center will represent one of the first new academic buildings to be completed as part of the UCHSC's relocation to the Fitzsimons campus, as delineated in the Institutional Master Plan of 1998. The Lazzara Center will serve as the new home of Colorado's only dental school, creating an expanded, state-of-the-art facility for the School of Dentistry's existing DDS, dental hygiene, general practice residency, pediatric dentistry programs, and for the new orthodontic and dentofacial orthopedics programs. The Lazzara Center will allow the School to continue and expand its missions of teaching, research, patient care and community / professional service.

CCA / BCJ and landscape consultant Insite Design developed a concept for the site and the waiting garden in the commons area. This proposed site plan, delineates architectural, landscape and hardscape responses to existing topographic and climatological conditions. Development of site utilities are discussed in the attached civil engineering documents.

The site boundaries are currently defined by 17th Avenue to the south, the parking area of the Native American Health Building to the west, 17th Place to the north, and the planned Educational Commons, as defined in the UCHSC Master Plan to the east. As currently interpreted by the Design Review Board, the master plan further defines the site's eastern edge by setback and terracing requirements, as well as a continuation of pathways and planting geometries from the north.



# 04.c

## Appendix

University of Utah | Proposed Dental School

### Lazzara Center for Oral - Facial Health CU School of Medicine / School of Dentistry

ChristopherCarvell ARCHITECTS

University of Colorado Health Sciences Center at Fitzsimons  
Aurora, Colorado



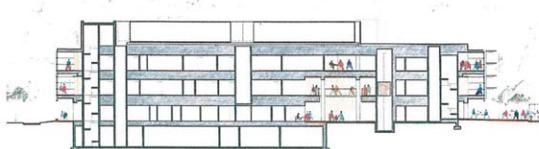
▲ East Elevation at Education Commons



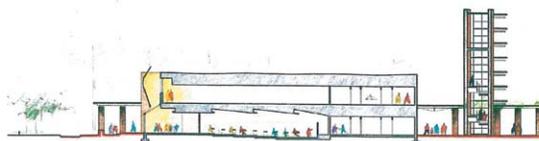
▲ North Elevation at 17th Place Promenade



▲ South Elevation at Gateway to Children's Hospital



▲ Longitudinal Section at Main Entry Lobby



▲ Longitudinal Section at Lecture Hall

#### Contextual Materials & Exterior Envelope:

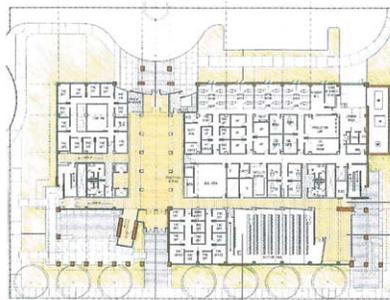
Although all of the buildings on the new Education Commons, and most of the buildings on the UCHSC's new Fitzsimons campus, will be new construction, selection of the exterior materials and form of the Lazzara Center will be dictated by a need to create a harmonious relationship with the adjacent buildings and landscape of the campus and Colorado's natural and architectural heritage. The exterior envelope will be primarily of masonry, especially at the lower levels, focusing on local campus brick and/or Colorado sandstone. Glazing will be used for daylight penetration, with screening assemblies for sun control appropriate to each exposure. Major glazing near areas of public circulation and occupancy provide the key opportunities to bring natural light into the building. In addition to the setbacks and other plan and section articulation seen in the attached drawings, the sun screening devices also provide an added benefit: besides improving the quality of interior light, they enrich the visual surface of the exterior of the wall through shade and shadow, making it more humane and friendly in the campus landscape.



**Lazzara Center for Oral - Facial Health  
CU School of Medicine / School of Dentistry**

ChristopherCarvell ARCHITECTS

University of Colorado Health Sciences Center at Fitzsimons  
Aurora, Colorado



▲ Main level floor plan



▲ Second level floor plan



▲ Third level floor plan

- Plan Key:
1. Main Lobby / Patient drop-off / Commons
  2. 100 seat Lecture Hall
  3. Surgery / Radiology Operator Suite
  4. Main Clinic
  5. Simulation Clinic
  6. Pre-technique Laboratory
  7. Orthodontics Open Operator Clinic
  8. Support / Production Laboratories
  9. School of Dentistry Dean / Administration Offices

**Building Organizing Features:**

Public circulation and way-finding through the clinics is highly visible and inviting. Moving through the light-filled lobby, open stairs carry people up through the three public/clinical floors. Clinic reception/waiting areas are located adjacent to each stair landing. Corridors on all levels are straight, daylight and legible. The structural bays in the east-west axis divide the building into three zones. The west zone, incorporating the first two bays, is primarily clinical space. The eastern bay contains didactic/educational spaces on the first floor, with clinics and offices above. The central bay includes north-south circulation and core/support functions for clinical areas. Building systems, utilities, and support functions (public toilets, electrical and telecommunications closets, HVAC duct and plumbing chases) are also located within the central bay, allowing the two outside bays to be dedicated almost exclusively to programmatic functions benefiting from daylight.

**Plan Efficiencies:**

Responding to the diverse challenges to achieve an efficient, economical and affordable project, it is critical to optimize the usability of available floor space. Customary determinants that yield high net to gross ratios (one measure of efficiency) include large floor plates, simple geometries, minimal compartmentalization and less sophisticated environmental systems. Conversely the opposite circumstance lowers the ratios. The Lazzara Center is a highly compartmentalized, meaning the ratio of corridor and other support spaces ("gross" area) to program space ("net" area) is high. An additional factor is the high amount of gross space needed for mechanical, electrical, plumbing, and technology shafts and equipment rooms. The Lazzara Center achieves a medium size footprint for the first three floors of the building, due to the limits of the available site. Additional programmatic and setback requirements yield a building design of five floors plus a partial basement, with the corresponding extension of stairs, elevators and envelope. A building such as this, with clinics and support spaces, laboratories, didactic and office/administrative spaces, requires a significant dedication of space to provide the accommodation and flexibility desired. We are using several strategies to offset these constraints. Our stacking diagrams reveal groupings of like activities, modular repetition and minimal passageways generate the basic economy in plan. The results of our efforts is a building which is approximately 65% efficient, exceptional for this building type at the Schematic Design stage.



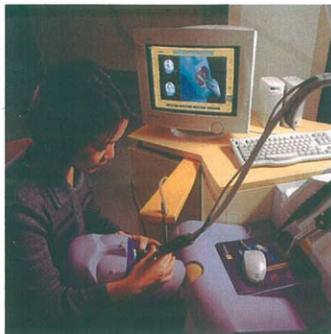
▲ Micro Master Plan Final Site Plan



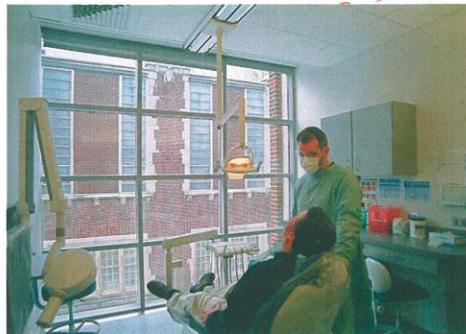
Lazzara Center for Oral - Facial Health  
CU School of Medicine / School of Dentistry

ChristopherCarvell ARCHITECTS

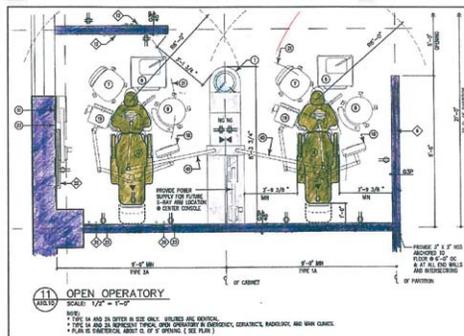
University of Colorado Health Sciences Center at Fitzsimons  
Aurora, Colorado



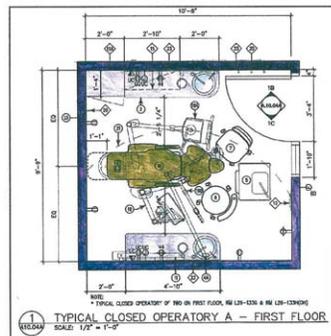
▲ Simulation Clinic Components



▲ BCJ Designed Closed Operator @ University of Pennsylvania



▲ Typical Open Operator Prototype, with head wall



▲ Typical Closed Operator Prototype



▲ Digital Simulation Teaching Laboratory

**Schedule:**

Program Completion = 03.15.03 - 05.15.03  
Design Phase / DD - GMP = 06.03.03 - 12.15.03  
Construction Documents / Bid Packages = 01.05.04 - 04.12.04  
Construction = 03.29.04 - 06.15.05

**CM/GC Contract:**

\$20,229,000 Base Building  
\$26,500,000 Total Project Cost  
\$3,500,000 Dental Equipment / FF&E

**Owner / CM/GC References:**

Tom Lewakowski, Project Manager Facility Projects, 303.724.1126  
Noel Copeland, UCHSC at Fitzsimons Campus Architect, 303.724.0613  
Mike Barden, Director Major Projects, 303.724.1038  
Robert Trombly, Associate Dean School of Dentistry, 303.315.8713  
Saunders Construction Company (CM/GC) 303.699.9000 / 303.617.6509  
Jim Weber, Vice President Pre-Construction / Joe Pepper, Project Manager



# 04.d

## Appendix

University of Utah | Proposed Dental School

### d. Information from Creighton

## Program Information from Creighton University

### Creighton Dental Program:

Class Size	85 (per year)
Clinic Chairs	116
Waiting Chairs	75 (65 in clinical area; 10 in emergency)
Dispensary	1,372 SF (reception desk / office, dispensary, records, billing)



**Meeting Report - No. 01**

**Project Name:** UU Proposed Dental Building Facility Plan  
 UU Project No.: xxxxx  
 MHTN Project No.: 2009xxx  
 Phase: Predesign  
 Date: February 12, 2009  
 Time: 9:30 AM  
 Location: HSEB 5900C  
 Purpose: Project Kick-Off Meeting

Attendees	Representing	Phone	Email
<input checked="" type="checkbox"/> Joseph Harman	Campus Design & Constr.	801.581.7580	<a href="mailto:joseph.harman@fm.utah.edu">joseph.harman@fm.utah.edu</a>
<input type="checkbox"/> Tami Cleveland	Campus Facilities Planning	801.585.6750	<a href="mailto:tami.cleveland@fm.utah.edu">tami.cleveland@fm.utah.edu</a>
<input checked="" type="checkbox"/> Steve Panish	Office Sr. VP, Health Sciences	801.585.2716	<a href="mailto:steve.panish@hsc.utah.edu">steve.panish@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Jim Bardsley	Office Sr. VP, Health Sciences	801.581.8037	<a href="mailto:james.bardsley@hsc.utah.edu">james.bardsley@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Cathy Anderson	Dean's Office, School of Medicine	801.585.6123	<a href="mailto:cathy.anderson@hsc.utah.edu">cathy.anderson@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Jay Aldous	Dentistry, School of Medicine	801.581.8951	<a href="mailto:jay.aldous@hsc.utah.edu">jay.aldous@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Lynn Powell	Dentistry, School of Medicine	801.581.8951	<a href="mailto:lynn.powell@hsc.utah.edu">lynn.powell@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Gary Lowder	Dentistry, School of Medicine	801.581.8951	<a href="mailto:gary.lowder@hsc.utah.edu">gary.lowder@hsc.utah.edu</a>
<input type="checkbox"/> Craige Olson	Dentistry, School of Medicine	801.581.8951	<a href="mailto:craige.olson@hsc.utah.edu">craige.olson@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Mick Gaviglio	MHTN Architects	801.326.3255	<a href="mailto:mick.gaviglio@mhtn.com">mick.gaviglio@mhtn.com</a>
<input checked="" type="checkbox"/> Eric Migacz	MHTN Architects	801.326.3220	<a href="mailto:eric.migacz@mhtn.com">eric.migacz@mhtn.com</a>
<input checked="" type="checkbox"/> Glen Beckstead	MHTN Architects	801.326.3225	<a href="mailto:glen.beckstead@mhtn.com">glen.beckstead@mhtn.com</a>
<input type="checkbox"/> Jeff Juip	MHTN Architects	801.326.3282	<a href="mailto:jeff.juip@mhtn.com">jeff.juip@mhtn.com</a>
<input checked="" type="checkbox"/> Sarah Miller	MHTN Architects	801.326.3203	<a href="mailto:sarah.miller@mhtn.com">sarah.miller@mhtn.com</a>

**Item Information or Action Required**

- 01.1 **Introductions.** Team members introduced themselves and described their roles on the project.
  
- 01.2 **Facility Plan Purpose.** Joe talked about the purpose of the Facility Plan.
  - A. The Facility Plan will be a quick effort to determine an approximate size for the building, recommend a site, and develop a total project cost for the facility's construction. Tami will use the Facility Plan information to prepare a submittal to the State, so that the project can be considered for approval.
  - B. University Administration, the Board of Regents and the Legislature must all approve the project. The approval process begins in spring, and results in the project being considered for approval by the State Legislature during the following year's session. The State does not need to appropriate initial project construction funding for this project, as donors are giving those funds to the University. However, the State is also concerned about funding for ongoing operations and maintenance, which must be approved by the Legislature.
  - C. The State Building Board considers and approves construction projects for the State. The Division of Facilities Construction & Management (DFCM) is the action arm of the State Building Board, managing projects through the approval process, as well as design and construction.

**Item Information or Action Required**

- 01.3 **Steering Committee.** Joe talked about the need to organize a Project Steering Committee, which will oversee the project from now through design. The Committee should be comprised of the key players for the project, which could be 1 to 2 people in addition to those attending today's kick-off meeting.
- A. **Chair.** Steve Panish will be the Steering Committee Chair.
  - B. **Membership.** Lynn will consider possible Committee members for a couple of days and email his input to Steve and Joe.
  - C. **UDA.** Lynn thought it would be appropriate to include a representative from the Utah Dental Association (UDA).
  - D. **Purpose.** In the future, the project will have a "Working Group", whose members will attend weekly meetings during design and construction. The Steering Committee is more of an oversight and decision-making group, and will attend review meetings during future project phases.
- 01.4 **MHTN Proposal Review.** Mick led the group through a review of MHTN's proposal, which includes:
- A. **Site Analysis.** Analysis of up to five potential project sites, with an evaluation of their pro's and con's and a recommendation for a preferred site. Traffic and parking considerations will be a large part of the evaluation.
  - B. **Preliminary Program.** Determination of a preliminary program or space list for the building, including a total square footage amount.
  - C. **Probable Costs.** Probable costs for the project, including site-related cost differences. Costs will be inserted into the CBE, an estimating form used by the DFCM and University. These costs will become a benchmark for the project and should be conservative, as it is difficult to increase the total project budget amount during the project process.
  - D. **Specialty Consultant.** Working with the University to select a specialty consultant, who has dental school planning experience. The consultant's input will be used during the formulation of the preliminary program.
  - E. **Schedule.** Completion of the Facility Plan by the beginning of April, so that Tami can begin the approval process in a timely manner. This is an aggressive schedule which requires meetings on a weekly or more frequent basis. Meeting attendees said they are willing to accommodate this schedule.
  - F. **Documentation.** Clear documentation of the process, information and recommendations of the Facility Plan.
- 01.5 **Proposal review Comments.** Discussion during the proposal review included the following:
- A. **Comparative Facility Information.** Lynn said it would be helpful if the design consultants used comparatives when presenting information, for example noting campus buildings of similar size, footprint, or configuration.
  - B. **Parking.** Parking is a big campus issue and all construction projects must include parking plans as they are developed.
  - C. **Dental School Site Visits.** Visits to other dental schools will take place during the future programming phase for the project, rather than during the Facility Plan development.
  - D. **Future Project Phases.** Joe explained that the next project phase, programming, will begin with a design consultant selection process. The design

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**Item Information or Action Required**

- phase will follow programming and that will also have a consultant selection process. DFCM will oversee consultant selection in these phases.
- E. **Conceptual Planning.** MHTN will not develop floor plans for the building, but will use the preliminary program area amounts to determine building massing, configuration, number of stories, etc., which will help in site evaluation.
- F. **Health Dept. Laboratory Building.** The existing State Dept. of Health laboratory building, to the north of the Moran Center, will be vacant in fall of 2009. This may be reserved for Moran Center expansion, but may also be available as a potential site.
- G. **Specialty Consultant.** The specialty consultant will be selected from either RFD or Jacobs Consultancy. The individual selected, not just the firm, must have specific dental school planning experience. MHTN will send specialty consultant qualifications information to meeting attendees electronically. Lynn would like to call the dental schools listed in the qualifications for references.
- 01.6 **Weekly Meeting.** The group decided that weekly project meetings will be on Friday from 11:30 AM to 1:00 PM, in HSEB 5900C. There may be other meetings and interviews in addition to the weekly meetings, on an as-needed basis.
- 01.7 **2006 Master Plan.** MHTN will email a PDF of the previous Dental School Master Plan to meeting attendees.
- 01.8 **Proposal Acceptance.** Joe said that MHTN's proposal was acceptable and asked them to send it to him in a final version. He will then initiate the contract.
- 01.9 **Potential Site Tours.** The group decided to tour the potential sites Wednesday, Feb. 18. Those interested should meet in the HSEB parking lot at 11 AM.
- 01.10 **USTAR Contact.** Tom Christensen is the University Facilities Project Manager for the USTAR project, and can be contacted for information related to USTAR and adjacent sites.
- 01.11 **First Weekly Meeting.** The group decided that those available and interested would meet Friday, Feb. 13, to discuss initial site information and the planning of information-gathering interviews. Tami is available for that meeting.
- 01.12 **Research Park Information.** Charles Evans is the director of Research Park and can be contacted for information. The group was uncertain which sites in Research Park are available for the potential Dental School. The group discussed the fact that having academic programs located in Research Park causes difficulties in transportation and access for both students and faculty. It was noted that Research Park was not originally intended to have educational program facilities, although some have been located there. It is understood that the University owns the Research Park land, so would not have to purchase a site for a University facility.
- 01.13 **Meeting Notes.** MHTN will write a report for each meeting and this will be sent by email to the project team.

**End of Meeting Report No. 01**

*Minutes will stand as recorded unless notified within 3 working days of any discrepancies or inaccuracies.*

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## Meeting Report - No. 02

**Project Name:** UU Proposed Dental Building Facility Plan  
 UU Project No.: xxxxx  
 MHTN Project No.: 2009xxx  
 Phase: Predesign  
 Date: February 13, 2009  
 Time: 11:30 AM  
 Location: HSEB 5900C  
 Purpose: Preliminary Site Discussion & Interview Planning

Attendees	Representing	Phone	Email
<input type="checkbox"/> Joseph Harman	Campus Design & Constr.	801.581.7580	<a href="mailto:joseph.harman@fm.utah.edu">joseph.harman@fm.utah.edu</a>
<input checked="" type="checkbox"/> Tami Cleveland	Campus Facilities Planning	801.585.6750	<a href="mailto:tami.cleveland@fm.utah.edu">tami.cleveland@fm.utah.edu</a>
<input checked="" type="checkbox"/> Steve Panish	Office Sr. VP, Health Sciences	801.585.2716	<a href="mailto:steve.panish@hsc.utah.edu">steve.panish@hsc.utah.edu</a>
<input type="checkbox"/> Jim Bardsley	Office Sr. VP, Health Sciences	801.581.8037	<a href="mailto:james.bardsley@hsc.utah.edu">james.bardsley@hsc.utah.edu</a>
<input type="checkbox"/> Cathy Anderson	Dean's Office, School of Medicine	801.585.6123	<a href="mailto:cathy.anderson@hsc.utah.edu">cathy.anderson@hsc.utah.edu</a>
<input type="checkbox"/> Jay Aldous	Dentistry, School of Medicine	801.581.8951	<a href="mailto:jay.aldous@hsc.utah.edu">jay.aldous@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Lynn Powell	Dentistry, School of Medicine	801.581.8951	<a href="mailto:lynn.powell@hsc.utah.edu">lynn.powell@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Gary Lowder	Dentistry, School of Medicine	801.581.8951	<a href="mailto:gary.lowder@hsc.utah.edu">gary.lowder@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Craige Olson	Dentistry, School of Medicine	801.581.8951	<a href="mailto:craige.olson@hsc.utah.edu">craige.olson@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Mick Gaviglio	MHTN Architects	801.326.3255	<a href="mailto:mick.gaviglio@mhtn.com">mick.gaviglio@mhtn.com</a>
<input checked="" type="checkbox"/> Eric Migacz	MHTN Architects	801.326.3220	<a href="mailto:eric.migacz@mhtn.com">eric.migacz@mhtn.com</a>
<input type="checkbox"/> Glen Beckstead	MHTN Architects	801.326.3225	<a href="mailto:glen.beckstead@mhtn.com">glen.beckstead@mhtn.com</a>
<input type="checkbox"/> Jeff Juip	MHTN Architects	801.326.3282	<a href="mailto:jeff.juip@mhtn.com">jeff.juip@mhtn.com</a>
<input checked="" type="checkbox"/> Sarah Miller	MHTN Architects	801.326.3203	<a href="mailto:sarah.miller@mhtn.com">sarah.miller@mhtn.com</a>

### Item Information or Action Required

- 02.1 **Kick-Off Recap.** There was a brief recap of the information covered in previous day's kick-off meeting, particularly the scope. Tami concurred with the project scope as described.
- 02.2 **Parking & Transportation.** The group discussed the critical role that parking and transportation issues will have on the project. The project will have parking demand for the clinical component, as well as students, faculty and staff.
- Commuter Services.** Tami recommended a meeting with Commuter Services, in particular David Moyes. Commuter Services can give input on a variety of parking and transportation issues, for example using past data to project mass transit use. Steve will contact Commuter Services.
  - New Projects Parking Req'ts.** Tami noted that new building projects must replace any parking displaced by the project, as well as provide parking for the new demand created by the facility.
  - Health Sciences Parking Status.** The Health Sciences campus is at maximum capacity for parking. Health Sciences is currently developing a comprehensive parking plan, which looks at future growth.

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**Item Information or Action Required**

- 02.3 **Sites E7 and E8.** These sites, under consideration for the Dental Building, are part of a complex that will primarily be occupied by ambulatory care clinics currently located in the University and Primary Children's Medical Centers.
- A. **Parking.** Parking is planned underneath the new buildings; there is currently no surface parking planned at that site. The planned parking quantity is sufficient for the ambulatory clinic demand.
  - B. **Moran Center Expansion.** Expansion for the Moran Eye Center is master planned south of the E7/E8 complex. It is not known if the existing State Health Dept. laboratory building, directly north of the existing Moran Center, has been considered as a possible expansion site for Moran.
  - C. **USTAR.** E7 and E8 are east of the USTAR site. Utility and infrastructure information for this area will have bearing on the evaluation process and can be obtained from Tom Christensen, the University Facilities PM for the USTAR project.
  - D. **Planning Study.** Tami will send MHTN a planning study for the buildings in this area of campus.
- 02.4 **Site E56.** This is the surface parking lot south of the HSEB. Discussion included:
- A. **HSEB Expansion.** This site is the planned expansion location for the HSEB. More seminar rooms / teaching spaces are needed in the HSEB. If the Dental Building is constructed in the E56 location, there are several possibilities for providing additional space for HSEB (constructing extra seminar rooms in the Dental space for use by HSEB; converting existing HSEB Dental program space to HSEB seminar rooms; converting existing HSEB Bioinformatics space into classroom space for HSEB; etc.). The space list in the 2006 Dental Master Plan did not include any extra seminar rooms or other teaching spaces.
  - B. **Dental Building Identity.** The donors for the Dental Building have not expressed a need to have a building with a separate, unique identity, so it would likely not be a problem to house the program in an HSEB expansion.
- 02.5 **Site E50.** This site is the Dumke building, currently occupied by the dialysis center associated with the University Hospital and research programs. Discussion included:
- A. **Dialysis Center Relocation.** There is no provision in the University Master Plan for the relocation of the dialysis center, which would have to occur before this site is available for another use.
  - B. **Vivarium Expansion.** This site is identified in the master plan as the expansion location for the vivarium, which is filled to capacity. There must be an alternate plan for the vivarium expansion for this site to be available for another use.
  - C. **Maintenance Issues.** This building has maintenance issues and high maintenance costs. The University would like to replace it with a new building. However, the master plan issues above must be addressed.
  - D. **Issue Summary.** Steve will write a summary of the issues associated with this site that must be resolved.
- 02.6 **Research Park Sites.** The group was not sure what sites are available in Research Park. ARUP is planning an expansion, plus a new additional building, which are both shown on the master plan. The surface parking lot of the Imaging and Neuroscience Centre (INC) may be available as a building site. Steve will call Charles Evans, the director of Research Park, and ask him about available sites.

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- 02.7 **Tour of Potential Sites.** Those interested and available will meet next Wednesday, Feb. 18, at 11 AM, in the parking lot south of HSEB to begin a tour of the potential sites for this project.
- 02.8 **Parking and Transportation Discussion.** The group decided that next Friday's weekly meeting should be a discussion of parking and transportation issues. Steve will follow up with Commuter Services to see if they can attend.
- 02.9 **Preliminary Program Interviews.** The group discussed upcoming space interviews. Space groupings were reviewed briefly. Lynn will decide who should attend these interviews to give input on space needs. Sarah will look at the overall project schedule to see when the interviews should occur. The specialty consultant will need to attend the interviews.

**End of Meeting Report No. 02**

*Minutes will stand as recorded unless notified within 3 working days of any discrepancies or inaccuracies.*



**Meeting Report - No. 03 (Revised 02.24.09)**

**Project Name:** UU Proposed Dental Building Facility Plan  
 UU Project No.: 0999-12909  
 MHTN Project No.: 2009510  
 Phase: Predesign  
 Date: February 20, 2009  
 Time: 11:30 AM  
 Location: HSEB 5900C  
 Purpose: Parking & Transportation Discussion; Research Park Sites

Attendees	Representing	Phone	Email
<input checked="" type="checkbox"/> Joseph Harman	Campus Design & Constr.	801.581.7580	<a href="mailto:joseph.harman@fm.utah.edu">joseph.harman@fm.utah.edu</a>
<input checked="" type="checkbox"/> Tami Cleveland	Campus Facilities Planning	801.585.6750	<a href="mailto:tami.cleveland@fm.utah.edu">tami.cleveland@fm.utah.edu</a>
<input checked="" type="checkbox"/> David Moyes	Commuter Services	801.585.9657	<a href="mailto:david.moyes@ucs.utah.edu">david.moyes@ucs.utah.edu</a>
<input checked="" type="checkbox"/> Steve Panish	Office Sr. VP, Health Sciences	801.585.2716	<a href="mailto:steve.panish@hsc.utah.edu">steve.panish@hsc.utah.edu</a>
<input type="checkbox"/> Jim Bardsley	Office Sr. VP, Health Sciences	801.581.8037	<a href="mailto:james.bardsley@hsc.utah.edu">james.bardsley@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Cathy Anderson	Dean's Office, School of Medicine	801.585.6123	<a href="mailto:cathy.anderson@hsc.utah.edu">cathy.anderson@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Jay Aldous	Dentistry, School of Medicine	801.581.8951	<a href="mailto:jay.aldous@hsc.utah.edu">jay.aldous@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Lynn Powell	Dentistry, School of Medicine	801.581.8951	<a href="mailto:lynn.powell@hsc.utah.edu">lynn.powell@hsc.utah.edu</a>
<input type="checkbox"/> Gary Lowder	Dentistry, School of Medicine	801.581.8951	<a href="mailto:gary.lowder@hsc.utah.edu">gary.lowder@hsc.utah.edu</a>
<input type="checkbox"/> Craige Olson	Dentistry, School of Medicine	801.581.8951	<a href="mailto:craige.olson@hsc.utah.edu">craige.olson@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Ron Bowen	Utah Dental Association	801.565.8080	<a href="mailto:rbowendds@gmail.com">rbowendds@gmail.com</a>
<input checked="" type="checkbox"/> Mick Gaviglio	MHTN Architects	801.326.3255	<a href="mailto:mick.gaviglio@mhtn.com">mick.gaviglio@mhtn.com</a>
<input checked="" type="checkbox"/> Eric Migacz	MHTN Architects	801.326.3220	<a href="mailto:eric.migacz@mhtn.com">eric.migacz@mhtn.com</a>
<input type="checkbox"/> Glen Beckstead	MHTN Architects	801.326.3225	<a href="mailto:glen.beckstead@mhtn.com">glen.beckstead@mhtn.com</a>
<input type="checkbox"/> Jeff Juip	MHTN Architects	801.326.3282	<a href="mailto:jeff.juip@mhtn.com">jeff.juip@mhtn.com</a>
<input checked="" type="checkbox"/> Sarah Miller	MHTN Architects	801.326.3203	<a href="mailto:sarah.miller@mhtn.com">sarah.miller@mhtn.com</a>

**Item Information or Action Required**

- 03.1 **Fort Douglas Site.** Tami explained that the surface parking area south of the HSEB parking lot is not available for use by Health Sciences. It is reserved for a future Health Sciences research building.
- 03.2 **Future Parking Structure.** The Campus Master Plan shows a parking structure to the east of the HSEB which will provide future parking capacity to the HSEB vicinity. It is not know when this structure will be constructed.
- 03.3 **Parking Quantities.** The group discussed the method for determining parking demand and needed parking quantities for different sites.
  - A. **Parking Demand.** Parking demand is determined through detailed analysis of the programs and functions that will occur in a facility. Typically, demand is broken down into categories (patient/clinical, staff, students, etc.).
  - B. **Mass Transit.** Historical data can be used to estimate the percentage of demand that will be satisfied by mass transit (TRAX, bus, campus shuttle), for the

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different categories of parking.

- C. **Replacement of Existing Parking.** When a new facility will displace existing parking, as is the case with Site E56 south of the HSEB, the project must provide an equal quantity of replacements for the displaced parking.
  - D. **Total Required Parking.** The demand, minus the percentage satisfied by mass transit, plus replacement for displaced parking, results in the total quantity of parking that must be provided by the project.
- 03.4 **Parking Financing Plan.** A project can include a Parking Financing Plan, which analyzes how parking costs can be paid for. This can include anticipated future income from on-site parking permits.
- 03.5 **Parking Study, Mass Transit Impacts.** The University has a study that summarizes the impact of mass transit on parking demand. Steve will locate the study and provide it to MHTN for use on this project.
- 03.6 **E56, HSEB Site.** This site will incur extra costs, due to the need to replace the approximately 80 stalls that will be displaced by a new building. Structured parking is estimated to cost up to \$50,000 per stall, so this would be a \$4-5 million additional cost to the project.
- 03.7 **E7-E8, Ambulatory Care Site.** The group looked at projected images from a study of this site. The study contains two options for building and parking configurations and counts. The following was noted:
- A. There is no "extra" space planned for additional functions in the Ambulatory Care Complex. If the Dental School were to locate here, space in addition to that already planned would have to be included on the site.
  - B. If the Dental School were to locate at this site, its planning and programming would need to be combined with that of the Ambulatory Care Complex. The entire complex would need to be planned as a single facility.
  - C. Tami suggested that MHTN look in more detail at the study to see if there is extra parking capacity on the site. The study may have determined maximum parking capacity; there may be more than is needed for the planned use.
  - D. There is a height restriction at this site; its purpose is to buffer the neighborhood at this edge of campus.
  - E. The Campus Master Plan shows a future expansion site for the Moran Center directly south of the Ambulatory Care Complex, across the pedestrian walkway. The expansion site has a view corridor in the direction of the Ambulatory Care Complex, which is defined in a letter of agreement between the University and the Moran donor. The Moran Center might consider trading the expansion site with that of the existing State Health Laboratory, which is directly adjacent to the existing Moran Center. Steve will follow up.
  - F. The Ambulatory Care Complex is under consideration for programming. Whether it moves forward is dependent on commitments by potential partners. Its schedule for moving forward is unknown.
  - G. The Ambulatory Care Complex is considered a primary clinical facility and a

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secondary educational facility. The Dental School is considered a primary educational facility and a secondary clinical facility.

