DESIGN GUIDELINES

Stanford University
Campus Drive
Design Guidelines

University Architect / Planning Office

2004

Stanford University

CAMPUS DRIVE DESIGN GUIDELINES

UNIVERSITY ARCHITECT / PLANNING OFFICE

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EXECUTIVE SUMMARY

BACKGROUND

- **Importance** – With the enlargement of the pedestrian zone in the central campus and the corresponding closure of almost all through streets, Campus Drive has become Stanford's primary arterial street. Most trips on campus are now at least partly over Campus Drive.

- **History** – There was no loop road in the original campus plan, and Campus Drive has developed without a unified plan. As a consequence, there are multiple problems which should be addressed for consistency and safety along the entire loop.

OBJECTIVES

- **Capacity** – To meet projected demand, as described in the Stanford General Use Permit (G.U.P.) of 2000, the road will need to have two vehicular lanes in each direction. An exception is the stretch from Mayfield Avenue to Junipero Serra Boulevard, where one vehicular lane in each direction will be adequate.

- **Safety** – There are safety concerns along much of the length of the road, some involving the present alignment, but mostly related to the lack of bike lanes, lack of pedestrian walks and crossings, and confusing intersection design. All of these should be addressed.

- **Permeability** – In some areas of the campus, particularly at the Medical Center and Athletics, the road presents

a division between related uses and a barrier between the "outside" and the "inside". This condition should be mitigated to the extent possible in order to unify the campus.

- **Emergency Access** – The road is the primary route for emergency vehicles to many parts of the campus. Emergency access needs to be maintained and in some areas improved.

- **Service and Delivery** – The road handles much of the service and delivery access for the campus and is a part of the primary truck route. Service and delivery access needs to be maintained and in some areas improved, consistent with identified campus service routes.

- **Land Opportunities** – In some key areas Campus Drive has extremely wide medians (up to 150 feet) that often make for confusing and potentially dangerous intersections, and represent potentially valuable but currently inaccessible land. In appropriate areas the alignment of the road could be shifted to narrow the median and make land available for other uses.

- **Identity/Way-Finding** – As Stanford's primary arterial street, Campus Drive provides the opportunity to help people find their way around the campus. A consistent visual character for the road would help orient people and make it easier for visitors to find their destinations.

- **Economy** – The road should be redeveloped economically. This will involve the use of the simple materials and the

implementation of improvements over time in response to capacity requirements and to the availability of funds. Implementation should be linked to other necessary improvements including drainage projects, utility upgrades, and the construction of buildings on adjacent sites.

- **Amenity** – The increasingly important role of Campus Drive in the experience of residents and visitors to the campus means that the road correspondingly plays a greater part in the identity of Stanford. It will become one of the identifying elements of the campus like Palm Drive and Serra Mall, and it should be designed accordingly.

Process

- **Consultant Team** – The development of the design has been managed by the Stanford University Architect/ Planning Office with the help of a team composed of consultants with a long history of work on the campus: Sebastian & Associates for landscape architecture; BKF Engineers for civil engineering design; Fehr & Peers for transportation planning.

- **Traffic Analysis** – As part of the development of the Stanford Community Plan, approved in December of 2002, adequate analysis had been done to establish the necessary capacity for the road and to serve as the basis of more detailed design that will be required later.

- **Input from Stakeholders** – Focused meetings have been held to address the concerns of Stanford departments: Parking and Transportation, Facilities Operations, Public Safety, and Grounds. Meetings were also held with representatives of the Stanford Medical Center and Sciences.

PRODUCT

- **Design Guidelines** – The guidelines contained in this document address both the technical and the aesthetic issues of the redesign of the road. The guidelines are intended to be the basis for the development of any project adjacent to or involving Campus Drive.

- **Overall Realignment** – Concurrently with the development of the guidelines, a general realignment study was done to show where the road will deviate from its current location, where it will be widened or narrowed from its present condition, how intersections will be handled, and where principle pedestrian crosswalks will be located. This alignment study will also serve as a basis for the development of any project adjacent to or involving Campus Drive.

- **Testing** – In order to be sure that the guidelines are, in fact, consistent with the objectives and capable of being implemented, a couple of specific segments of the road were studied in more detail and preliminary designs were prepared. These were from Welch Road to Roth Way and from Escondido Road to Mayfield Avenue, both of which segments were potentially to be implemented in the foreseeable future.

RECOMMENDATIONS

- **Design Speed** – The posted speed limit for the road should remain 25 miles per hour and the geometry of the road should be modified accordingly.

- **Lane Count** – The road will have two vehicular travel lanes in each direction and a continuous bike lane in each direction, except between Mayfield and JSB, where a single vehicular travel lane in each direction will be sufficient. There will be no need for acceleration or deceleration lanes.

- **Median** – The road will have a raised, planted median, generally of 12' to 18' width, throughout its length. An exception is the Arboretum where the current wide median without curbs will remain. At key locations between intersections the median will be designed to accommodate turns by fire trucks and service vehicles.

- **Intersection Design** – Intersections will be designed to permit turning movements by appropriate vehicles, to create safe pedestrian crossings on all four corners, and to create pedestrian refuges at the median.

- **Intersection Control** – Street intersections will be controlled by stop signs. A need for traffic signals is not currently foreseen.

- **Pedestrian Crossings** – In areas of high pedestrian traffic or of particularly long distances between intersections, well-marked pedestrian crosswalks will be provided. The striping of the crosswalks on Campus Drive will remain distinct from the striping of crosswalks elsewhere on the campus, with wider stripes being used at mid-block crossings. Speed tables remain the recommended device for mid-block crossings. Stop signs will be installed per the recommendation of the traffic consultants with input from Public Safety.

- **Bicycles** – There will be continuous, marked, five-foot wide bike lanes along the road's entire length. Intersections will be designed to improve the safety of bicyclists.

- **Sidewalks** – There will continuous, six-foot wide pedestrian walkways along both sides of the road, usually separated from the road by planted parkways.

- **Lighting** – There will be consistent lighting along the length of the road. Pedestrian paths will have standard Holophane fixtures, with High pressure sodium lamps, at approximately 70 feet on center. At intersections and marked pedestrian crossings will be standard Gardco fixtures, with metal halide lamps, set three feet behind the curbs.

- **Storm Water** – Portions of the road are part of Stanford's ten- and one-hundred-year floodways. The grading of these portions of the road will respond accordingly. In addition, where possible, the planted medians will be designed and used for retention and infiltration for smaller, more frequent storm events in support of the County's C-3 regulations.

- **Landscape Character** – The median will be planted with a continuous row of regularly spaced California Redwoods (*Sequoia sempervirens 'Aptos Blue'*) with a consistent low-shrub groundcover. Openings in the planting will occur at key crossings to provide views to important architectural and landscape features. The parkways will be planted with native and/or drought-tolerant species of trees, shrubs, and wildflowers that respond to the local landscape conditions.

- **Way Finding** – Campus Drive will remain the major orienting route on campus, with vehicle post and panel signs along its entire length. A consistent street section with a continuous median and consistent planting, lighting, and crosswalk design will give the road a consistently identifiable "look". The opportunity to hang banners on the Gardco fixtures at intersections and mid-block pedestrian crosswalks will remain a feature of Campus Drive.

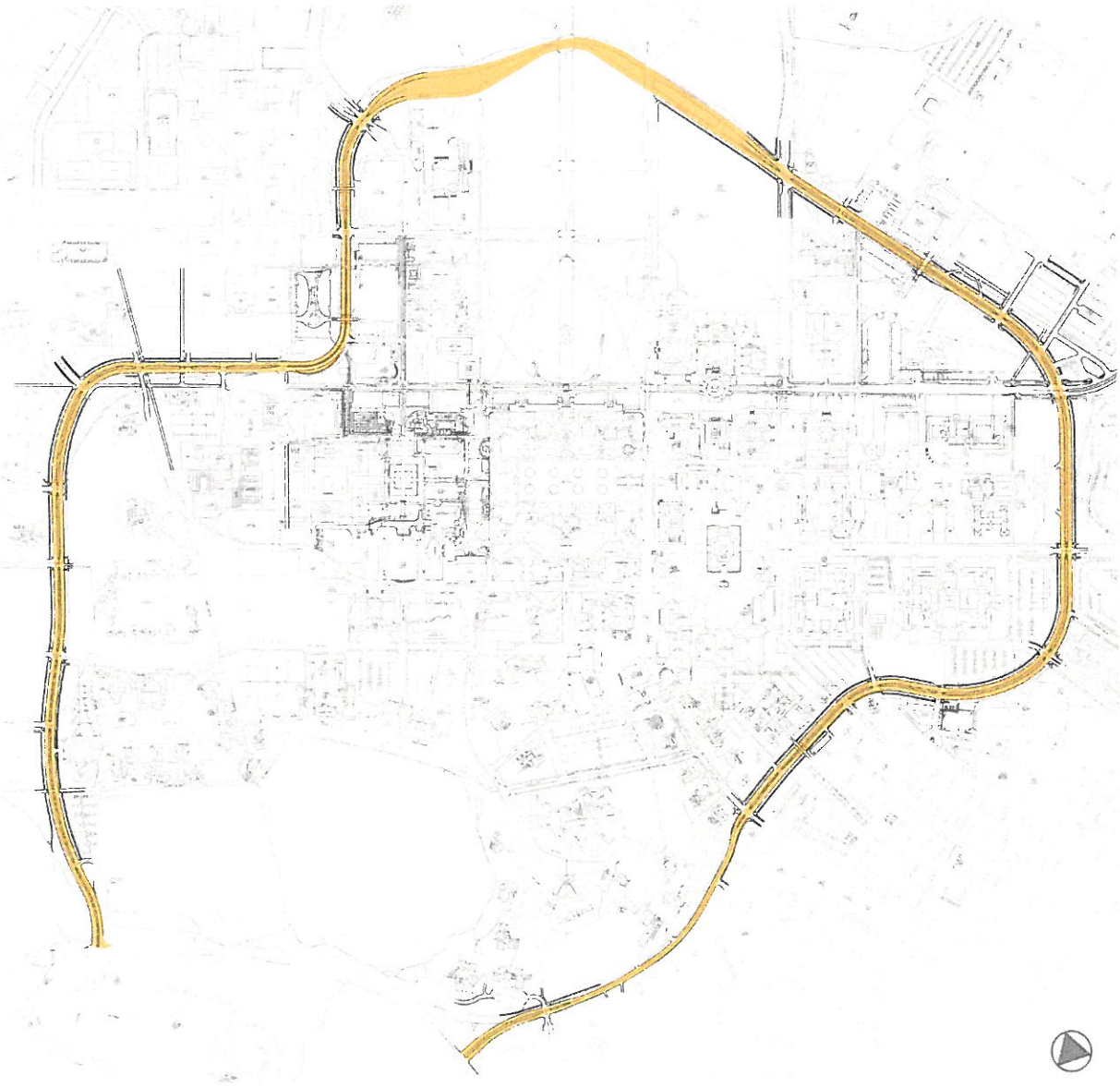
IMPLEMENTATION

- **Clark/Lokey Reach** – Construction of a median between Roth Way and Via Ortega in the realigned road (Summer, 2003).

- **Galvez Intersection** – Modifications to the Campus Drive/ Galvez intersection to increase pedestrian safety and reduce vehicular confusion, involving changes to the road geometry, the creation of a pedestrian refuge, and better lighting. Concurrently, the pedestrian crosswalk at Sam MacDonald Way will be up-graded. (Autumn, 2003).

- **Law School Reach** – Concept plan is complete. Traffic review is in process. Schematic design and community outreach to commence related to Law School project schedule.

Fig. 1. Schematic Alignment



I. INTRODUCTION

Integral to the planning for every significant new building or infrastructure project at Stanford is the enhancement of the overall campus plan and its landscape. In recent years redevelopment in the central campus has led to a re-evaluation of circulation patterns and to an increased emphasis on the importance of pedestrians and bicycles as well as of outdoor spaces that are intended for both formal and informal use. As a consequence, over the past two decades, vehicular access to much of the central campus, has been restricted to shuttle busses, emergency and maintenance vehicles, delivery vehicles, and construction equipment.

The gradual process of removing private automobiles and their parking spaces from the center of the campus has increased the importance of Campus Drive, both functionally and visually, as Stanford's primary arterial road. Diagrammatically, Campus Drive forms – along with a segment of Junipero Serra Boulevard – a complete loop around the central campus. All of the important access routes to the central campus either cross Campus Drive or dead-end into it. Many, perhaps most, vehicular trips at Stanford now involve using some part of Campus Drive.

Thus, this particular road has taken on an exceptional importance in terms of vehicles, bicycles, pedestrians, service, emergency access, way-finding, and the landscape "identity" of Stanford. Nonetheless, the road is not currently performing its multiple functions as well as it could.

In order to improve Campus Drive both functionally and aesthetically, the entire road needs to be conceived as a single system and to be designed or modified accordingly. As a

concept plan, this is best described as a set of design guidelines, for both engineering and landscape treatment, and a schematic layout of the entire loop. In this way, all new projects for buildings or infrastructure near Campus Drive can respond to the planned alignment and design for the road and detailed designs can be developed to implement required portions of the road and its landscape.

The University Architect/Planning Office has worked with Stanford Facilities Operations, the Fire Marshall's Office, and the Public Safety Office to develop objectives for the improvement of Campus Drive. Among the most important of these are:

1. Capacity. The road should have sufficient capacity to handle the projected future volumes of vehicles without creating undue congestion and delays.

2. Safety. The safety of pedestrians, bicyclists, transit users, and occupants of other vehicles is extremely important.

3. Permeability. To the extent possible, the road's barrier-like characteristics should be reduced and the ability to cross it should be facilitated.

4. Identity/Way-Finding. The road should have a single, memorable character along its entire length so that it can help orient visitors and residents alike.

5. Emergency Access. The road must continue to function as a primary access route for all types of emergency vehicles.

6. Service and Delivery. The road must continue to accommodate the number, variety, and type of vehicles that need to enter the central campus.

7. Land Opportunities. The alignment and section of the road should respond to the opportunity to reclaim some of the excess land in the medians for other uses.

8. Economy. The probable costs related to the improvement and redevelopment of Campus Drive are considerable, and a clearly delineated plan for the road will to inform the design of adjacent projects.

9. Amenity. The design should preserve the rustic native California landscape that still characterizes much of Campus Drive, which should be memorable in its own right but also should clearly be a part of the Stanford landscape.

Among these objectives are some implicit conflicts, and at various points along the loop road there are site conditions which create special situations. The guidelines have been developed concurrently with an alignment study by BKF, civil engineers, and with a capacity study by Fehr and Peers, Transportation Consultants. The guidelines have been tested in several specific reaches of the road in order to achieve an appropriate balance among the objectives and to ensure that they are capable of implementation. It is assumed that, as each additional portion of the road is built, a detailed design will address and resolve any unique or special conditions.

II. History

A loop road was, per se, not part of the original 1887 Olmsted design for the campus. Rather Campus Drive has evolved over time as the result of many decisions and has been repeatedly modified in response to local projects. By the time the Stanford Plan for the Second Century was prepared, in 1991, a loop road was not only perceived to be integral to the campus but was identified as one of the five "fundamental elements" which provide the campus with its spatial organization and identity.

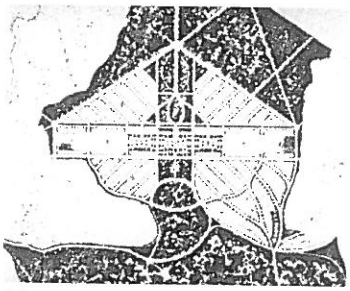


Fig. 2. 1887 Olmsted Campus Plan

The Second Century Plan also established the policy of creating design guidelines. Since then, guidelines have been prepared to strengthen the functionality and the visual character of specific areas of the campus, such as the Medical Center and the Main Quad. These design guidelines for Campus Drive are required because the redevelopment of the road is unlikely to be funded as a single infrastructure project. Rather, it will be incrementally improved and reconfigured as funding becomes available and/or as adjacent projects require improvements to the road. These guidelines will ensure that all improvements will be consistent for Campus Drive and will support the creation of a unified and functional road.

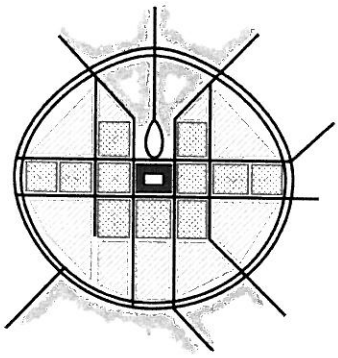


Fig. 3. Campus Planning Elements (from Plan for the Second Century 1991)

The approval in December, 2000, by County of Santa Clara of the Stanford Community Plan, included various requirements in relation to transportation management. Most important among these was a policy of "no new net commute trips." One of the effects of this policy is to reduce uncertainty about the future growth of traffic volumes and therefore about the required capacity of the street system. Stanford subsequently hired Fehr & Peers, Transportation Consultants, to prepare a campus-wide roadway capacity study to determine what roadway improvements would be necessary to respond to the projected

traffic volumes and proposed campus development. They found that Campus Drive would need to be widened to four lanes or to remain four lanes wide throughout its entire length, with the exception of the segment of East Campus Drive from Junipero Serra Boulevard to shortly before Mayfield Avenue.

The Stanford Community Plan reinforces Stanford's long-standing tradition of encouraging pedestrian, bicycle, and shuttle access to and through the campus. The Plan's map of primary pedestrian pathways and bikeways includes the entire length of Campus Drive. It also shows all of Campus Drive as part of the primary access system for emergency vehicles and parts of Campus Drive as shuttle routes.