- H. This site has significant disadvantages in that its schedule to move forward is uncertain and out of the control of the University. It is also uncertain how the area needed by an added program (Dental) would fit with the preliminary planning for the facility and site.

03.8 **Site E50, Dumke.** This site is difficult in that replacement sites for the existing dialysis center and the master-planned vivarium expansion would need to be found before it could be used for the Dental School. The following was noted:

- A. It is an ideal site for the vivarium expansion, as the existing vivarium and closely related functions are adjacent. It was noted that it may not be ideal to have a vivarium become the highly visible terminus of a major green space, as shown in the Campus Master Plan.
- B. The Master Plan does not state a square footage amount for the vivarium expansion, but it is thought to be around 160,000 SF.
- C. Research Park is a possible site for a new / replacement dialysis center.
- D. Site E56, HSEB, is also a possible site for a replacement dialysis center. The group talked about the possibility of combining the dialysis center with the Dental School on the HSEB site. It is not known how much area the dialysis center occupies.
- E. It was decided that this site should not receive further analysis, but that it should be included in the study with preliminary analysis and an explanation as to why it was not pursued.

03.9 **Research Park Sites.** Steve had met with Charles Evans of Research Park and had information on possible building sites. The advantages of a Research Park location are easy access for clinic patients, less expensive parking alternatives, and an easy shuttle connection with the main campus. Disadvantages include being at a distance from other academic programs on the Health Sciences campus. The possible sites include the following:

- A. Directly east of the Orthopedic Center parking lot on Wakara Way is a vacant site of about two acres. The Gross Anatomy lab used by medical students, including dental, is directly east of the vacant site. This site has good access from Foothill Drive for mass transit, and could possibly accommodate surface parking. However, because of the site's relatively small size, it may be preferable to use a 2-level, partially open parking structure, which at approximately \$20,000 / stall, is much less costly than structured parking that would be necessary on the main campus.
- B. There is a hilly three-acre site south of Wakara Way, west of the Evans and Sutherland building. The site is directly east of Foothill Drive.
- C. On the upper, east side of Research Park, there is a seven-acre site on Colorow. This site is between two existing facilities; to its south is the Huntsman Building. There is a stream on this site.
- D. Also on Colorow, to the south of the Huntsman Building, is another site.

03.10 **Research Park Discussion.** The following was noted about the Research Park sites:

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- A. Utilities were installed to serve Research Park lots during the original street construction. The streets and utilities belong to Salt Lake City. All buildings in the Park require standalone heating and cooling systems.
- B. There is good mass transit access along Foothill and Wakara. The easternmost sites in Research Park may be difficult to access by clinic visitors who use mass transit.
- C. The campus shuttle runs on Wakara Way and goes to the Gross Anatomy building. It doesn't currently run on Colorow, but that could probably be arranged if an educational program were located there. ARUP currently has a shuttle which connects to the main campus. Students access Research Park by foot, shuttle, or personal vehicle.
- D. There are development and design restrictions in Research Park, for buffers, green space, etc. Steve will follow up with Charles Evans regarding the restrictions and send them to MHTN.

03.11 **Clinic Parking Requirements.** David Moyes noted that there are more stringent accessible parking requirements for clinics of any type (10% of all parking) and this typically has a big site area impact. The team must be careful to include space for the correct percentage of accessible stalls in the evaluation of the Dental sites.

03.12 **Specialty Consultant.** Mick distributed the resume of the recommended planning consultant, Rob Trombly, Associate Dean of the College of Dental Medicine at Western University of Health Sciences in Pomona, California. University representatives approved the selection.

- 03.13 **Project Schedule.** Sarah distributed a proposed project schedule and the following was decided:
- A. The weekly meeting on Feb. 27<sup>th</sup> will be cancelled; the consultants will use the time to assimilate the information they are gathering.
  - B. Those interested in touring the Research Park sites will meet Tuesday, Feb. 24, at 9 AM in the east side of the Orthopedic parking lot.
  - C. The space needs interviews will take place on Monday or Tuesday, March 2<sup>nd</sup> or 3<sup>rd</sup>. MHTN will arrange the day and time with Rob Trombly and will distribute it to the team by email. Rob has been through the dental school planning process twice and will be able to advise the team on space needs, using the space list from the 2006 Dental School Master Plan as a starting point.
  - D. Lynn and Cathy will not be able to attend the weekly meeting on March 6, but the rest of the project team will meet. Because that will be a milestone meeting with a summary of all information gathered to date, Lynn and Cathy will meet with MHTN the following Monday to receive the information (March 9, time to be determined).
  - E. Sarah will send a message to Joe to ask him to set up a utilities meeting.

**End of Meeting Report No. 03**

*Minutes will stand as recorded unless notified within 3 working days of any discrepancies or inaccuracies.*



**Meeting Report - No. 04**

**Project Name:** UU Proposed Dental Building Facility Plan  
 UU Project No.: 0999-12909  
 MHTN Project No.: 2009510  
 Phase: Predesign  
 Date: March 2, 2009  
 Time: 9:30 AM – 3:30 PM  
 Location: HSEB 5900C  
 Purpose: Space Analysis

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04.1 **Introductions.** The meeting began with introductions of project team members to Bob Trombly, who is serving as a planning consultant for the project. Bob is the Executive Associate Dean of the College of Dental Medicine at Western University in Pomona, CA. He has experience planning dental schools, in particular the University of Colorado School of Dentistry. Bob is also a site reviewer for dental school accreditation, and as such is very familiar with dental school program and space requirements. His role today is to advise the team on spaces needed for the proposed school.

04.2 **Project Vision.** MHTN asked Dental School representatives to talk about their vision for the project. Responses included the following:

- A. Provide access to dental education for Utah students at a reasonable cost. It is very expensive for students to go out-of-state for dental education. Typically, students graduate with a large amount of debt from high tuition and fees. Utah students pay approximately \$50,000 / year for out-of-state dental education tuition. (In-state medical school tuition is currently less than half that amount.)

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It is difficult for graduates to return to Utah to practice dentistry, as dental fees and income are lower here than in other areas. Perhaps as a result of this, Utah has a lower rate of dentists per capita than the national average.

- B.** Provide a first-class dental education for Utah students, excellent educational opportunities that will help them excel.
- C.** Provide public service and care through the clinic associated with the school.
- D.** Enhance the image of dentistry and increase the level of dental appreciation in the community.
- E.** Fulfill the obligation to provide this educational opportunity for local students. The state currently offers all other areas of medical education (medicine, nursing, pharmacy, dental hygiene); dentistry should be included to complete the full range.
- F.** About 160 students leave Utah each year to pursue dental education in other states. This represents a great loss for the state (resource and revenue).
- G.** The Dental School could provide graduate education, continuing education and research opportunities.
- H.** The University of Utah has a strong focus on research and provides unique opportunities for collaborative research among the medical community (genetics program, Huntsman Cancer Center, etc.). Current dental program faculty members benefit from this cooperative research, as would faculty of the future dental program. The Dental Education Program has a substantial research endowment fund.
- I.** Gary distributed copies of a written Mission Statement for the School of Dentistry that he had prepared, which describes Dental School vision and goals in three areas: didactic, clinical and research.

**04.3 Dental School Location.** Bob talked about location considerations:

- A. Patient Access.** The most important consideration for location is good patient access and flow.
- B. Classroom Adjacency.** It is beneficial if general classrooms that will be used by dental students are near the Dental School.

**04.4 International Students.** Bob talked about how international student tuition can help subsidize pre-program tuition.

**04.5 Program Expansion Capability.** The school will initially have 50 students, but will be planned with capacity for 60. Bob pointed out that between 90 and 120 clinic operatories are needed for a class size of 60; there should be a minimum of 1-1/2 operatories / student, in order for the clinic to function well. The most effective expansion strategy is to have capacity, in the number of operatories, for an increase in the student quantity.

**04.6 Building Expansion.** Even though a building expansion is not expected in the foreseeable future, all sites should be evaluated for building expansion capability.

**04.7 Space Review.** The goal of today's session was to review the preliminary space list in the 2006 Dental School Master Plan, revise it as appropriate, and arrive at a rough estimate of the amount of space that will be needed for the Dental School. More

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detailed space needs analysis will come in the next project phase, programming. Space review discussions included the following:

- A. **Operatory Size.** The operatories will be about 9 x 8.5 net square feet, but are in the space list at 100 net square feet. Listing them as a larger size at this stage allows for flexibility.
- B. **Operatory Configuration.** Lynn thought cabinets should not be located between the operatories, but perhaps at the end. There may be a shared sink in this end cabinet, for each pair of operatories.
- C. **Sterilization Location.** The Sterilization Room should be located with the main clinic. Bob recommended doubling the size to 1,200 nsf. The room will contain an 80 nsf Detergent Room.
- D. **Clinic Groupings.** There will be a main clinic of 80 operatories and 3 smaller specialty clinics of 6-8 operatories each. Possible specialty clinics mentioned included Urgent Care, Screening, Diagnosis, Pediatric, Oral Surgery, Group Practice, Surgery, Special Care, Demonstration, and Geriatrics. The Diagnosis grouping includes Urgent Care.
- E. **Student/Instructor Set-up.** It was noted that typically there is one instructor for a group of 8 operatories. Students are not assigned to particular operatories, but relocate throughout the clinic.
- F. **Reception/Waiting.** A reception and waiting area will be located near the main clinic. There may need to be an additional reception area near the specialized clinics. There must be space for a cashier.
- G. **Specialized Operatories.** Some specialized operatories may need to be larger; special care, where patients may be on gurneys or in wheelchairs, and surgical operatories may need to be 120-140 net square feet, and enclosed with doors. Specialized care may occur in the hospital, rather than the Dental Clinic. Demonstration operatories may also need to be larger.
- H. **Enclosed Operatories.** There should be a small number of enclosed operatories, to contain sound or provide privacy. Some should be located near the pediatric area.
- I. **Clinic Rest Rooms.** Bob recommended locating small rest rooms for patients within or easily accessed from the clinic. These will not be listed in the space list, but are accounted for in the grossing factors.
- J. **Patient Consultation Space.** There should be enclosed rooms within or near the clinic for patient consultations, which sometimes require privacy. These can also be used for case presentations and confidential patient health history interviews. There should be about four for 80 operatories; they should be about the same size as the operatories. The conference room quantity was increased to account for this.
- K. **X-ray.** The x-ray spaces planned three years ago are no longer needed; these were changed in the space list to 3D Imaging spaces.
- L. **X-ray in Operatories.** The ratio of operatories that should include x-ray equipment was discussed. At the Colorado School of Dentistry, about one third of the chairs have x-ray capability, and there are several portable x-ray units to supplement built-in units. Bob pointed out that x-ray availability has an impact on the efficiency of the clinic operation, which is an important consideration.
- M. **Nitrous.** A decision will be needed regarding whether to plumb nitrous to operatories (including quantity and type). Portable units are a possibility.
- N. **Storage.** Bob recommended increasing the dispensary size. The Dental

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Store size is somewhat dependant on the frequency of ordering. Some equipment is large/bulky (nitrous tanks, wheelchairs, gurneys, etc.).

- O. **Alcove Storage.** Bob said that in Colorado, they were able to use alcoves created by the operatory layout for small item storage, which was a very effective use of space and provided convenient, immediate-access supplies. He noted that in the clinic, patients arrive at the same time and students are accessing the dispensary for supplies at the same time. The alcove storage helped mitigate the dispensary crowding issue.
- P. **Patient Education.** It would be beneficial to have a patient education / resource area / library in the facility.
- Q. **Waiting Area.** Bob thought the Waiting Area capacity may be low at 60 chairs. The chairs should be movable to accommodate wheelchair traffic.
- R. **Reception/Dispensary.** Bob thought it may be unrealistic to think that reception staff can also handle the dispensary. He recommended assuming additional staff for the dispensary.
- S. **Staff Lockers/Lounge.** Bob recommended providing lockers for clinic staff who will not have offices or cubicles; these should be near their workspace. A small lounge space would be very beneficial for them as well (“decompression space”).
- T. **Patient Record Storage.** Bob noted that the Dental School may be able to use a paperless file system, which would save space in the reception area. The Colorado school is paperless; the new school that Bob is currently planning will be paperless as well. The Dental School will need a server room. Bob noted that the patient quantity per student per year can get higher than the 25-30 noted in the 2006 Master Plan.
- U. **Electronic Records Back-up.** Backup of electronic records would likely be in a centralized campus server. The campus is currently programming a centralized facility of this type. The group was not sure if the University provides this service for programs located in Research Park.
- V. **Lecture Halls.** Lynn requested that all three of the lecture halls have sloping floors. They will each have a 75-student capacity. Two should be separated by a movable partition. The group noted that 66-75% of classes will be specifically for dental students. Others classes will be combined with those of medical school students.
- W. **Casual Learning.** The group decided to add Casual Learning to the space list. This is open space configured for small group discussions. It should be adjacent to the clinic and other learning spaces. There could be some outdoor space of this type.
- X. **Continuing Education.** In response to a question from Bob, the group noted that the dental school will be used for continuing education. This must be considered in planning.
- Y. **Research Labs.** The research labs are for faculty use and should be located adjacent to the faculty offices. Out of eight total, three would be functional initially, with five shelled for later use.
- Z. **In-House Lab.** This is prep and holding space for incoming and outgoing crowns, dentures, etc. It will also accommodate a limited amount of in-house fabrication of these items. In typical dental practices, this work is sent out to specialty labs, so there will not be a strong focus on this type of work in the school.

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- AA. **Administrative Space.** Bob recommended locating all faculty and administrative office space together, with the exception of the Clinic Director and Assistant Director, who must be located near the clinic.
- BB. **Offices.** There will be at least two offices sizes. At Colorado, they used 10' x 10' and 10' x 15' offices that could use the same structural bay size. The space list will retain the 120 nsf office size as an average. The size and quantity of offices will be broken out in a future phase. Offices will be used for faculty (35-37 qty.) and senior staff. Adjunct clinical staff will use shared offices (150 nsf, with 4 desks).
- CC. **Dean's Office.** This should be large enough to accommodate small meetings. There should be a small waiting room adjacent.
- DD. **Conference Rooms.** The conference room quantity was increased to six, at 300 net square feet. A greater quantity of rooms, some of smaller size, will likely be needed. Some should be located on the clinical level (patient consultations, rounds, etc.) and two should be on the upper, administrative level. Two rooms will be used for small group learning and should be located accordingly.
- EE. **Administrative Functions.** Bob mentioned the following administrative functions, which will require space, even if they are not listed specifically at this point: admissions/recruitment, data processing, finance (procurement, grants, contracts, HR), academic affairs (class scheduling, clinic schedule), continuing education director, advancement/development, community liaison, department secretary, business office, biomedical equipment tech (responsible for dental chairs & hand pieces - will require a small workshop space), in-house IT (clinic management, patient software, hardware support), maintenance.
- FF. **Miscellaneous Spaces.** Bob mentioned the following spaces, which may need to be included, even if they are not listed specifically at this point: centralized medical gas room, hazardous/bio area, flammable storage (alcohol, etc.), AV production (dental project representatives said this would not be required for the new school), dental mechanical (compressor, etc.), faculty/staff lounge, and student study space.
- GG. **Dental Mechanical.** A room is needed for compressors (2?) and vacuums (2?). The dental vacuum system will require redundancy, perhaps a 3-pump, rotating system. It is noisy and requires sound insulation. It must be located below the main clinic floor level. It could be located near other building mechanical equipment.
- 04.8 **Software.** The group discussed patient record and image management software. AXIOM is a common management software. Emago and MiPACS are two choices for imaging software. They both interface with AXIOM.
- 04.9 **Mechanical Penthouse.** It is possible to locate the mechanical equipment on the roof of the building on the UU campus, if enclosed in a penthouse.
- 04.10 **Floor-to Floor Height.** Bob recommended using a 15'-4" floor-to-floor height for the building.

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- 04.11 **HSEB Lecture Halls.** The group looked at two HSEB lecture halls which differ in their appearance. Eric pointed out that their lighting and ceiling designs and materials are different. HSEB 3515B is the more pleasant of the rooms; the other, 2600, appears darker. Bob noted that providing power in the lecture room tables is very important, as most students use laptops in class. Controllable lighting is also very important.
- 04.12 **Dental Library.** Separate dental libraries are generally not included in today's dental schools.
- 04.13 **Dental Program Discussion.** During lunch, the group discussed general dental education issues, philosophies and processes, which impact space types, configurations and adjacencies in dental schools.
- 04.14 **Technique Lab.** The group looked at the existing Technique Lab. Its stations are 42" wide. Bob recommended that the project team consider making the technique lab stations large enough to accommodate simulation as well; they should be 5-6' wide and 2' deep, with a 1' deep chase space.
- 04.15 **Emergency Power.** The building will require a generator for emergency back-up power, although it doesn't need to be high capacity.
- 04.16 **Code Issues.** There was a brief discussion about code issues, which will require further investigation in a future phase. The sedation quantity capacity affects the rating of the building and the amount of emergency power required. An amalgam separator will be required.
- 04.17 **Overall Size.** With today's changes, which were incorporated during the meeting, the space list is projecting a gross square foot amount of a little over 70,000. The building may need to be planned for 100 operatories rather than 120 as in the 2006 Master Plan, to keep the total size under 70,000 GSF.
- 04.18 **Weekly Meeting Change.** The group decided that the Friday, March 6, meeting should be cancelled and replaced by a meeting on Monday, March 9. MHTN will present a summary of the information gathered to date at that meeting.

**End of Meeting Report No. 04**

*Minutes will stand as recorded unless notified within 3 working days of any discrepancies or inaccuracies.*



## Meeting Report - No. 05

**Project Name:** UU Proposed Dental Building Facility Plan  
**UU Project No.:** 0999-12909  
**MHTN Project No.:** 2009510  
**Phase:** Predesign  
**Date:** March 3, 2009  
**Time:** 8:00 AM  
**Location:** USB 201  
**Purpose:** Utilities

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<input type="checkbox"/> Glen Beckstead	MHTN Architects	801.326.3225	<a href="mailto:glen.beckstead@mhtn.com">glen.beckstead@mhtn.com</a>
<input type="checkbox"/> Jeff Juip	MHTN Architects	801.326.3282	<a href="mailto:jeff.juip@mhtn.com">jeff.juip@mhtn.com</a>
<input checked="" type="checkbox"/> Sarah Miller	MHTN Architects	801.326.3203	<a href="mailto:sarah.miller@mhtn.com">sarah.miller@mhtn.com</a>

### Item Information or Action Required

- 05.1 **Project Description.** Joe explained the scope of the project and described the sites that are being considered for it. The purpose of this meeting was to gather information about the utilities available at the sites.
- 05.2 **Utilities.** The utilities being considered are culinary water, chilled water, high-temperature water, sanitary sewer, storm drain, natural gas, electrical, and communications / fiber optic.
- 05.2 **Storm Water.** On-site retention, rather than an increase in the storm sewer capacity, will be required for sites where an increase in storm water run-off occurs as

**Item Information or Action Required**

a result of development. Site A, south of the HSEB (Bldg. #575), is a surface parking lot; use of this site will not result in an increase in storm water load. The other sites being considered will need on-site storm water retention.

- 05.2 **Electrical Load.** It would be useful to know the approximate electrical load of the building. Attendees thought an assumption of 15 watts/SF would be reasonable for this type of building.
- 05.2 **Other Information Sources.** The following were mentioned during the meeting as possible sources of additional information:
- A. USTAR Project Manager: Tom Christensen, 581-4742.
  - B. Ken Garner: Working on a conceptual study for a campus utilities / substation upgrade.
  - C. Dave Wesemann, Spectrum Engineers: Nursing project electrical.
  - D. Jeff Richards, Spectrum Engineers: Pharmacy project electrical.
  - E. Ken Ament: Pharmacy project utilities cost estimating.
  - F. Dave Spalding: Rocky Mountain Power (Research Park electrical).
- 05.3 **Site A, HSEB.** Input on this site included the following:
- A. **Electrical.** There is probably space electrical capacity at that site, but it is not known how much.
  - B. **Pharmacy/Nursing.** Some utilities for these upcoming projects are coming from the north, manhole #40. It is not known if there would be sufficient capacity for a building on the HSEB expansion site as well.
  - C. **Chilled Water.** There is sufficient capacity in the chilled water plant for this area. The project could connect to that.
  - D. **HSEB Electrical.** The HSEB electrical comes from the south. It is possible that an HSEB expansion could come from the same source.
  - E. **Pharmacy/Nursing Electrical.** Electrical for these projects will be provided by a new line from the Medical Substation.
  - F. **Utilities Costs.** The utilities costs for this site could be assumed to be similar to those for the Pharmacy expansion. Joe will give MHTN Pharmacy programming information that contains the utilities costs.
- 05.4 **Site B, Ambulatory Care Complex (ACC).** Two possibilities exist at this site: Dental could be added to the ACC, or it could be constructed as an independent building on the Moran expansion site south of the planned interdisciplinary Mall walkway, if Moran expands elsewhere. Input on this site included:
- A. **New Tunnel.** The USTAR project is installing a tunnel for chilled and high-temperature water south of the planned walkway. The tunnel will extend from west of the USTAR site, east to Wasatch Drive.
  - B. **Chilled Water Capacity.** There is 10,000 tons of capacity in the north chilled water plant, but this must accommodate 14 existing buildings plus USTAR. It may require an additional chiller to accommodate the ACC.
  - C. **Sanitary Sewer.** A new large-capacity sewer line is being installed to accommodate the USTAR project. Attendees thought there would be sufficient capacity in that line for the ACC as well.

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Page 3 of 3**Item Information or Action Required**

- D. **Storm Water.** On-site retention of storm water will be required at this site.
- E. **Electrical.** The group was not aware of any extra electrical capacity being planned for the future ACC, in the USTAR project utilities. There was a discussion about the source of the electrical power for this area – the Red Butte substation at the south end of campus, or the Medical substation near the Jewish Community Center at the north end of campus. It is understood that the electrical for USTAR is coming from the Red Butte substation. There will be (8) 5” conduits run; only one is needed for USTAR. It was noted that there are no vacant sub cubicles in the Red Butte substation.
- F. **PCMC Utilities.** The group noted that Primary Children’s will be responsible for its own utilities in the ACC area. The University does not need to provide these.
- G. **ACC Study.** Joe thought there might be utilities information in the ACC study that Tami has. MHTN is to ask Tami for the entire study.
- H. **Further Mechanical Information.** Steve Laraway said that he would provide further information regarding utilities at this site to MHTN in a few days. *Note: the following information was received from Steve via email.*
- The University is installing a 15” sanitary sewer line in this area, but will investigate the possibility of installing a larger line.*
- There is an 8” high pressure natural gas line running north-south along the west boundary of the golf course. There are no current plans to provide natural gas in the Interdisciplinary Mall tunnels being constructed for the USTAR area.*
- Chilled water lines will be installed in the Interdisciplinary Mall tunnel. The north chiller plant appears to have adequate capacity for the proposed Dental School.*
- I. **Culinary Water.** It is not known whether there is sufficient culinary water capacity in this area for the new Dental School.
- J. **Schedule.** It was noted that the Dental School project on this site would be tied to the ACC project schedule, even for the independent Moran expansion site.
- K. **Estimated Cost.** The utilities infrastructure installation will be a very large and costly project in this area. The Dental School will be responsible for a percentage of the total utilities infrastructure cost. The group suggested that MHTN include a cost line item of \$500,000 for utilities infrastructure development for this site.
- 05.5 **Research Park Sites.** There are two sites being considered in Research Park. The group noted that electrical power there is provided by Rocky Mountain Power. Rocky Mountain Power is currently upgrading power lines to accommodate the new Natural History Museum. The city provides other utilities; they are available under the Research Park streets. All utilities in this area are planned on a standalone basis for each building/project.

**End of Meeting Report No. 05**

*Minutes will stand as recorded unless notified within 3 working days of any discrepancies or inaccuracies.*



## Meeting Report - No. 06

**Project Name:** UU Proposed Dental Building Facility Plan  
**UU Project No.:** 0999-12909  
**MHTN Project No.:** 2009510  
**Phase:** Predesign  
**Date:** March 9, 2009  
**Time:** 9:00 AM  
**Location:** HSEB 5100A  
**Purpose:** Information Summary / Initial Site Analysis

Attendees	Representing	Phone	Email
<input checked="" type="checkbox"/> Joseph Harman	Campus Design & Constr.	801.581.7580	<a href="mailto:joseph.harman@fm.utah.edu">joseph.harman@fm.utah.edu</a>
<input checked="" type="checkbox"/> Tami Cleveland	Campus Facilities Planning	801.585.6750	<a href="mailto:tami.cleveland@fm.utah.edu">tami.cleveland@fm.utah.edu</a>
<input checked="" type="checkbox"/> David Moyes	Commuter Services	801.585.9657	<a href="mailto:david.moyes@ucs.utah.edu">david.moyes@ucs.utah.edu</a>
<input type="checkbox"/> Steve Panish	Office Sr. VP, Health Sciences	801.585.2716	<a href="mailto:steve.panish@hsc.utah.edu">steve.panish@hsc.utah.edu</a>
<input type="checkbox"/> Jim Bardsley	Office Sr. VP, Health Sciences	801.581.8037	<a href="mailto:james.bardsley@hsc.utah.edu">james.bardsley@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Cathy Anderson	Dean's Office, School of Medicine	801.585.6123	<a href="mailto:cathy.anderson@hsc.utah.edu">cathy.anderson@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Jay Aldous	Dentistry, School of Medicine	801.581.8951	<a href="mailto:jay.aldous@hsc.utah.edu">jay.aldous@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Lynn Powell	Dentistry, School of Medicine	801.581.8951	<a href="mailto:lynn.powell@hsc.utah.edu">lynn.powell@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Gary Lowder	Dentistry, School of Medicine	801.581.8951	<a href="mailto:gary.lowder@hsc.utah.edu">gary.lowder@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Craig Olson	Dentistry, School of Medicine	801.581.8951	<a href="mailto:craig.olson@hsc.utah.edu">craig.olson@hsc.utah.edu</a>
<input type="checkbox"/> Ron Bowen	Utah Dental Association	801.565.8080	<a href="mailto:rbowendds@gmail.com">rbowendds@gmail.com</a>
<input checked="" type="checkbox"/> Mick Gaviglio	MHTN Architects	801.326.3255	<a href="mailto:mick.gaviglio@mhtn.com">mick.gaviglio@mhtn.com</a>
<input checked="" type="checkbox"/> Eric Migacz	MHTN Architects	801.326.3220	<a href="mailto:eric.migacz@mhtn.com">eric.migacz@mhtn.com</a>
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### Item Information or Action Required

- 03.1 **Parking Demand.** MHTN presented a spreadsheet summarizing the estimated parking quantity needed for the project. The spreadsheet lists peak parking demands, an average occupancy factor, and campus mass transit ridership percentages that MHTN received from Commuter Services. Per the spreadsheet calculations, the parking demand for faculty, staff and patients is 172. The student demand is 126. Site A, HSEB, must provide 80 additional parking stalls, for a total of 252, to replace those that will be displaced in the surface parking lot. There were the following comments:
- Research Park Mass Transit.** The mass transit readership data may be different for Research Park. MHTN will follow up with Commuter Services.
  - Student Parking.** It may be necessary to provide parking spaces for students if the Dental School is in Research Park, as there are fewer student parking options at that location than on main campus.
  - Student Parking – Main Campus.** Projects on the main campus have not been required to provide student parking in the past, but this may need to change in the future, as parking becomes more scarce.

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Page 2 of 3**Item Information or Action Required**

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**End of Meeting Report No. 05**

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## Meeting Report - No. 06

**Project Name:** UU Proposed Dental Building Facility Plan  
 UU Project No.: 0999-12909  
 MHTN Project No.: 2009510  
 Phase: Predesign  
 Date: March 9, 2009  
 Time: 9:00 AM  
 Location: HSEB 5100A  
 Purpose: Information Summary / Initial Site Analysis

Attendees	Representing	Phone	Email
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<input checked="" type="checkbox"/> Tami Cleveland	Campus Facilities Planning	801.585.6750	<a href="mailto:tami.cleveland@fm.utah.edu">tami.cleveland@fm.utah.edu</a>
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<input checked="" type="checkbox"/> Craige Olson	Dentistry, School of Medicine	801.581.8951	<a href="mailto:craige.olson@hsc.utah.edu">craige.olson@hsc.utah.edu</a>
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  - C. **Student Parking - Main Campus.** Projects on the main campus have not been required to provide student parking in the past, but this may need to change in the future, as parking becomes more scarce.