Fig. 4. Primary Pedestrian Pathways and Bikeways (from Stanford Community Plan)

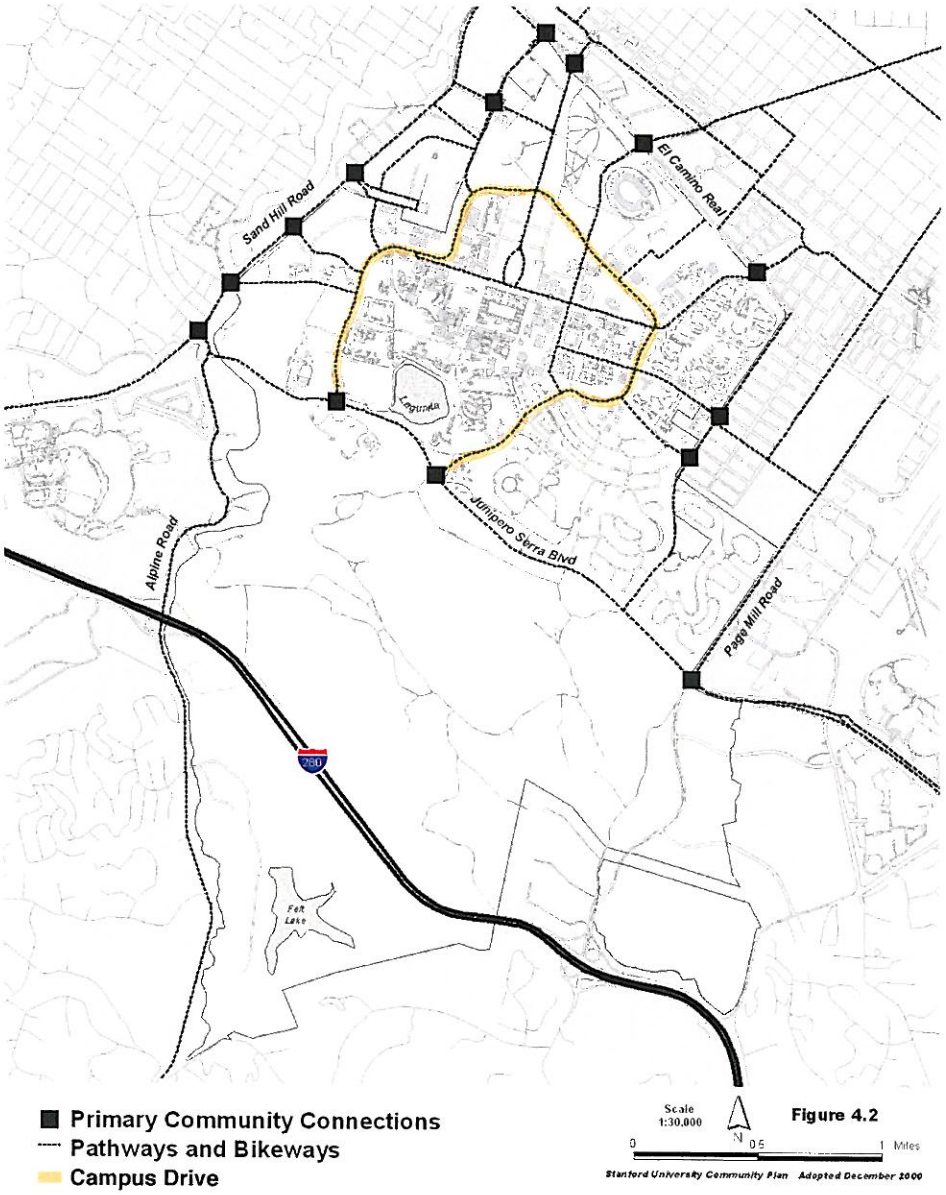


Fig. 5. Primary Access for Emergency Response (from Stanford Community Plan)

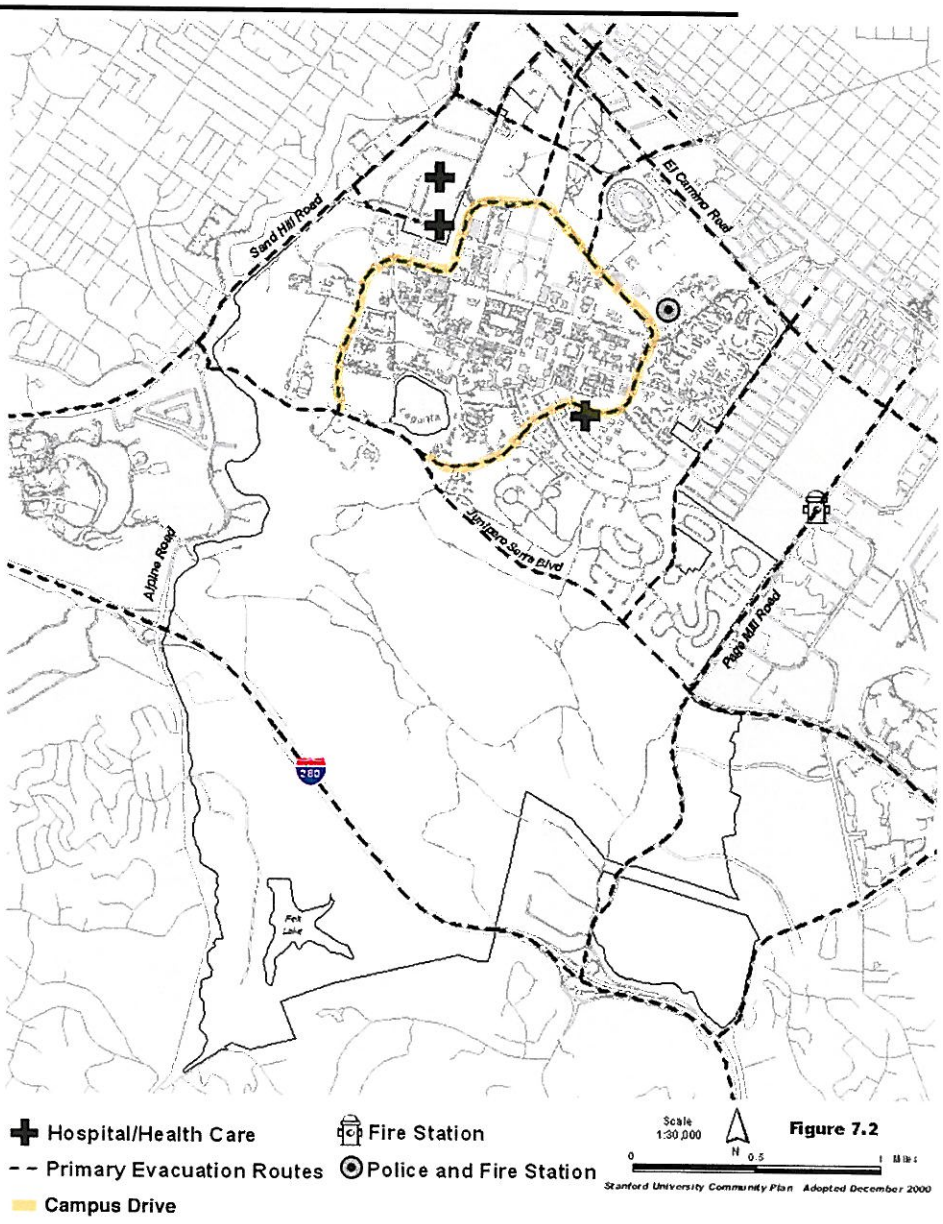


Fig. 6. Designated Service and Truck Routes

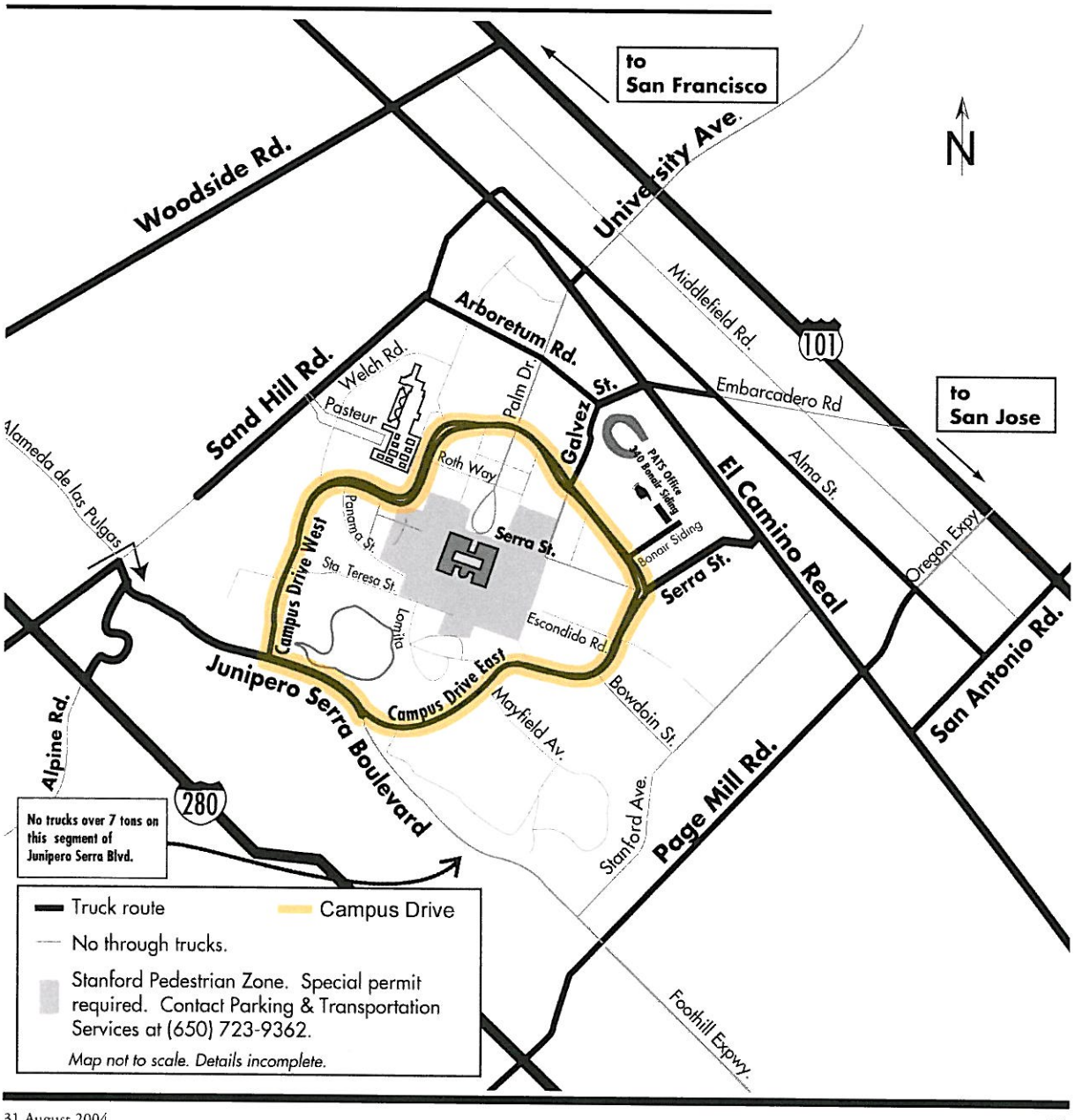
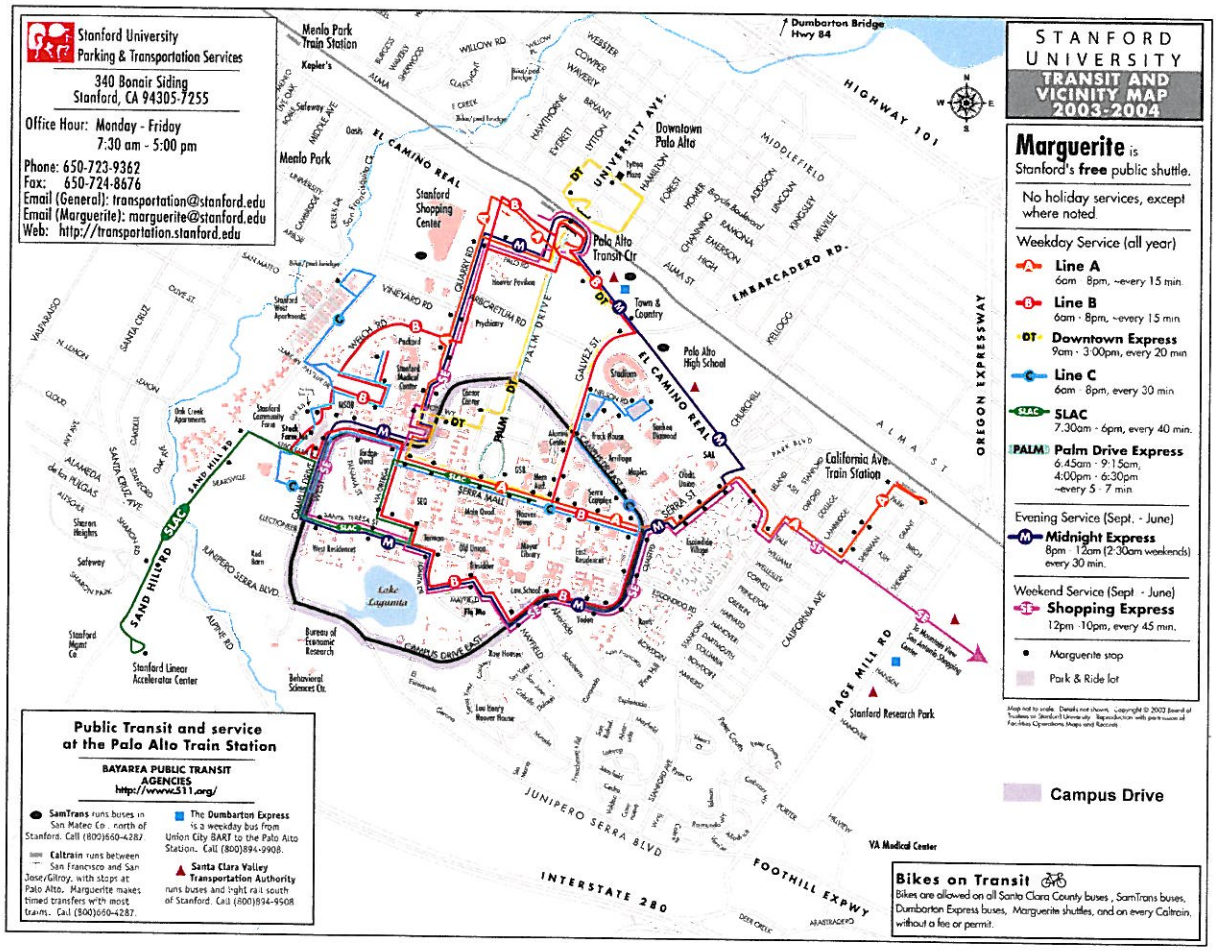


Fig. 7. Designated Shuttle Routes



III. Program Issues

It is possible to characterize Campus Drive in terms of the problems and opportunities it presents. Here we shall simply call them issues. Some of these are quantitative, and in 2001 the University asked Fehr & Peers, transportation consultants, to analyze current and projected future traffic volumes on Campus Drive and to develop technical design parameters for the road. The report for that study, issued in May, 2002, was called *Stanford Campus Roadway Capacity Study*. Concurrently, the University began to assemble materials related to the road's potential in terms of way-finding, pedestrian and bicycle circulation, orientation, and landscape character. This process culminated in a workshop conducted in March, 2001, in which a concept plan was developed. Excerpts from that plan are attached as Appendix 'B'.

Provide adequate capacity

Out of those studies the following conclusions emerged:

- Capacity. The existing road section varies greatly. In some places where it narrows to one lane of traffic in each direction, it generates considerable congestion (e.g. Alvarado to Mayfield). In other places, it becomes extremely wide, with huge medians and deceleration lanes for right and left turns (e.g. Serra to Galvez). These "extra" lanes are not necessary for either the volumes or the speeds on this road. In general, to handle the current and project future traffic volumes, nearly the entire length of Campus Drive will need two vehicular lanes in each direction but without deceleration or acceleration lanes. Only between Mayfield Avenue and Junipero Serra Boulevard can the road continue to have only one vehicular travel lane in each direction.

Delete extra lanes

- Design Speed. Given the preponderance of pedestrians and bicyclists on campus, safety considerations require that motor vehicles operate at relatively modest speeds. On Campus Drive, which is the most important arterial on campus, the posted speed limit will remain 25 miles per hour.

Simplify intersection design

- Intersections. Accident data show that most accidents occur at intersections, so particular care must be taken in their design. There are more than fifty intersections along the road, and they vary widely in configuration. Some of the them seem unsafe, and the sheer variety of their design is a source of confusion to many. The intersections should be redesigned to be less confusing, and to be safe for pedestrians, bicyclists, and motorists.

Respect vehicle turning requirements

- Vehicular Turning. Since the road is a primary access way for emergency, service, and delivery vehicles, it is important to maintain or improve the geometry of the intersections so that these vehicles can continue circulate unimpeded. At the same time, care must be taken in the design of the intersections to ensure that vehicular speeds are limited and sight lines are respected in a way that maximizes the safety of pedestrians and bicyclists.

- Pedestrian Crossings. As development continues on both sides of the road, there are more pedestrians crossing it, many of them doing so in the middle of its very long blocks. Where appropriate, marked mid-block crossings will be created, and, as with the design of the intersections, these will have a consistent design. Previous efforts to implement mid-block pedestrian crossings, like those

Provide marked crosswalks

at Parking Structure #1 and at the DAPER area should eventually be brought to current standards.

- Sidewalks. Pedestrian walkways along the road are intermittent and inconsistently designed. While some portions of the road are not now important pedestrian routes, there are always some pedestrians and joggers. In certain areas they have no choice but to walk or run on the vehicular paving or in the bike lanes. Furthermore, as both sides of the road are redeveloped more pedestrian trips will be generated. Thus, continuous, safe pedestrian walkways should be provided along the entire length of both sides of the road.


Provide pedestrian paths

- Bicycles. The 20,000 bicyclists at Stanford are an important component of campus circulation, and Campus Drive is a designated bike route. However, bike lanes are striped along only some portions of the road; in other areas the existing pavement is too narrow to accommodate them. Where bike lanes exist they are somewhat inconsistent in width. Campus Drive also intersects with many other bike routes, and at some of these points there is confusion about where they bicyclists are to go. The needs of bicyclists should be addressed both in the provision of consistent bike lanes along the entire length of the road in both directions and in the creation of well designed intersections.


Provide consistent bike lanes

- Medians. Some parts of the road have extremely wide medians; other parts have none. The wide medians create problems at intersections, as motorists often stop in the middle of a turning motion because they are unsure of

who has the right of way. The wide medians, at least in some areas, also represent land that is unavailable for other uses. This is an increasingly important consideration as the campus attempts to develop in a compact, infill-oriented, pedestrian-friendly manner. Nonetheless, medians are themselves an important contributor to pedestrian safety in that they serve as refuges so that people trying to cross the road need to worry about traffic from only one direction at a time. Medians also serve to reduce the apparent scale of the road and to create an identity for the road that complements the landscape character of the campus. Therefore, the road should have a continuous planted median that is sized to be consistent with traffic safety recommendations.

Retain planted medians

- Way-Finding. As Campus Drive has become the primary route for getting around the campus, it has also become part of the mental map of those who live and work here. However, at present, its continuously varying size and character tend to confuse those who are not familiar with the place. The redesign of the road to have a consistent section and a continuous, landscaped median will give it a clear identity so that it becomes a positive means of orientation. The design and placement of directional and event signage should continue to reinforce this identity.

Provide clear way-finding

- Landscape Character. The road has a varied landscape character, but on the whole it is still fairly "rural" and thus is still representative of "the Farm". Nonetheless, recent and currently projected developments are changing the landscape character of the road, just as they are changing the character of the campus, which is evolving into a mix

Retain rural landscape character through the arboretum

of the rural and the urban. The landscape character of Campus Drive will necessarily respond to this mix. In general, the median should be the consistent, unifying element, while the design of the roadway edges can vary in response to the character and design of the areas through which the road passes.

- Storm Water. Over the past several years the University has undertaken an analysis of the potential for flooding from extreme (100-year) storm events and discovered that some of its buildings were vulnerable to flooding. Furthermore, in recent years governmental regulations for the handling of storm water runoff have changed substantially, shifting from a focus on encouraging storm-water collection and removal via ditches and pipes to a focus on the retention of storm water on site and either its gradual release into storm drains or its infiltration into the ground. As a consequence, Stanford has developed a storm-water management plan that requires barriers around buildings and the creation of series of routes for overland flow of storm water to peripheral detention basins. Portions of Campus Drive are part of this overland flow system and those portions need to be configured so that, in the event of an extreme storm, they will function for brief periods as shallow rivers to carry storm water to designated detention areas. Also, to support new Santa Clara County drainage regulations, portions of Campus Drive's medians and parkways will be configured as short term storm-water infiltration swales.

Facilitate storm drainage

- Habitat. Portions of the Stanford campus through which Campus Drive runs are within the habitat area

of the California tiger salamander. These areas include the length of the road from Junipero Serra Boulevard to approximately Searsville Road on the west and from Junipero Serra Boulevard to approximately Mayfield Avenue on the east. In these areas special measures need to be taken in the design of the road to discourage the salamanders from trying to cross it or, in the event that they do so, to help them cross successfully.