**Item Information or Action Required**

- D. **Individualized Parking Requirements.** MHTN will tally parking requirements for individual sites, taking differences into account.
- 03.2 **Future Expansion.** Joe pointed out that future building expansion possibilities should be considered for each site, even though there is no defined plan for future expansion. Lynn said that the team has discussed this and has been incorporating expansion possibilities into the planning. A 20% expansion is built into the program, as it will be designed for 60-student classes but will start with 50 students.
- 03.3 **Strategic Academic Plan.** Tami and Joe talked about the need for a strategic academic plan for the Dental program at this point. The strategic plan forms the basis for the program and the facility. Lynn and the other Dental Program representatives will generate the plan. Tami or Steve can provide the Pharmacy expansion strategic plan as a good example to follow. The plan is critical to the project, as it informs and tests the thinking of the group proposing the program. It helps them think about the possibilities and goals for the future. It will help the Dental Program get approval to move forward. It is also a business plan for the clinical portion of the program. It will be given to the design team to assist them in their work. Pharmacy needed a month to develop their plan.
- 03.4 **Space List.** The space list from the 2006 Master Plan was reviewed and updated last week with the assistance of Bob Trombly, the project's planning consultant. MHTN presented the revised spreadsheet list. Eric explained the terms used in the spreadsheet, in particular the grossing factors. The building's efficiency as represented in the revised space list is 60%. Joe said the appropriate efficiency range is 60-65%, and since this is a small building, the efficiency factor is appropriate at the lower end of the range. Lynn noted that the process of reviewing space needs had been very helpful and informative.
- 03.5 **Review of Sites.** Eric briefly reviewed the five sites that are currently being considered: HSEB, golf course/ACC, Orthopaedic, Foothill, and CAMT. The following was discussed:
- A. **Golf Course/ACC.** MHTN can't develop a plan study for the golf course site, since the Dental building would be combined with the future ACC building. The study should show an extra story added to the SOM study model and should discuss the advantages/disadvantages of the site. Some advantages are having all clinical space in one location and being able to share the utility development costs among more partners. A disadvantage is that it would be very difficult to provide future expansion at that site. Lynn mentioned another dental program that was required to leave its location when the collocation partner (a medical school) needed more space.
  - B. **Moran.** The Moran expansion site does not look very feasible, as it requires much negotiation with the Moran Center and the state (for possible use of the State Health Lab site by Moran). The site would have schedule issues.
  - C. **Orthopaedic.** A difficulty for the Orthopaedic site is the lack of pedestrian access from the main campus. In addition, an Orthopaedic expansion may be designated for this site.
  - D. **CAMT.** The CAMT is a new site for consideration. It was suggested by Charles Evans of Research Park. MHTN has just begun looking at this site and doesn't have any graphic representation of it yet.

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Page 3 of 5**Item Information or Action Required**

- E. **Dumke.** Dumke is not being studied further, but the facility plan should include it, label it, and explain why it is not being pursued. Steve had mentioned in an earlier meeting that he would provide a summary of the issues connected with this site; Joe will ask him for it.
- F. **ACC Program.** Joe noted that the University may not move forward with ACC programming, even if approved to do so.
- G. **Foothill Site.** The Foothill site is the largest and allows the most surface parking. It will likely be the least expensive option.
- 03.6 **Eccles Plaza.** Joe and Tami noted that a plaza, with 2-3 levels of partially open parking underneath, has been considered to replace a surface parking lot north of Nursing. This project has been approved by the legislature. Potential donor funding does not include the parking portion. If the Dental project paid for the parking portion, the parking quantity could be applied toward their parking requirements. There are about 50 surface parking spaces that would be displaced, that must be replaced by the project (for an approximate total of 302 spaces). The plaza parking structure would be less expensive to build than the HSEB below-grade structured parking. Steve has a study describing the plaza and parking. Joe will ask him to provide it to MHTN, so they can incorporate it into the HSEB site information.
- 03.7 **Prototype Footprint.** MHTN has developed a prototype building footprint for use in evaluating sites. The footprint was developed using assumptions about how the program will function; its purpose is to ensure that the sites under consideration will work for the Dental program. Joe and Tami agreed that it was acceptable to use a footprint of this type in evaluating the sites. The prototype's first level contains the main clinic of 80 operatories, clinic support spaces, and public entry, reception and waiting areas. The second level includes auxiliary clinics (additional to the main clinic), clinic support labs, lecture halls, prefunction, student lounge space, and casual study areas. The third level contains faculty and staff offices, research labs, and casual study areas. Mechanical space would be on the roof in a penthouse. Joe recommended showing the roof penthouse at its projected size. The prototype was configured to work with the spine plan organization of the HSEB.
- 03.8 **Site A Test Fit.** The site A test fit is configured to allow the HSEB parking ramp and structure to be used during construction of the Dental building. The new Dental parking structure would have 252 stalls and would need to extend 4 levels below grade. (This does not take into consideration the Eccles Plaza parking structure.) The test fit does not provide any student parking; this structure would be very expensive to construct and maintain and students generally could not afford to park there. The test fit shows about 25' feet from the south edge of HSEB to the new building. The building would require three stories for the Dental School. Future expansion would have to be an additional story on the building. Discussion included:
- A. **Expansion.** The group concluded that the study should show the new building as four stories, which would include one floor for expansion.
- B. **Parking Expansion.** The question was raised as to how to provide parking for the future expansion - would that be required now?
- C. **Mechanical Location.** It was noted that mechanical space would likely have to be provided under the building, if it is four stories high.
- D. **HSEB Expansion.** If the Dental School is built in this location, the HSEB expansion as originally planned would have to be abandoned.

420 East South Temple, Suite 100 . Salt Lake City . Utah . 84111 . 801.595.6700 . Fax 801.595.6717 . www.mhtn.com

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- E. **Height Restriction.** The group thought the new building was allowed to be the same height as the existing HSEB, but there may be a restriction by the Biopolymers building to the east. Joe will follow up with Steve on that.
- F. **High Rise.** Joe noted that the building should be planned to avoid being a high-rise as defined by the building code. The understanding of the definition is: less than 75' from the lowest point of surrounding grade to the floor level of the highest floor. (The penthouse can be in addition to that.)
- G. **Parking Construction.** The parking structure on Site A, being four stories deep and against a tight east boundary, would likely need to use micro-piles. It would be very expensive construction.
- H. **Views.** The building in this location would not have views to the west; they would be blocked by the new Pharmacy expansion. There would be good views to the south.
- I. **Traffic.** There are concerns about increased traffic on the road south of this location. The study should include at least a cursory mention of traffic concerns and impacts.

03.9 **Site B.** The group moved to discussion of Site C, Orthopaedic, as there are no site studies for Site B.

03.10 **Site C (Orthopaedic) Test Fit.** This site is roughly two acres. It is a good, flat site that would be easy to build on. The prototype building footprint was modified to fit on this site; one bay was shifted to form an "L" floor plate. Two and a half decks of parking are needed for the 172 required spaces and the naturally sloping grade could be used to keep a parking structure partially open. Parking could be divided into two areas: a below-grade area for faculty/staff, accessed from the service drive north of the site; and a surface lot for patients, accessed from Wakara Way. The group has these comments:

- A. Joe recommended going with 3 levels of parking, rather than 2-1/2.
- B. Joe said that the semi-open parking structure that would be possible on this site is very desirable and would be less expensive to build than a fully enclosed parking structure. The South Campus Drive parking structure, east of the Institute Building is a good model for this type of parking. It has a very efficient layout and works very well with the natural slope of the grade.
- C. The parking structure wouldn't be visible from Wakara Way; it would be hidden by the building.
- D. Joe will ask Steve for information about the Orthopaedic expansion plans.
- E. The group questioned the pedestrian link between the Health Sciences area and Research Park. It may be shown in the master plan.
- F. There is a 30% open space requirement in Research Park. This is a SLC zoning requirement and the University is not required to follow it. Joe noted that the University is outside of the city's jurisdiction, but must follow its own and the state's restrictions and guidelines.
- G. The expansion for this site would be along the site's east boundary.

03.11 **Site D (Foothill) Test Fit.** On this site, the front of the building faces east toward its parking areas. Parking is to the north (faculty/staff) and east (patients). It would be possible to place more than 200 cars on surface lots on this site. The three-story prototype footprint fits very well on this site. The following was noted:

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- A. Surface parking costs about \$2,200/stall vs. \$20,000-\$40,000/stall for semi-open or fully enclosed parking structures. This is the least expensive site for that reason.
  - B. MHTN will show expansion possibilities for this site rather than targeting a specific expansion amount.
  - C. The building and parking fit well with the Park neighbors.
  - D. This site must be accessed from a drive on the south side, as it does not have a right-of-way for the other two access drives further north.
  - E. Lynn noted that it would be desirable to have some structured parking on this site, if possible. This would help with future expansion space.
- 03.12 **Evaluation Criteria.** MHTN had summarized some preliminary evaluation criteria, which was briefly reviewed. There was a discussion about the process for evaluation.
- 03.13 **Two-Week Pause.** Joe suggested that the project pause for two weeks to allow time for the Dental Program to develop the strategic academic plan.
- 03.14 **Next Steps.** The following were noted as next steps:
- A. After it is formulated, the strategic academic plan will be reviewed to make sure the facility plan complies with it.
  - B. Joe will ask Steve for the Dumke rationale, the Eccles plaza study, and the height restriction for Biomedical Polymers.
  - C. Tami will look up the Orthopaedic expansion boundaries.
  - D. MHTN will send today's presentation to Tami, for use in planning discussions.
  - E. The next meeting will be Friday, March 20. It will begin at 11:00 AM and go until 2:30 PM, as there will be a lot to cover. Lunch will be provided.
  - F. MHTN will study the CAMT site. They will insert Dumke into the planning information. They will add one story to the Site B SOM diagrams. They will add one story to the HSEB site building mass.
  - G. The group should review the preliminary evaluation criteria, in order to prioritize it in the next meeting.
  - H. Pedestrian and ADA access should both be added to the first evaluation criteria grouping. The group noted these may be problems in Research Park because of the lack of sidewalks and the heavy vehicular traffic.
- 03.15 **March 20 Agenda.** Joe suggested the following agenda for March 20:
- A. Review the strategic plan.
  - B. Review the site evaluation criteria and list them in order of priority.
  - C. Review each site. This will be a preliminary evaluation and ranking that can then be given to the project's Steering Committee.

**End of Meeting Report No. 06**

*Minutes will stand as recorded unless notified within 3 working days of any discrepancies or inaccuracies.*



## Meeting Report - No. 07

**Project Name:** UU Proposed Dental Building Facility Plan  
**UU Project No.:** 0999-12909  
**MHTN Project No.:** 2009510  
**Phase:** Predesign  
**Date:** March 20, 2009  
**Time:** 11:00 AM  
**Location:** HSEB 5100A  
**Purpose:** Strategic Academic Plan / Initial Site Evaluation

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- 07.1 **Strategic Academic Plan.** Lynn distributed copies of the *Strategic Plan in Support of the School of Dentistry Building, 2<sup>nd</sup> Draft*. This plan is related to the need for a new facility.
- A. Jim explained that a more comprehensive strategic plan will need to be completed prior to legislative approval of the project. The more comprehensive plan should start with the vision ("where do we want to be"), based on the program mission ("why are we here?"). It should discuss the strengths, weaknesses, opportunities and threats for the program, as well as program objectives and how to achieve them. It should describe the physical environment needed to achieve the vision and objectives. A business plan should be included in the comprehensive strategic plan.
  - B. In response to a question from Lynn, Jim thought that someone within Health Sciences may be able to create a template, or facilitate the process of creating the plan.

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- C. One objective of the comprehensive strategic plan is to ensure that the physical facility being planned will fit the needs of the program. The comprehensive strategic plan will answer questions such as the need for future expansion of the Dental building, which relates directly to the importance of expansion capability on different sites.
  - D. Cathy pointed out that much data is available regarding need and the local medical environment, which could be assembled fairly readily for use in the plan.
  - E. Lynn asked if the initial plan presented today is sufficient to move forward with the current facility planning project. Jim thought the facility plan could move forward, and that it could be modified in the future if needed as a result of the strategic planning process.
- 07.2 **Building Prototype.** Eric gave a brief review of the building prototype presented in the previous meeting. The site evaluation needs to consider whether the size and configuration of a particular site will allow a building footprint that supports the Dental program. The prototype is three stories, with a 22,500 GSF footprint.
- 07.3 **Parking Demand.** There was a brief review of the parking demand information that was presented in the previous meeting. Visitors/patients, faculty and staff will require 172 spaces.
- A. At Site A-HSEB, the parking provided by the project must include an additional 80 stalls to replace those currently existing on that site, for a total of 252 spaces.
  - B. The facility plan assumes that student parking will not be provided, as it is not provided for any campus programs. There is a question as to whether the project should provide a limited amount of student parking at the Research Park sites.
  - C. Reductions for mass transit ridership were obtained from Alma Allred at Commuter Services. MHTN has asked Alma whether there are different mass transit ridership rates for Research Park, but has not received a response yet.
  - D. For parking expansion, MHTN should use the ratio of parking stalls/GSF represented by the proposed 172 stalls and 70,000 GSF building.
- 07.4 **Review of Sites.** Eric reviewed the five sites that are currently being considered.
- A. **Site A, HSEB Expansion.** MHTN has restacked the building prototype as a four-story building, because the three-story prototype fills the entire site and does not provide any expansion space. With a four-story building, there is one 30' wide bay of expansion, providing about 10,000 additional gross square feet. The 252 parking spaces for this site would require a 4-level parking structure below the building. This could be accessed through the existing HSEB parking ramp. Jim explained that the Eccles Plaza/parking structure project will probably not be undertaken for another ten years, so does not provide a viable parking alternative for the Dental project. The group suggested that MHTN look at the master-planned parking structure east of Site A as a possibility for this site's parking needs. The group concluded that this site's viability is tied to how parking difficulties can be mitigated. There is a possibility that faculty and staff parking could be in a more remote location, but the patient/visitor parking (95 stalls) must be immediately adjacent.

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- B. **Site B, Ambulatory Care Complex (ACC).** MHTN had recreated the graphic representation of the ACC's Angled View Scheme from the SOM/KSA study and added a partial story to it representing the approximate area required for the Dental program. They also gave verbal information regarding the needed increase in the ACC parking structure size, related to Dental. Meeting attendees explained the ACC project participation and phasing, which had not been clear to MHTN from the SOM/KSA study excerpts they had received. The group discussed the difficulties of this site related to the various participants, phasing and schedules, some of which are outside the control of the University. Tami will check on a site south and east of the Moran expansion site, that is shown as undeveloped in the Campus Master Plan.
- C. **Site C, Dumke.** No graphics will be developed for this site, as is it not receiving further consideration for the Dental program. Narrative will be included in the facility plan document, explaining why it is not being pursued.
- D. **Site D, Wakara Way.** The current graphic representation for this site shows three levels of partially-open, structured parking, which would provide parking in excess of the requirement. This site would use the existing curb cut and service drive of the Hartport Building to the east, for parking structure access. The building could be a three-story L-shape, with the L wing extended for future growth. Another option would be to construct the initial building as a basement with two above-grade levels, adding a third story for future expansion. There are possible obstacles to this site: 1) the Orthopaedic Clinic may be considering this site as possible future expansion space; and 2) a University rehabilitation facility is currently looking for a Research Park site and may want to consider this site. When Lynn talked to Orthopaedic representatives recently about the possible Dental building, they did not mention Orthopaedic expansion plans, but noted that they and Dental may share some common research interests.
- E. **Site E, Foothill.** This site is large enough to allow surface parking for 200 cars. The 3-story prototype fits well on the site. Two bays of expansion would be possible. On-grade expansion parking may be possible. A potential difficulty for this site is that the current owner of Evans & Sutherland has leased the site for the past several years, and another Research Park occupant would like to obtain the lease for possible development of the site. Jim and Steve mentioned that they had been unaware of this site as a possibility until very recently.
- F. **Site F, CAMT.** MHTN has created a 3D model of this site. The building would be placed in the location of the existing CAMT staff parking lot, facing Arapeen Way. The existing visitor parking in front of the CAMT building would be expanded to hold 164 cars. New surface parking would be constructed in the location of the existing solar panel array. Eric noted that the University's contour map does not include this parcel, so MHTN had to fabricate site contours for the 3D model from surroundings contours and from studying the site. The group noted that the other Research Park sites would be much more desirable from a patient-use perspective. There are questions about how arrangements and agreements with the site's current occupant would be made.

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- 07.5 **Research Park Vs. HSEB.** After discussing all of the sites, the group noted the advantages of the Research Park sites. Decision-makers would have to consider whether those advantages outweigh the Site A advantage of being located on the main campus adjacent to similar programs and shared facilities (College of Medicine, Pharmacy, Nursing, and HSEB).
- 07.6 **Sites for Evaluation.** The next agenda item was a preliminary evaluation of the sites. It was decided that B-ACC, C-Dumke, and F-CAMT would not be included in the evaluation. B would be a difficult site for Dental to pursue due to the many unknowns related to its configuration, participants and schedule. F would be difficult because of its low visibility and also due to the fact that it has an existing building/program on site.
- 07.7 **Preliminary Evaluation.** The group made a preliminary evaluation of Sites A-HSEB, D-Wakara, and E-Foothill.
- A. MHTN had modified an earlier version of the evaluation matrix with input received from Tami. MHTN had also added criterion-related information for each site. Printed copies of the updated matrix were distributed and a file was projected for editing per the group's input.
  - B. Tami explained the evaluation method: mark each criterion with a +, =, or -, depending on whether its impact on the project is positive, marginal, or negative. The group discussed and reached a decision for each criterion, and results were marked on the editable file. Tami marked a hard copy for her records. The criteria categories were then summarized with a +, =, or -, in the spreadsheet's blue header row. The resulting spreadsheet is attached.
  - C. Several criteria were eliminated from consideration because they were irrelevant or equal for all three sites: wheelchair/ADA access; campus political support; utility availability and capacity.
  - D. The group did not prioritize the criteria.
- 07.8 **Evaluation Results.** The two Research Park sites received higher evaluation results than the HSEB site and were ranked fairly equally to each other.
- A. There are questions about the existing land lease for the Foothill site, and whether that would cause schedule delays; more input is needed regarding this.
  - B. The Wakara site is unencumbered, if not needed for Orthopaedic expansion or the University rehabilitation facility. However, it requires partially-open structured parking, which is more expensive than Site E's surface parking.
  - C. If the two sites are equally available, the Foothill site may be preferred due to its visibility from Foothill Blvd. and its size, which allows all surface parking.
- 07.9 **Future Project Phases/Schedule.** Dental representatives would like the Dental building project to move forward as quickly as possible. The group discussed the possibilities for programming and design, and approvals that would be needed to proceed:
- A. A possible schedule is 4 months for programming and 8-10 months for design.

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- B. The group thought Mike Perez could ask DFCM for permission to pursue programming or programming + design without legislative approval, since the Dental program will be funding these phases.
- A. Legislative approval is needed prior to project construction because the state will provide operations and maintenance funds for at least the academic portion of the program. The Dental Clinic income may provide funds for some operations and maintenance. That is how University auxiliaries fund their operations.

07.10 **Schedule.** The schedule is revised as follows:

- A. 03/27: Cost information
- B. 04/03: Weekly meeting if needed; otherwise cancelled
- C. 04/10: Draft document presentation
- D. 04/24: Draft review comments
- E. 05/01 or 08: Final document (date depends on extent of review modification)

07.10 **Next Steps.** The project's next steps were discussed:

- A. Steve will ask whether Charles Evans can attend the weekly meeting on March 27. If that is not possible, a meeting with Charles will take place prior to the meeting, to get his input on the Foothill land lease, and possibly the CAMT site.
- B. Steve will check on the status of the Wakara site for the Orthopaedic expansion and the rehabilitation facility.
- C. MHTN will develop cost information for Sites A-HSEB, D-Wakara, and E-Foothill, for presentation at the next weekly meeting.

**End of Meeting Report No. 07**

*Minutes will stand as recorded unless notified within 3 working days of any discrepancies or inaccuracies.*



**Meeting Report - No. 08**

**Project Name:** UU Proposed Dental Building Facility Plan  
**UU Project No.:** 0999-12909  
**MHTN Project No.:** 2009510  
**Phase:** Predesign  
**Date:** March 27, 2009  
**Time:** 11:00 AM  
**Location:** HSEB 5100A  
**Purpose:** Initial Costs

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08.1 **Site Evaluation.** Tami noted that she recorded the site evaluation process and conclusions from last week's project meeting. She will present the evaluation information in a meeting with the Campus Planning Vice President and others next week.

08.2 **Charles Evans Input.** Steve, Lynn, Mick, Eric and Sarah met with Charles Evans of Research Park on March 26 and gained more information about the Research Park sites. The following was discussed:

- A. **Foothill Site Lease.** The Site E (Foothill) land lease is with Evans & Sutherland. The land lease is able to be cancelled by the University/Research Park at any time. Charles has talked with Evans & Sutherland about the possibility of the lease being cancelled in the near future.
- B. **Foothill Site Access.** It is possible that representatives of the properties adjoining the Foothill site may grant right-of-way access through their drives/ parking lots. In any case, there would have to be good signage directing visitors to this site, as the route is not obvious.

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- C. **Research Park Residential Neighbors.** Charles communicated that the Foothill site may generate a fairly strong reaction from residential neighbors in the area, who are vocal with concerns regarding traffic, signage, and the appearance / visibility of buildings in Research Park. The Wakara Way site (D) may generate fewer concerns among the neighbors.
  - D. **Wakara Way Site - Parking Access.** Charles communicated that the University owns the College of Health Gross Anatomy Lab building (also called Dumke and Heartport) to the east of the Wakara site, so the Dental program could use its service drive to access the Dental parking structure.
  - E. **Wakara Way Site - Orthopaedic Expansion.** The Orthopaedic Clinic is planning an expansion of its existing building to the west and north. There are no known plans for the Clinic to use the vacant Wakara Way site for expansion.
  - F. **Wakara Way Site - Rehabilitation Hospital.** The University is in preliminary stages of looking for a site for a future rehabilitation hospital. The Wakara Way site is likely too small; the hospital will be around 110,000 gross square feet.
- 08.3 **Initial Costs.** MHTN projected an electronic file summarizing initial site construction costs. The following was noted.
- A. **Site A Parking Options.** Three parking options were presented for Site A (HSEB): 1) all parking in 4 levels below the building, 2) one parking level below the building and the balance of the parking in a new master-planned structure P18 to the east, and 3) all parking in a new structure P18 to the east, with no parking below the building.
  - B. **P18 Displaced Parking.** For parking options 2 and 3 above, MHTN had not added the displaced parking from the P18 site to the parking quantity that must be provided by the project. The displaced parking was estimated to be 84 spaces, for a total of 336 spaces. The rough cost for the 84 additional spaces was added to the estimates.
  - C. **P18 Access Road.** Joe said that if the P18 site is used for some of the Site A parking requirement, the costs should include reconfiguration of a portion of the P18 access road. He suggested the following parameters: 300' long; 24' wide curb-to-curb; with curb and gutter; 3" of asphalt and 8" of road base.
  - D. **4-Story vs. 3-Story Building.** The Site A building costs are higher because this is a 4-story, rather than a 3-story building.
  - E. **Site A Contractor Staging.** The Site A building costs need to be increased to account for the lack of contractor staging space in this part of the campus.
- 08.4 **Cost Estimate.** The following was noted regarding the presented costs:
- A. **CBE (Construction Budget Estimate).** The costs presented today were "hard" construction costs. Joe would like the costs to be presented in the State's standard CBE format, which uses embedded formulas to add "soft" costs (fees, equipment, furnishings, etc), to calculate total project costs.
  - B. **Conservative Cost Estimate.** Because the estimates generated at this early stage are used to set the project's budget, they should be very conservative. It is difficult to increase a project's budget as it moves through the approval process; it is important to start with a sufficiently high budget number.

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- C. **Dental Equipment.** Equipment costs for this project will be higher than typical, because of the amount of dental equipment that will be used. Lynn has some initial cost estimates for the dental equipment; these will be provided to Glen.
  - D. **Inflation.** The initial cost estimates did not contain any inflation; the current construction market is in a deflation period.
  - E. **Process.** The group decided that Glen should refine the construction cost estimates by Tuesday of next week. Glen, Joe and others as appropriate will then coordinate to complete the CBE form. The completed CBE will be sent to project team members by email, prior to the next meeting.
- 08.5 **Proximity Issues.** Campus Planning representatives have noted the impact that parking is having on the evaluation of sites for the project. They suggest that strong consideration be given to issues of proximity. Examples include opportunities for collaboration and interaction with similar academic and research programs, and the impact of travel time on students if located away from Health Sciences. Several items were noted:
- A. **Health Sciences Campus Future Changes.** A Health Sciences campus location must be considered in light of upcoming changes, such as the rebuilding of the medical school and the relocation of clinics.
  - B. **Proximity Issues Meeting.** There will be a separate meeting for project team members and others (i.e. medical school representatives) who can give perspective on this issue. They will discuss issues of proximity and collaboration and their possible impacts on the educational, research and clinical aspects of the project.
  - C. **Evaluation Matrix.** The “adjacencies” category in the evaluation matrix will be expanded to include different facets of this issue. Attendees of the above-noted meeting will forward suggested revisions, after the meeting, to MHTN (as possible). MHTN will incorporate any input received into the evaluation matrix prior to the next project meeting. The project team will evaluate sites per the expanded, revised category in the next meeting.
- 08.6 **Ranking of Evaluation Criteria.** Joe noted that Dental representatives should determine the relative importance of the evaluation criteria. The next version of the strategic plan should address the importance of the different issues and factors.
- 08.7 **Parking Funding.** It was noted that there may be options (such as bond funding) to assist with the cost burden of more expensive parking scenarios.
- 08.8 **Patient Access.** In conjunction with parking costs, ease of access/wayfinding for clinic patients has been a strong driver in site evaluation. Patient “flow” and ease of access were noted by the project’s dental planning consultant as important location considerations.
- A. **Site A Access.** It was noted that it is more difficult to access Site A. The road to the south of Site A, Medical Drive South, is circuitous. It cannot be modified because of the high amount of utilities underneath it.
  - B. **Campus Patient Care Facilities.** The direction for the campus is to have patient care facilities accessed from the north; there are no patient care facilities being developed on the south side of Health Sciences near Site A.

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- C. **P18 Parking Structure Use.** The master-planned P18 parking structure would be for faculty and staff use only. The campus is separating faculty/staff and patient/visitor parking zones. Since patients could not use the P18 structure, all patient parking would need to be provided elsewhere (i.e. underneath the Dental building).
- D. **Prospective Clinic Patients.** In response to a question about prospective Dental clinic patients, Lynn said that they will be people who put a high value on cost savings and who have time available. Clinic visits will require more time, but will cost about 50% of typical. The patient group will likely include retirees and Medicaid recipients. Cost (including cost of parking), convenience and ease of access are likely the most important factors to patients in deciding whether to use the clinic.

08.9 **Next Steps.** The project's next steps were discussed:

- A. MHTN will refine construction cost projections for sites A, D & E.
- B. MHTN will coordinate with University representatives to complete the CBE (Construction Budget Estimate).
- C. MHTN will send the completed CBE to project team members.
- D. Tami will present the preliminary site evaluation from the previous meeting at next week's Campus Planning meeting.
- E. An expanded group of University representatives will meet to discuss issues of proximity and collaboration that impact site evaluation.
- F. University representatives will forward information (as available) from the proximity/ collaboration meeting to MHTN, to insert into the evaluation matrix, prior to the next meeting if possible.

08.10 **Schedule/Next Meeting.** The draft document date was postponed. The revised date may be decided in the next meeting. Tami needs the final planning document at the end of May. The next team meeting will be Wednesday, April 8, from 11 AM to 1 PM. The agenda will include:

- A. Review of cost projections.
- B. Review of proximity/collaboration issues per the University representative meeting noted above.
- C. Modification of the evaluation matrix (if not completed prior to the meeting).
- D. Evaluation of the sites, per the revised/expanded evaluation matrix.

**End of Meeting Report No. 08**

*Minutes will stand as recorded unless notified within 3 working days of any discrepancies or inaccuracies.*



## Meeting Report - No. 09

**Project Name:** UU Proposed Dental Building Facility Plan  
**UU Project No.:** 0999-12909  
**MHTN Project No.:** 2009510  
**Phase:** Predesign  
**Date:** April 8, 2009  
**Time:** 11:00 AM  
**Location:** HSEB 2908  
**Purpose:** Estimated Costs & Proximity Input

Attendees	Representing	Phone	Email
<input checked="" type="checkbox"/> Joseph Harman	Campus Design & Constr.	801.581.7580	<a href="mailto:joseph.harman@fm.utah.edu">joseph.harman@fm.utah.edu</a>
<input checked="" type="checkbox"/> Tami Cleveland	Campus Facilities Planning	801.585.6750	<a href="mailto:tami.cleveland@fm.utah.edu">tami.cleveland@fm.utah.edu</a>
<input type="checkbox"/> David Moyes	Commuter Services	801.585.9657	<a href="mailto:david.moyes@ucs.utah.edu">david.moyes@ucs.utah.edu</a>
<input checked="" type="checkbox"/> Steve Panish	Office Sr. VP, Health Sciences	801.585.2716	<a href="mailto:steve.panish@hsc.utah.edu">steve.panish@hsc.utah.edu</a>
<input type="checkbox"/> Jim Bardsley	Office Sr. VP, Health Sciences	801.581.8037	<a href="mailto:james.bardsley@hsc.utah.edu">james.bardsley@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Cathy Anderson	Dean's Office, School of Medicine	801.585.6123	<a href="mailto:cathy.anderson@hsc.utah.edu">cathy.anderson@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Jay Aldous	Dentistry, School of Medicine	801.581.8951	<a href="mailto:jay.aldous@hsc.utah.edu">jay.aldous@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Lynn Powell	Dentistry, School of Medicine	801.581.8951	<a href="mailto:lynn.powell@hsc.utah.edu">lynn.powell@hsc.utah.edu</a>
<input type="checkbox"/> Gary Lowder	Dentistry, School of Medicine	801.581.8951	<a href="mailto:gary.lowder@hsc.utah.edu">gary.lowder@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Craig Olson	Dentistry, School of Medicine	801.581.8951	<a href="mailto:craig.olson@hsc.utah.edu">craig.olson@hsc.utah.edu</a>
<input checked="" type="checkbox"/> Ron Bowen	Utah Dental Association	801.565.8080	<a href="mailto:rbowendds@gmail.com">rbowendds@gmail.com</a>
<input checked="" type="checkbox"/> Mick Gaviglio	MHTN Architects	801.326.3255	<a href="mailto:mick.gaviglio@mhtn.com">mick.gaviglio@mhtn.com</a>
<input type="checkbox"/> Eric Migacz	MHTN Architects	801.326.3220	<a href="mailto:eric.migacz@mhtn.com">eric.migacz@mhtn.com</a>
<input checked="" type="checkbox"/> Glen Beckstead	MHTN Architects	801.326.3225	<a href="mailto:glen.beckstead@mhtn.com">glen.beckstead@mhtn.com</a>
<input type="checkbox"/> Jeff Juip	MHTN Architects	801.326.3282	<a href="mailto:jeff.juip@mhtn.com">jeff.juip@mhtn.com</a>
<input checked="" type="checkbox"/> Sarah Miller	MHTN Architects	801.326.3203	<a href="mailto:sarah.miller@mhtn.com">sarah.miller@mhtn.com</a>

### Item Information or Action Required

- 09.1 **Site Concept Refinements.** MHTN gave a brief presentation of the site concepts and parking capacities, which have been refined. This was followed by a discussion of the cost estimates for each site, which were presented in summary format. Meeting attendees had received the cost information prior to the meeting. Attendee comments/discussions related to these are in the items below.
- 09.2 **Student Parking.** The project will not provide any student parking. Parking is being provided for faculty, staff and visitors only. Students will be required to take care of their own parking needs; this is the current situation for all students on campus.
- 09.3 **Site A (HSEB).**
- A. **Replacement Parking Fees/Income.** On Site A (HSEB), there is existing parking that is being displaced, at the building site and at the P18 parking structure location (Option 2). Parking fees earned by the replacement spaces built by the project will be paid to campus parking services.

**Item Information or Action Required**

- B. **Site A Staging Costs.** Joe requested that a higher cost number be used for the lack of contractor staging space at Site A.
  - C. **P18 SF/Stall.** MHTN used 372 SF/stall when estimating the size of the P18 parking structure. Joe thought this was sufficient.
  - D. **P18 as Standalone Structure.** Joe suggested estimating the cost of P18 as a standalone, self-contained structure with capability for expansion. There is no funding currently available for the University to supplement the project budget so that P18 can be constructed at a larger capacity.
  - E. **P18 Access Road.** The current Site A Option 2 cost estimate includes the access road reconfiguration needed for the P18 parking structure.
- 09.4 **Site D (Wakara).**
- A. **Parking Structure.** MHTN has shown the parking structure for this site partially under the building, in order to preserve site space for landscaping and future expansion. Joe said that there is a strong preference for the parking structure to be separate from the building if possible. Major repairs or replacement, generally required 20-30 years after initial parking structure construction, are much easier when the structure is a standalone building. MHTN will revise the design accordingly.
  - B. **Parking Roofing.** Joe requested that the parking for Site D be priced with a roof over the upper level, as this will increase the longevity of the structure.
- 09.5 **Site E (Foothill).**
- A. **Loss of Lease Income.** The University has the potential to receive lease income from this site, if the site is not used for the Dental School. The loss of this income, through the year 2028 when all Research Park leases terminate, should be considered when evaluating sites.
  - B. **Covered Parking.** Joe requested that the cost of covering 100 cars be added to the estimate for this site.
- 09.6 **Traffic Coating.** MHTN included traffic coating in all parking structure estimated costs. A traffic coating will definitely be include in the design/construction, as it eases maintenance and prolongs the life of the structure.
- 09.7 **O & M Costs.** Building occupants/users are responsible for their parking structure operations and maintenance costs, so it is in their best interests to construct structures that will minimize future maintenance and repairs.
- 09.8 **LEED Certification/Compliance.** All of the estimates include the cost to have the project achieve a LEED Silver rating. Project representatives will need to decide whether the project should be certified for LEED compliance, which adds a cost of \$25,000-50,000 for a project. Both the Pharmacy and College of Nursing projects are seeking LEED certification. Benefits of constructing sustainable buildings were noted: they are healthier to work in (less material off-gassing); increased energy efficiency; and sustainability is increasingly important to potential faculty, staff, students and donors. The facility plan should state that the project will have a goal of achieving LEED compliance or certification, level to be determined.

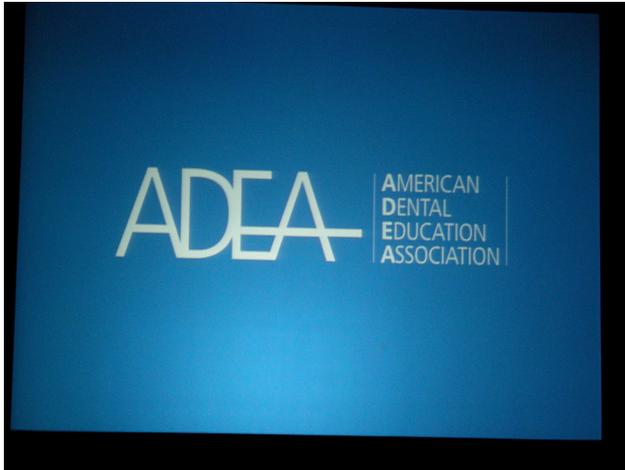
Meeting Report 09 . 04.08.09  
Page 3 of 3**Item Information or Action Required**

- 09.9 **Proximity/Collaboration Discussion.** Lynn gave a summary of recent discussions about the effect of the Dental School location on interaction and collaboration with other Health Sciences community members. He is preparing a written summary which will be included in the facility plan document. Discussion participants were from various Health Sciences areas. Discussions were organized around the impacts on educational, research and clinical areas. Points included:
- A. Interaction/collaboration between medical and dental students is unlikely, regardless of the Dental School location. Reasons include: the medical school is going to incorporate clinical work into all four years of school; it is unlikely that the medical and dental programs will share coursework because of the high student quantities in each program; and it may be difficult to schedule dental courses in the HSEB, which is very heavily used.
  - B. Collaborative and interactive clinical work for dental and medical students occurs now, and will occur in the future, in community-based clinics. The Dental School location will not influence the occurrence or amount.
  - C. Research collaboration between Dental School faculty and other Health Sciences community members is expected. Collaborative research is the result of the desire to collaborate, as well as planning, rather than proximity. Participants didn't think the Dental School location will influence this.
  - D. It was acknowledged that the Dental School location will influence casual contact and social interaction between students, faculty and staff of the different schools and programs. If the Dental School is located in Research Park, possibilities for this type of contact will be diminished.
- 09.10 **Dental Clinical & Teaching Settings.** Lynn explained that it is typical for clinics to be located in dental school buildings that contain dental classrooms, rather than in separate facilities/locations. In the dental clinics, the students are the clinicians. The clinical work is very integral to the dental education process.
- 09.11 **Site Ranking.** There was a brief discussion regarding ranking the sites under consideration. Priority orders of E, D, A2 and A1, as well as D, E, A2 and A1 were mentioned. It was decided that project team members would discuss the ranking with University administrators and decision-makers, so that it is a unified decision.
- 09.12 **Next Steps.**
- A. Project representatives will discuss the project with University administrators and decision-makers.
  - B. MHTN will refine the site concepts and cost estimates per today's input.
  - C. Joe or Steve will contact the team regarding the next meeting.
  - D. Dates for the draft and final documents will be discussed at the next meeting.

**End of Meeting Report No. 09**

*Minutes will stand as recorded unless notified within 3 working days of any discrepancies or inaccuracies.*







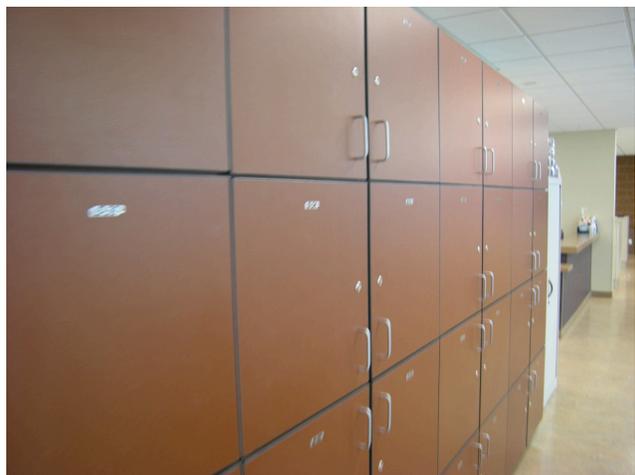
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## Appendix

Proposed Dental Building Facility Plan | University of Utah

Dental School Photos





# 05e

Appendix

Proposed Dental Building Facility Plan | University of Utah

Dental School Photos





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Appendix

Proposed Dental Building Facility Plan | University of Utah

Dental School Photos





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Appendix

Proposed Dental Building Facility Plan | University of Utah

Dental School Photos





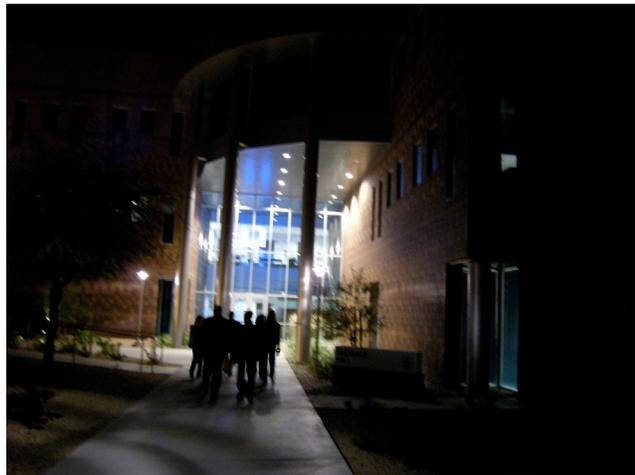
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Appendix

Proposed Dental Building Facility Plan | University of Utah

Dental School Photos









# 05e

Appendix

Proposed Dental Building Facility Plan | University of Utah

Dental School Photos





**DRAFT COPY, MAY 19, 2009**

**(REVISION 1)**

**UNIVERSITY OF UTAH  
SCHOOL OF DENTISTRY**

STRATEGIC PLANNING SESSION REPORT

APRIL 29 2009



1 | University of Utah School of Dentistry  
Strategic Plan draft 1 2009 (edit 06.03.09)

## EXECUTIVE SUMMARY

This plan describes a vision for the development and growth of the University of Utah's School of Dentistry.

The State of Utah does not have a dental school. Currently, Utah resident students who wish to enter the dental profession are required to leave the state to complete schooling for a dental degree. Their assets, tuition dollars and living expenses leave Utah with them.

The Regional Dental Education Program (RDEP) at the University of Utah helps provide dental education to twenty Utah resident students each year through two programs. Ten RDEP-Creighton students attend the first year of dental school at the University of Utah and the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> years at Creighton University School of Dentistry in Omaha, Nebraska. Ten additional Utah resident students are selected for the RDEP At Large program. These ten students, accepted by American Dental Association (ADA) accredited dental schools in the United States, attend all four years at those schools. After graduation and completion of their education programs, and if they return to the State of Utah to practice dentistry, these RDEP students are reimbursed a portion of their tuition.

The University's ADA accredited General Practice Residency program is one of only three post-doctoral dental programs in Utah. This one-year program is designed to help recent dental school graduates improve skills in all areas of oral health. The University dental clinics, on and off campus, provide supervised, hands-on experiences, often with complex cases, as well as experiences with Utah's underserved populations, medically compromised and ambulatory patients in both urban and rural settings.

For the past six years, the University School of Dentistry has examined the need, costs and benefits of creating a comprehensive dental school in Utah to meet the needs of our Utah residents. Recently, an anonymous Utah donor, sympathetic to the need for increased dental care for all Utah residents, but especially the underserved, approached the dental program with a gift of \$30 million to help the University establish a dental school and fulfill our vision of education, patient care and research. Her vision, like ours, was to establish a first class dental school to ensure that more Utahns have access to well-trained, oral health care professionals. This plan describes how we will make this vision a reality.

## UNIVERSITY OF UTAH SCHOOL OF DENTISTRY

The **PURPOSE** of the University of Utah School of Dentistry is to improve the health of our community through education, research, and clinical service. We share this purpose with the University of Utah's School of Medicine.

Our **MISSION** is to educate excellent, compassionate, ethical dentists to serve our community and beyond.

Ethical, compassionate and excellent training and treatment are at the center of all we do and the core of what we believe. These **VALUES** are instilled in our educational programs and services, our relationships with our students and patients, our partnerships with all who share our concern for community health, and the way we lead and support the School of Dentistry. Decisions about the future of our school are guided by these core values:

- > We know that oral health is fundamental to the overall health, well being and quality of life of an individual and a community. We know that poor oral health leads to complex and costly complications with a profound negative effect on nutrition, learning, socialization, employment and general health of individuals.
- > We believe that excellent dental care is more than technical competence; it is an ability to take the 'perfect' dentistry practiced in school and apply it to an imperfect world.
- > We are patient focused. Ethical dentists work closely with their patients to maintain and enhance their oral health. They provide what is best for patients' health, knowing that many do not have access to regular dental care, lack insurance or have limited financial means.
- > We honor our role as a public institution and are committed to increasing the public's access to oral health care. We are mindful of the trust placed in us and use all resources wisely. We are transparent and accountable to the public.
- > We treat our patients, students and colleagues with dignity, respect, and care. Our patients receive compassionate care without compromise. We instill integrity, trust and a passion for teaching and learning in our students and colleagues.

This plan builds on almost thirty years of the highest quality training and treatment. As we work to implement this plan, the School of Dentistry builds on these **STRENGTHS**:

- > The University of Utah School of Dentistry offers an excellent education at a very reasonable price. Our affiliation with the University of Utah Health Sciences Center and School of Medicine offers our students a high quality education and peer relationships with a full range of health professions and specialties.
- > Our faculty are community clinicians and excellent teachers, dedicated to sharing dental expertise. We offer a low student-teacher ratio, allowing our students to work closely with practicing professionals to deliver real life, high quality care.

- > We are innovative and participate in clinical and academic research. We bring the best in new oral health practices to our students, patients and the community of dentists who work along side us. We therefore further the oral health profession.
- > We are the sole provider of a dental degree for much of the Intermountain West. Our faculty, students and patients come from Utah and surrounding states for excellent training and treatment.

## STRATEGIC PLAN

**The University of Utah School of Dentistry will lead the creation and support of excellent and ethical oral health care delivery, education and research.**

## CRITICAL ISSUES ADDRESSED

Reaching this vision requires a clear understanding of the challenges ahead and the needs and opportunities facing the School of Dentistry. The plan identifies strategies to address each of these critical issues:

- > The Utah Oral Health Coalition’s Action Plan of 2004 finds that too few Utahns, especially those in rural and low income communities, lack access to dental care and treatment. For children, untreated tooth decay can cause pain and infection that can lead to problems with nutrition, growth, school readiness, and speech problems. For adults, poor oral health can also negatively impact health, employment and socialization. The public continues to underestimate the crucial role the mouth plays in overall health and well-being.
- > The lack of a comprehensive dental education program exacerbates the state’s poor oral health. Many highly motivated and skills Utahns who want to complete a dental education cannot. The lack of an in-state option means that dentists returning to Utah to practice bring with them an average of **over \$250,000** in debt. The high debt load makes finding dental professionals to serve the Medicaid, underinsured and uninsured people a deepening challenge. **[Dr. Powell or Dr. Olson will find a source]**
- > To become accredited, the existing one year dental program will need to expand from one to four years of education. This requires a new and expanded curriculum, faculty and support staff as well as new research, clinical and teaching facilities. A new facility brings with it a myriad of complex logistical and capital decisions.
- > Many practicing Utah dentists want to teach at the School of Dentistry. They find interacting with students invigorating. **Access to new clinical research and best practice techniques are valuable to the care provided to patients. However, the salaries offered current clinical faculty are at a ‘volunteer’ level, and dentists who are inventing new approaches to dental care want to partner with the university**

4 | University of Utah School of Dentistry  
Strategic Plan draft 1 2009 (edit 06.03.09)

provided they can retain some of the benefit of their intellectual property. [Dr. Powell wants to re-word this to make a distinction between fulltime faculty and volunteer faculty].

- > The public at large, the state legislature, and the dental community itself need to share a full understanding of the value of the dental school's new plan.

Specific strategies must be developed for the following areas:

- > **COMMUNICATIONS**, especially those targeting the dental community, potential donors to the program and the Utah State Legislature.
- > **PROGRAM ACCREDITATION**, including the development of a full curriculum and research objectives.
- > **STUDENT ENROLLMENT**, including processes for identification, recruitment and selection.
- > **FACULTY RECRUITMENT AND SUPPORT**, including recruitment, salary, benefit and retention strategies for dental faculty and support staff.
- > **SUSTAINABILITY**, including identifying support for the ongoing program and capital expenses through tuition, private donations, endowments, and long term financial support from the state.
- > **PATIENT RECRUITMENT**, including the design and implementation of new clinical settings in communities with limited access to dental care.
- > **FACILITY DESIGN AND CONSTRUCTION**, including labs, clinical and office space, transportation, parking and patient services.

The following goals address these critical issues and strategic decisions.

## GOALS

### 1 THE STATE OF UTAH WILL HAVE A FOUR YEAR, ACCREDITED SCHOOL OF DENTISTRY TO SERVE ITS RESIDENTS

OUTCOME:

- > Utahns will be able to complete a dental degree in the State of Utah.
- > The University of Utah will have a state of the art educational facility designed to address the state's oral health education, delivery and research needs.
- > Excellent, ethical and compassionate dental professionals will graduate each year to serve our state and beyond.

ACTIVITIES:

- > Develop a curriculum for the new program (see specific planning documents).
- > Design and build a new dental facility (see specific planning documents).
- > Set rates for tuition and requirements for admission (see specific planning documents).
- > Recruit and retain a highly qualified professional and paraprofessional staff (see specific planning documents).

RESOURCES NEEDED:

TIMELINE:

## **2 THE SCHOOL OF DENTISTRY WILL CONTRIBUTE TO THE EXCELLENCE OF ALL OF UTAH'S ORAL HEALTH PROFESSIONALS.**

OUTCOME:

- > Utah dentists will have local continuing professional education that contributes to their professionalism, supports their ethical care and advances their individual practice.
- > The School of Dentistry creates a revenue stream for its programs and services.

ACTIVITIES:

- > Describe how the School will help the state's active oral health professionals turn research into practice.

RESOURCES NEEDED:

TIMELINE:

## **3 UTAHNS WILL HAVE INCREASED ACCESS TO EXCELLENT AND ETHICAL DENTAL CARE.**

OUTCOME:

- > An estimated X,000 Utahns who otherwise would go without care will have access to oral health care, including xxx children and xxx individuals receiving Medicaid. [Dr. Powell or Dr. Olson will find a source]

ACTIVITIES:

- > Quantify the number of individuals who will receive care through the establishment of a dental school.
- > Identify new clinical partners to increase the amount of free or low cost care provided care to low income and uninsured individuals

RESOURCES NEEDED:

TIMELINE:

#### 4 THE STATE OF UTAH WILL PROVIDE ONGOING SUPPORT FOR THE EXPANSION OF EDUCATIONAL PROGRAMMING AT THE UTAH SCHOOL OF DENTISTRY

OUTCOME:

- > The University will receive approval for the dental school in the 2010 General Session of the Utah State Legislature and an annual appropriation beginning in Fiscal year 2012.

ACTIVITIES:

- > Work in collaboration with Kim Wirthlin to develop a comprehensive strategy to share the benefit of the program with members of the Utah State legislature.
- > Complete a schematic of the new building.
- > Quantify the economic benefit of this new resource to the state of Utah.
- > Develop, with University input, a plan to reach legislators with a common, approved message about the dental school and its new vision.

RESOURCES NEEDED:

TIMELINE:

- > Seek approval from the President of the University in June, 2009.
- > Present the plan to key dental professionals on June 24, 2009.
- > Present to key legislators in the summer of 2009.
- > Seek approval from the legislature during the 2010 session (beginning January, 2010).

## 5 THE PUBLIC WILL UNDERSTAND THE VALUE THE SCHOOL OF DENTISTRY BRINGS TO THE STATE OF UTAH AND ITS CITIZENS.

### OUTCOME:

- > The School of Dentistry will see an xx% increase in the number of annual donors and funds. [Dr. Powell is working on a figure here]
- > Private gifts to the dental school will increase from \$x to \$x by the time the new facility is completed. [Dr. Powell is working on a figure here]

>

### ACTIVITIES:

- > Quantify the economic benefit of this new resource to the State of Utah.

### RESOURCES NEEDED:

### TIMELINE:

## COLLABORATION - DENTAL SCHOOL BUILDING

## I. EDUCATION

Currently, there are ten dental students who study at the University of Utah during their first year of dental school. These students take Histology, Embryology and Gross Anatomy with the medical students. Histology and Embryology classes take place in the Health Sciences Education Building (HSEB). Gross Anatomy is housed in Research Park. Biochemistry, Physiology, Neuroanatomy and Oral Histology coursework is taken separately from the medical students. Second and third year basic sciences classes are also taken separately from the medical students.

The University of Utah School of Medicine (SOM) is in the process of transforming the curriculum. One of the goals for this change is to integrate the teaching of basic sciences with clinical science instruction across the four years of medical education. As that takes place, the dental students will no longer be able to be part of the medical school classes, either by curriculum structure or classroom size. The dental school is planning for a class size of fifty students per year, with a possible expansion in future years. Although the SOM class size has been reduced for fiscal year 2010, it is planned that the class size will be reinstated to 104 and eventually expanded to 130. Lecture halls in the HSEB have a capacity of 150 students and are insufficient in size for combined medical and dental classes.

There is limited contact with other health sciences students in the HSEB, other than passing in the halls. This casual contact could continue, but there appears to be insufficient classrooms of appropriate size to accommodate 200 (50 students per year new dental students) for either basic science instruction or dental lecture classes except for the Histology Lab in the HSEB and Gross Anatomy in Research Park, which will continue to be utilized by the dental students. The dental school will have the need to provide and account for its own teaching space.

Basic science instructors for the dental students will continue to come from the health sciences faculty. Some are located in the SOM complex (but not in the HSEB) and some are located in Research Park. This will provide some collaboration in teaching, but in most cases (except Histology and Gross Anatomy) teachers will need to come to the dental school building to instruct students.

The location of the new dental school building will have little or no bearing on the collaborative efforts in teaching or interaction between/with medical students.

Draft 4-15-09

## II. CLINICAL MISSION

Collaboration in clinical teaching or patient care services will most likely be limited to third and fourth year clinical activities and rotation in community clinics.

Currently, clinical facilities for the SOM and the dental program are located away from the classroom setting. SOM clinical activities are remote and away from the HSEB complex. The dental school will have a clinical component contained in its building for third and fourth year students. The care provided by the dental school will be aimed at a population that values quality, low cost, and has time to spend since procedures done by students generally take longer since they are learning. This population will largely encompass Medicaid, low income or retired patients. To help insure an adequate number of patients and supply of clinical materials, it is critical that the building is easy for the patients' to access. This aspect of the program will neither lend itself to, nor provide much opportunity for, interaction with the medical or other health science students. The exception would be dental hygienists or dental assistants from other campuses who could come to the clinics for integrated clinical training.

The interaction and collaboration with medical and other health science students will likely take place in the community clinics settings, such as the Greenwood Clinic, Oquirrh View Clinic, or other hospital clinics where dental, medical and other students are on rotations treating common patients and in a smaller interactive setting. We will plan to incorporate such collaborative interactive teaching and patient care in our curriculum for community clinic rotations and practice experience. Our dental faculty and graduate students are currently active in these types of settings and have interactions with other health care professionals.

The HSEB site is remote from other clinical activities and it is difficult for patients to access as well as for part time faculty members. Research Park sites are located closer to clinical programs and provide easy patient and faculty access. Community clinics will lend themselves to increased possible collaborative teaching and interaction and has no bearing on the dental building's location.

## III. RESEARCH

Collaboration in research will be encouraged and expected. The location of the dental school building will have little impact on interdepartmental collaborative research, but rather common interest in a subject and willingness to interact with other faculty will be more important determining factors.

Draft 4-15-09

Collaboration within the dental school and between dental clinical and research faculty is anticipated and expected. The new dental school building will facilitate collaboration by housing the dental faculty primarily in one building.

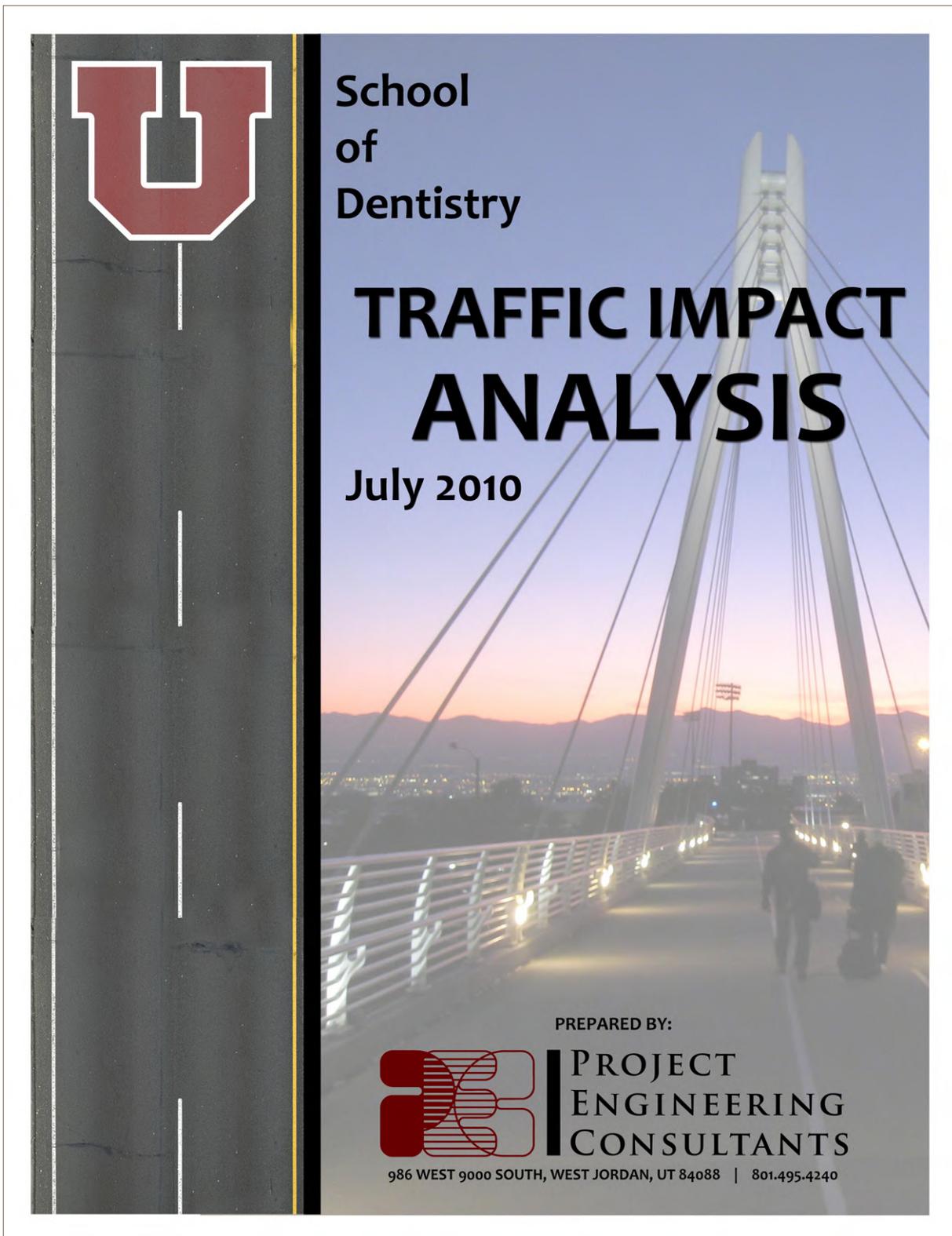
Dental research spans many areas, from genetics to materials, and from basic science to clinical studies. We expect our interaction to be with many faculty groups around campus, including Genetics, Pathology, Engineering, Orthopaedics, Neurology, Pharmacology, the Laser Institute, etc., as well as with off-campus organizations such as Clinical Research Associates and Ultradent Products, Inc.

Close proximity of collaborating faculty members is preferred: all research programs, projects and faculty housed in one building. This is not the current circumstance at the University of Utah Health Sciences. Faculty and laboratories are currently spread across campus, including Research Park and are usually housed in department or program-specific buildings, most often widely separated from each other. Some of our collaborative projects have involved Oncology at Huntsman Hospital, Laser Institute on lower-campus, GI and Oral Radiology at the University of Washington.

If the dental building were located at HSEB, it would provide improved opportunity for social interaction with Pharmacy, Biomedical Polymers, or selected faculty in Building 521 as we traverse the halls of 521 or go to the Hospital Cafeteria. However, location in Research Park, improves opportunity to interact with Orthopaedics, Anatomy or ARUP (Microbiology) because of their locations. The relocation of faculty and labs from Building 521 to other locations will further show the importance of common interest and communication in inter-departmental collaborative research as programs are spread across the campus and Research Park.

Draft 4-15-09





**School  
of  
Dentistry**

**TRAFFIC IMPACT  
ANALYSIS**

**July 2010**

PREPARED BY:



**PROJECT  
ENGINEERING  
CONSULTANTS**

986 WEST 9000 SOUTH, WEST JORDAN, UT 84088 | 801.495.4240



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Figure 8	2015 Build Total Peak Hour Traffic with Recommended Improvements	Page 17



## **I. Introduction and Executive Summary**

Project Engineering Consultants (PEC) was retained by the University of Utah Facilities Planning Department to perform a traffic analysis for two alternative locations for the construction of a new building for the School of Dentistry. The first, identified in the facility plan as Site A, is located on the north side of S. Medical Drive immediately northeast of the proposed pharmacy expansion. The second, identified as Site D in said plan, is located on the north side of Wakara Way approximately 1000 feet east of Foothill Drive. (See **Figure 1.**) The analysis included the proposed pharmacy and nursing expansions located near Site A.

The forecasted traffic conditions and this analysis demonstrate that development of the proposed dental facility is feasible. However, the proposed development is expected to have some impacts on study intersections. Building the facility at Site A (S. Medical Drive) would significantly increase delay at an intersection that already operates poorly. Intersection improvements would be required with this option. Building the facility at Site D (Wakara Way) would result in some impact to a study intersection, but no improvements are recommended due to the existing capacity being adequate.