Protect the Tiger Salamander

- Tree Protection. Since the redesign of Campus Drive will involve widening it in some areas, realigning it in others, and the narrowing of some medians, existing trees will necessarily be affected. To the extent possible the design of the road will be adjusted and special measures taken to preserve particularly notable specimens, as was done recently to protect a huge oak when the road was realigned between Allen CIS and the Clark Center. For some trees this will not be possible, and relocation should be considered. Over the past decade the University has developed a program to relocate significant existing trees, which are regarded as valuable assets, where they are in the way of development of buildings or of infrastructure. In the area between Roth Way and Panama Street, where Campus Drive is to be realigned, dozens of trees have already been removed; some of them are now in front of the Packard Electrical Engineering Building; others are next to the Clark Center. Future portions of Campus Drive should continue both to avoid the most important specimens and to relocate them where possible.


Relocate trees when possible

Thus, Campus Drive emerges as a complex landscape, circulation, and engineering design problem. The "solution" to that problem is presented in Section IV of this report as a set of prescriptive components which, taken together will establish the overall design of the road.

In terms of roads with a strong visual character at Stanford, the most powerful example is Palm Drive. The design of Palm Drive has a simplicity and clarity which is unmatched at Stanford and rare anywhere else. Of course, it is clear that this character was intended from the very founding of the University. The survival of the Arboretum also provides a relatively unvarying and neutral background for the landscape of Palm Drive. It is impossible to impose such consistency of appearance on a winding existing road of variable section which traverses a semi-urban landscape of great diversity. So, while certain elements of the character of Palm Drive may be relevant to the redesign of Campus Drive, the two streets will of necessity be quite different. The double row of palm trees lining Palm Drive are the most important element of its visual character; for Campus Drive the most important element will be the continuously planted median.

IV. Components of the Design

Based on both quantitative and qualitative considerations and in response to the many physical, functional, and financial forces to be reconciled in transforming a road of this importance, a schematic design has been developed for the road. It is composed of two major components: 1) an alignment study for the entire length of the road and 2) a set of details that include typical engineering and landscape sections.

The alignment study shows subtle modifications in many areas. This has been done to improve the safety of intersections and crosswalks, to regain land from overly wide medians, and to ensure appropriate setbacks for buildings, where possible. The realignment has already been implemented for the portion of the road between Roth Way and Via Ortega near the recently completed Clark and Lokey buildings, where all of the above considerations were at work. Figure 7 shows the overall schematic alignment for the road. More detailed studies will be done for each segment of the road as it is implemented.

To the extent possible, the section of the road will be consistent, both in terms of its engineering characteristics and in terms of its landscape treatment. With the exception of the portion of the road between Junipero Serra Boulevard and Mayfield Avenue, the road will have two vehicular lanes in each direction. It will have a continuous planted median, continuous bike lanes, and continuous pedestrian walks generally set back from the curb. In the median will be regularly spaced trees with a consistent groundcover treatment. The fifty-foot minimum setback for buildings, which has been in place since the 1970's, will continue allow adequate room for planting and walkways along the sides of the road.

Fig. 8. Schematic Roadway Alignment

There are some segments of the road where it will be preferable to modify the treatment of the road to recognize important existing buildings or landscapes. The most significant of these segment is the one through the Arboretum. There the visual identity of Campus Drive will be deliberately suppressed in favor of the informal and memorable landscape character of the Arboretum. In other parts of the campus there are building entries, open spaces, plazas, or other important features adjacent to Campus Drive. At the most important of these points the tree planting of the median and the parkways should be interrupted or modified to provide views into the campus (e.g. at the Deans' Lawn of the Medical School and at the entry plaza to the athletics area).


Planted median

Street Sections. On either side of the median the paved sections of the street will be composed of two lanes for motorized vehicles and one lane for bicycles. The bike lanes will always be 5 feet wide. Throughout nearly all of the campus the vehicular travel lanes will be 10.5 feet wide. In certain areas, in response constraints imposed by existing conditions, the section may vary slightly, but the variations should be kept to a minimum in order to support the idea of a consistent, unified street.

Curbs. In order to deal with storm drainage and to enhance pedestrian safety, there will be dark grey concrete curbs at the medians and dark grey concrete curbs and gutters along the outside edges of the road. The exception to this is where the road runs through the Arboretum and currently has no curbs or gutters. This condition will be retained to enable storm water to disperse and infiltrate into the soil and to retain the rural character of the Arboretum. At intersections, where median noses are intended to create refuges for pedestrians crossing the


Curbs for safety and stormwater

street, the curbs will be white to signal their presence to drivers of turning vehicles.


Median as retention area

Medians. Largely in response to existing constraints, the medians will vary in width. In the Arboretum, where no future development is foreseen, the existing extremely wide medians will be retained. Most of the rest of the road will have medians of 12 to 18 feet in width. This width provides sufficient scale and area for the planting of large trees and in most cases is narrower than the existing medians. Where the road approaches Junipero Serra Boulevard the constraints of the site – given by the need to protect California tiger salamander habitat on the west and the desire to avoid cutting into the rolling topography on the east – the medians will be narrower, generally about 12 feet. In the area to the south and east of the Clark Center existing conditions are constrained, requiring an even narrower median. There the width of the median still corresponds to the minimum necessary for the planting of large trees, as permitted recently by CalTrans for the City of Palo Alto in the medians of El Camino Real. The grading within the median will generally be slightly concave to retain water and encourage infiltration. In some areas there will be breaks in the curb to allow water to drain from the road surface into the median.


Buildings set well back from street

Building Setbacks. The road will be laid out so as to provide a minimum setback of 50 feet between existing buildings and the edge of the street, measured from the face of the curb. A few exceptions will be unavoidable. These are mostly in the southeast from just south of Mayfield Road to the Vaden Health Center where some smaller one- and two-story structures will end up closer to the street. All new buildings should be

required to continue to observe the minimum setback of 50 feet from the closest curb of the street, which has been a requirement for at least the past 25 years.

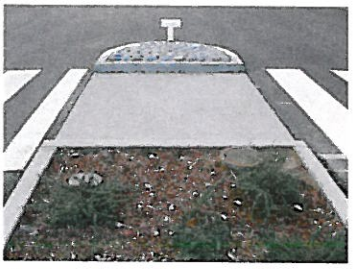

Typical asphalt pedestrian path

Pedestrian Paths. Continuous asphalt paths for pedestrians will be provided on both sides of the entire length of the road. These will generally be 6 feet wide, although in response to the volume of pedestrian traffic, in some areas they may be wider. They will generally be parallel to the curbs, typically set back about 15 feet, but in some areas they may be closer to the road to avoid excessive grading, or they may meander in response to existing conditions, such as large trees. In some portions of the campus, particularly through the Arboretum, existing meandering walks will be retained.


Handicap ramps at crossings

Intersections. At intersections the medians will narrow to no more than 12 feet in width to discourage vehicles from stopping part way through a turning movement and blocking traffic. Typically, pedestrian crosswalks and standard handicap ramps will be provided on all sides of the intersections, and pedestrian refuges will be provided at the median.

Pedestrian Crossings. All pedestrian crosswalks of Campus Drive at its intersections with other streets will have pedestrian refuges at the median and special striping which will be characteristic of Campus Drive. Mid-block pedestrian crossings will be placed at points where major pedestrian routes cross the road. These will be of two types. Elevated speed tables with special paving will mark the principle crossings. Conventional striped crosswalks with curb ramps will be used at secondary crossings. The preliminary locations of principle mid-block crossings have been identified. Additional crossings may be added as the need arises.


Pedestrian refuges at median

Lighting. The University's standard 10-foot tall "Holophane" light fixtures with high-pressure sodium lamps will illuminate the pedestrian paths. The fixtures are to be set consistently 3 feet away from the outside edge of the paths and approximately 80 feet on center. The streets themselves will continue to be lighted only at intersections and pedestrian crosswalks, using the University's standard Gardco fixtures with metal halide lamps mounted on 25-foot poles. These poles are suitable for the display of the University's banners.

Intersection Light Fixture

Median Planting. In the Arboretum the existing informal planting of various species will be retained and enhanced so that the landscape character of the arboretum takes precedence over the character of the road. For the rest of the road, California Redwood (Sequoia sempervirens 'Aptos Blue') will be planted at a regular interval of approximately 40 feet on center in a continuous line down the center of the median except in the areas where a significant open space permits views into the campus. In some areas, existing trees of other species will remain as reminders of the longevity of the history of the campus. The ground in the median will be planted with drought-tolerant shrubs or, in some areas, with seasonal wildflowers which are a well-known feature of Stanford's landscape. The density and species of the shrubs will vary in response to local conditions, but the species and spacing of the trees should remain consistent.

Path Light Fixture

Parkway Planting. In response to the University's on-going program to reduce water consumption and to control maintenance costs, planting will be drought-tolerant and well adapted to local the climatic conditions. To be consistent with the overall character of "the Farm", the zones between the curbs and the building setback line will be planted informally with a variety of native and naturalized tree species. Under the trees will be bark mulch groundcover and drifts of shrubs. In some areas the choice of species and the layout of the planting will be modified to adapt to the already installed landscape related to existing open spaces or buildings. Turf will be used only in areas where it is intended for active use or to extend existing lawns to the street. In general, there will be trees planted in the parkways, interrupted by occasional large openings to promote selected views into major open spaces. In special situations the landscape of major building entries may extend from the building to Campus Drive, interrupting it's otherwise informal character.

Sequoia sempervirens 'Aptos Blue'

Varied informal landscape

Fig. 9. Landscape Character

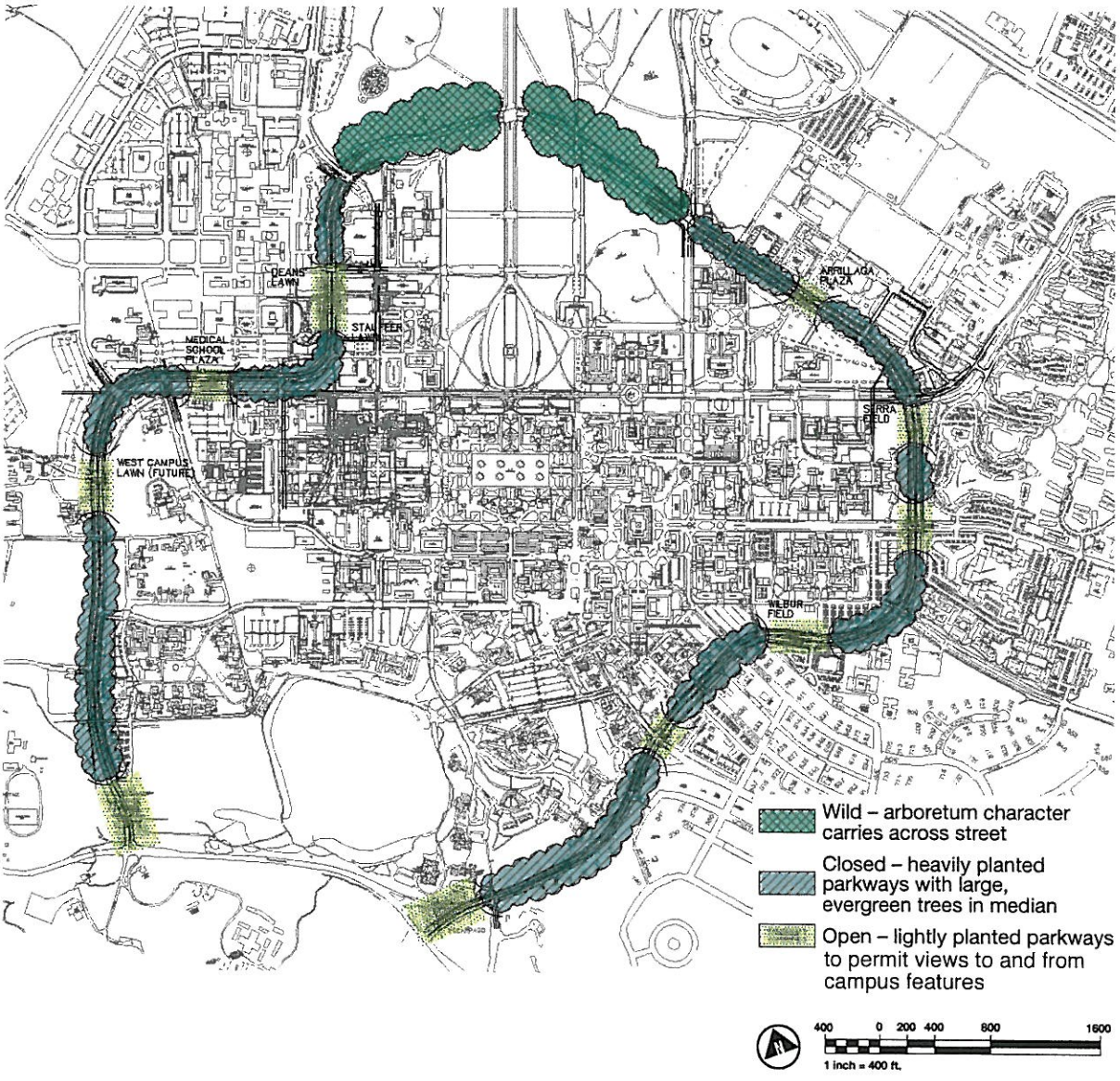
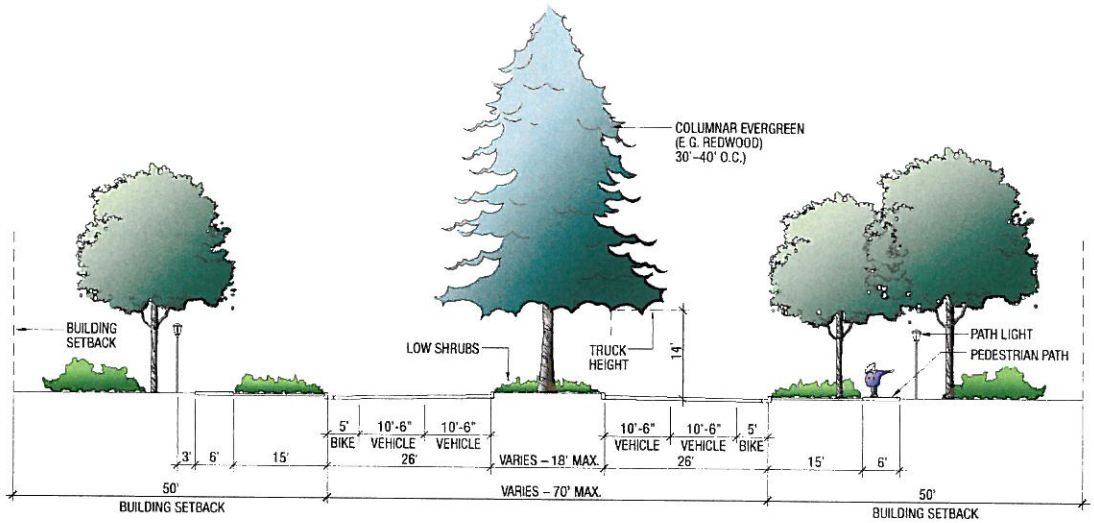
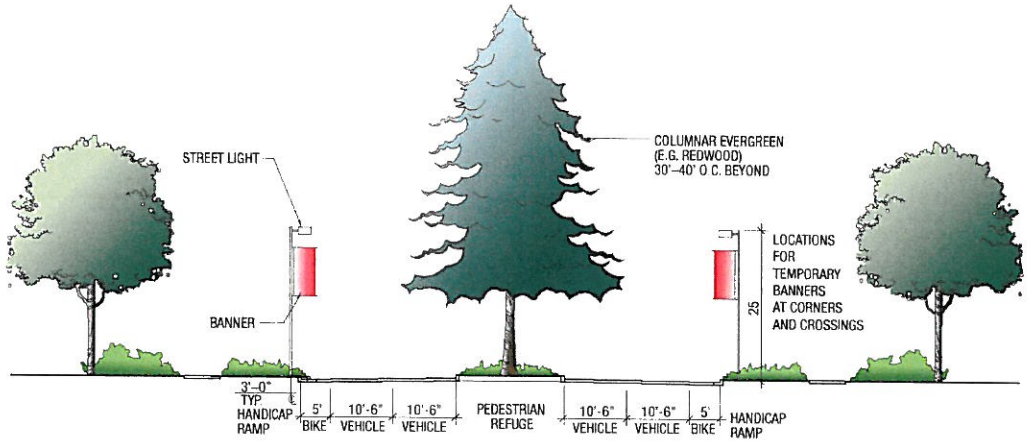


Fig. 10. Typical Street Sections



Typicial Street Section



Typical Street Section at Intersections and Mid Block Crossings

Fig. 11. Principal Pedestrian Crossings

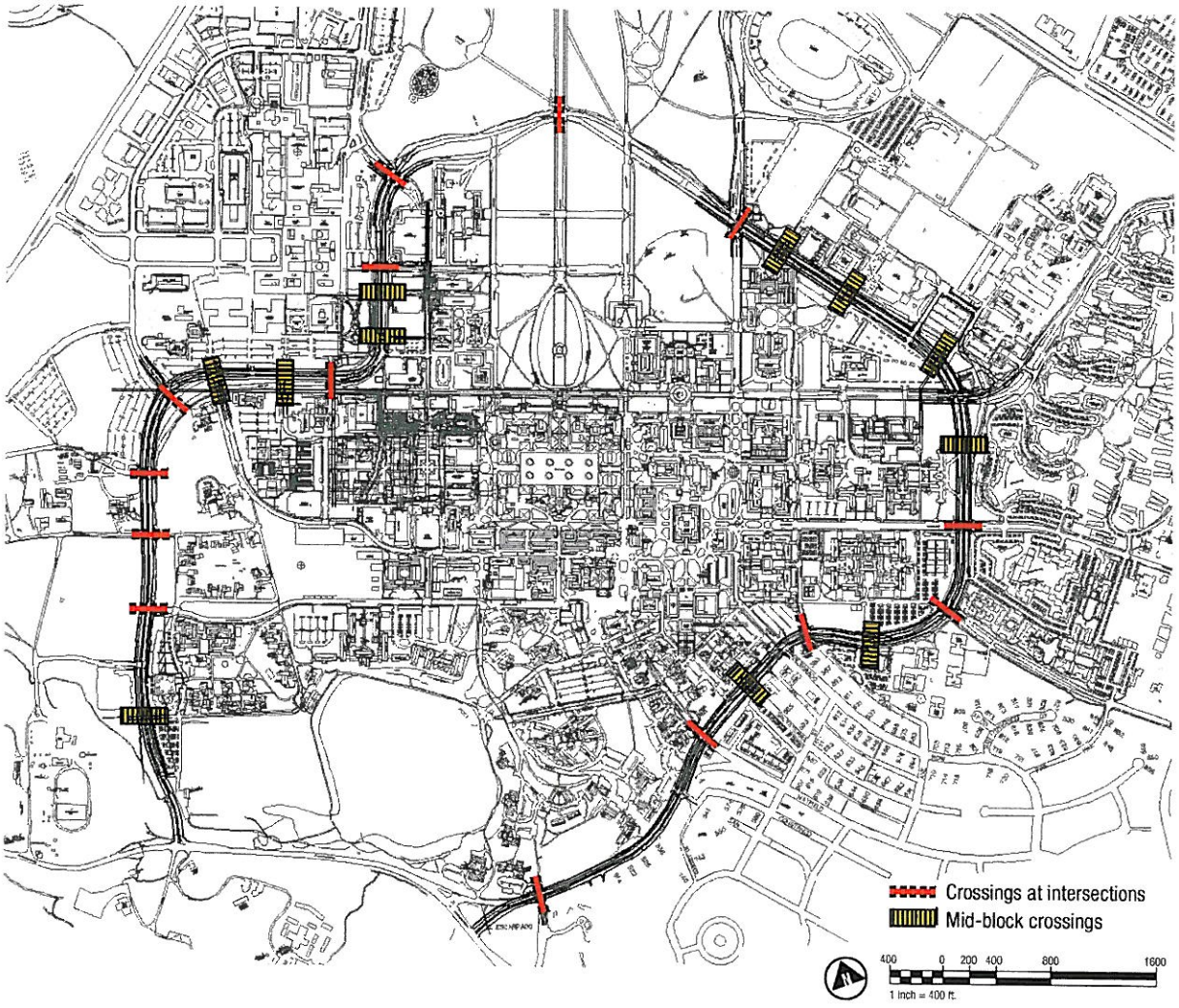
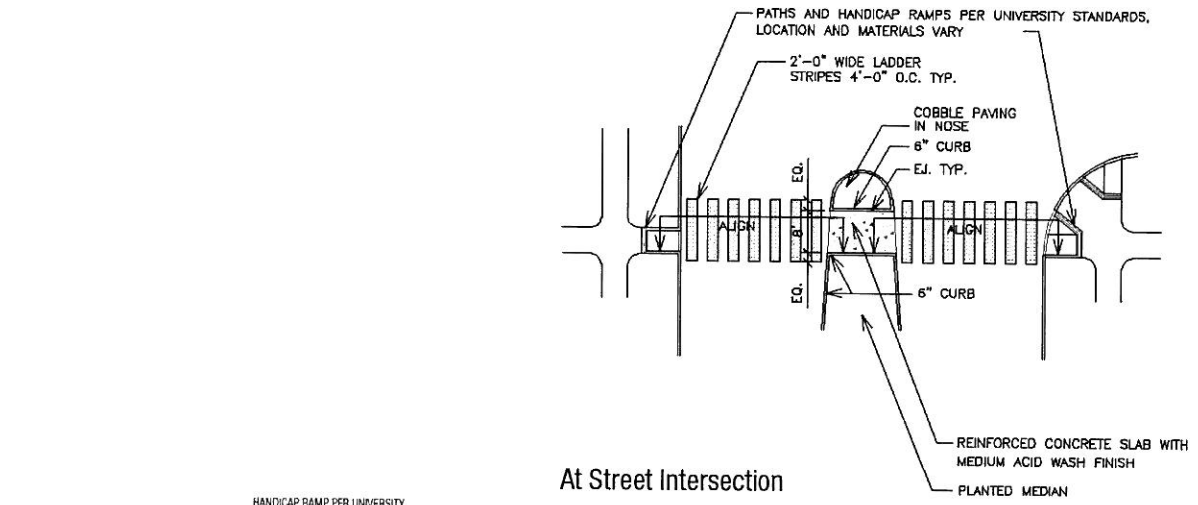
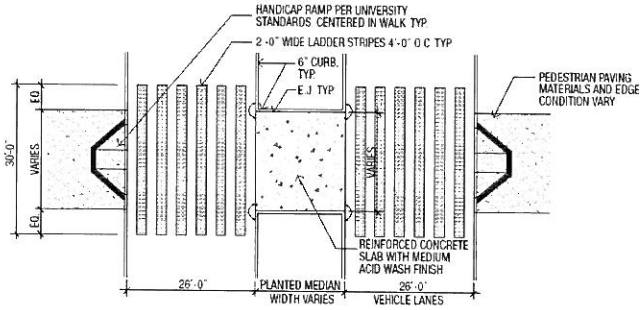