In summary, the recommendations within the study area according to this analysis are as follows:

- A traffic signal is needed at the intersection of Mario Capecchi Drive with 1900 East, with interconnect to the adjacent signals to the north and south on Mario Capecchi Drive. Note that these improvements are needed with or without the addition of the dental facility at either of the alternative locations.
- If the dental facility is built at Site A, construct a northbound right-turn lane at the intersection of Mario Capecchi Drive with 1900 East.
- If the dental facility is constructed at Site D, no intersection improvements are recommended.
- Traffic impacts would be further mitigated if the clinical hours can be set to avoid having patients arrive or leave during peak traffic periods.
- **From a traffic standpoint, construction of the dental facility at Site D (Wakara Way) is preferable due to the ability of the existing transportation system to absorb the additional traffic.**



## **II. Existing Conditions**

To establish baseline conditions and determine actual impacts that the proposed facility could have on the adjacent transportation corridors and the intersections located within the study area, existing conditions within the study area were investigated. (See **Figure 2.**) PEC collected traffic counts of the individual movements at two intersections during peak AM and PM hours within the specified study area. The traffic counts were performed on Wednesday, October 7<sup>th</sup> and Thursday, October 8<sup>th</sup> of 2009 between the hours of 6:45 AM and 8:45 AM as well as 4:00 PM and 6:00 PM. These days and times were considered to be representative of typical peak traffic flows. These dates were also mid-semester, providing for typical peak student traffic flows. The intersections selected and analyzed include:

- Wakara Way and Foothill Drive
- Mario Capecchi Dr. and 1900 East

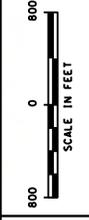


**LEGEND**

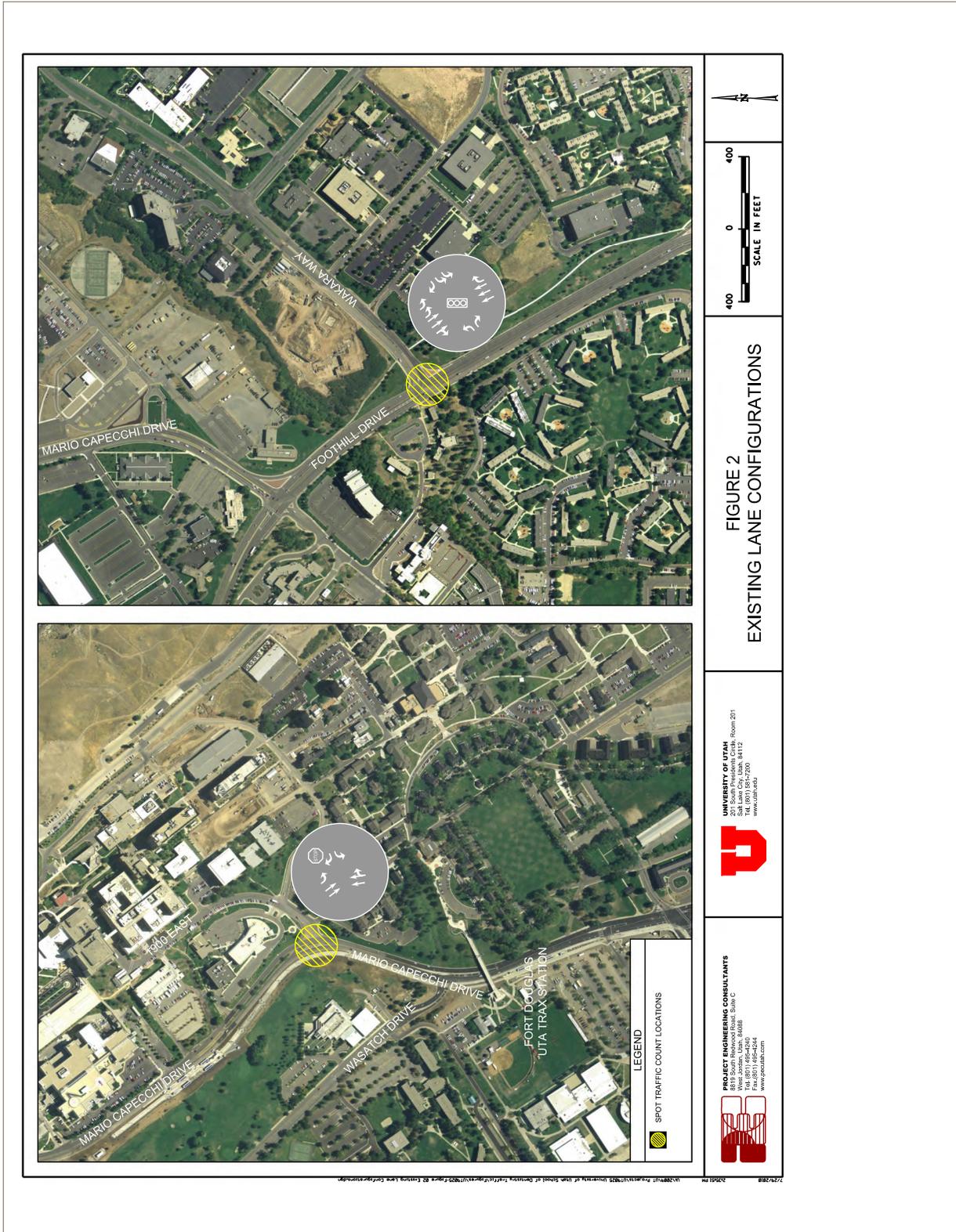
-  SPOT TRAFFIC COUNT LOCATIONS
-  ALTERNATIVE SCHOOL OF DENTISTRY SITES

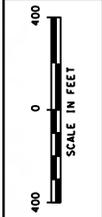
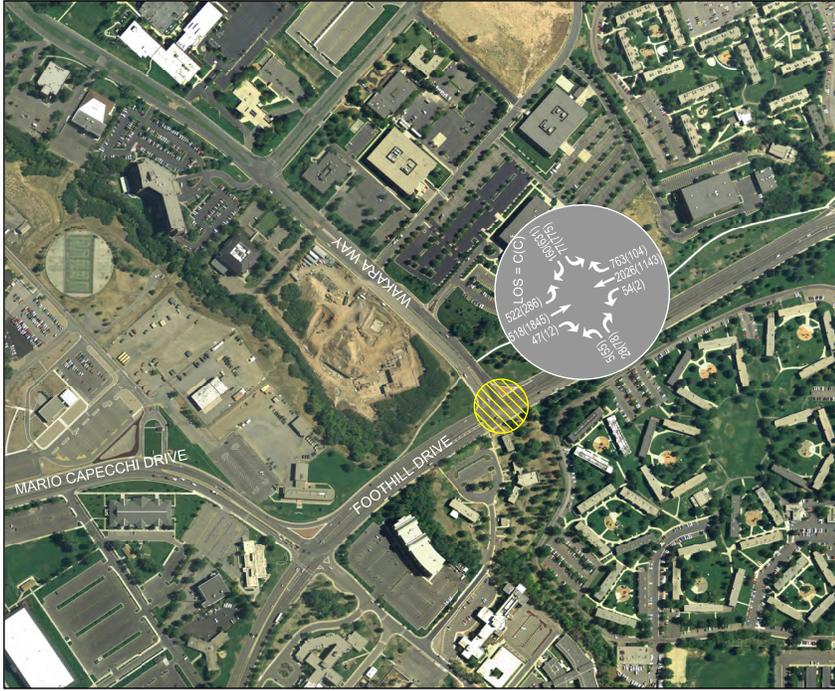
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**FIGURE 1**  
**STUDY AREA**





**FIGURE 3**  
**EXISTING FALL PEAK HOUR TRAFFIC**

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04/17/14 04/17/14 04/17/14



### III. Traffic Analysis

In order to quantify the impact that the forecasted traffic could have on the adjacent roadways and intersections, an assessment and intersection analysis was performed for the existing conditions at each intersection. Intersection analyses were conducted using Synchro 6 Traffic Simulation Software. Utilizing this method the intersections are given a level of service. Level of Service (LOS) is a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or pedestrians. A Level of Service definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. There are six levels of service describing these conditions, ranging from A to F, which have been standardized by the Transportation Research Board. LOS A represents a free-flowing traffic condition where motorists are affected very little by other motorists, there is a high degree of freedom to select desired speeds and the level of comfort and convenience to the motorist is excellent. LOS F is characterized by congested flow conditions with stoppages as the amount of traffic approaching a point exceeds the amount that can pass that point. Motorists have little if any freedom to choose speeds or lanes of travel, and experience discomfort, inconvenience, and delay. The various levels of service and associated delay relationships are summarized in **Table 1**.

TABLE 1: INTERSECTION LOS-DELAY RELATIONSHIP

Level of Service	Unsignalized	Signalized
	Total Delay per Vehicle (sec)	Total Delay per Vehicle (sec)
A	< 10.0	< 10.0
B	> 10.0 < 15.0	> 10.0 < 20.0
C	> 15.0 < 25.0	> 20.0 < 35.0
D	> 25.0 < 35.0	> 35.0 < 55.0
E	> 35.0 < 50.0	> 55.0 < 80.0
F	> 50.0	> 80.0

The intersections included within the study area were analyzed for the existing conditions and were input into the Synchro 6 Software. The lane widths at each of the intersections were approximated at 12-feet. The traffic volumes are shown in **Figure 3**. The Synchro results at each intersection for the existing conditions can be found in the appendix of this report and are also summarized and described in **Table 2** as follows:



TABLE 2: INTERSECTION LOS – EXISTING CONDITIONS

Intersection	Time Period	Movement	Delay (sec/veh)	LOS
Mario Capecchi/1900 East	AM Peak Hour	WB Left	25.4	D
		WB Right	15.1	C
		SB Left	14.0	B
	PM Peak Hour	WB Left	63.7	F
		WB Right	12.1	B
		SB Left	9.5	A
Foothill/Wakara	AM Peak Hour	Intersection	24.8	C
	PM Peak Hour	Intersection	26.8	C

**IV. Horizon 2015 Conditions**

**Trip Generation**

To adequately forecast the impacts that the project generated traffic could have on the surrounding traffic corridors, the horizon year traffic conditions within the study area must be developed. This process provides a full build-out scenario for the project and considers a complete forecast of the future conditions within the study area.

To establish the horizon year/forecasted traffic volumes, University of Utah staff were consulted and information was collected concerning gross square footage (GSF) for the proposed building massing, anticipated growth in student enrollment and full time employees, and numbers of anticipated clinical patients. This information was supplemented with information from *The Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition, 2008*. The *ITE Trip Generation Manual* is a standard compilation of trip counts for different types of facilities at different time periods. The ITE land use (L.U.) (760) Research and Development Center was used to estimate trips generated by the nursing and pharmacy facilities. Copies of the land uses, from the ITE manual, can be found in the appendix of this report. Information obtained from the University was used to estimate trips produced by the proposed dental facility.

**Multi-modal Trip Reduction**

Due to the availability of alternative modes of transportation and mass transit such as the light rail system, bus, and on campus shuttles, a reduction in the forecasted trip generation and horizon conditions is necessary. Information provided by the University Commuter Services suggested that a mode split of 22%/78% (non-vehicular/vehicular) could be expected for trips



generated at Site A. At Site D, it was expected that the mode split would be 14%/86%. Therefore, for the purposes of this study, trips travelling through the intersection of Mario Cappecchi Dr. with 1900 East were reduced by 22%, while the trips travelling through the intersection of Foothill Drive with Wakara Drive were reduced by 14%.

**Table 3** summarizes the anticipated trip generation and distributes the trips between ingress and egress. The trip generation calculations including assumptions made can be seen in the Appendix.

TABLE 3: TRIP GENERATION SUMMARY

Land Use	Time Period	Total Trips	Trips Entering		Trips Exiting	
			% of Total	Vehicles	% of Total	Vehicles
Dental Facility - North Site	AM Peak Hour	309	80%	247	20%	62
	PM Peak Hour	309	20%	62	80%	247
Dental Facility - South Site	AM Peak Hour	340	80%	272	20%	68
	PM Peak Hour	340	20%	68	80%	272
Pharmacy (Land Use 760: Research and Development Center)	AM Peak Hour	80	83%	66	17%	14
	PM Peak Hour	79	15%	12	85%	67
Nursing Facility (Land Use 760: Research and Development Center)	AM Peak Hour	29	83%	24	17%	5
	PM Peak Hour	30	15%	4	85%	25
Total Trip Generation - North Site w/o Dental	AM Peak Hour	109	83%	90	17%	19
	PM Peak Hour	109	15%	16	85%	93
Total Trip Generation - North Site with Dental	AM Peak Hour	418	81%	337	19%	80
	PM Peak Hour	418	19%	78	81%	340
Total Trip Generation - South Site	AM Peak Hour	340	80%	272	20%	68
	PM Peak Hour	340	20%	68	80%	272



### Adjustments to Background Traffic

When traffic at the Mario Capecchi/1900 East intersection was counted in October 2009, construction work to renovate and expand their facility was underway, forcing temporary relocation of that program to downtown Salt Lake City. As a result, traffic related to the existing nursing program was absent from those existing counts. In addition, a 1000-car parking garage is proposed east of the proposed dental facility. That facility will accommodate much of the parking for the dental program and provide overflow parking for other existing program. Additional new trips on the roadway network not already accounted for in Table 3 are also anticipated. **Table 4** summarizes the adjustments to the background traffic attributable to the existing nursing program and the new trips to the proposed parking garage.

TABLE 4: ADJUSTMENTS TO BACKGROUND TRAFFIC

Land Use	Time Period	Total Trips	Trips Entering		Trips Exiting	
			% of Total	Vehicles	% of Total	Vehicles
Nursing Program Relocation	AM Peak Hour	180	87%	157	13%	23
	PM Peak Hour	180	15%	27	85%	153
1000 Stall Parking Garage	AM Peak Hour	300	85%	255	15%	45
	PM Peak Hour	300	15%	45	85%	255
Total Background Adjustment	AM Peak Hour	480	86%	412	14%	68
	PM Peak Hour	480	15%	72	85%	408

### Trip Distribution

In order to allocate the project generated traffic to the study area, the major traffic corridors, proposed building massing, availability of parking, and existing traffic patterns in the vicinity of the proposed facilities were taken into consideration. Considering the general arrival and departure within the project area, the following trip distribution was estimated at the two Sites:

#### Site A

Trips to and from the east on S Medical Drive: 5%

Other 95% through the Mario Capecchi/1900 E intersection as follows:



Egress: 35% turning right (to north), 60% turning left (to south)  
Ingress: 30% from north (turning left), 65% from south (turning right)

#### Site D

Trips to and from east on Wakara Way: 5%

Trips to and from south on Arapeen Dr.: 5%

Other 90% through the Foothill/Wakara intersection as follows:

Egress: 35% turning right (to north), 55% turning left (to south)

Ingress: 35% from north (turning left), 55% from south (turning right)

This distribution was applied to the trips shown in Tables 3-4. The resulting peak hour traffic trips through each of the study intersections are shown in **Figures 4-6**. Figure 4 shows the trips generated by the Nursing and Pharmacy expansions, Figure 5 shows the adjustments to the background traffic, and Figure 6 shows the expected trips generated by the School of Dentistry.

Growth rates were applied to the existing traffic volumes at the study intersections to develop traffic volumes under background conditions for the horizon year of 2015. The University of Utah Campus Master Plan Update was used to determine growth rates at the two study intersections. The estimated growth rates used for this report were -0.5% at the intersection of Mario Capecchi Dr. with 1900 East and 0.66% at the intersection of Foothill Drive with Wakara Way. In addition, the estimated trips produced by the nursing and pharmacy facilities (see Figure 4) were added to the 2015 background traffic. Total 2015 background traffic volumes are shown in **Figure 7**.

Vehicle trips generated by the proposed dental facility (see Figure 6) were added to the background traffic volumes to derive traffic volumes under build conditions, or the volumes that are anticipated after the construction and operation of the proposed facility. Build condition traffic volumes for the 2015 horizon year are shown in **Figure 8**.



XXX(YYY)  
 XXX = AM PEAK HOUR TRIPS  
 YYY = PM PEAK HOUR TRIPS

LEGEND



**FIGURE 4**  
**NURSING AND PHARMACY GENERATED**  
**PEAK HOUR TRIPS**

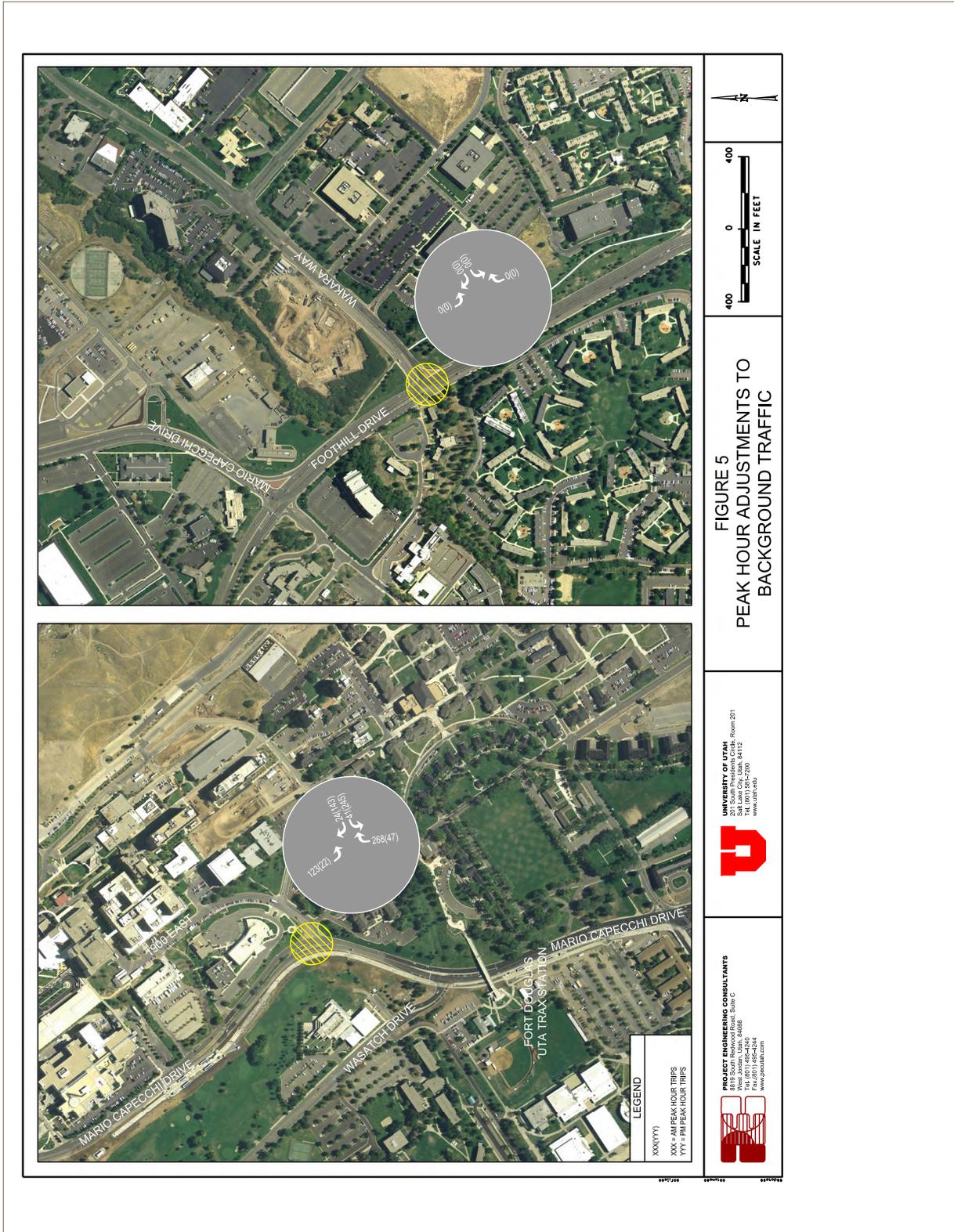
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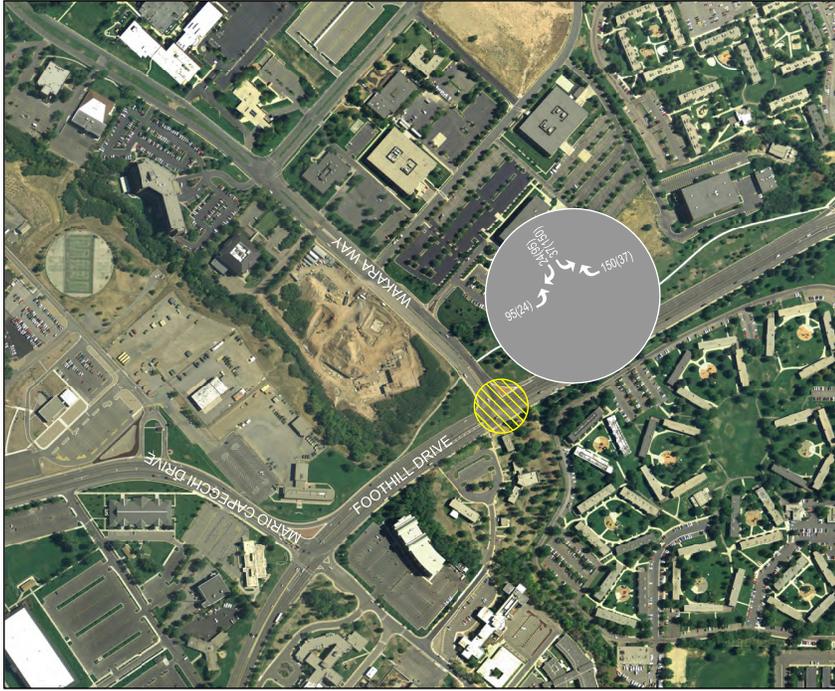


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XXX(YY)  
 XXX = AM PEAK HOUR TRIPS  
 YY = PM PEAK HOUR TRIPS

**LEGEND**



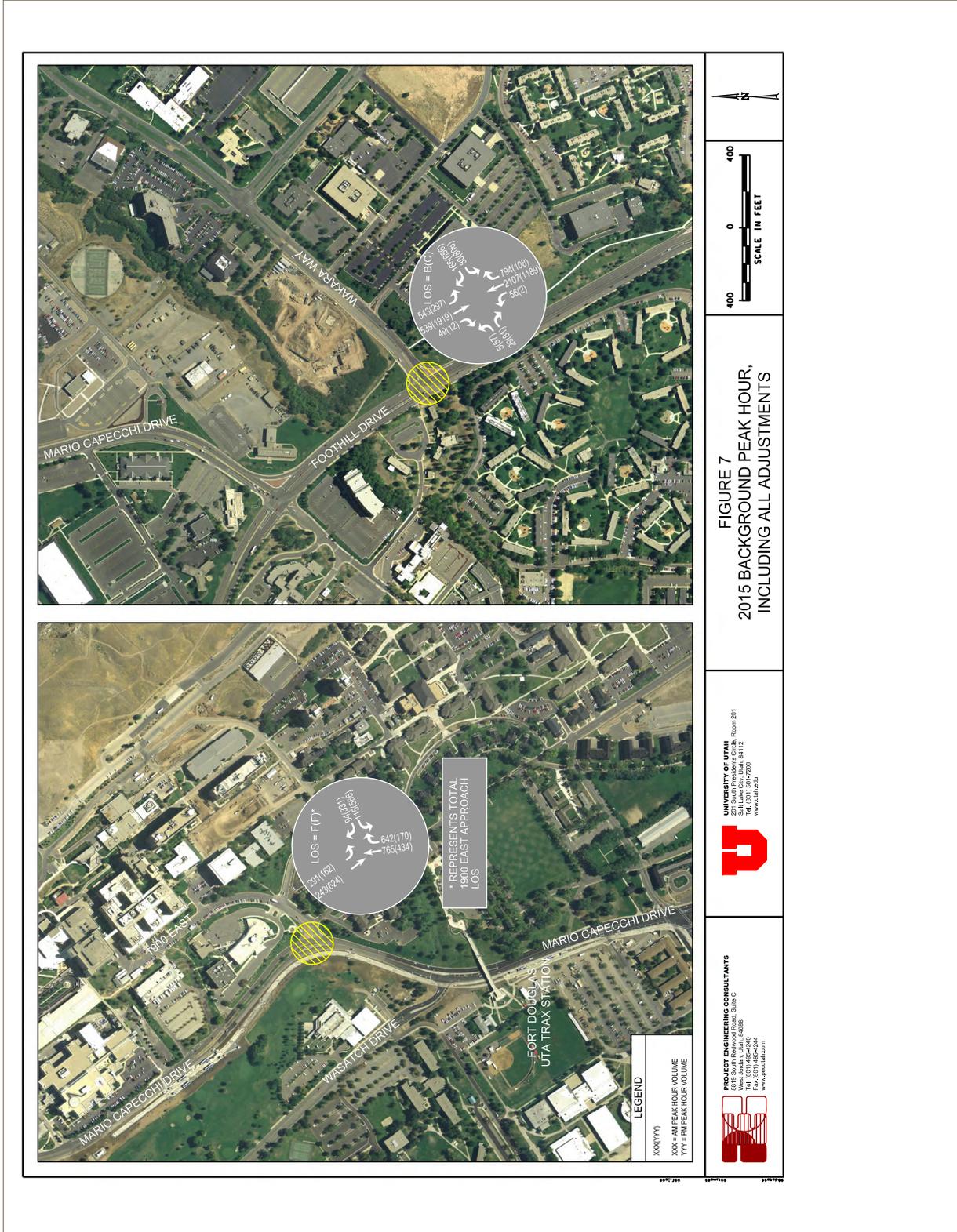
**FIGURE 6  
PROJECT GENERATED PEAK  
HOUR TRIPS**

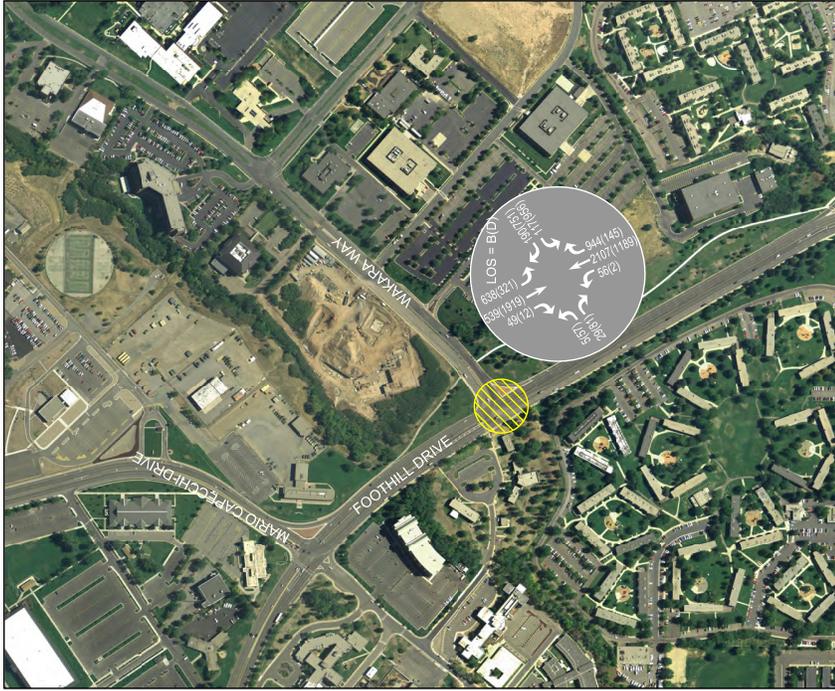
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LEGEND  
 XXX(YYY)  
 XXX = AM PEAK HOUR VOLUME  
 YYY = PM PEAK HOUR VOLUME



FIGURE 8  
 2015 BUILD TOTAL PEAK HOUR  
 TRAFFIC



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### V. 2015 Level of Service Traffic Summary

Following distribution of the forecasted traffic volumes and establishment of the 2015 build out conditions, the intersections were analyzed once again utilizing Synchro 6 Traffic Simulation Software.

Each intersection was analyzed during the AM and PM Peak under 2015 background conditions. This was done in order to establish a future year baseline with which to compare the 2015 build conditions.

For the 2015 build condition analysis, the intersection of Mario Capecchi Drive with 1900 East was analyzed assuming construction of the dental facility at Site A. Additionally, the intersection of Foothill Drive with Wakara Way was analyzed assuming construction of the dental facility at Site D. The results of the 2015 Background and 2015 Build conditions are shown in detail in the appendix and in summary below in **Tables 5-7**. 2015 Background and 2015 Build analysis results are also shown in Figures 7-8.

TABLE 5: 2015 BACKGROUND CONDITIONS

Intersection	Time Period	Movement	Delay (sec/veh)	LOS
Mario Capecchi/1900 East	AM Peak Hour	WB Left	365.3	F
		WB Right	20.4	C
		SB Left	37.3	E
	PM Peak Hour	WB Left	496.5	F
		WB Right	17.1	C
		SB Left	9.9	A
Foothill/Wakara	AM Peak Hour	Intersection	18.0	B
	PM Peak Hour	Intersection	31.4	C



TABLE 6: 2015 INTERSECTION LOS – BUILD CONDITIONS - DENTAL FACILITY AT SITE A

Intersection	Time Period	Movement	Delay (sec/veh)	LOS
Mario Capecchi/1900 East	AM Peak Hour	WB Left	>600	F
		WB Right	26.4	D
		SB Left	124.0	F
	PM Peak Hour	WB Left	>600	F
		WB Right	24.2	C
		SB Left	10.3	B

TABLE 7: 2015 INTERSECTION LOS – BUILD CONDITIONS – DENTAL FACILITY AT SITE D

Intersection	Time Period	Delay (sec/veh)	LOS
Foothill/Wakara	AM Peak Hour	19.9	B
	PM Peak Hour	41.0	D

As can be seen in the previous tables, the proposed project will increase delay at the two study intersections. The intersection of Mario Capecchi Drive with 1900 East has poor levels of service under background conditions and the addition of the dental facility at Site A will increase the already high delay experienced by drivers using this intersection.

The intersection of Foothill Drive with Wakara Way has acceptable levels of service under both the background and build conditions. Should the dental facility be built at Site D, it is expected that the added traffic generated by the facility will cause drivers using the intersection of Foothill Drive with Wakara Way to experience increased levels of delay. (The operational experience of the intersection as a whole would worsen from LOS C, under PM peak background conditions, to LOS D, with some individual movements experiencing LOS E.)

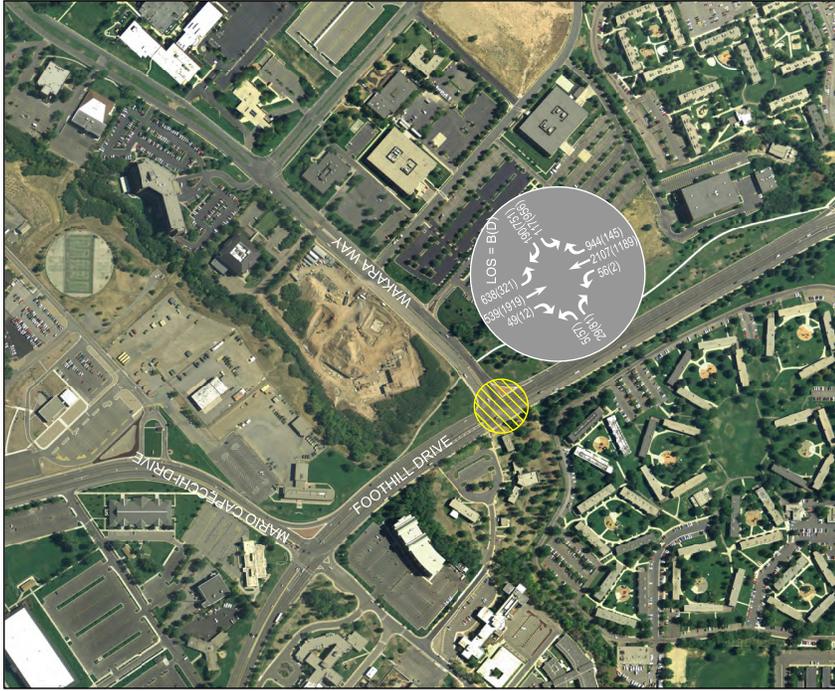


**VI. 2015 Level of Service Traffic Summary with Recommended Improvements**

Considering the 2015 deficiencies generated by development of the proposed facilities within the adjacent transportation system, PEC evaluated several spot improvement alternatives that might increase capacity and safety. **Table 8** summarizes the Level of Service with the recommended improvements at the Mario Capecchi/1900 East intersection. Details of this analysis are shown in the Appendix. Improvements used for this analysis include the signalization of the intersection of Mario Capecchi Drive with 1900 East. In order to provide progression along Mario Capecchi Drive through this corridor with closely-spaced signals, the new traffic signal should be accompanied by signal interconnect between the new signal and the next adjacent signals to the north and south. Also, a northbound right-turn lane is needed at this intersection should the dental facility be built at Site A. If the dental facility is built at Site D, it was found that the existing improvements are adequate at the intersection of Foothill Drive with Wakara Way. No improvements are proposed at that intersection. **Figure 9** shows the analysis results with the recommend geometric improvements and control upgrades at each intersection.