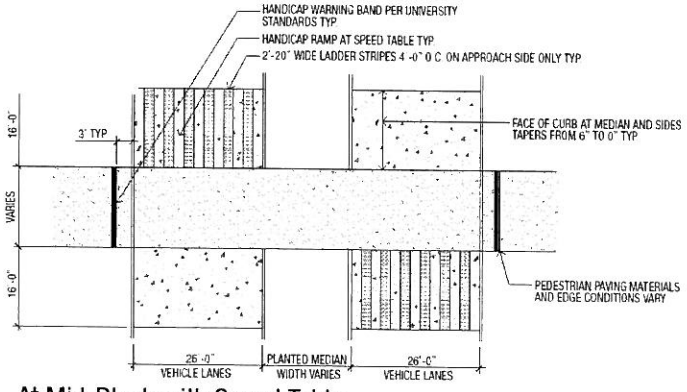
Fig. 12. Typical Crosswalks



At Street Intersection



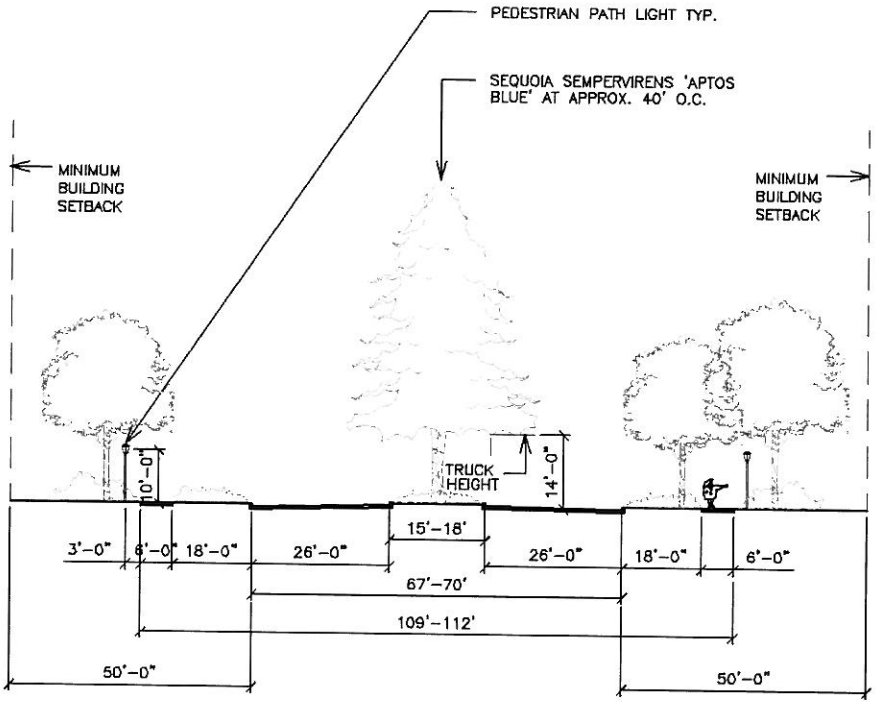
At Mid-Block with Handicap Ramps



At Mid-Block with Speed Table

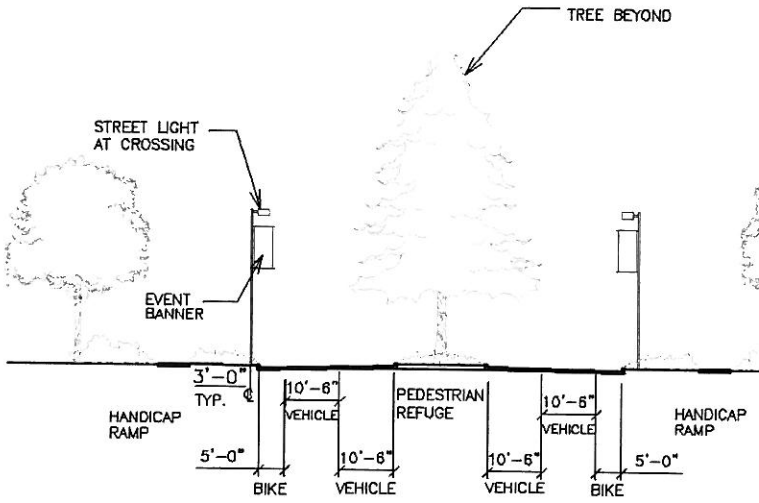
V. Standard Details

To ensure visual continuity and consistent implementation of these guidelines, some special landscape and engineering details have been developed. These are included here for reference. Local conditions will vary, and the details should be reviewed and adjusted accordingly.

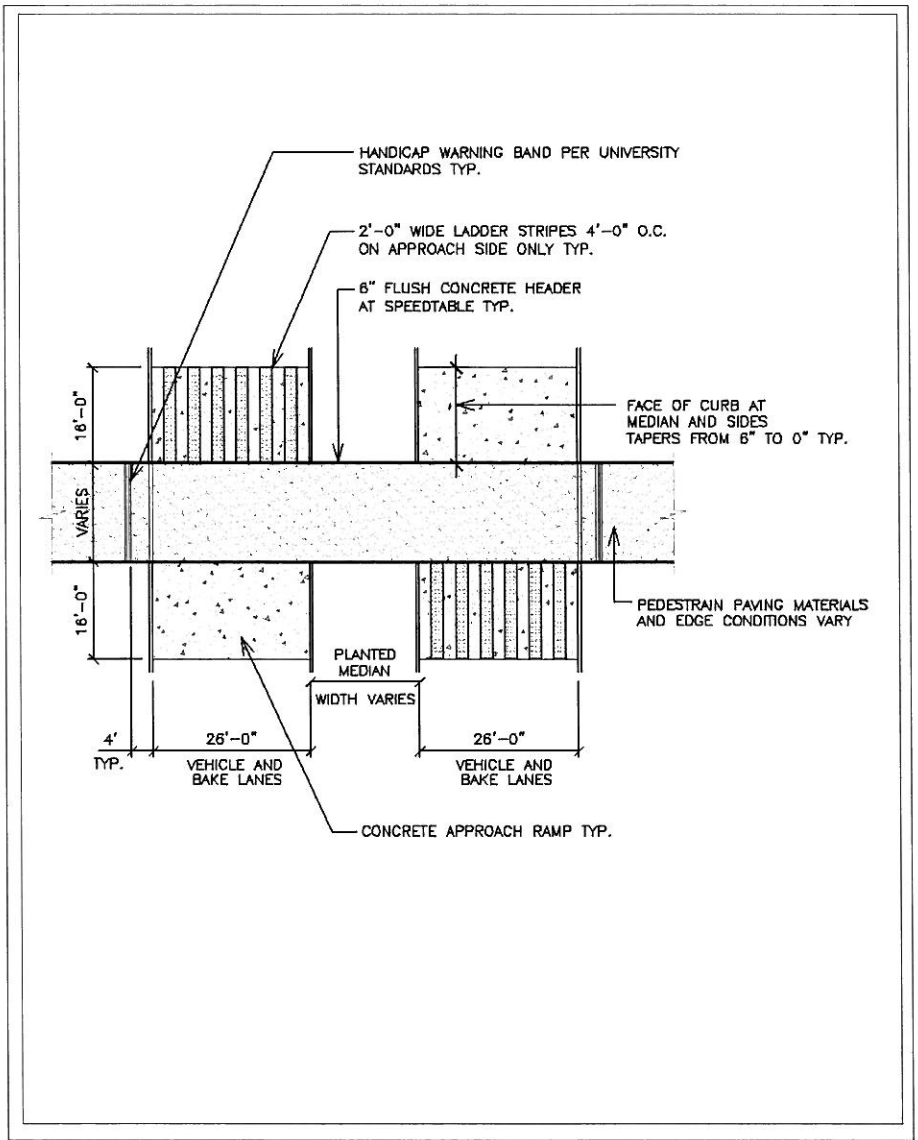


NOTE:
PLANTING IN PARKWAYS VARIES IN RESPONSE TO LOCAL CONDITIONS

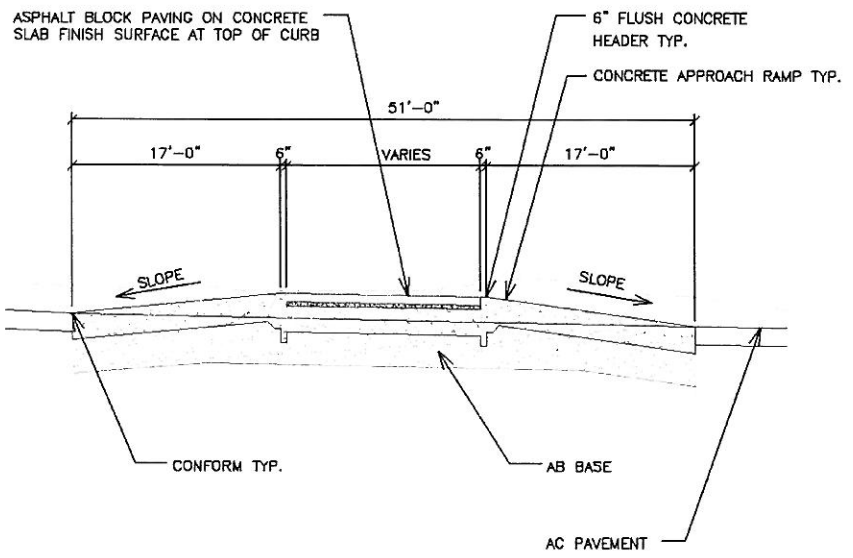
	TYPICAL STREET SECTION	Scale: N.T.S.
	Stanford University Architect/Planning Office Standard Campus Site Furnishings Guidelines	Updated: Superseded:



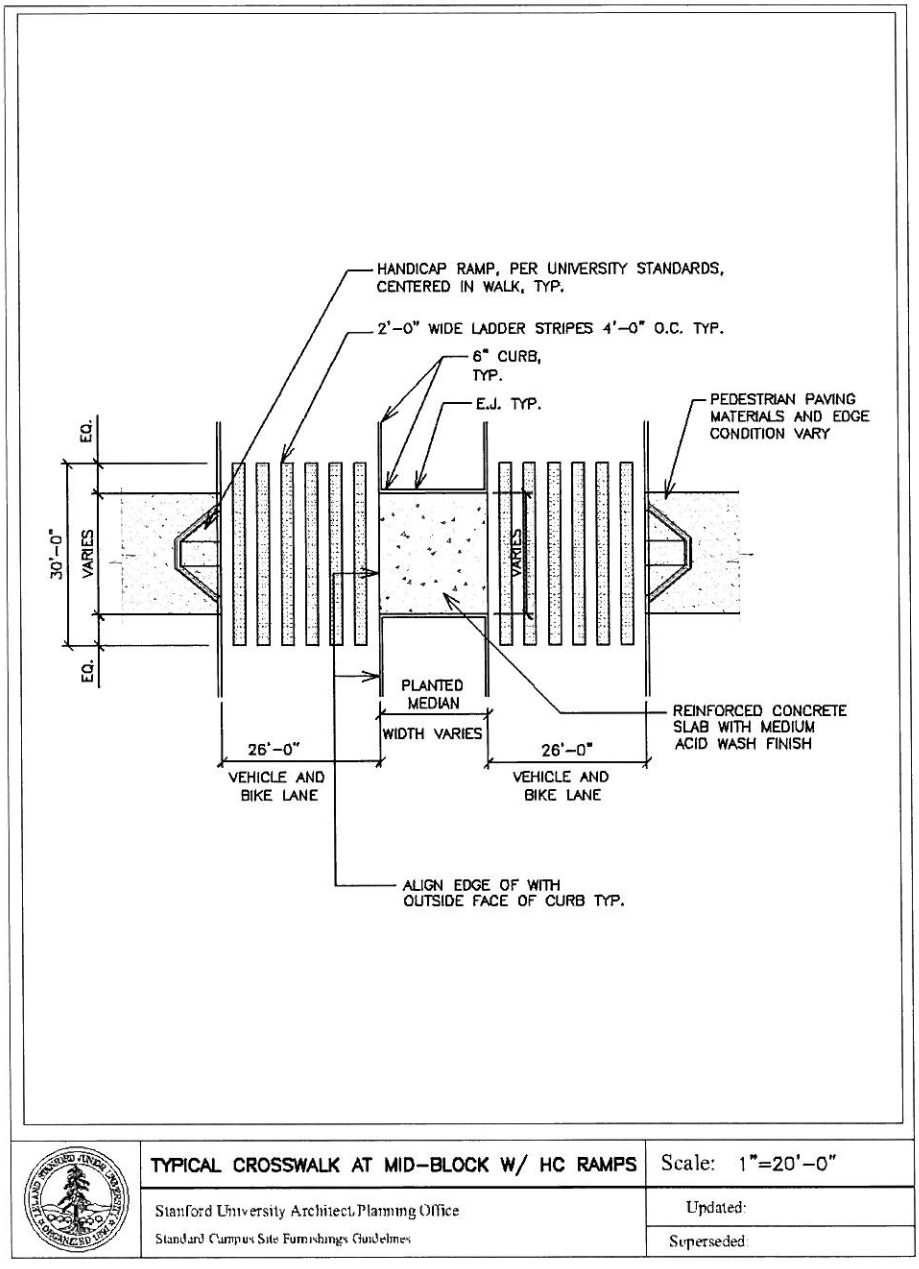
STREET SECTION AT PEDESTRIAN CROSSING	Scale: N.T.S.
Stanford University Architect/Planning Office Standard Campus Site Furnishings Guidelines	Updated: Superseded:



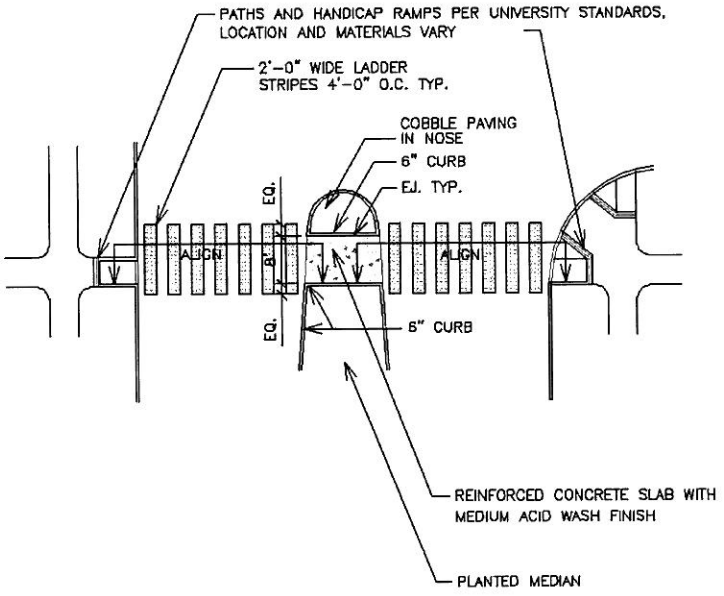
	TYPICAL CROSSWALK AT MID-BLOCK W/ SPEEDTABLE	Scale: 1"=20'-0"
	Stanford University Architect/Planning Office Standard Campus Site Furnishings Guidelines	Updated: Superseded:



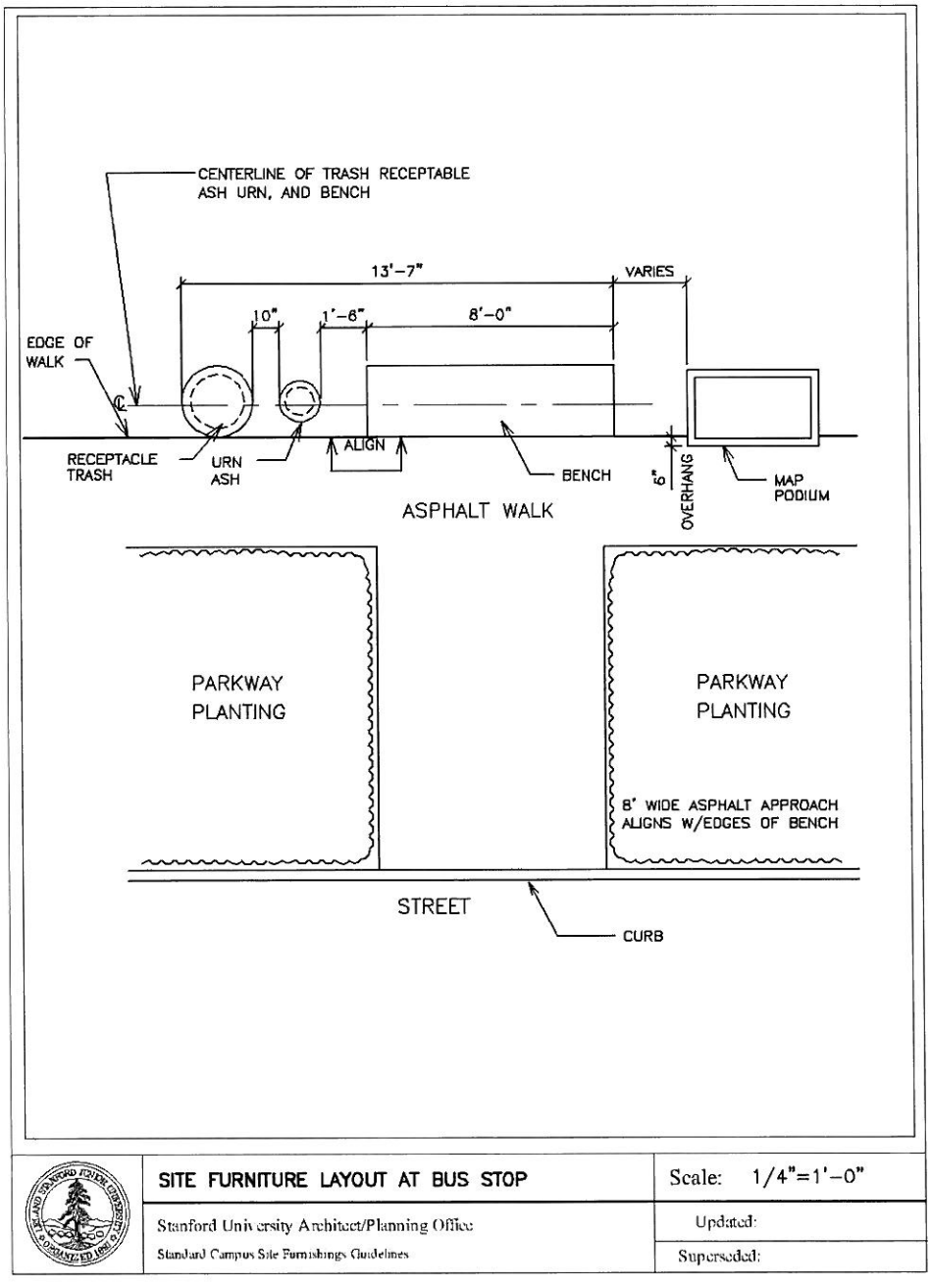
	SECTION AT SPEEDTABLE	Scale: 1"=10'-0" (HOR.)
	Stanford University Architect/Planning Office Standard Campus Site Furnishings Guidelines	Updated: Superseded:



	TYPICAL CROSSWALK AT MID-BLOCK W/ HC RAMPS	Scale: 1"=20'-0"
	Stanford University Architect/Planning Office Standard Campus Site Furnishings Guidelines	Updated: Superseded

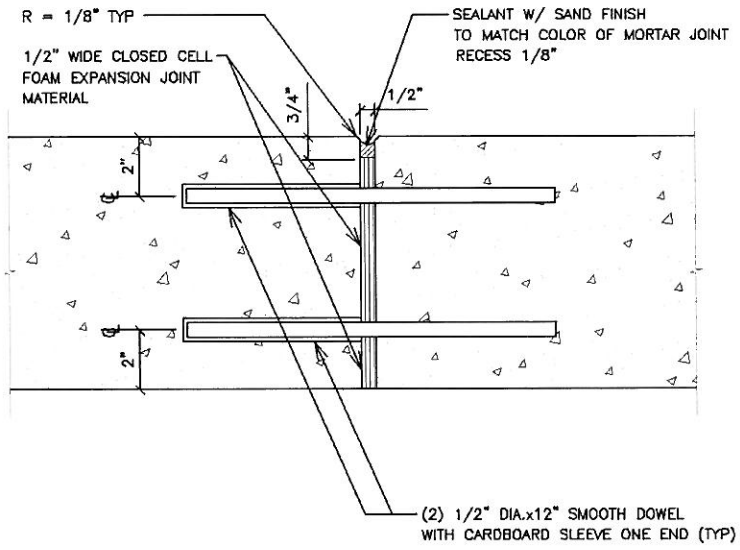


	TYPICAL CROSSWALK AT STREET INTERSECTION	Scale: 1"=20'-0"
	Stanford University Architect/Planning Office	Updated:
	Standard Campus Site Furnishings Guidelines	Superseded:

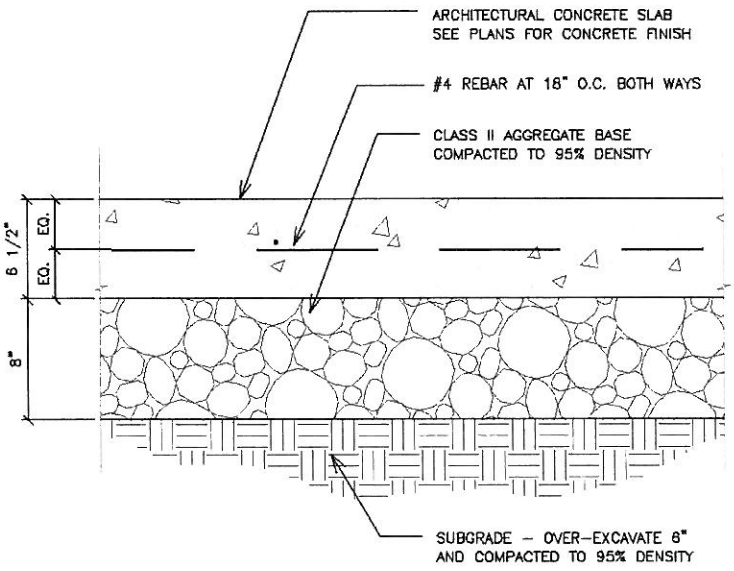

CENTERLINE OF TRASH RECEPTABLE
ASH URN, AND BENCH
13'-7"
VARIES
10"
1'-6"
8'-0"
EDGE OF
WALK
RECEPTACLE
TRASH
URN
ASH
ALIGN
BENCH
6"
OVERHANG
MAP
PODIUM
ASPHALT WALK
PARKWAY
PLANTING
PARKWAY
PLANTING
8' WIDE ASPHALT APPROACH
ALIGNS W/EDGES OF BENCH
STREET
CURB
SITE FURNITURE LAYOUT AT BUS STOP
Scale: 1/4"=1'-0"
Stanford University Architect/Planning Office
Standard Campus Site Furnishings Guidelines
Updated:
Superseded:

NOTE:

1. INSTALL EXPANSION JOINTS AT 12' O.C. MIN.
2. EXPANSION JOINTS AT CURB SIMILAR BUT WITHOUT DOWELS



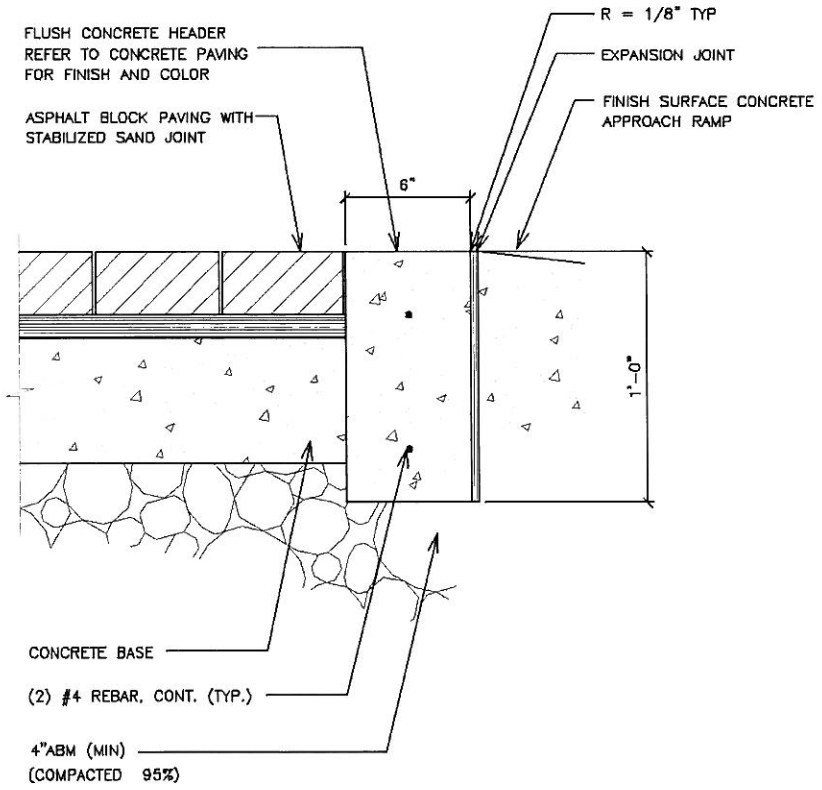
	EXPANSION JOINT IN CONCRETE SLAB	Scale: 3"=1'-0"
	Stanford University Architect/Planning Office	Updated:
	Standard Campus Site Furnishings Guidelines	Superseded:



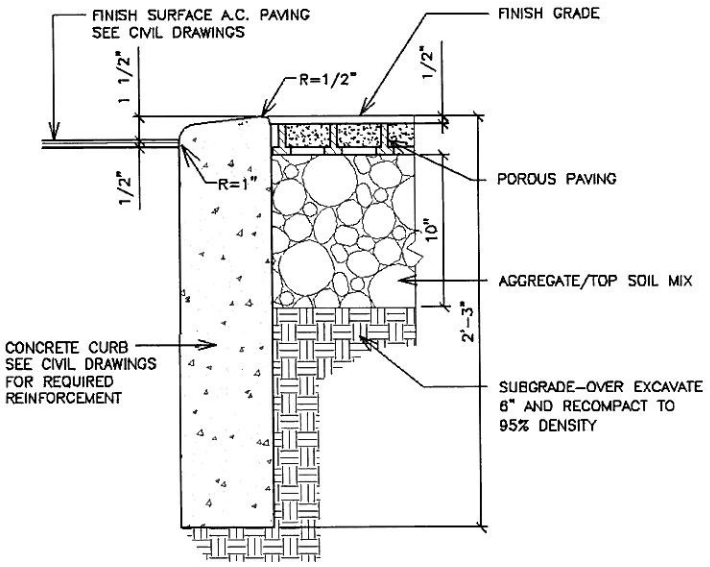
NOTE:

1. SEAL ALL EXPOSED CONCRETE SURFACES.
2. VERIFY PAVEMENT THICKNESS, BASE COURSE AND REINFORCEMENT WITH GEOTECHNICAL SOILS ENGINEER'S LATEST RECOMMENDATIONS PER GEOTECHNICAL REPORT.

	CONCRETE PAVING AT CROSSWALKS/SPEEDTABLES	Scale: 1 1/2"=1'-0"
	Stanford University Architect Planning Office	Updated:
	Standard Campus Site Furnishings Guidelines	Superseded:

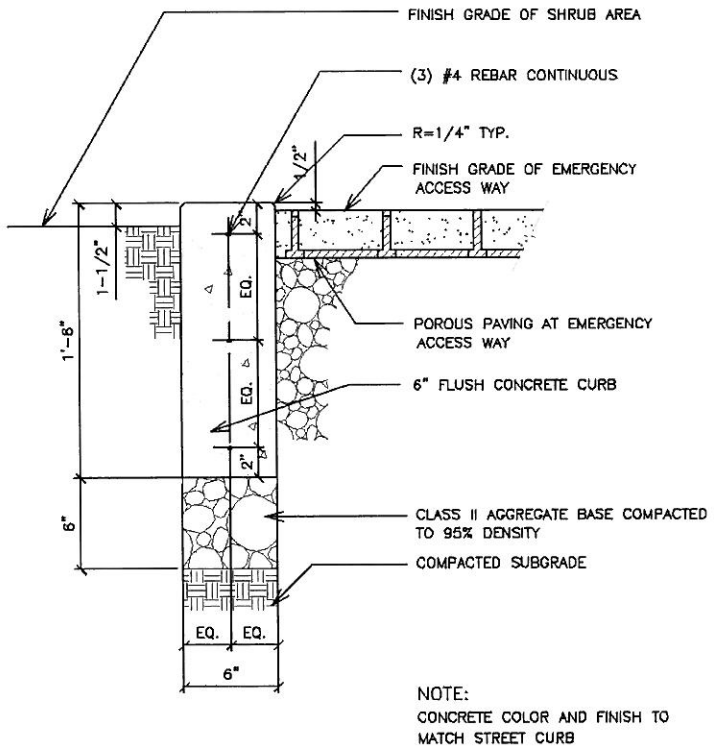


	6" FLUSH CONCRETE HEADER AT SPEEDTABLE	Scale: 2"=1'-0"
	Stanford University Architect/Planning Office	Updated:
	Standard Campus Site Furnishings Guidelines	Superseded:

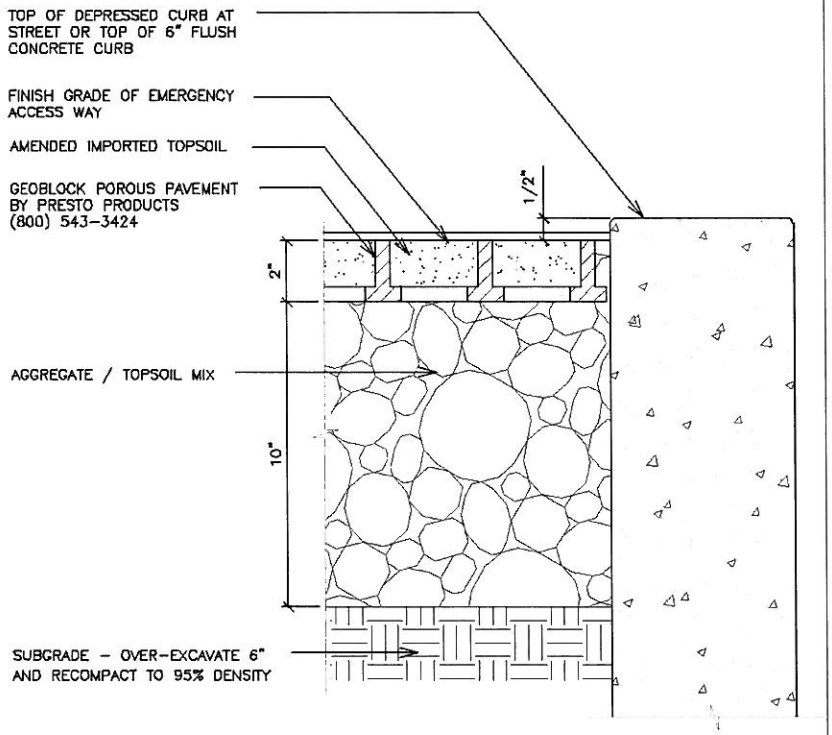


NOTE:
AGGREGATE / TOPSOIL MIX
TO BE COMPOSED OF 70%
AGGREGATE BASE AND 30%
CLASS II AMENDED IMPORTED
TOPSOIL

	MEDIAN CURB AT PLANTED EMERGENCY ACCESS	Scale: 1 1/2"=1'-0"
	Stanford University Architect/Planning Office	Updated:
	Standard Campus Site Furnishings Guidelines	Superseded:

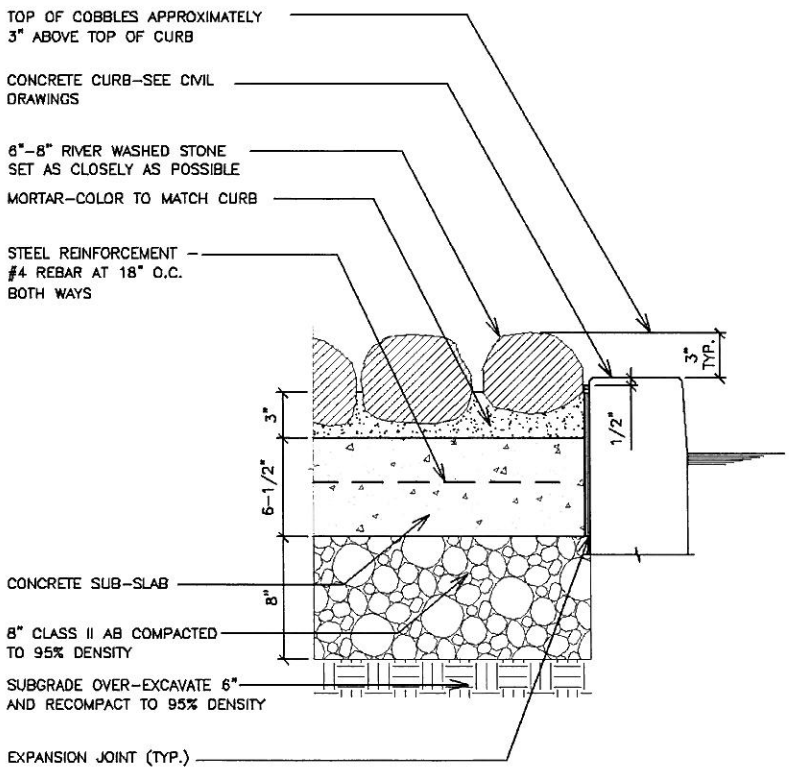


	6" FLUSH HEADER AT PLANTED EMERGENCY ACCESS WAY	Scale: 1 1/2"=1'-0"
	Stanford University Architect/Planning Office Standard Campus Site Furnishings Guidelines	Updated. Superseded:

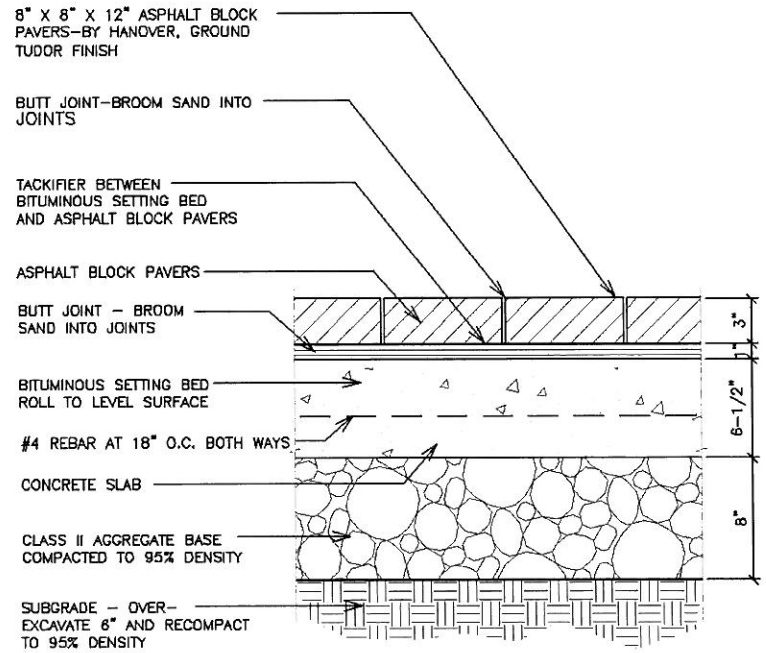


NOTE:
AGGREGATE / TOPSOIL MIX TO BE COMPOSED OF 70% CLASS II AGGREGATE BASE AND 30% AMENDED IMPORTED TOPSOIL THOROUGHLY MIXED.