TABLE 8: 2015 INTERSECTION LOS – BUILD CONDITIONS - DENTAL FACILITY AT SITE A  
– WITH IMPROVEMENTS

Intersection	Time Period	Delay (sec/veh)	LOS
Mario Capecchi/1900 East	AM Peak Hour	11.6	B
	PM Peak Hour	15.3	B



LEGEND

XXX(YYY)

XXX = AM PEAK HOUR VOLUME

YYY = PM PEAK HOUR VOLUME

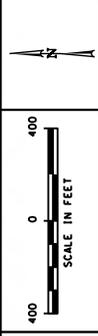


FIGURE 9  
2015 BUILD TOTAL PEAK HOUR TRAFFIC  
WITH RECOMMENDED IMPROVEMENTS

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## **VII. Pedestrian / Bikeway Analysis**

In the summer of 2005 a Pedestrian Pathways study was conducted that summarizes problem areas, constraints and recommended alternatives surrounding the project site on the University of Utah campus. As part of the current study, PEC evaluated routes for bikes and pedestrians to access the two alternate sites for the School of Dentistry facility.

### **Site "A"**

It is anticipated that bicycle and pedestrian trips to this site will be primarily from the main campus and from the Fort Douglas TRAX station via the Legacy Bridge. Going northeast from the Legacy Bridge, PEC observed a continuous network of sidewalks by which pedestrians can travel to the proposed site. No specific system deficiencies were identified and improvements are not recommended.

### **Site "D"**

Sidewalks are in place on the north side of Wakara Way, on Foothill Drive, and throughout the research park. In addition, bicycle lanes are in place on Wakara Way, and on other roadways in the area (including Arapeen Drive and Sunnyside Avenue). No specific system deficiencies were identified and improvements are not recommended.



### **VIII. Conclusions and Recommendations**

The forecasted traffic conditions and this analysis demonstrate that development of the proposed dental facility is feasible. However, the proposed development is expected to have some impacts on study intersections. Building the facility at Site A (S. Medical Drive) would significantly increase delay at an intersection that already operates poorly. Intersection improvements would be required with this option. Building the facility at Site D (Wakara Way) would result in some impact to a study intersection, but no improvements are recommended due to the existing capacity being adequate.

In summary, the recommendations within the study area according to this analysis are as follows:

- A traffic signal is needed at the intersection of Mario Capecchi Drive with 1900 East, with interconnect to the adjacent signals to the north and south on Mario Capecchi Drive. Note that these improvements are needed with or without the addition of the dental facility at either of the alternative locations.
- If the dental facility is built at Site A, construct a northbound right-turn lane at the intersection of Mario Capecchi Drive with 1900 East.
- If the dental facility is constructed at Site D, no intersection improvements are recommended.
- Traffic impacts would be further mitigated if the clinical hours can be set to avoid having patients arrive or leave during peak traffic periods.
- **From a traffic standpoint, construction of the dental facility at Site D (Wakara Way) is preferable due to the ability of the existing transportation system to absorb the additional traffic.**



---

**IX. Appendix**

AM Peak

HCM Unsignalized Intersection Capacity Analysis

3: 1900 East & Mario Capecchi Dr.



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	↙	↘	↑	↘	↙	↑	
Sign Control	Stop		Free		Free	Free	
Grade	0%		0%			0%	
Volume (veh/h)	65	66	789	326	144	251	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	72	73	877	362	160	279	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type TWLTL							
Median storage (veh) 2							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1517	619			1239		
vC1, stage 1 conf vol	1058						
vC2, stage 2 conf vol	459						
vCu, unblocked vol	1517	619			1239		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	71	83			71		
cM capacity (veh/h)	248	431			558		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	72	73	584	654	160	139	139
Volume Left	72	0	0	0	160	0	0
Volume Right	0	73	0	362	0	0	0
cSH	248	431	1700	1700	558	1700	1700
Volume to Capacity	0.29	0.17	0.34	0.38	0.29	0.08	0.08
Queue Length 95th (ft)	29	15	0	0	29	0	0
Control Delay (s)	25.4	15.1	0.0	0.0	14.0	0.0	0.0
Lane LOS	D	C			B		
Approach Delay (s)	20.2		0.0		5.1		
Approach LOS	C						
Intersection Summary							
Average Delay			2.8				
Intersection Capacity Utilization			53.8%		ICU Level of Service		A
Analysis Period (min)			15				

PM Peak

HCM Unsignalized Intersection Capacity Analysis

3: 1900 East & Mario Capecchi Dr.

Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Sign Control	Stop		Free		Free	Free	
Grade	0%		0%		0%	0%	
Volume (veh/h)	274	161	447	116	139	643	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	304	179	497	129	154	714	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL						
Median storage (veh)	2						
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1227	313			626		
vC1, stage 1 conf vol	561						
vC2, stage 2 conf vol	666						
vCu, unblocked vol	1227	313			626		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	10	74			84		
cM capacity (veh/h)	336	683			952		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	304	179	331	294	154	357	357
Volume Left	304	0	0	0	154	0	0
Volume Right	0	179	0	129	0	0	0
cSH	336	683	1700	1700	952	1700	1700
Volume to Capacity	0.90	0.26	0.19	0.17	0.16	0.21	0.21
Queue Length 95th (ft)	222	26	0	0	14	0	0
Control Delay (s)	63.7	12.1	0.0	0.0	9.5	0.0	0.0
Lane LOS	F	B			A		
Approach Delay (s)	44.6		0.0		1.7		
Approach LOS	E						
Intersection Summary							
Average Delay			11.6				
Intersection Capacity Utilization			48.9%		ICU Level of Service		A
Analysis Period (min)			15				

AM Peak

HCM Signalized Intersection Capacity Analysis

3: Wakara Way & Foothill Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘		↗	↘↗	↙	↘	↙↘	↑↑↑	↘	↘	↗↗	↘↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	0.97		1.00	1.00	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00		1.00	1.00		0.94	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00		1.00	0.99	1.00	1.00	1.00	1.00	
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583	3433		1488	1758	5085	1583	1770	4998	
Fit Permitted	0.95		1.00	0.95		1.00	0.42	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	1770		1583	3433		1488	771	5085	1583	171	4998	
Volume (vph)	5	0	28	77	0	160	54	2026	763	522	518	47
Peak-hour factor, PHF	0.95	0.95	0.95	0.75	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	0	29	103	0	168	57	2133	803	549	545	49
RTOR Reduction (vph)	0	0	26	0	0	148	0	0	0	0	10	0
Lane Group Flow (vph)	5	0	3	103	0	20	57	2133	803	549	584	0
Confl. Peds. (#/hr)	29					29	14					14
Turn Type	Prot		custom	Prot		custom	pm+pt		Free		pm+pt	
Protected Phases	4			4			5	2			1	6
Permitted Phases			4			4	2		Free		6	
Actuated Green, G (s)	10.6		10.6	10.6		10.6	44.7	39.7	90.0		71.4	62.4
Effective Green, g (s)	10.6		10.6	10.6		10.6	44.7	39.7	90.0		71.4	62.4
Actuated g/C Ratio	0.12		0.12	0.12		0.12	0.50	0.44	1.00		0.79	0.69
Clearance Time (s)	4.0		4.0	4.0		4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	208		186	404		175	438	2243	1583		628	3465
v/s Ratio Prot	0.00			0.03			0.01	c0.42			c0.27	0.12
v/s Ratio Perm			0.00			0.01	0.06		c0.51		0.43	
v/c Ratio	0.02		0.02	0.25		0.11	0.13	0.95	0.51		0.87	0.17
Uniform Delay, d1	35.1		35.1	36.1		35.5	12.3	24.2	0.0		24.3	4.8
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0		0.0	0.3		0.3	0.1	10.5	1.2		12.9	0.1
Delay (s)	35.2		35.1	36.4		35.8	12.4	34.7	1.2		37.2	4.9
Level of Service	D		D	D		D	B	C	A		D	A
Approach Delay (s)		35.1			36.0			25.3				20.4
Approach LOS		D			D			C				C
<b>Intersection Summary</b>												
HCM Average Control Delay			24.8				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)				8.0	
Intersection Capacity Utilization			81.4%				ICU Level of Service				D	
Analysis Period (min)			15									

c Critical Lane Group

PM Peak  
HCM Signalized Intersection Capacity Analysis

3: Wakara Way & Foothill Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	0.97		1.00	1.00	0.91	1.00	1.00	0.91	
Frbp, ped/bikes	1.00		1.00	1.00		0.95	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583	3433		1500	1770	5085	1583	1770	5079	
Fit Permitted	0.95		1.00	0.95		1.00	0.18	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	1770		1583	3433		1500	331	5085	1583	281	5079	
Volume (vph)	55	0	78	775	0	631	2	1143	104	286	1845	12
Peak-hour factor, PHF	0.95	0.95	0.95	0.75	0.95	0.95	0.95	0.95	0.75	0.95	0.95	0.95
Adj. Flow (vph)	58	0	82	1033	0	664	2	1203	139	301	1942	13
RTOR Reduction (vph)	0	0	53	0	0	198	0	0	0	0	1	0
Lane Group Flow (vph)	58	0	29	1033	0	466	2	1203	139	301	1954	0
Confl. Peds. (#/hr)	48					48	14					14
Turn Type	Prot	custom	Prot	custom	pm+pt	Free	pm+pt					
Protected Phases	4		4		5	2		1		6		
Permitted Phases			4		4	2		Free		6		
Actuated Green, G (s)	24.4		24.4	24.4	24.4	26.8	22.5	70.0	37.6	29.3		
Effective Green, g (s)	24.4		24.4	24.4	24.4	26.8	22.5	70.0	37.6	29.3		
Actuated g/C Ratio	0.35		0.35	0.35	0.35	0.38	0.32	1.00	0.54	0.42		
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	617		552	1197		523	215	1634	1583	387	2126	
v/s Ratio Prot	0.03			0.30			0.00	0.24		c0.12	c0.38	
v/s Ratio Perm			0.02			c0.31	0.00		0.09	0.29		
v/c Ratio	0.09		0.05	0.86		0.89	0.01	0.74	0.09	0.78	0.92	
Uniform Delay, d1	15.4		15.1	21.2		21.5	15.2	21.1	0.0	13.1	19.2	
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1		0.0	6.6		17.2	0.0	3.0	0.1	9.5	7.9	
Delay (s)	15.4		15.2	27.9		38.7	15.2	24.1	0.1	22.6	27.1	
Level of Service	B		B	C		D	B	C	A	C	C	
Approach Delay (s)		15.3			32.1			21.6			26.5	
Approach LOS		B			C			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			26.8			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			78.3%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

## Land Use: 760 Research and Development Center

### Description

Research and development centers are facilities or groups of facilities devoted almost exclusively to research and development activities. The range of specific types of businesses contained in this land use category varies significantly. Research and development centers may contain offices and light fabrication areas. General office building (Land Use 710), corporate headquarters building (Land Use 714), single tenant office building (Land Use 715), office park (Land Use 750) and business park (Land Use 770) are related uses.

### Additional Data

Truck trips accounted for 1.84 percent of the weekday traffic at the research and development centers surveyed (range of 0.4 percent to 4.0 percent).

The average vehicle occupancy for the 13 studies for which information was submitted was approximately 1.19 persons per automobile. The vehicle occupancy rates ranged from 1.10 to 1.33 persons per automobile.

The sites were surveyed between the 1960s and the 2000s throughout the United States.

### Trip Characteristics

The trip generation for the a.m. and p.m. peak hours of the generator typically coincided with the peak hours of the adjacent street traffic; therefore, only one a.m. peak hour and one p.m. peak hour, which represent both the peak hour of the generator and the peak hour of the adjacent street traffic, are shown for research and development centers.

### Source Numbers

9, 105, 213, 218, 253, 332, 384, 423, 630

## Research and Development Center (760)

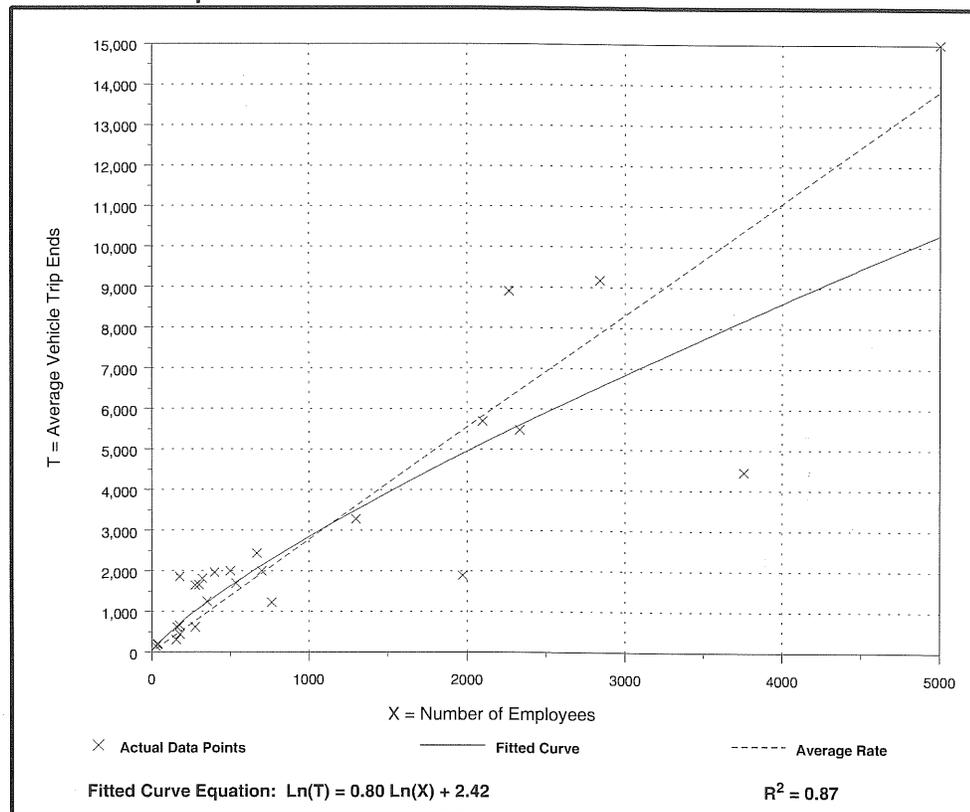
**Average Vehicle Trip Ends vs: Employees**  
**On a: Weekday**

Number of Studies: 27  
Avg. Number of Employees: 1,022  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
2.77	0.96 - 10.63	2.09

### Data Plot and Equation



## Research and Development Center (760)

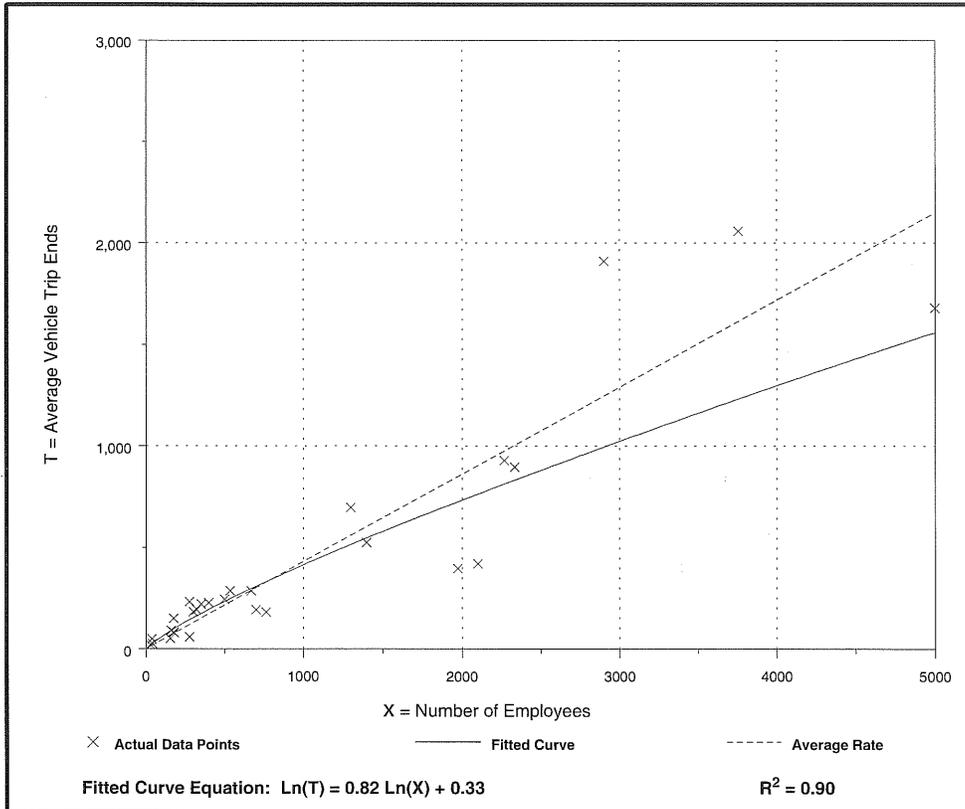
**Average Vehicle Trip Ends vs: Employees**  
**On a: Weekday,**  
**A.M. Peak Hour**

Number of Studies: 28  
 Avg. Number of Employees: 1,038  
 Directional Distribution: 86% entering, 14% exiting

### Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.43	0.20 - 1.39	0.67

### Data Plot and Equation



## Research and Development Center (760)

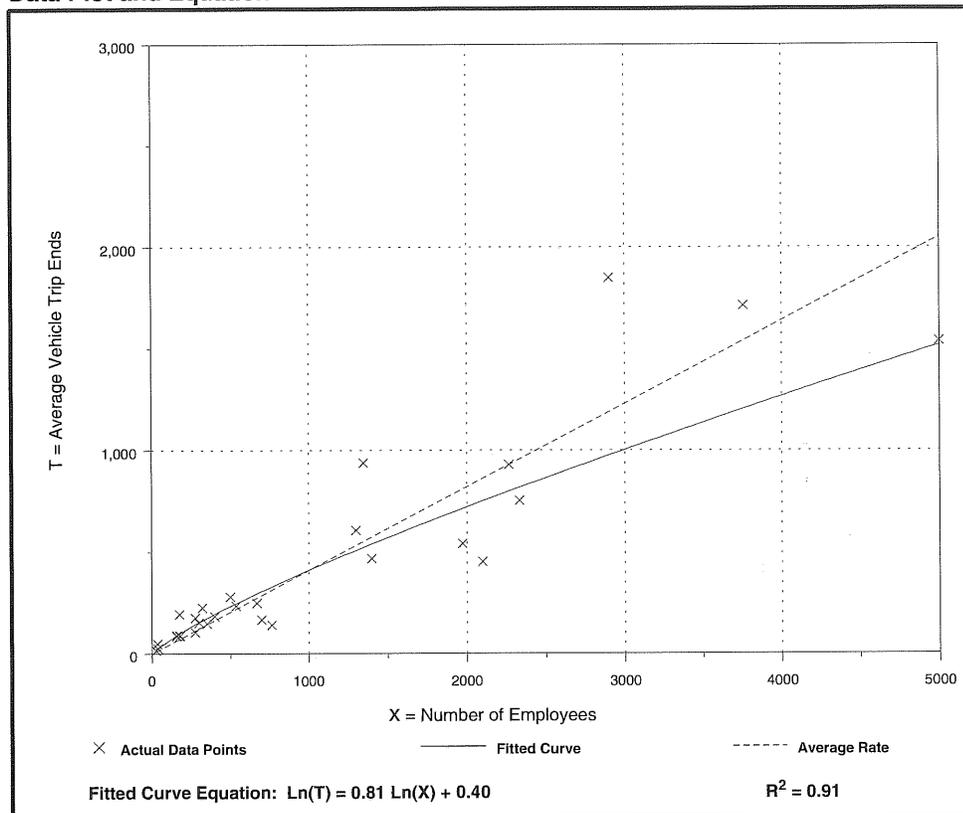
**Average Vehicle Trip Ends vs: Employees**  
On a: **Weekday,**  
**P.M. Peak Hour**

Number of Studies: 29  
Avg. Number of Employees: 1,049  
Directional Distribution: 10% entering, 90% exiting

### Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.41	0.18 - 1.39	0.66

### Data Plot and Equation



## Research and Development Center (760)

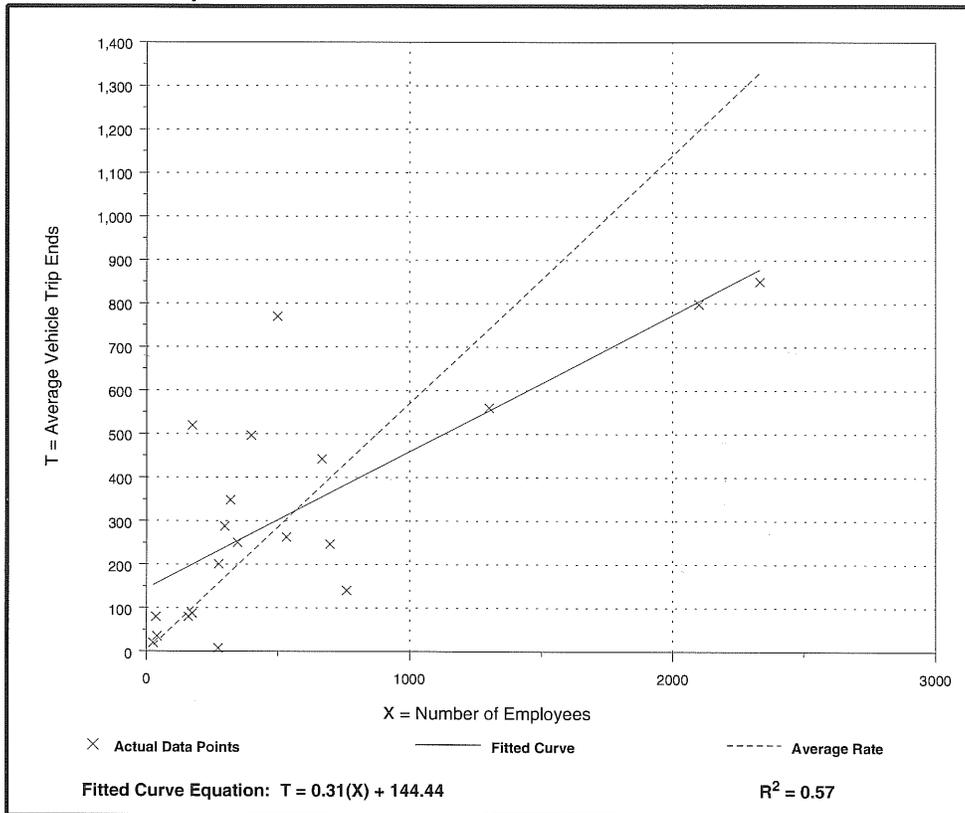
**Average Vehicle Trip Ends vs: Employees**  
On a: **Saturday**

Number of Studies: 20  
Avg. Number of Employees: 572  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.57	0.03 - 2.97	0.88

### Data Plot and Equation



## Research and Development Center (760)

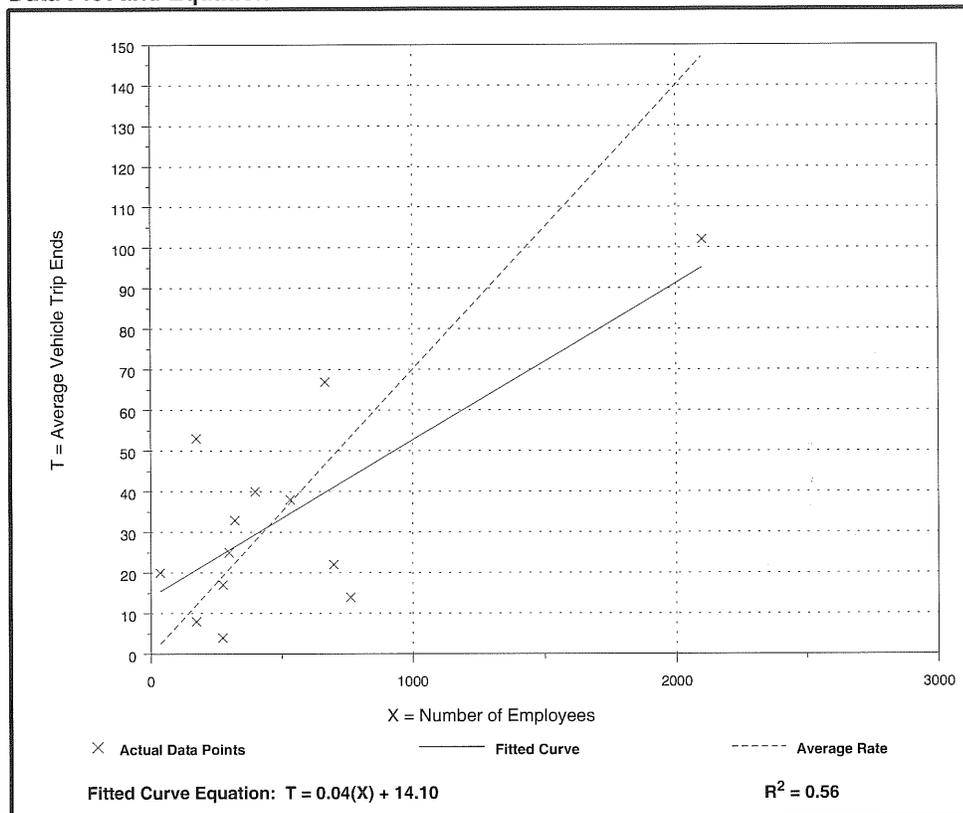
**Average Vehicle Trip Ends vs: Employees**  
**On a: Saturday,**  
**Peak Hour of Generator**

Number of Studies: 13  
Avg. Number of Employees: 518  
Directional Distribution: Not available

### Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.07	0.01 - 0.56	0.26

### Data Plot and Equation



## Research and Development Center (760)

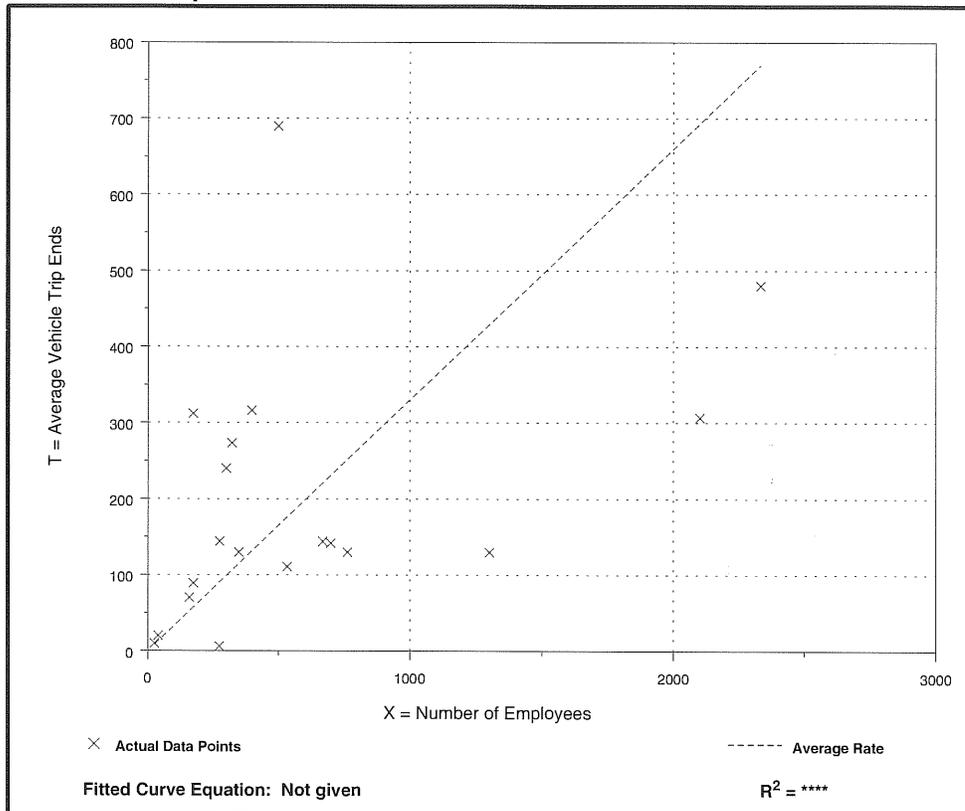
**Average Vehicle Trip Ends vs: Employees**  
On a: **Sunday**

Number of Studies: 19  
Avg. Number of Employees: 600  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.33	0.02 - 1.78	0.67

### Data Plot and Equation



## Research and Development Center (760)

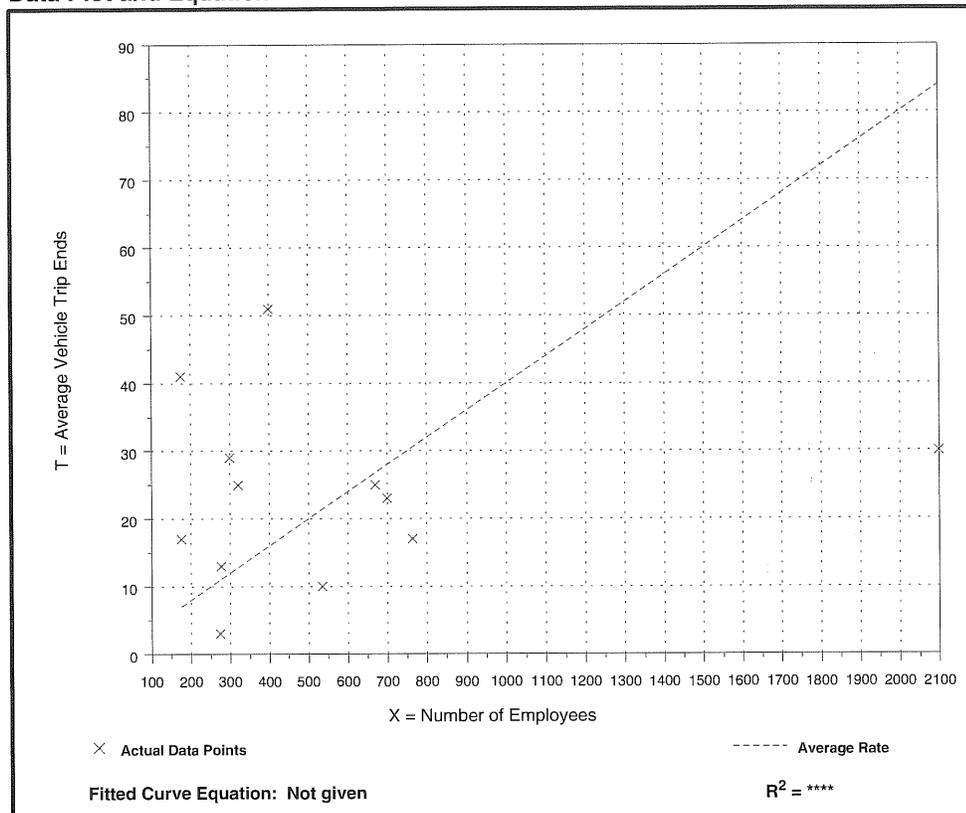
**Average Vehicle Trip Ends vs: Employees**  
**On a: Sunday,**  
**Peak Hour of Generator**

Number of Studies: 12  
Avg. Number of Employees: 558  
Directional Distribution: Not available

### Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.04	0.01 - 0.23	0.21

### Data Plot and Equation



## Research and Development Center (760)

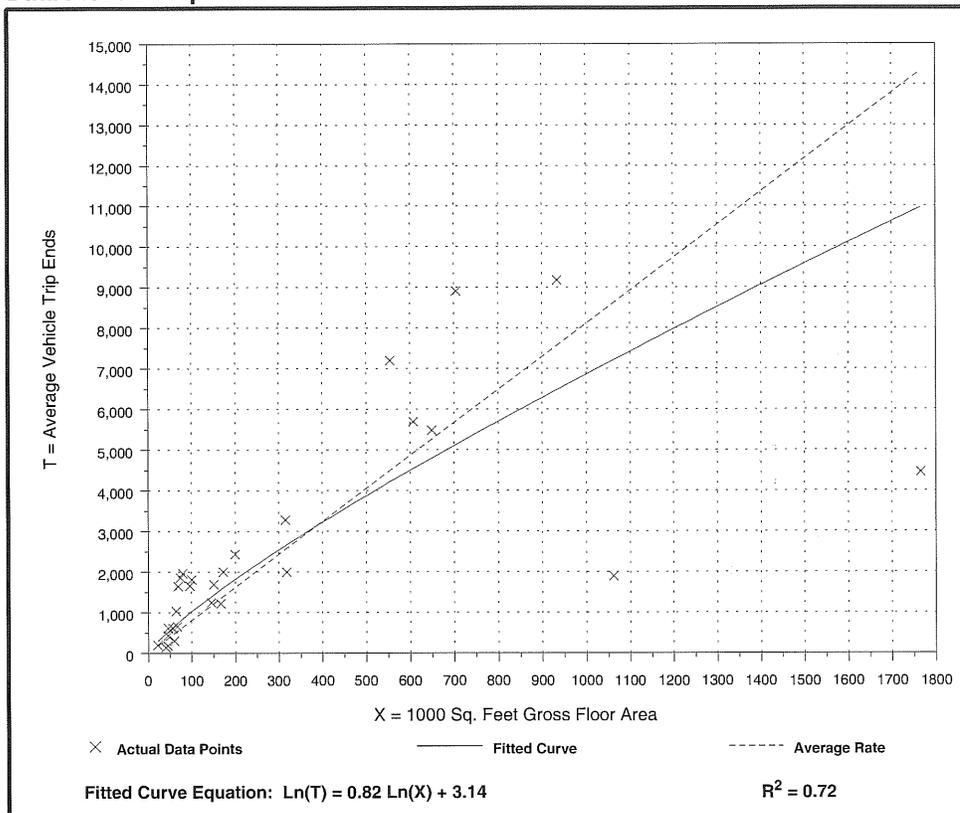
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
On a: **Weekday**

Number of Studies: 28  
Average 1000 Sq. Feet GFA: 308  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
8.11	1.78 - 24.95	5.85

### Data Plot and Equation



## Research and Development Center (760)

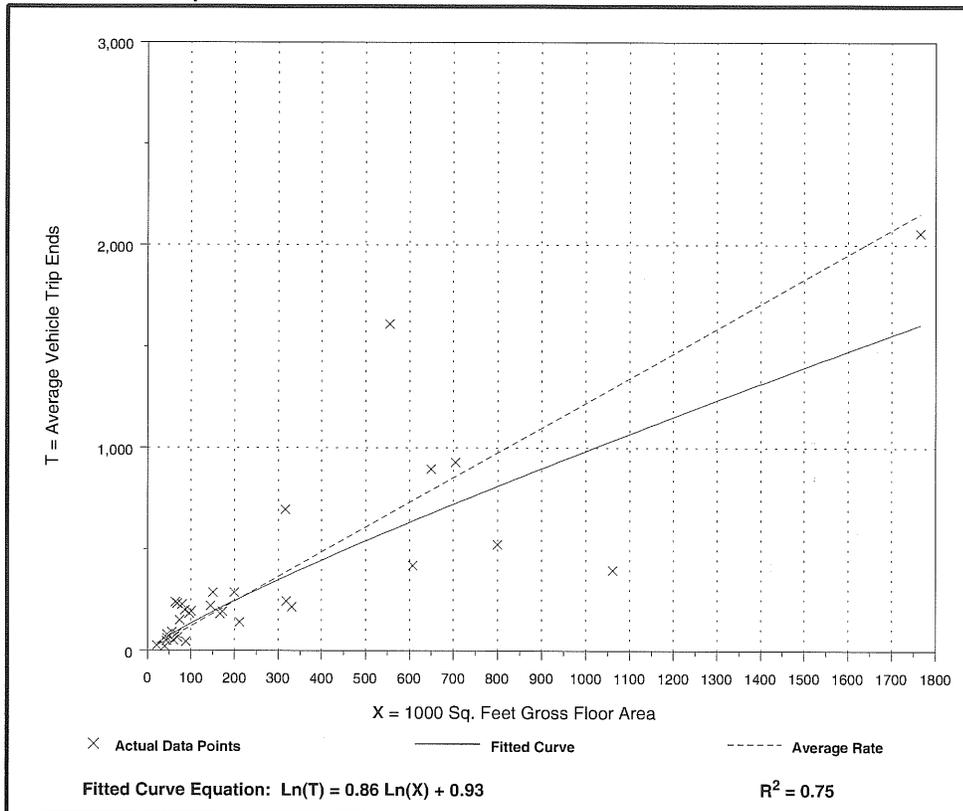
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
On a: **Weekday,**  
**A.M. Peak Hour**

Number of Studies: 33  
Average 1000 Sq. Feet GFA: 281  
Directional Distribution: 83% entering, 17% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.22	0.37 - 3.73	1.31

### Data Plot and Equation



## Research and Development Center (760)

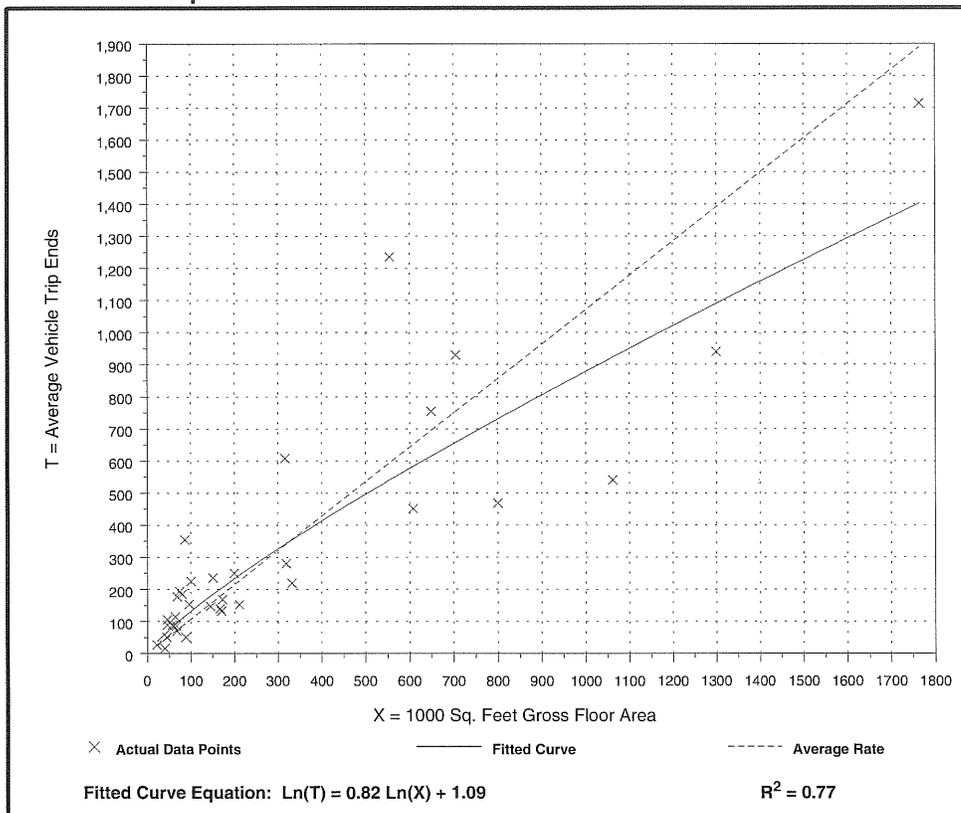
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**P.M. Peak Hour**

Number of Studies: 35  
 Average 1000 Sq. Feet GFA: 307  
 Directional Distribution: 15% entering, 85% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.07	0.40 - 4.13	1.18

### Data Plot and Equation



## Research and Development Center (760)

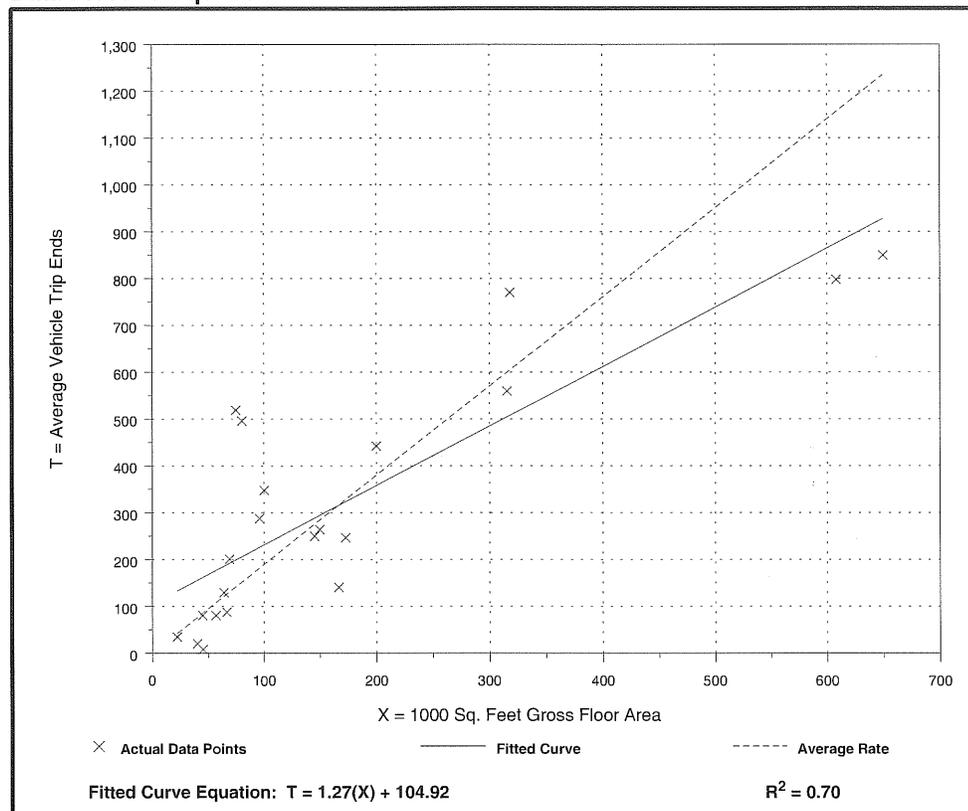
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
On a: Saturday**

Number of Studies: 21  
Average 1000 Sq. Feet GFA: 166  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.90	0.18 - 6.96	1.81

### Data Plot and Equation



## Research and Development Center (760)

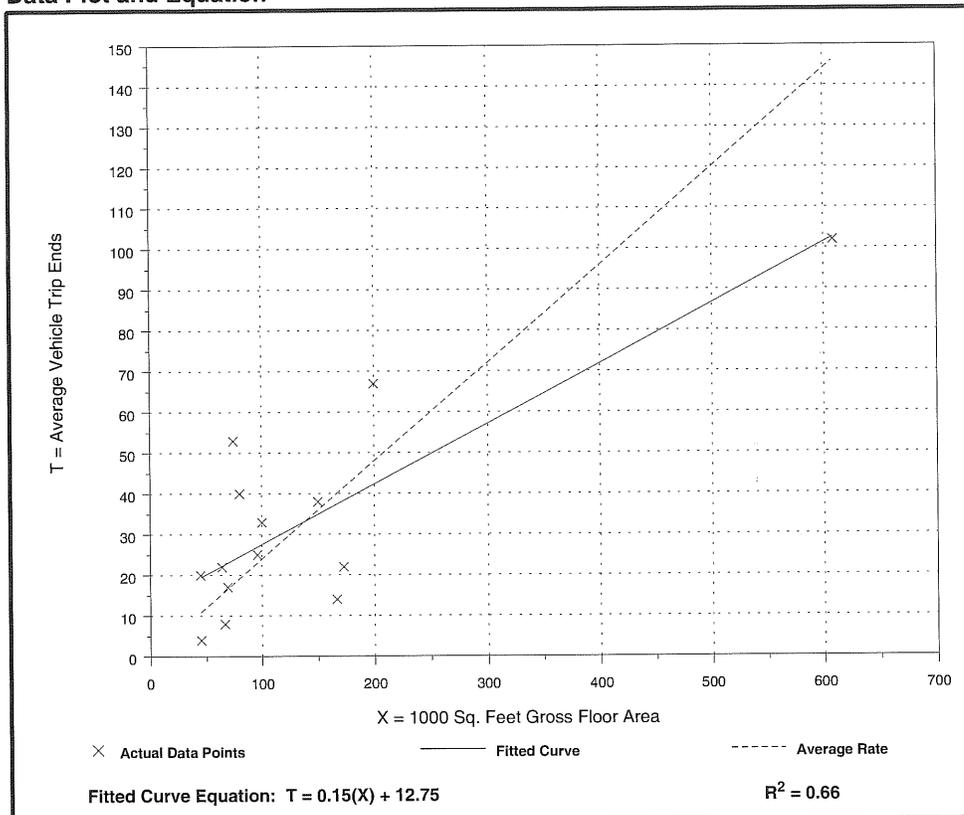
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Saturday,**  
**Peak Hour of Generator**

Number of Studies: 14  
 Average 1000 Sq. Feet GFA: 138  
 Directional Distribution: Not available

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.24	0.08 - 0.71	0.51

### Data Plot and Equation



## Research and Development Center (760)

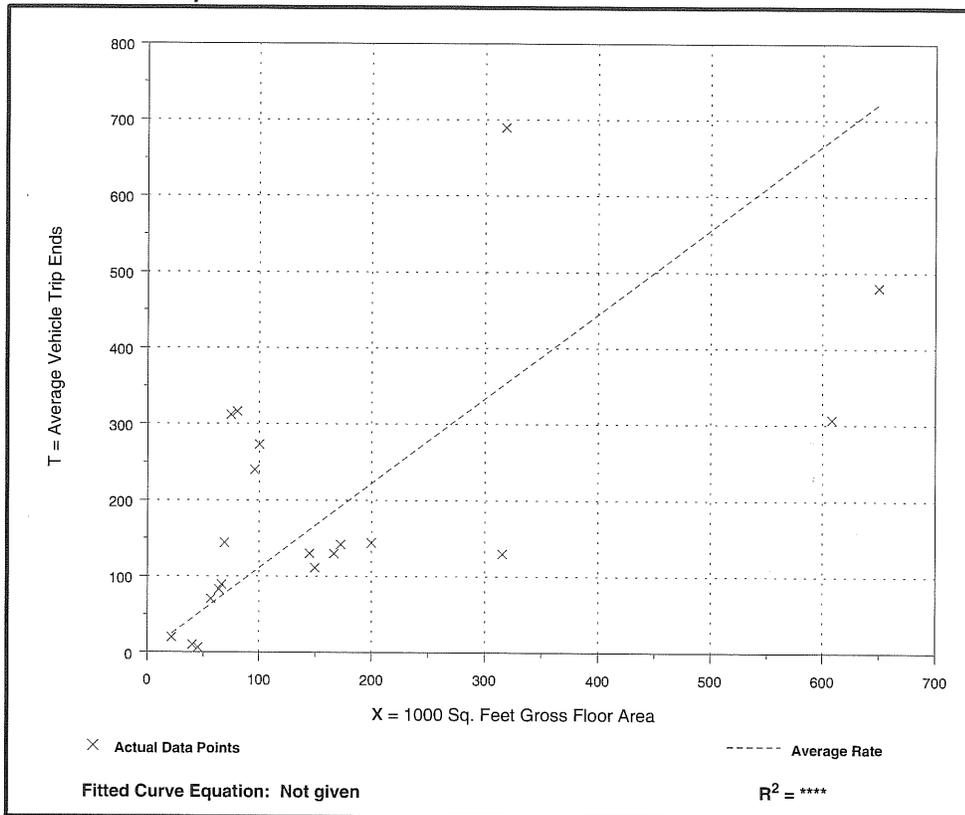
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
On a: Sunday**

Number of Studies: 20  
Average 1000 Sq. Feet GFA: 172  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.11	0.13 - 4.18	1.39

### Data Plot and Equation



## Research and Development Center (760)

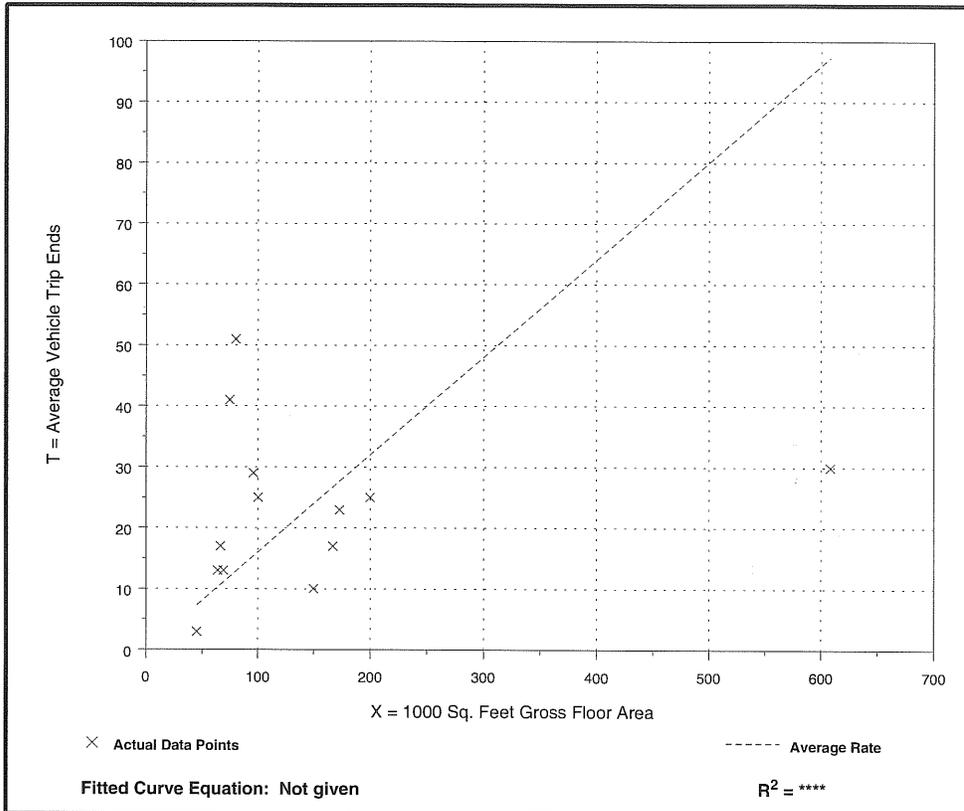
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Sunday,**  
**Peak Hour of Generator**

Number of Studies: 13  
 Average 1000 Sq. Feet GFA: 146  
 Directional Distribution: Not available

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.16	0.05 - 0.64	0.42

### Data Plot and Equation



## Research and Development Center (760)

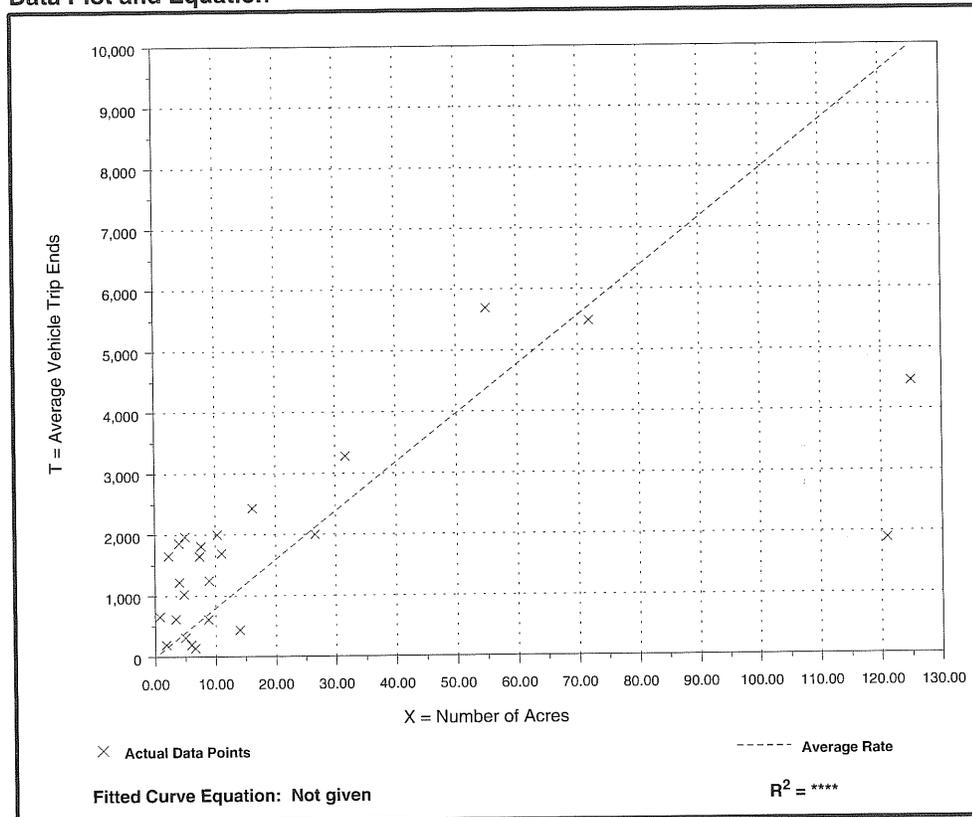
**Average Vehicle Trip Ends vs: Acres**  
**On a: Weekday**

Number of Studies: 25  
Average Number of Acres: 22  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
79.61	15.61 - 876.00	88.46

### Data Plot and Equation



## Research and Development Center (760)

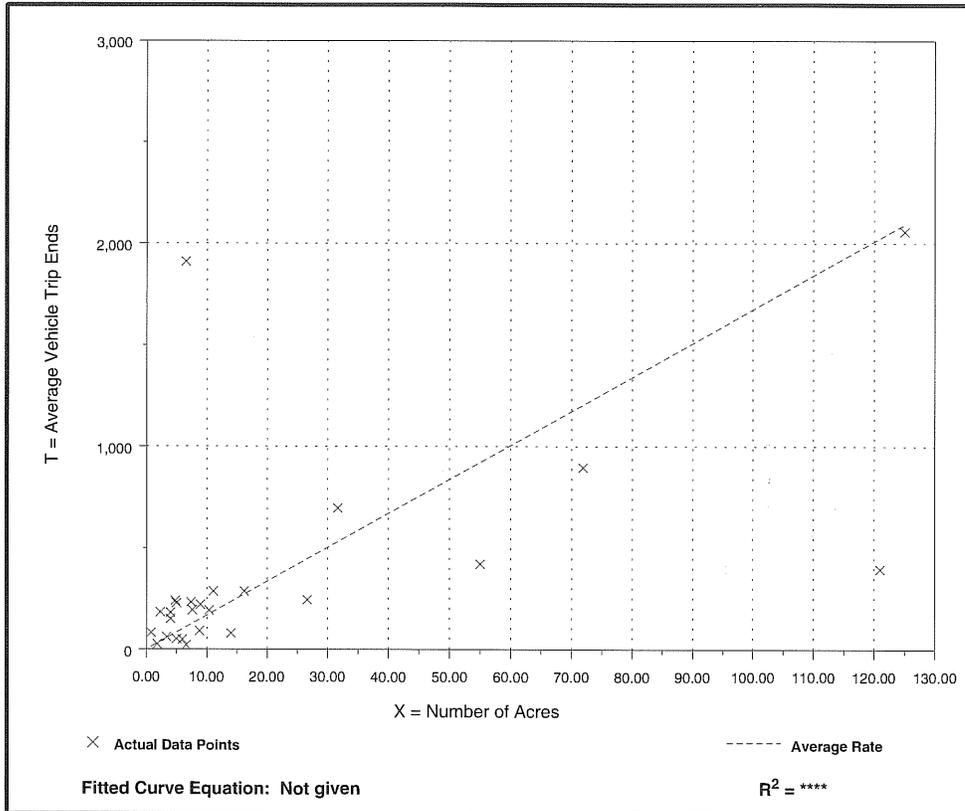
**Average Vehicle Trip Ends vs: Acres**  
**On a: Weekday,**  
**A.M. Peak Hour**

Number of Studies: 26  
 Average Number of Acres: 22  
 Directional Distribution: 84% entering, 16% exiting

### Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
16.77	3.03 - 293.85	31.93

### Data Plot and Equation



## Research and Development Center (760)

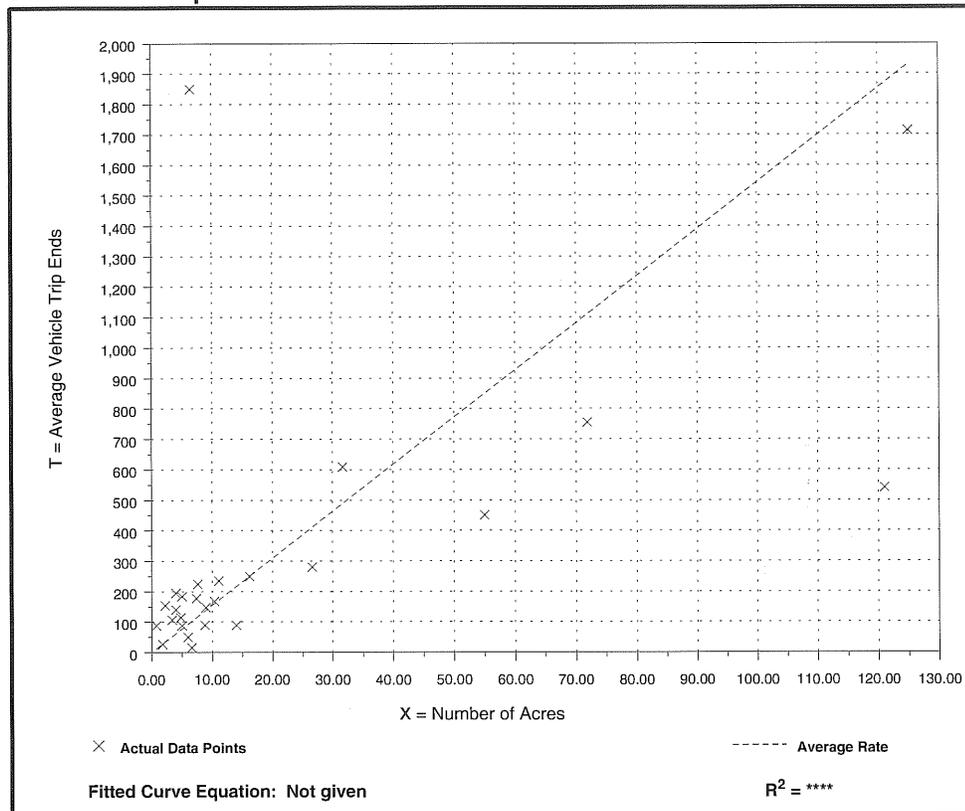
**Average Vehicle Trip Ends vs: Acres**  
**On a: Weekday,**  
**P.M. Peak Hour**

Number of Studies: 26  
Average Number of Acres: 22  
Directional Distribution: 12% entering, 88% exiting

### Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
15.44	2.42 - 284.62	30.56

### Data Plot and Equation



## Research and Development Center (760)

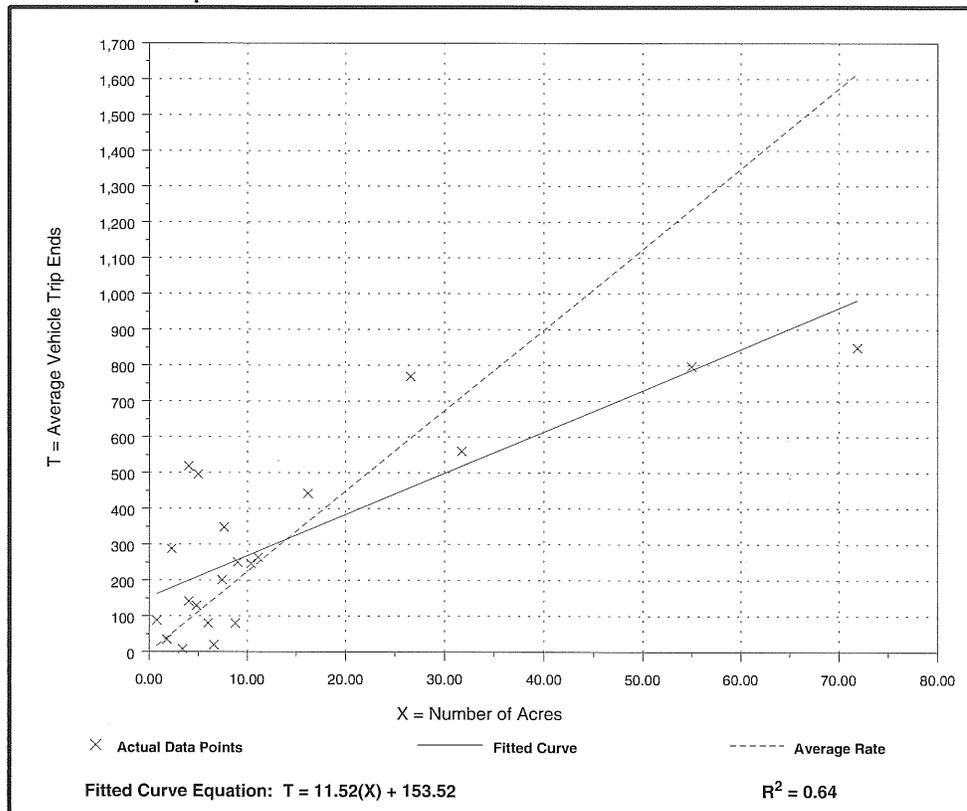
**Average Vehicle Trip Ends vs: Acres**  
**On a: Saturday**

Number of Studies: 21  
Average Number of Acres: 14  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
22.47	2.35 - 128.78	21.60