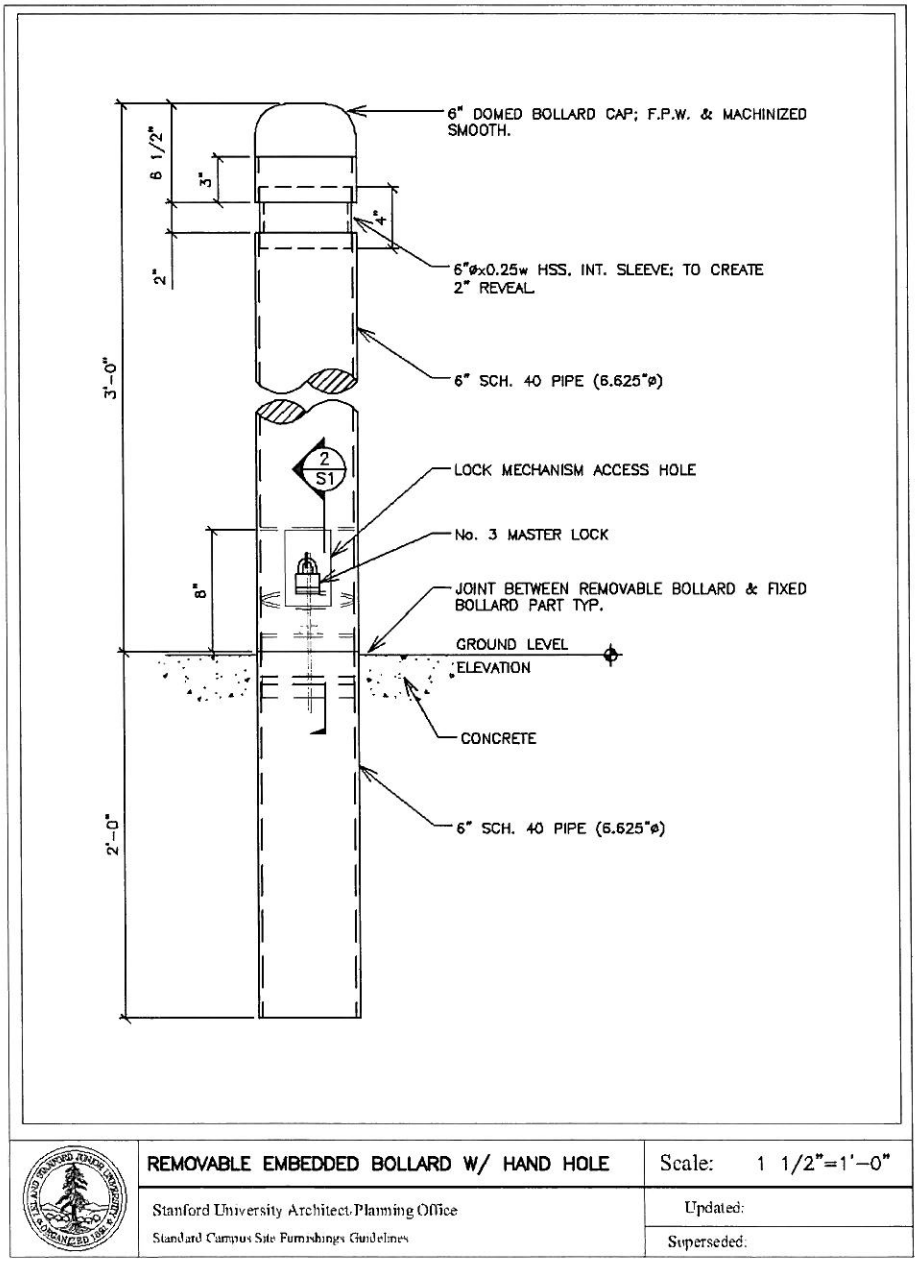
	POROUS PAVING AT PLANTED EMERGENCY ACCESS WAY	Scale: 3"=1'-0"
	Stanford University Architect/Planning Office Standard Campus Site Furnishings Guidelines	Updated: Superseded:

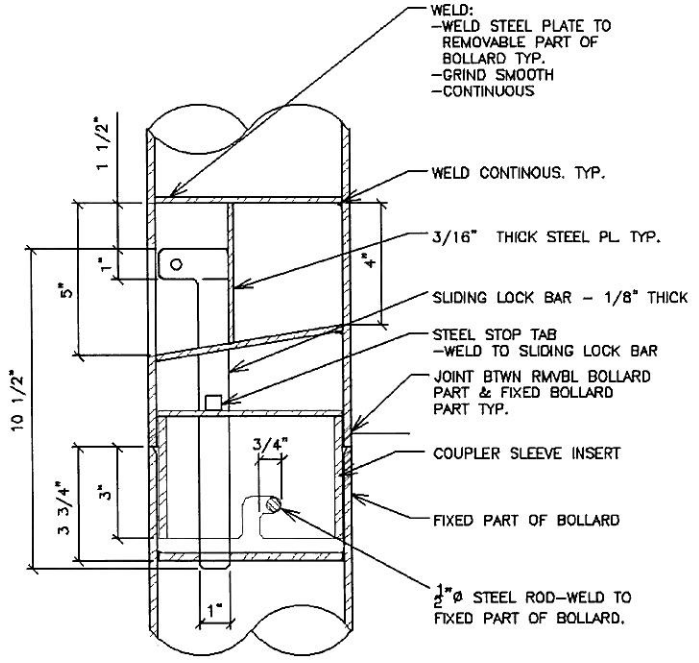


	COBBLE PAVING AT MEDIAN NOSE	Scale: 1 1/2"=1'–0"
	Stanford University Architect Planning Office	Updated:
	Standard Campus Site Furnishings Guidelines	Superseded:



	ASPHALT BLOCK PAVING ON CONCRETE SLAB	Scale: 1 1/2"=1'–0"
	Stanford University Architect/Planning Office	Updated:
	Standard Campus Site Furnishings Guidelines	Superseded.


6" DOMED BOLLARD CAP; F.P.W. & MACHINIZED SMOOTH.
6 1/2"
3"
4"
2"
6"øx0.25w HSS. INT. SLEEVE; TO CREATE 2" REVEAL
6" SCH. 40 PIPE (6.625"ø)
3'-0"
2
S1
LOCK MECHANISM ACCESS HOLE
No. 3 MASTER LOCK
8"
JOINT BETWEEN REMOVABLE BOLLARD & FIXED BOLLARD PART TYP.
GROUND LEVEL ELEVATION
CONCRETE
6" SCH. 40 PIPE (6.625"ø)
2'-0"
REMOVABLE EMBEDDED BOLLARD W/ HAND HOLE
Scale: 1 1/2"=1'-0"
Stanford University Architect/Planning Office
Standard Campus Site Furnishings Guidelines
Updated:
Superseded:



	HAND HOLE SECTION	Scale: 3"=1'-0"
	Stanford University Architect/Planning Office	Updated:
	Standard Campus Site Furnishings Guidelines	Superseded:

VI. IMPLEMENTATION

Modifications to Campus Drive are expected to be implemented as part of multiple capital improvement projects over the course of the next five to ten years. These guidelines, in conjunction with the schematic alignment and layout of the road, are intended to serve as background and reference material for any project which is proposed in the vicinity of Campus Drive. The question of what portion of the roadway and of the landscape improvements along the road are to be made part of a project will be determined on a case-by-case basis.

A phasing plan for capital improvements to Campus Drive – including installation of pedestrian paths and crosswalks, medians, lighting, and planting of parkways and medians, is currently being developed in conjunction with the schedule of proposed or contemplated capital projects on sites adjacent to the road. Preliminarily, projects have been identified as follows:

Fiscal Year	Road Segment	Related Capital Projects
02-03	Clark Median	Clark/ChemBio Completion
02-03	Galvez/Campus Drive intersection crossing at Sam MacDonald Way	Alumni Center
05-06	Bowdoin to Mayfield	SLS Housing/ parking structure
T.G.D.	Campus Drive at Serra Street	Maples parking structure

APPENDIX A. – BIBLIOGRAPHY

The following documents were used in the development of these Design Guidelines and contain information that may be useful in the implementation of the Guidelines:

- Fehr & Peers, ***Stanford Campus Roadway Capacity Study***, May 2002.
- Fehr & Peers, Memorandum: Access / Circulation and Off-Site Impact Analyses for Five Stanford Parking Structure Sites, 1 May, 2002.
- Fehr & Peers, Campus Drive East Width Analysis, 9 January, 2001.
- Sasaki Associates, Inc., ***Stanford East Campus Parking Study***, 7 May, 2002.
- Sebastian & Associates, ***Campus Drive, Stanford University, Interim Report – Summary of Design Workshop***, 22-23 March, 2001
- Stanford University Planning Office, ***Plan for the Second Century***, June, 1991.
- Stanford University Planning and Transportation Programs, ***Stanford University Comprehensive Bicycle Plan***, (no date).
- Stanford University Planning Office, ***Landscape Design Guidelines***, March, 1989.
- ***Stanford University Community Plan***, December, 2000.
- ***Stanford University General Use Permit Conditions of Approval***, 12 December, 2000.

APPENDIX B. – LANDSCAPE CONCEPT PLAN

At the end of a series of internal meetings about the qualitative and aesthetic aspects of the road, the Planning Office held a two-day design workshop with consultants to develop a set of landscape design ideas that would help generate identity for the road and allow the road both to be integrated into the overall campus and also to reinforce the necessary functions for enhancing the campus. The main points to emerge the workshop are summarized here.

CAMPUS DRIVE
DESIGN WORKSHOP – 2001
SUMMARY REPORT

Background

Campus Drive is one of the few designed elements of the Stanford campus with sufficient scale to be both a primary circulation element and a primary identification element for residents and visitors. The only other components of the campus with the same potential are the fully realized Palm Drive and the partially completed Serra Mall. These were taken as the models for the design of Campus Drive.

In March of 2001 the staff of the Stanford Planning Office held a two-day workshop with landscape architects Bill Johnson and Scott Sebastian to analyze the problems and opportunities of the road and to develop a unified conceptual design for the entire length of Campus Drive. Among the goals of the exercise were:

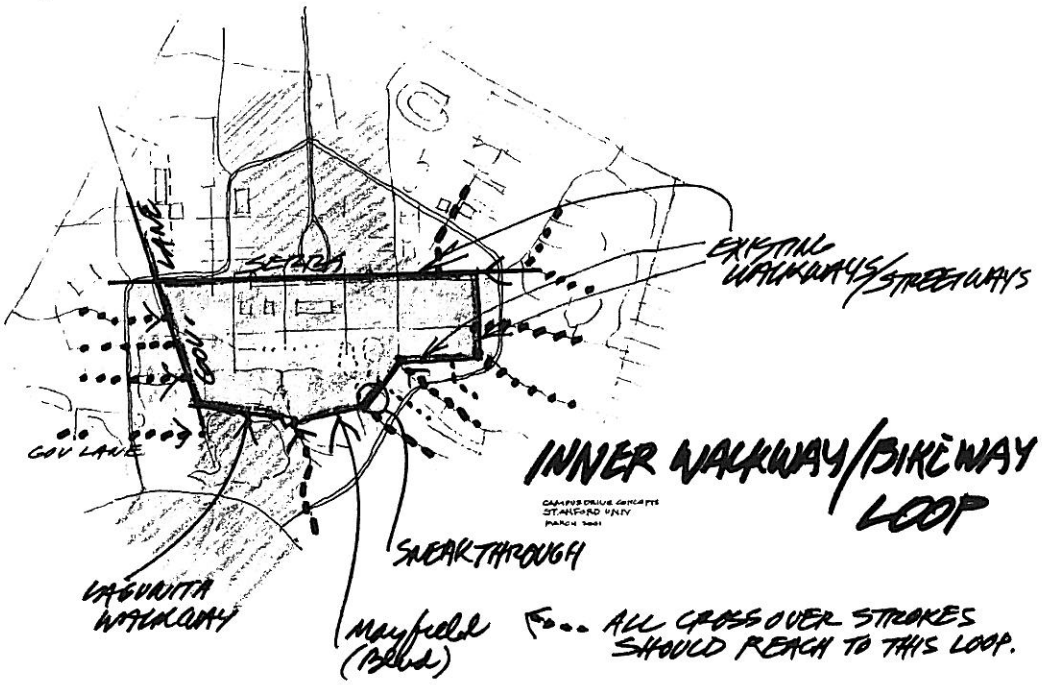
- to integrate the road into existing and proposed land uses.
- to adapt the road to the character of the landscapes through which it passes.
- to respond to the University's concerns about safety, efficiency, and economy of means.
- to establish a distinct and memorable character for the road itself.

With a clear idea of the overall design of the road, the eventual implementation of the design would most appropriately be done in multiple phases, each of which would likely relate to other infrastructure improvements or to the development of buildings on sites adjacent to the road.

Response to Context

To some extent, the landscape character of the road should respond to the overall landscape character of the zones of the campus through which it passes. That landscape character is implicitly related to land use, and it has several manifestations. The largest, and perhaps the most abstract, of these is the connection between the two large "natural" areas of the campus: the Arboretum to the north and Lake Lagunita and the foothills to the south. These are representative of the traditional rural landscape of "The Farm". The central part of Campus Drive cuts through the Arboretum and its two ends are at the base of the foothills.

Between these two rural zones, Campus Drive is transected by two linear elements, both of which are potentially very powerful in the way the cut through the central campus: Serra Street/Serra Mall and Governor's Lane. The former cuts through the campus from east to west and represents one of the original axes of the Olmsted plan, and Governor's Lane. The latter predates the founding of the University and represents the connection between the Stanford's main house and the barns. Combined with these are several other existing connections inside the loop which, taken together, represent a fairly clearly defined implicit inner pedestrian/bicycle loop. This loop presents a host of design opportunities both in itself and in relation to Campus Drive.

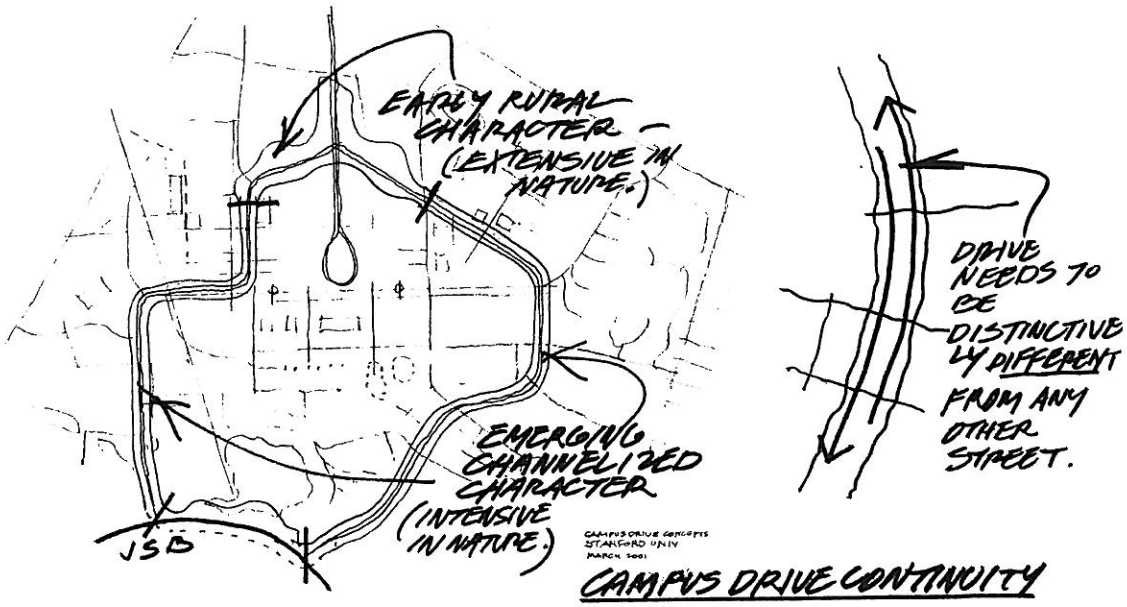


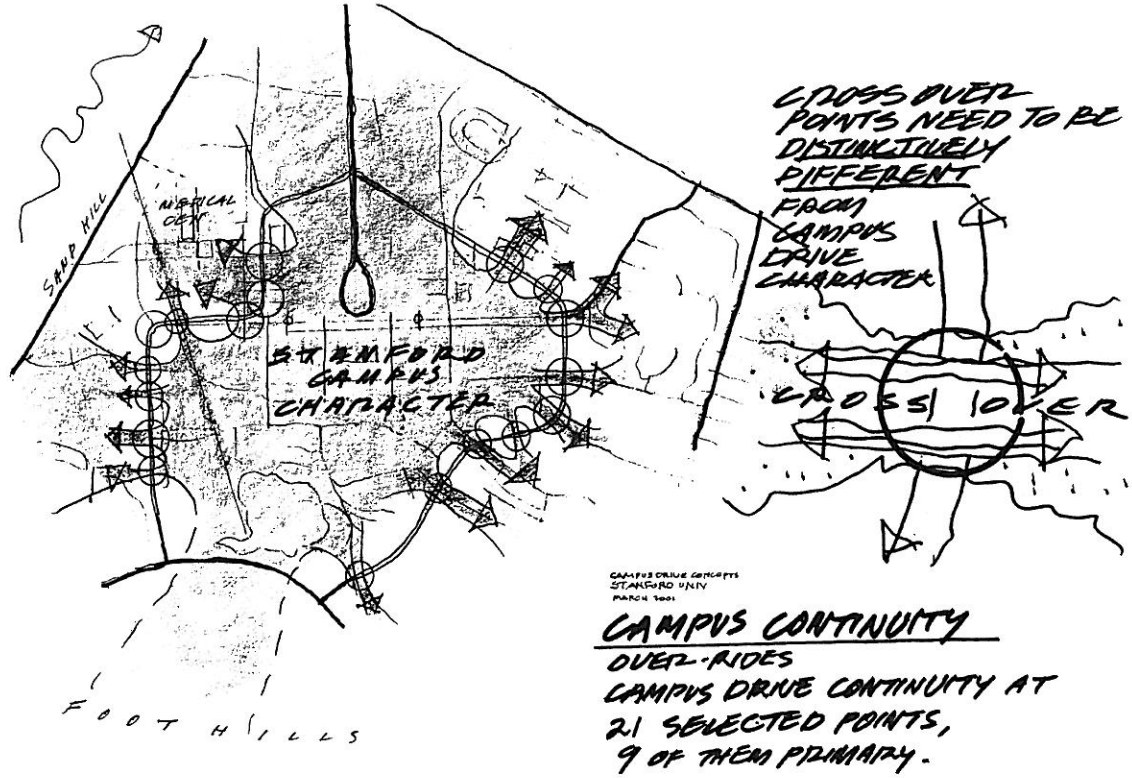
Design Principles

The team concluded that two principles are fundamental to achieving its goals for Campus Drive:

- Clarity. The road should have a clear visual identity – distinct from that of any other road at Stanford. Having such an identity would make the road into a means of way-finding and orientation for visitors and residents alike. Palm Drive and Serra Mall do this simply and effectively largely through the use of consistent dimensions and materials. A similar simplicity and consistency of materials should characterize Campus Drive. Some of the elements to that identity will need to be derived from or related to the rest of the campus, but they may also include elements that are unique to this particular road.

- Continuity. When it was originally laid out, Campus Drive was generally at the outer boundary of the academic campus. Over time, however, both the residential and the academic areas of the campus have spread across the road. Thus, the road is no longer in any way an edge. Therefore, the design of the road must facilitate two kinds of continuity: that of the campus itself, which implies linking the uses on opposite sides of the road, and that of the continuity of the road itself as an organizing element of the campus.


EARLY RURAL CHARACTER - (EXTENSIVE IN NATURE.)
EMERGING CHANNELIZED CHARACTER (INTENSIVE IN NATURE.)
JSB
CAMPUS DRIVE CONCEPTS STANFORD UNIV MARCH 2001
DRIVE NEEDS TO BE DISTINCTIVELY DIFFERENT FROM ANY OTHER STREET.
CAMPUS DRIVE CONTINUITY

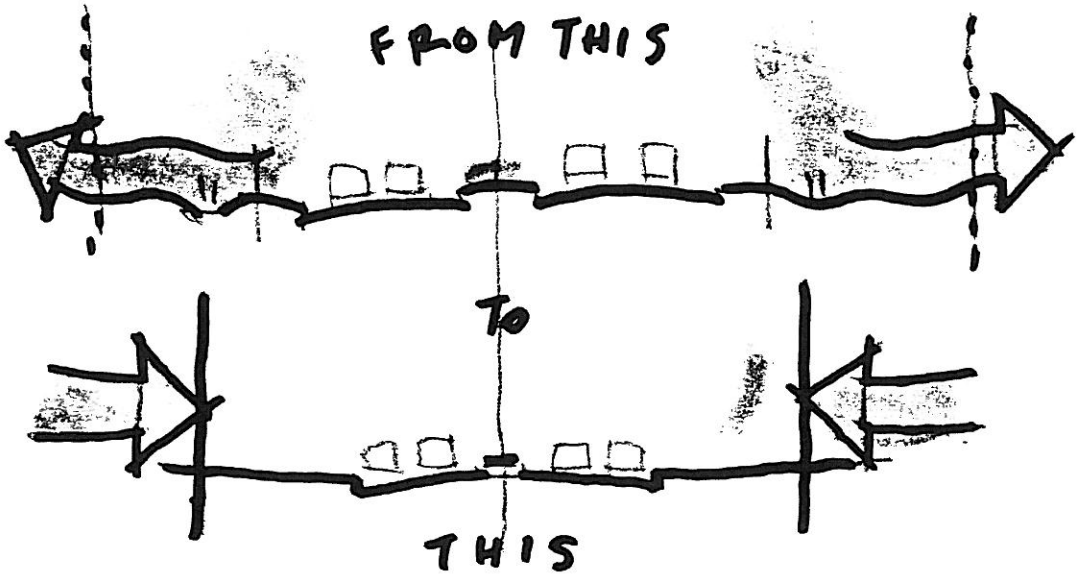

SAND HILL
MEDICAL CTR
STANFORD CAMPUS CHARACTER
FOOT HILLS
CROSSOVER POINTS NEED TO BE DISTINCTIVELY DIFFERENT FROM CAMPUS DRIVE CHARACTER
CROSSOVER
CAMPUS DRIVE CONCEPTS STANFORD UNIV MARCH 2001
CAMPUS CONTINUITY
OVER-RIDES CAMPUS DRIVE CONTINUITY AT 21 SELECTED POINTS, 9 OF THEM PRIMARY.

Zones

Since the calculations of capacity and thus many of the engineering aspects of the road had already been established, the team concentrated on the visual character of the road. In general, it was clear that, despite our desire to emphasize its clear and special identity and to make that identity continuously readable throughout the campus, there are in fact two distinct zones of the campus and the road will have a somewhat different character in each.

The smaller zone lies through the Arboretum. Here the existing "rural" character of the road – with sweeping curves, no curbs, and no sidewalks – should continue, out of respect to the historic nature of this area, which is to remain as permanent open space. Here the views are, and can remain, generally outward into the surrounding semi-natural landscape.

On the other hand, the segments of the road between the Arboretum and Junipero Serra Boulevard, which together comprise perhaps 85% of its length, have lost or are losing this rural character under the pressure of development on the adjacent sites. Campus Drive in these zones is being "channelized" into something more like an urban boulevard. Here the median will be of a more uniform width with a more uniform character. There will be curbs, parkways, and pedestrian walks. The views in these segments of the road are necessarily more constrained, and the landscape character should be more enclosed, with occasional breaks at points of special interest.



Street Section

The distinguishing characteristics of the street section were preliminarily defined as follows:

- Median. The most important characteristic of the road will be a continuous planted median throughout its entire length. The median will always be present and always consistent in appearance In general, it will be a minimum of 13 feet wide throughout the urban zone. In the exceptional case of the segment of the road that runs between the Medical School and Stauffer Lawn – where it is already in reconstruction – it will be only 8 feet wide, but here too the landscape treatment will not vary.

- Paths. Sidewalks should be continuous and, where possible, located well away from the curbs.

- Lighting. The lighting along the entire length of the road needs to be consistent. It should be metal halide as opposed to high pressure sodium.

- Planting. The ground plane of the median should be planted with a single groundcover or low shrub throughout its entire length, rather in the way that the parkways of Palm Drive are planted with a single groundcover. A consistent planting of trees, either in the median or in the 50-foot setback zone would be desirable except perhaps in the Arboretum.

At the end of the workshop the specifics of the lighting and landscape treatment of the street section remained to be determined. There was agreement that both should be extremely simple and repetitive. Palm Drive is a good example. In regard to planting, there was no agreement on whether there should be trees in the median. In the parkways there should be trees, probably regularly spaced, but no determination of species was made. A uniform, consistent treatment of the road would allow for increased drama at special places along it where there are views of adjacent open spaces or into the interior of the campus.

The Crossings

In terms of the identity of the street, and of its function as a connector rather than a divider, the vehicular and pedestrian crossing points are extremely important. There many of these, and they are of many kinds. In some cases, streets intersect with Campus Drive in the traditional way; others streets coming from outside the campus end at Campus Drive. In still other locations there are mid-block pedestrian/bicycle crossings. The team identified at least five different kinds of intersections in terms of their characteristics and importance. It was generally agreed that the two intersection points of Serra Mall with Campus Drive should receive the most attention and presented an opportunity to heighten the importance of both of these principle circulation elements of the campus.

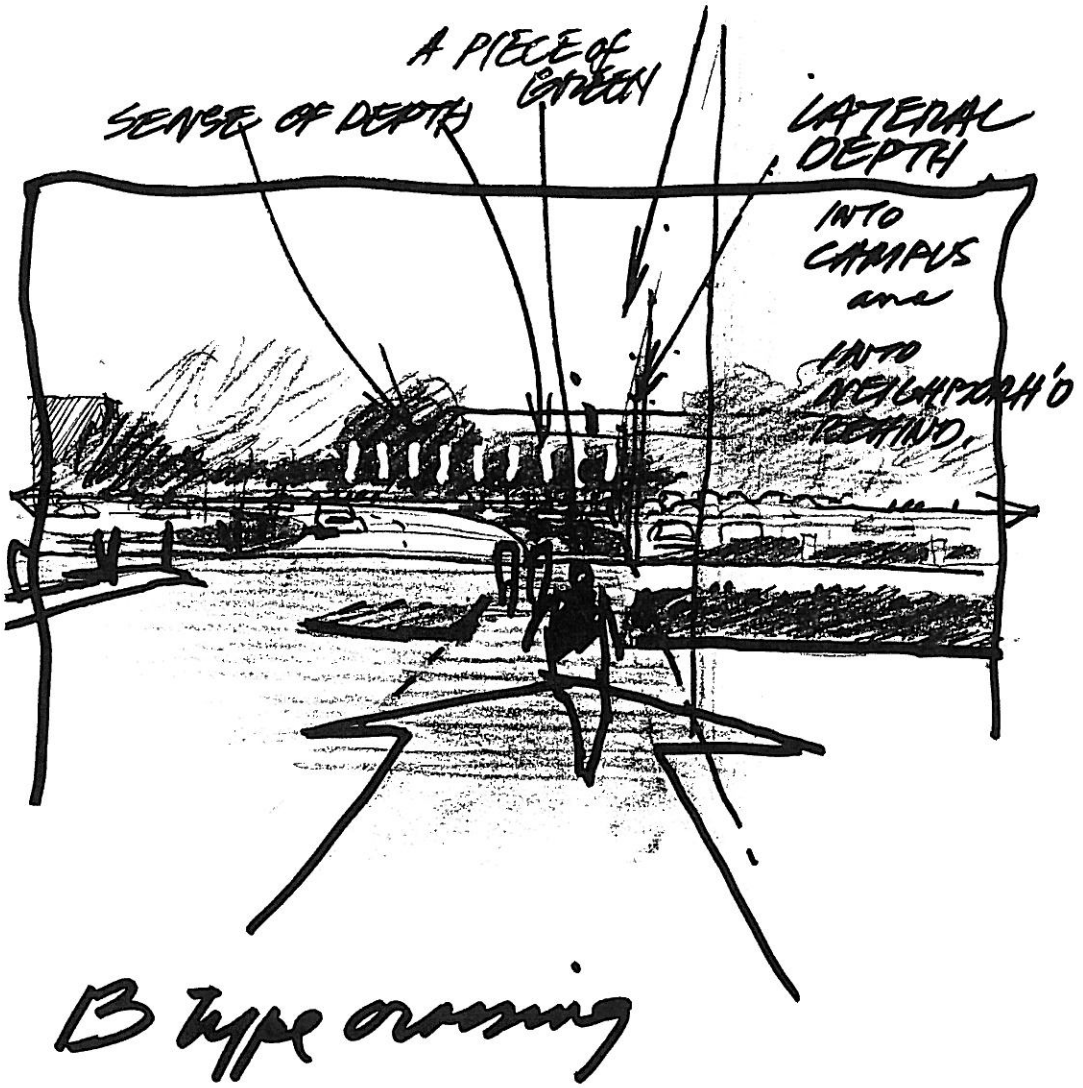
All intersections, while of varying importance, should have the following characteristics:

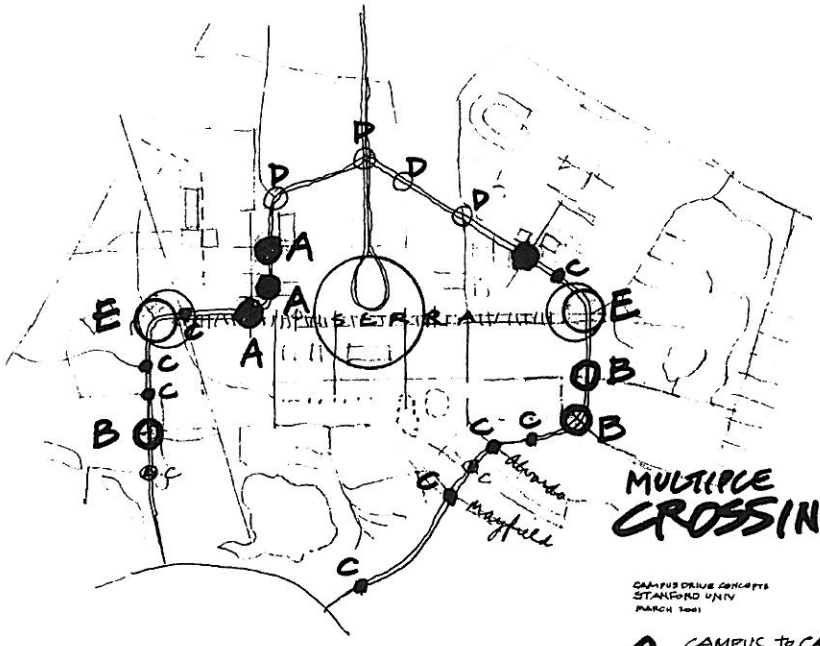
- Scale. No matter how they are organized functionally, they all should have the scale of something like a plaza or a small quadrangle. They will be larger and more important than other intersections and thus become part of the identity of Campus Drive.

- Direction. Generally, the open space at a crossing should penetrate inward from Campus toward the historic core of the campus. In many cases the spaces could connect Campus Drive to the inner pedestrian loop.

- Lighting. As with the road, so the crossing should have a special quality of light. They may also have a greater intensity of light, both to establish their identity and to provide greater safety.

In general, the crossings should be big and "open" and in strong contrast with the rest of the road, which should be made to feel small and "enclosed".


A PIECE OF
SENSE OF DEPTH
LATERAL
DEPTH
INTO
CAMPUS
INTO
B type crossing



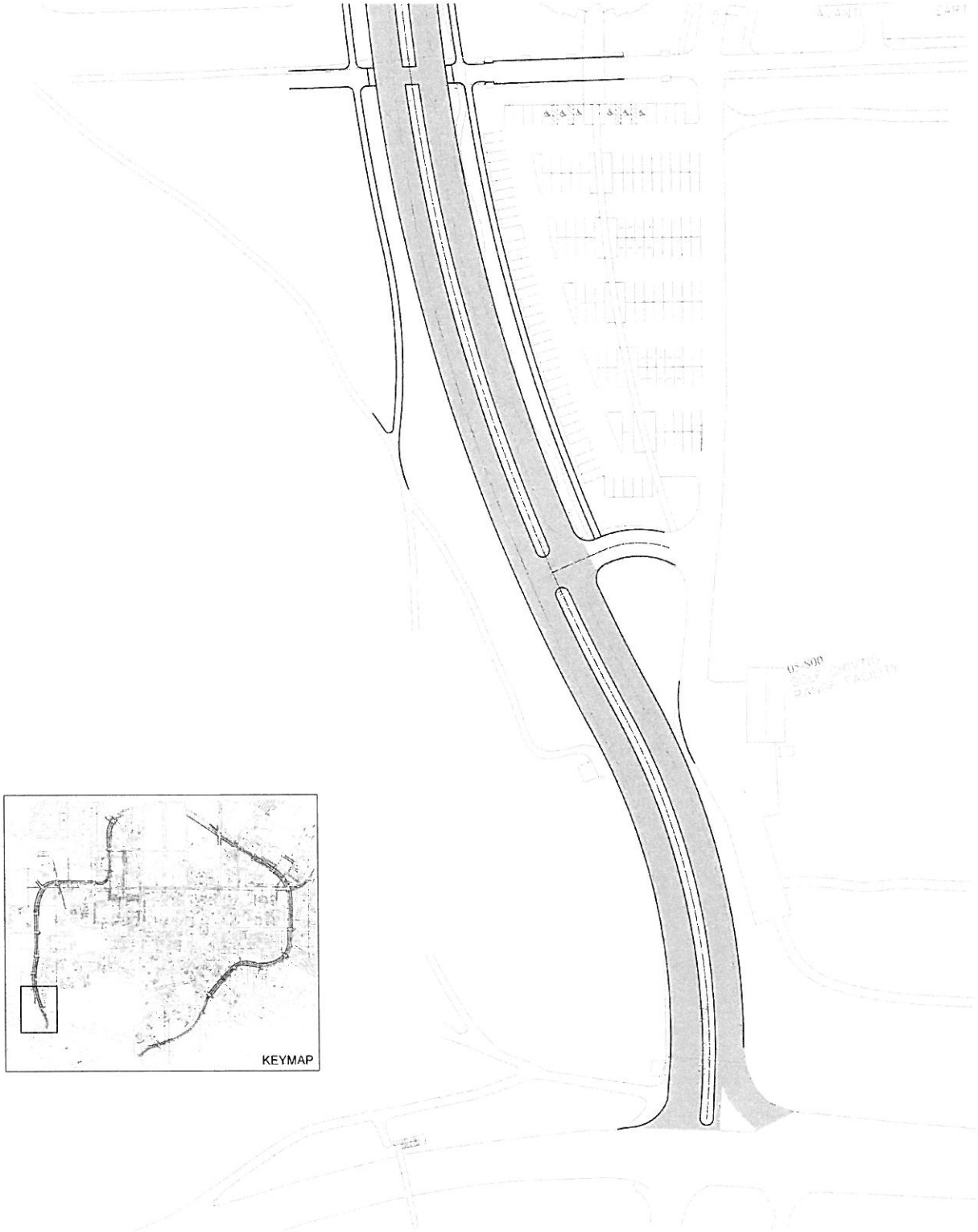
MULTIPLE CROSSINGS BY VARYING CIRCUMSTANCE

CAMPUS DRIVE CONCEPTS
STANFORD UNIV
MARCH 2001

A	CAMPUS to CAMPUS INTERCONNECT PRIMARY	4
B	RESIDENTIAL to CAMPUS/RESIDENTIAL PRIMARY	3
C	RESIDENTIAL to CAMPUS/RESIDENTIAL	
D	EARLY CAMPUS/TRADITIONAL	4
E	CROSS-CAMPUS/SERRA MALL	2