### Data Plot and Equation



## Research and Development Center (760)

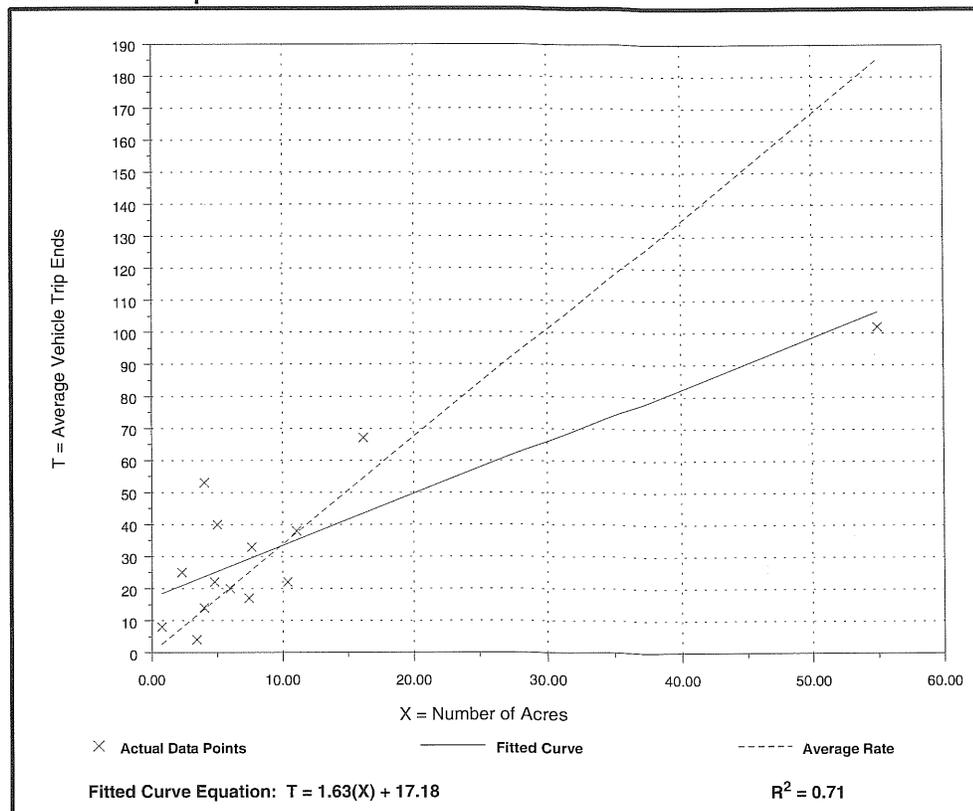
**Average Vehicle Trip Ends vs: Acres**  
**On a: Saturday,**  
**Peak Hour of Generator**

Number of Studies: 14  
Average Number of Acres: 10  
Directional Distribution: Not available

### Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
3.37	1.18 - 13.15	3.01

### Data Plot and Equation



## Research and Development Center (760)

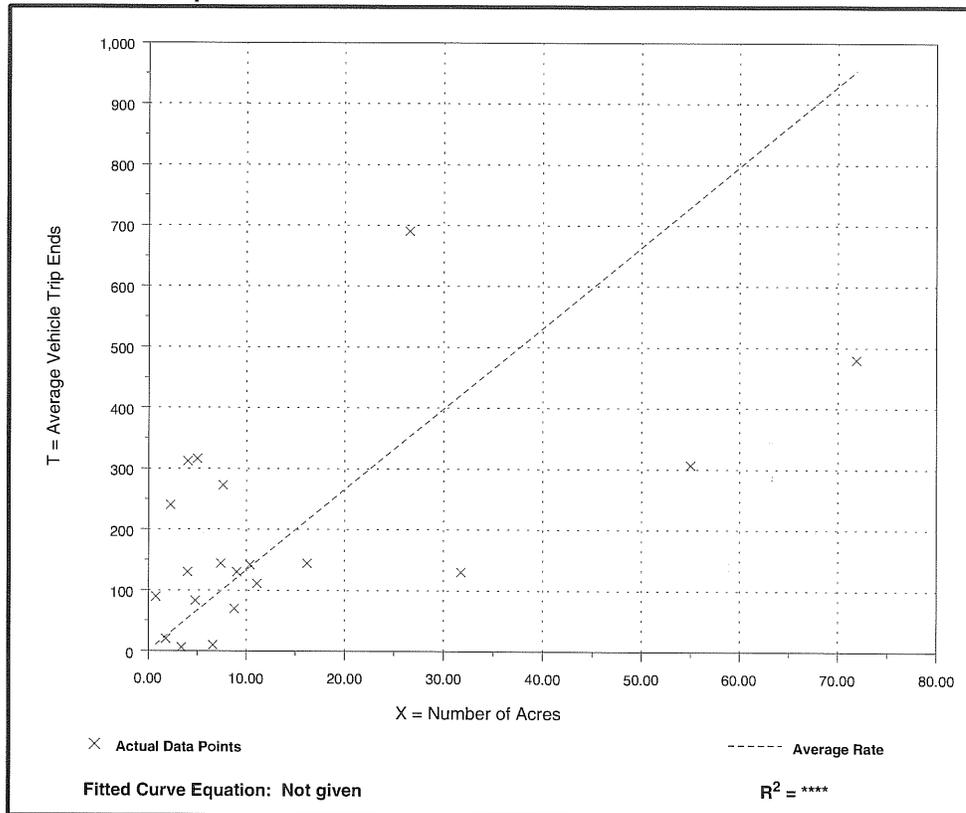
**Average Vehicle Trip Ends vs: Acres**  
**On a: Sunday**

Number of Studies: 20  
Average Number of Acres: 14  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
13.27	1.52 - 118.67	16.76

### Data Plot and Equation



## Research and Development Center (760)

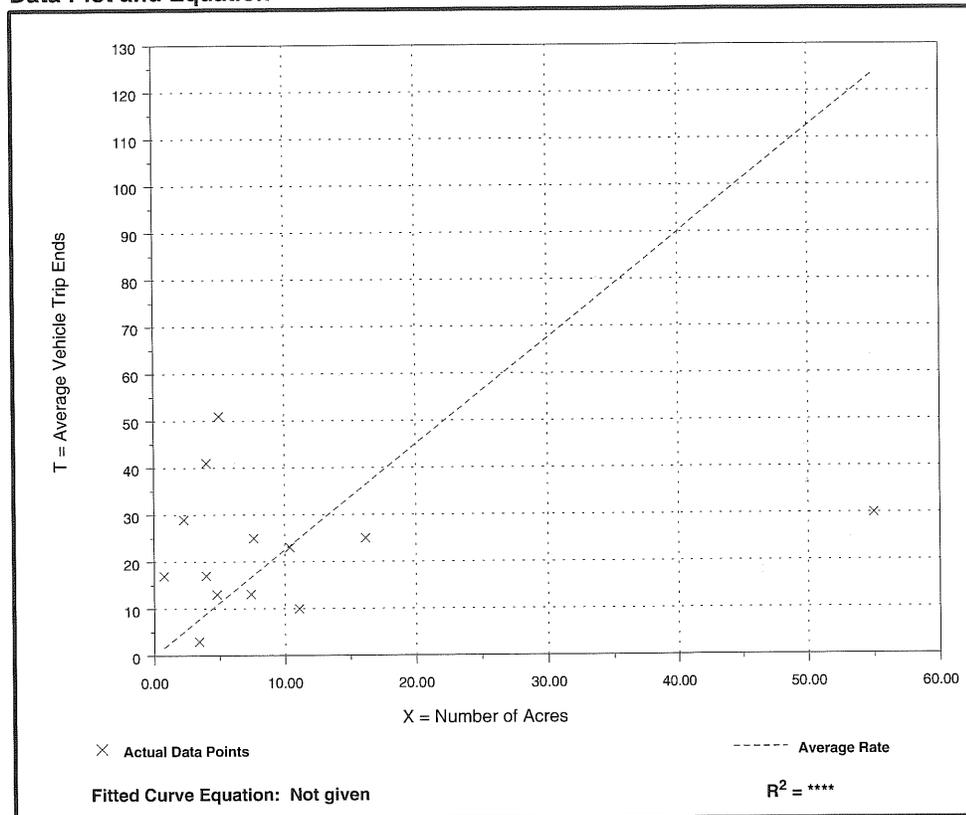
**Average Vehicle Trip Ends vs: Acres**  
**On a: Sunday,**  
**Peak Hour of Generator**

Number of Studies: 13  
Average Number of Acres: 10  
Directional Distribution: Not available

### Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
2.25	0.55 - 22.67	3.46

### Data Plot and Equation



Trip Generation Calculations

**Dental Facility**

	Provided	Used	Notes
# Faculty	50	50	Assumed faculty would work normal business hours
# Staff	60	60	Assumed staff would work normal business hours
# students	240	180	Assumed 75% of students would arrive in the AM Peak Hour and leave in the PM Peak Hour
# patients	110	110	Assumed 110 patients arriving in AM, leaving in Mid-day, then 110 more patients arriving in mid-day, leaving in PM
<b>Total Raw Trips</b>	<b>460</b>	<b>400</b>	<b>trips arriving in AM and Leaving in PM</b>

Trip Generation Calculation - North Site

Total Raw Trips	400
Ingress/Egress Adj.	500
Building Occ.	95%
Build. Occ. Adj.	475
Mode Split	22%
Mode Split Adj.	371
Vehicle Occupancy	1.2
Veh. Occ. Adj.	309
<b>Total Trip Generation - North:</b>	<b>309</b>

Trip Generation Calculation - South Site

Total Raw Trips	400
Ingress/Egress Adj.	500
Building Occ.	95%
Build. Occ. Adj.	475
Mode Split	14%
Mode Split Adj.	409
Vehicle Occupancy	1.2
Veh. Occ. Adj.	340
<b>Total Trip Generation - South:</b>	<b>340</b>

**Pharmacy**

Sq Feet Gross Floor Area	74000
Calculated AM trips	103
Calculated PM trips	101
Mode Split	22%
AM Mode Split Adj.	80
PM Mode Split Adj.	79
<b>Total AM trips</b>	<b>80</b>
<b>Total PM trips</b>	<b>79</b>

**Nursing Facility**

Sq Feet Gross Floor Area	22500
Calculated AM trips	37
Calculated PM trips	38
Mode Split	22%
AM Mode Split Adj.	29
PM Mode Split Adj.	30
<b>Total AM trips</b>	<b>29</b>
<b>Total PM trips</b>	<b>30</b>

Land Use	Time Period	Total Trips	Trips Entering		Trips Exiting	
			% of Total	Vehicles	% of Total	Vehicles
Dental Facility - North Site	AM Peak Hour	309	80%	247	20%	62
	PM Peak Hour	309	20%	62	80%	247
Dental Facility - South Site	AM Peak Hour	340	80%	272	20%	68
	PM Peak Hour	340	20%	68	80%	272
Pharmacy (Land Use 760: Research and Development Center)	AM Peak Hour	80	83%	66	17%	14
	PM Peak Hour	79	15%	12	85%	67
Nursing Facility (Land Use 760: Research and Development Center)	AM Peak Hour	29	83%	24	17%	5
	PM Peak Hour	30	15%	4	85%	25
Total Trip Generation - North Site w/o Dental	AM Peak Hour	109	83%	90	17%	19
	PM Peak Hour	109	15%	16	85%	93
Total Trip Generation - North Site with Dental	AM Peak Hour	418	81%	337	19%	80
	PM Peak Hour	418	19%	78	81%	340
Total Trip Generation - South Site	AM Peak Hour	340	80%	272	20%	68
	PM Peak Hour	340	20%	68	80%	272

**Background Adjustment to Mario Cappechi/1900 East due to Nursing Program Relocation and Proposed 1000 Stall Parking Garage**

**Nursing Program Relocation**

Total Raw Trips	180
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**1000 Stall Parking Garage**

Total # of Stalls	1000
Peak Hour Occupancy	80%
Peak Hour Occ. Adj.	800
Overflow from Dental	200
Overflow from Nursing Expansion	110
Exist. Nursing Fac. Parking loss	40
Additional unmet demand	150
Total Additional Trips	300

Land Use	Time Period	Total Trips	Trips Entering		Trips Exiting	
			% of Total	Vehicles	% of Total	Vehicles
Nursing Program Relocation	AM Peak Hour	180	87%	157	13%	23
	PM Peak Hour	180	15%	27	85%	153
1000 Stall Parking Garage	AM Peak Hour	300	85%	255	15%	45
	PM Peak Hour	300	15%	45	85%	255
Total Background Adjustment	AM Peak Hour	480	86%	412	14%	68
	PM Peak Hour	480	15%	72	85%	408

AM Peak

HCM Unsignalized Intersection Capacity Analysis

3: 1900 East & Mario Capecchi Dr.



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	↙	↘	↑	↘	↙	↑	
Sign Control	Stop		Free		Free	Free	
Grade	0%		0%		0%	0%	
Volume (veh/h)	115	94	765	642	291	243	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	128	104	850	713	323	270	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL						
Median storage (veh)	2						
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1988	782			1563		
vC1, stage 1 conf vol	1207						
vC2, stage 2 conf vol	782						
vCu, unblocked vol	1988	782			1563		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	0	69			23		
cM capacity (veh/h)	85	337			419		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	128	104	567	997	323	135	135
Volume Left	128	0	0	0	323	0	0
Volume Right	0	104	0	713	0	0	0
cSH	85	337	1700	1700	419	1700	1700
Volume to Capacity	1.51	0.31	0.33	0.59	0.77	0.08	0.08
Queue Length 95th (ft)	253	32	0	0	164	0	0
Control Delay (s)	365.3	20.4	0.0	0.0	37.3	0.0	0.0
Lane LOS	F	C			E		
Approach Delay (s)	210.2		0.0		20.3		
Approach LOS	F						
Intersection Summary							
Average Delay	25.5						
Intersection Capacity Utilization	74.2%		ICU Level of Service			D	
Analysis Period (min)	15						

PM Peak  
 HCM Unsignalized Intersection Capacity Analysis

3: 1900 East & Mario Capecchi Dr.

Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	↘	↗	↑	↘	↗	↑	
Sign Control	Stop		Free		Free		
Grade	0%		0%		0%		
Volume (veh/h)	566	331	434	170	162	624	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	629	368	482	189	180	693	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL						
Median storage (veh)	2						
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1283	336			671		
vC1, stage 1 conf vol	577						
vC2, stage 2 conf vol	707						
vCu, unblocked vol	1283	336			671		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	0	44			80		
cM capacity (veh/h)	312	660			915		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	629	368	321	350	180	347	347
Volume Left	629	0	0	0	180	0	0
Volume Right	0	368	0	189	0	0	0
cSH	312	660	1700	1700	915	1700	1700
Volume to Capacity	2.02	0.56	0.19	0.21	0.20	0.20	0.20
Queue Length 95th (ft)	1123	86	0	0	18	0	0
Control Delay (s)	496.5	17.1	0.0	0.0	9.9	0.0	0.0
Lane LOS	F	C			A		
Approach Delay (s)	319.6		0.0		2.0		
Approach LOS	F						
Intersection Summary							
Average Delay			126.1				
Intersection Capacity Utilization			67.8%		ICU Level of Service		C
Analysis Period (min)			15				

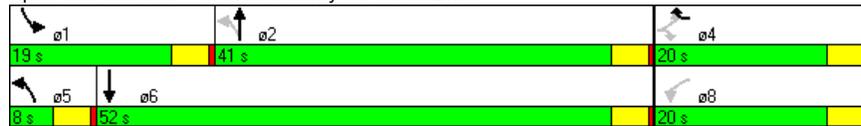
AM Peak  
Timings

3: Wakara Way & Foothill Drive

Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	5	29	80	166	56	2107	794	543	539
Turn Type	custom	custom	custom	custom	pm+pt		Free	Prot	
Protected Phases					4	5	2	1	6
Permitted Phases	4	4	8		2		Free		
Detector Phases	4	4	8	4	5	2		1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0		8.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	8.0	41.0	0.0	19.0	52.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	10.0%	51.3%	0.0%	23.8%	65.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5
Lead/Lag					Lead	Lag		Lead	Lag
Lead-Lag Optimize?					Yes	Yes		Yes	Yes
Recall Mode	Min	Min	None	Min	Min	C-Min		Min	C-Min
Act Effct Green (s)	10.5	10.5	10.5	10.5	45.9	40.9	80.0	16.6	52.5
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.57	0.51	1.00	0.21	0.66
v/c Ratio	0.02	0.13	0.24	0.49	0.12	0.85	0.53	0.80	0.19
Control Delay	26.8	10.9	30.0	7.5	5.4	22.4	1.3	40.8	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	10.9	30.0	7.5	5.4	22.4	1.3	40.8	5.7
LOS	C	B	C	A	A	C	A	D	A
Approach Delay						16.4			22.5
Approach LOS						B			C

**Intersection Summary**  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 18.0      Intersection LOS: B  
 Intersection Capacity Utilization 69.5%      ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 3: Wakara Way & Foothill Drive



PM Peak  
 HCM Signalized Intersection Capacity Analysis 3: Wakara Way & Foothill Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	0.97		1.00	1.00	0.91	1.00	0.97	0.91	
Frbp, ped/bikes	1.00		1.00	1.00		0.95	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583	3433		1505	1770	5085	1583	3433	5079	
Fit Permitted	0.95		1.00	0.95		1.00	0.12	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583	3433		1505	232	5085	1583	3433	5079	
Volume (vph)	57	0	81	806	0	656	2	1189	108	297	1919	12
Peak-hour factor, PHF	0.95	0.95	0.95	0.75	0.95	0.95	0.95	0.95	0.75	0.95	0.95	0.95
Adj. Flow (vph)	60	0	85	1075	0	691	2	1252	144	313	2020	13
RTOR Reduction (vph)	0	0	53	0	0	160	0	0	0	0	1	0
Lane Group Flow (vph)	60	0	32	1075	0	531	2	1252	144	313	2032	0
Confl. Peds. (#/hr)	48					48	14					14
Turn Type	Prot		custom	Prot		custom	pm+pt		Free		Prot	
Protected Phases	4			4			5	2			1	6
Permitted Phases			4			4	2		Free			
Actuated Green, G (s)	33.8		33.8	33.8		33.8	36.4	32.1	90.0	12.1	39.9	
Effective Green, g (s)	33.8		33.8	33.8		33.8	36.4	32.1	90.0	12.1	39.9	
Actuated g/C Ratio	0.38		0.38	0.38		0.38	0.40	0.36	1.00	0.13	0.44	
Clearance Time (s)	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	665		595	1289		565	167	1814	1583	462	2252	
v/s Ratio Prot	0.03			0.31			0.00	0.25		c0.09	c0.40	
v/s Ratio Perm			0.02			c0.35	0.00		0.09			
v/c Ratio	0.09		0.05	0.83		0.94	0.01	0.69	0.09	0.68	0.90	
Uniform Delay, d1	18.2		17.9	25.5		27.1	19.1	24.7	0.0	37.1	23.2	
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1		0.0	4.8		23.9	0.0	2.2	0.1	3.9	6.5	
Delay (s)	18.2		17.9	30.3		51.1	19.1	26.9	0.1	41.0	29.7	
Level of Service	B		B	C		D	B	C	A	D	C	
Approach Delay (s)		18.1			38.5			24.1			31.2	
Approach LOS		B			D			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			31.4									HCM Level of Service C
HCM Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			90.0								12.0	
Intersection Capacity Utilization			80.8%									ICU Level of Service D
Analysis Period (min)			15									

c Critical Lane Group

AM Peak

HCM Unsignalized Intersection Capacity Analysis

3: 1900 East & Mario Capecchi Dr.



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	↙	↘	↑	↘	↙	↑	
Sign Control	Stop		Free		Free	Free	
Grade	0%		0%		0%	0%	
Volume (veh/h)	152	116	765	803	365	243	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	169	129	850	892	406	270	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL						
Median storage (veh)	2						
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	2242	871			1742		
vC1, stage 1 conf vol	1296						
vC2, stage 2 conf vol	946						
vCu, unblocked vol	2242	871			1742		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	0	56			0		
cM capacity (veh/h)	0	294			357		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	169	129	567	1176	406	135	135
Volume Left	169	0	0	0	406	0	0
Volume Right	0	129	0	892	0	0	0
cSH	0	294	1700	1700	357	1700	1700
Volume to Capacity	Err	0.44	0.33	0.69	1.14	0.08	0.08
Queue Length 95th (ft)	Err	53	0	0	394	0	0
Control Delay (s)	Err	26.4	0.0	0.0	124.0	0.0	0.0
Lane LOS	F	D			F		
Approach Delay (s)	Err		0.0		74.4		
Approach LOS	F						
Intersection Summary							
Average Delay			Err				
Intersection Capacity Utilization			85.6%		ICU Level of Service		E
Analysis Period (min)			15				

PM Peak  
HCM Unsignalized Intersection Capacity Analysis

3: 1900 East & Mario Capecchi Dr.

Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Sign Control	Stop		Free		Free	Free	
Grade	0%		0%		0%	0%	
Volume (veh/h)	715	418	434	211	180	624	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	794	464	482	234	200	693	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL						
Median storage (veh)	2						
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1346	358			717		
vC1, stage 1 conf vol	599						
vC2, stage 2 conf vol	747						
vCu, unblocked vol	1346	358			717		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	0	27			77		
cM capacity (veh/h)	288	638			880		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	794	464	321	395	200	347	347
Volume Left	794	0	0	0	200	0	0
Volume Right	0	464	0	234	0	0	0
cSH	288	638	1700	1700	880	1700	1700
Volume to Capacity	2.76	0.73	0.19	0.23	0.23	0.20	0.20
Queue Length 95th (ft)	1692	156	0	0	22	0	0
Control Delay (s)	826.9	24.2	0.0	0.0	10.3	0.0	0.0
Lane LOS	F	C			B		
Approach Delay (s)	530.8		0.0		2.3		
Approach LOS	F						
Intersection Summary							
Average Delay			233.6				
Intersection Capacity Utilization			78.3%		ICU Level of Service		D
Analysis Period (min)			15				

AM Peak

HCM Signalized Intersection Capacity Analysis

3: Wakara Way & Foothill Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↘		↗	↗	↗	↗	↗	↑↑↑	↗	↗	↗	↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.97		1.00	1.00	0.91	1.00	0.97	0.91		
Frbp, ped/bikes	1.00		1.00	1.00		0.94	1.00	1.00	1.00	1.00	1.00		
Flpb, ped/bikes	1.00		1.00	1.00		1.00	0.99	1.00	1.00	1.00	1.00		
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	0.99		
Fit Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1770		1583	3433		1488	1759	5085	1583	3433	4997		
Fit Permitted	0.95		1.00	0.95		1.00	0.41	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1770		1583	3433		1488	752	5085	1583	3433	4997		
Volume (vph)	5	0	29	117	0	190	56	2107	944	638	539	49	
Peak-hour factor, PHF	0.95	0.95	0.95	0.75	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	5	0	31	156	0	200	59	2218	994	672	567	52	
RTOR Reduction (vph)	0	0	27	0	0	175	0	0	0	0	10	0	
Lane Group Flow (vph)	5	0	4	156	0	25	59	2218	994	672	609	0	
Confl. Peds. (#/hr)	29					29	14					14	
Turn Type	Prot		custom	Prot		custom	pm+pt		Free		Prot		
Protected Phases	4			4			5	2			1	6	
Permitted Phases			4			4	2		Free				
Actuated Green, G (s)	11.3		11.3	11.3		11.3	50.8	45.7	90.0	21.0	61.6		
Effective Green, g (s)	11.3		11.3	11.3		11.3	50.8	45.7	90.0	21.0	61.6		
Actuated g/C Ratio	0.13		0.13	0.13		0.13	0.56	0.51	1.00	0.23	0.68		
Clearance Time (s)	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0		
Vehicle Extension (s)	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	222		199	431		187	482	2582	1583	801	3420		
v/s Ratio Prot	0.00			0.05			0.01	c0.44		c0.20	0.12		
v/s Ratio Perm			0.00			0.02	0.06		c0.63				
v/c Ratio	0.02		0.02	0.36		0.13	0.12	0.86	0.63	0.84	0.18		
Uniform Delay, d1	34.5		34.5	36.0		35.0	9.3	19.3	0.0	32.9	5.1		
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.0		0.0	0.5		0.3	0.1	4.0	1.9	7.7	0.1		
Delay (s)	34.5		34.5	36.6		35.3	9.4	23.3	1.9	40.6	5.2		
Level of Service	C		C	D		D	A	C	A	D	A		
Approach Delay (s)		34.5			35.9			16.6			23.6		
Approach LOS		C			D			B			C		
<b>Intersection Summary</b>													
HCM Average Control Delay			19.9									HCM Level of Service	B
HCM Volume to Capacity ratio			0.78										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	4.0
Intersection Capacity Utilization			72.2%									ICU Level of Service	C
Analysis Period (min)			15										

c Critical Lane Group

PM Peak  
HCM Signalized Intersection Capacity Analysis 3: Wakara Way & Foothill Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	0.97		1.00	1.00	0.91	1.00	0.97	0.91	
Frbp, ped/bikes	1.00		1.00	1.00		0.96	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770		1583	3433		1512	1770	5085	1583	3433	5078	
Fit Permitted	0.95		1.00	0.95		1.00	0.12	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770		1583	3433		1512	225	5085	1583	3433	5078	
Volume (vph)	57	0	81	956	0	751	2	1189	145	321	1919	12
Peak-hour factor, PHF	0.95	0.95	0.95	0.75	0.95	0.95	0.95	0.95	0.75	0.95	0.95	0.95
Adj. Flow (vph)	60	0	85	1275	0	791	2	1252	193	338	2020	13
RTOR Reduction (vph)	0	0	48	0	0	124	0	0	0	0	1	0
Lane Group Flow (vph)	60	0	37	1275	0	667	2	1252	193	338	2032	0
Confl. Peds. (#/hr)	48					48	14					14
Turn Type	Prot		custom	Prot		custom	pm+pt		Free		Prot	
Protected Phases	4			4			5	2			1	6
Permitted Phases			4			4	2		Free			
Actuated Green, G (s)	43.0		43.0	43.0		43.0	37.1	33.1	100.0		11.9	41.0
Effective Green, g (s)	43.0		43.0	43.0		43.0	37.1	33.1	100.0		11.9	41.0
Actuated g/C Ratio	0.43		0.43	0.43		0.43	0.37	0.33	1.00		0.12	0.41
Clearance Time (s)	4.0		4.0	4.0		4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0		3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	761		681	1476		650	145	1683	1583		409	2082
v/s Ratio Prot	0.03			0.37			0.00	0.25			c0.10	c0.40
v/s Ratio Perm			0.02			c0.44	0.00		0.12			
v/c Ratio	0.08		0.05	0.86		1.03	0.01	0.74	0.12		0.83	0.98
Uniform Delay, d1	16.8		16.6	25.8		28.5	24.2	29.7	0.0		43.0	29.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0		0.0	5.5		42.3	0.0	3.0	0.2		12.8	14.9
Delay (s)	16.9		16.7	31.4		70.8	24.3	32.7	0.2		55.9	43.9
Level of Service	B		B	C		E	C	C	A		E	D
Approach Delay (s)		16.7			46.4			28.4				45.6
Approach LOS		B			D			C				D
<b>Intersection Summary</b>												
HCM Average Control Delay			41.0									HCM Level of Service D
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			100.0									Sum of lost time (s) 8.0
Intersection Capacity Utilization			86.7%									ICU Level of Service E
Analysis Period (min)			15									

c Critical Lane Group

AM Peak  
 HCM Signalized Intersection Capacity Analysis

3: 1900 East & Mario Capecchi Dr.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↘	↑↑	↘	↙	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Fr <sub>t</sub>	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Fit Permitted	0.95	1.00	1.00	1.00	0.31	1.00
Satd. Flow (perm)	1770	1583	3539	1583	585	3539
Volume (vph)	152	116	765	803	365	243
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	169	129	850	892	406	270
RTOR Reduction (vph)	0	107	0	0	0	0
Lane Group Flow (vph)	169	22	850	892	406	270
Turn Type	custom		pm+ov		Perm	
Protected Phases	2	2	4	2	8	
Permitted Phases	2	2	4		8	
Actuated Green, G (s)	14.0	14.0	59.0	73.0	59.0	59.0
Effective Green, g (s)	14.0	14.0	59.0	73.0	59.0	59.0
Actuated g/C Ratio	0.17	0.17	0.73	0.90	0.73	0.73
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	306	274	2578	1583	426	2578
v/s Ratio Prot	0.10	0.01	0.24	c0.10	0.08	
v/s Ratio Perm			0.47		c0.69	
v/c Ratio	0.55	0.08	0.33	0.56	0.95	0.10
Uniform Delay, d1	30.6	28.1	3.9	0.8	9.8	3.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.1	0.1	0.5	31.6	0.0
Delay (s)	32.8	28.2	4.0	1.3	41.4	3.3
Level of Service	C	C	A	A	D	A
Approach Delay (s)	30.8		2.6		26.2	
Approach LOS	C		A		C	
<b>Intersection Summary</b>						
HCM Average Control Delay	11.6		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.86					
Actuated Cycle Length (s)	81.0		Sum of lost time (s)		4.0	
Intersection Capacity Utilization	76.6%		ICU Level of Service		D	
Analysis Period (min)	15					
c Critical Lane Group						

PM Peak  
HCM Signalized Intersection Capacity Analysis

3: 1900 East & Mario Capecchi Dr.

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Fit Permitted	0.95	1.00	1.00	1.00	0.44	1.00
Satd. Flow (perm)	1770	1583	3539	1583	813	3539
Volume (vph)	715	418	434	211	180	624
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	794	464	482	234	200	693
RTOR Reduction (vph)	0	73	0	161	0	0
Lane Group Flow (vph)	794	391	482	73	200	693
Turn Type	custom		Perm		Perm	
Protected Phases	2	2	4		8	
Permitted Phases	2	2	4		8	
Actuated Green, G (s)	23.8	23.8	14.4	14.4	14.4	14.4
Effective Green, g (s)	23.8	23.8	14.4	14.4	14.4	14.4
Actuated g/C Ratio	0.52	0.52	0.31	0.31	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	912	815	1103	493	253	1103
v/s Ratio Prot	c0.45	0.25	0.14		0.20	
v/s Ratio Perm			0.05		c0.25	
v/c Ratio	0.87	0.48	0.44	0.15	0.79	0.63
Uniform Delay, d1	9.8	7.2	12.7	11.5	14.5	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	0.4	0.3	0.1	15.4	1.1
Delay (s)	18.9	7.7	12.9	11.6	29.9	14.7
Level of Service	B	A	B	B	C	B
Approach Delay (s)	14.8		12.5		18.1	
Approach LOS	B		B		B	
<b>Intersection Summary</b>						
HCM Average Control Delay			15.3	HCM Level of Service		B
HCM Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			46.2	Sum of lost time (s)		8.0
Intersection Capacity Utilization			71.6%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						