APPENDIX C. – TWO-LANE ALTERNATIVE AT MEDICAL SCHOOL AREA

In recent years many components of the University faculty and administration have expressed the need for greater integration of the main campus and the Medical School. Since Campus Drive presents the greatest single functional and visual barrier between the two, the Planning Office undertook a study of the possibility of narrowing the road from four lanes to two lanes through the west campus adjacent to the new James Clark Center and Lorry I Lokey Building. Fehr & Peers, Transportation Consultants, were asked to simulate the two-lane alternative and evaluate the consequences. Their findings supported a reduction in the number of lanes if the University was prepared to incur costs and to engage in substantial modifications and improvements to other streets, including the installation of roundabouts at the intersections of Campus Drive with Welch Road and with Quarry Road. Their report is available through the Stanford University Architect/Planning Office, and an illustrative plan is included here for reference only.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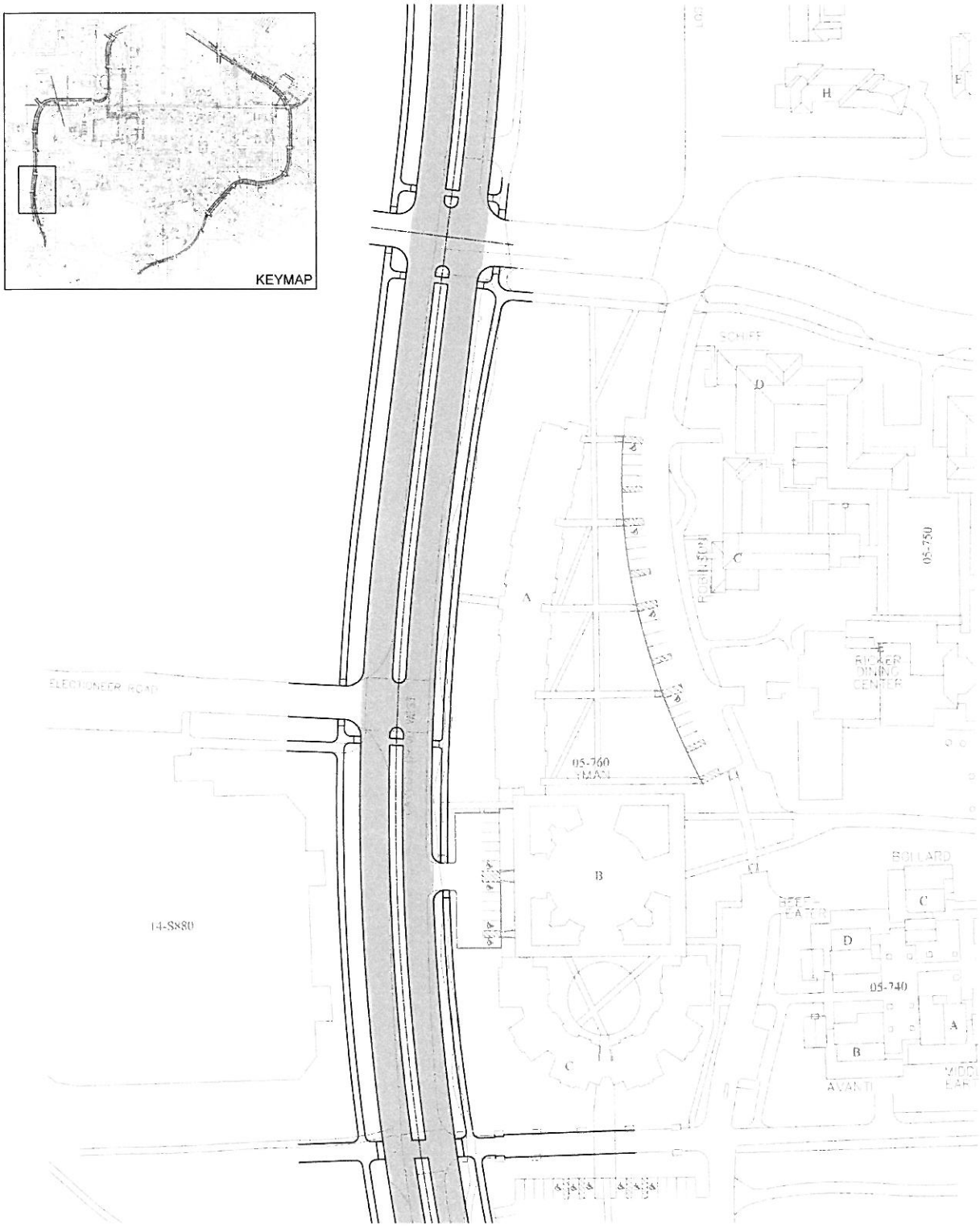
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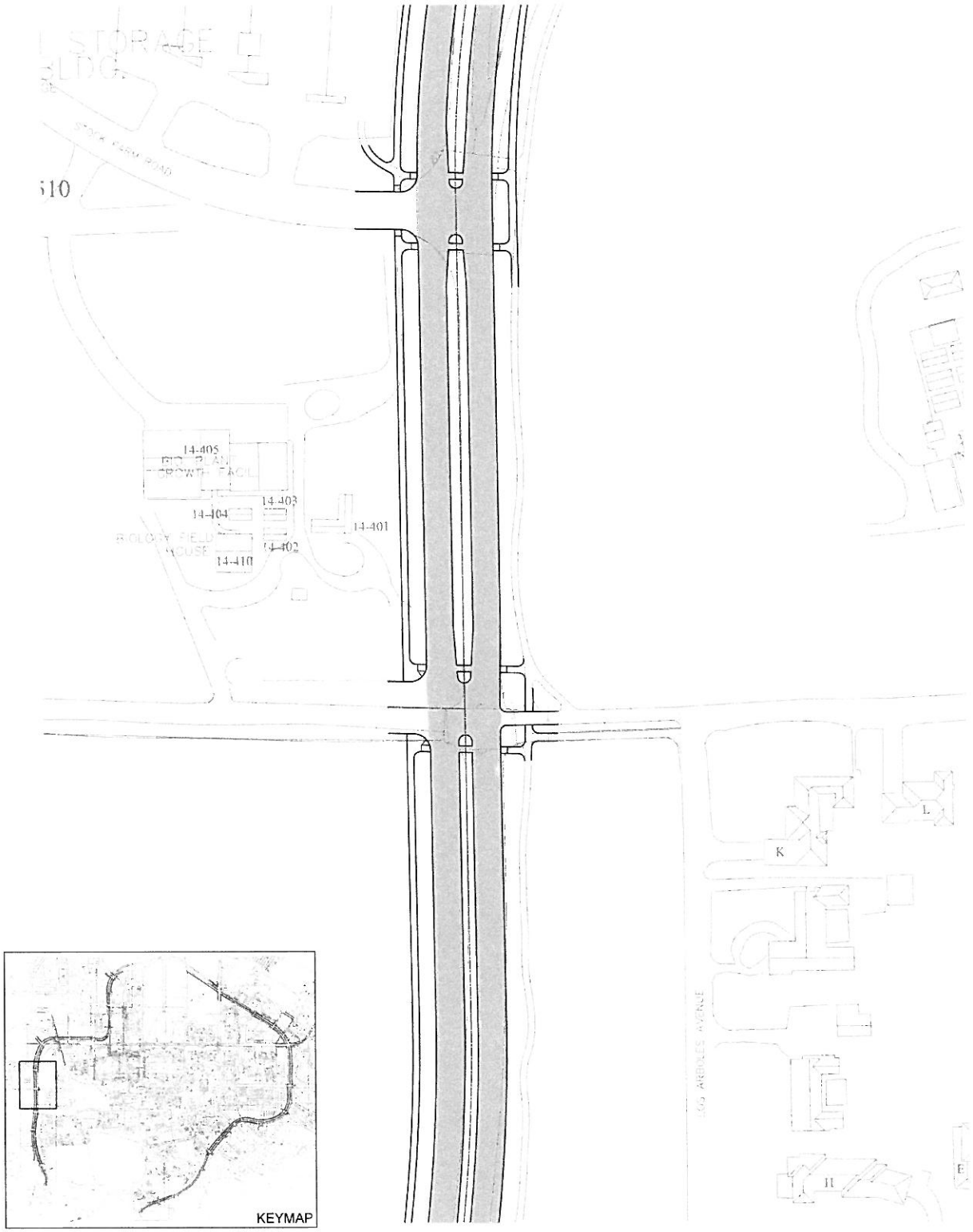
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14-402
14-410
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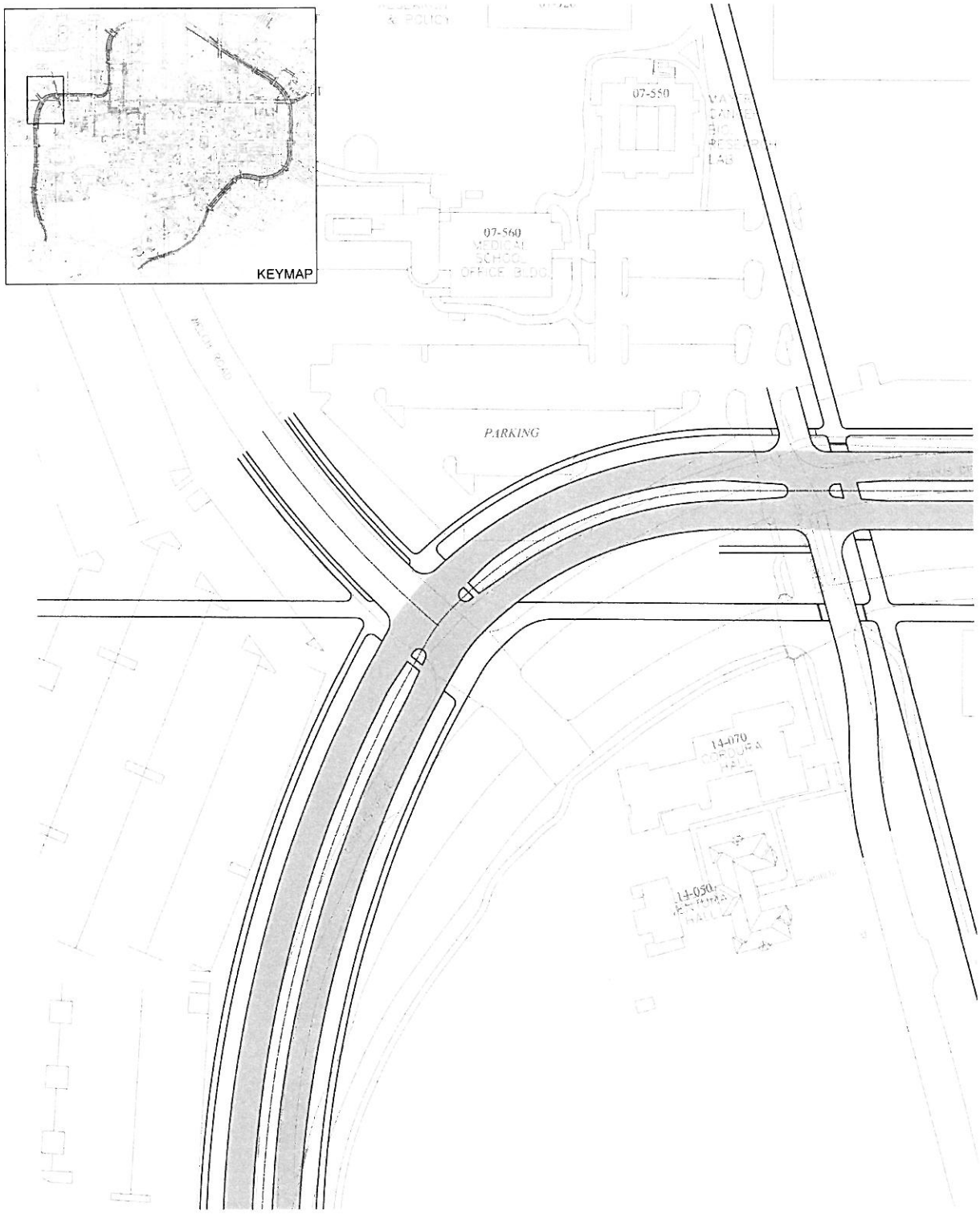
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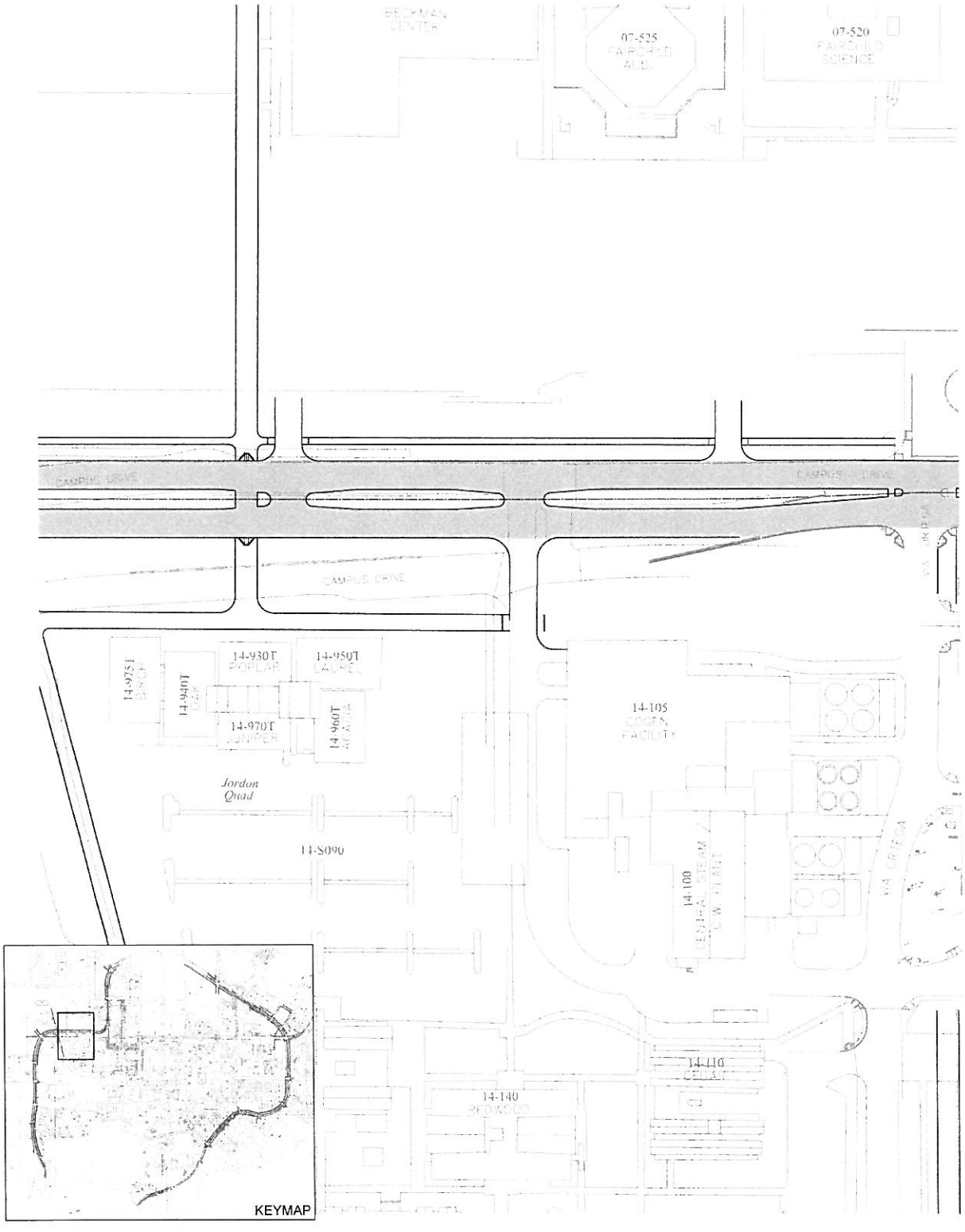
BECKMAN CENTER
07-525 FAIRCHILD AUDIT
07-520 FAIRCHILD SCIENCE
CAMPUS DRIVE
CAMPUS DRIVE
CAMPUS DRIVE
14-930T POPLAR
14-950T LAUREL
14-940T
14-970T JUNIPER
14-960T
14-105 COGEN FACILITY
Jordon Quad
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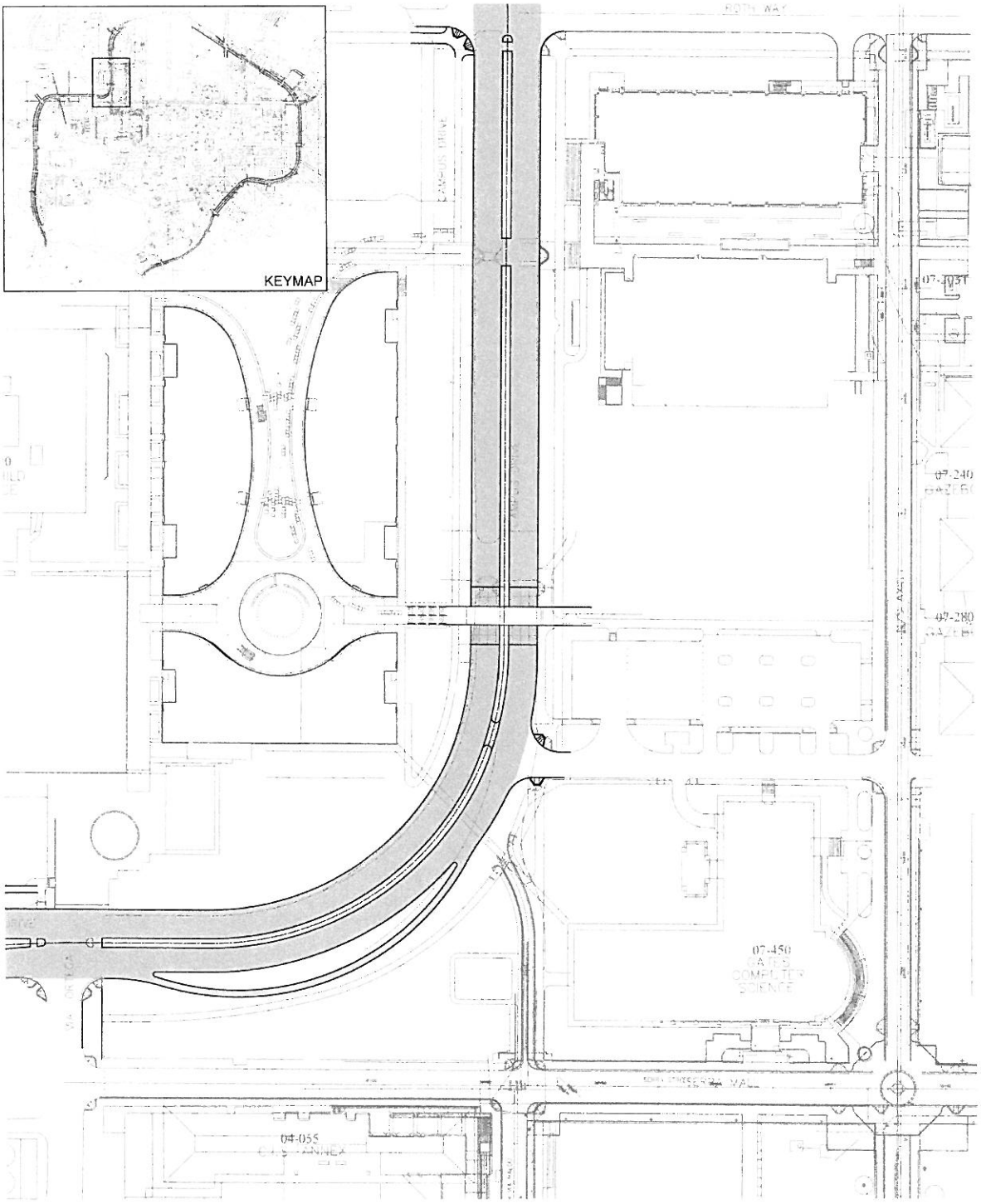
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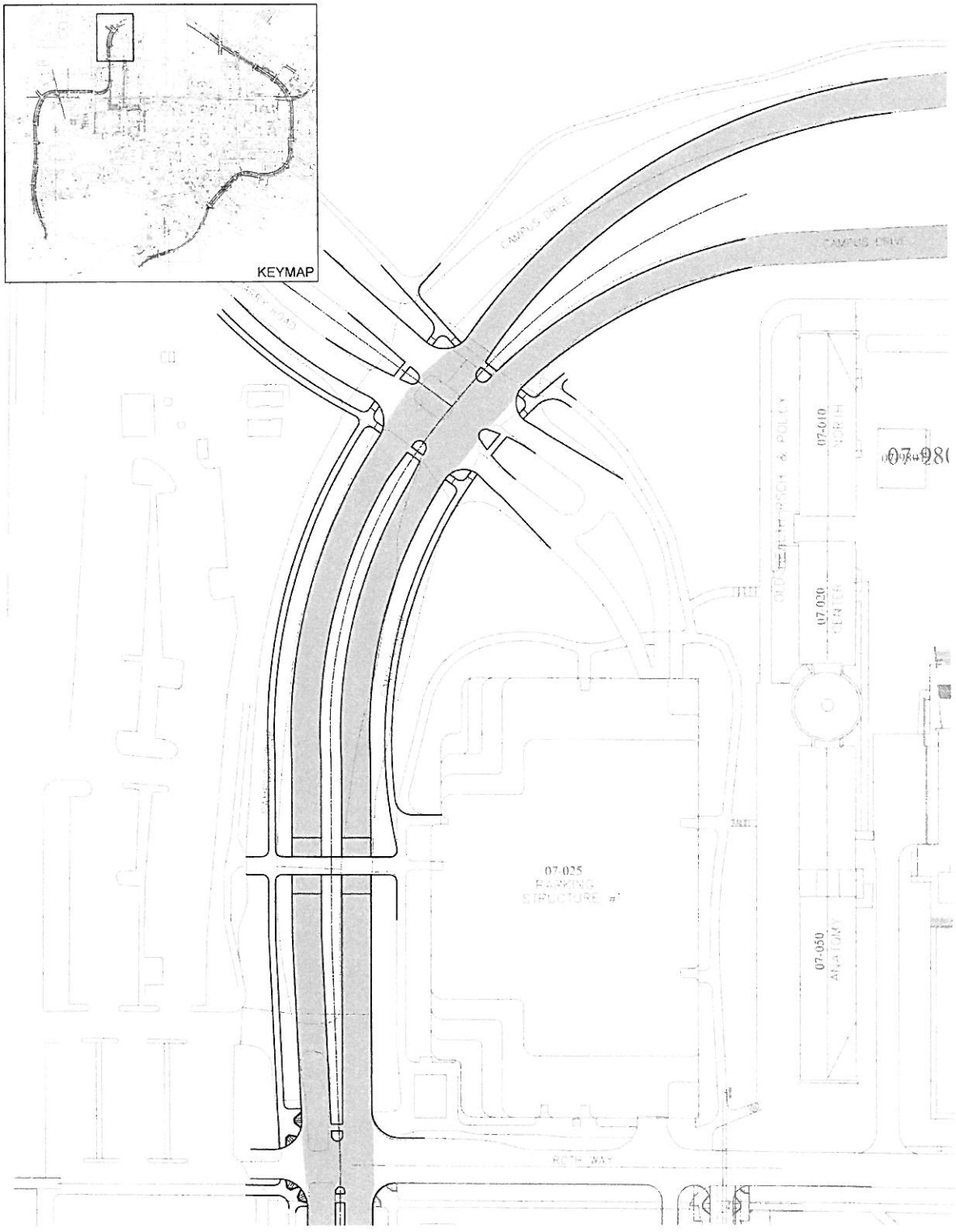
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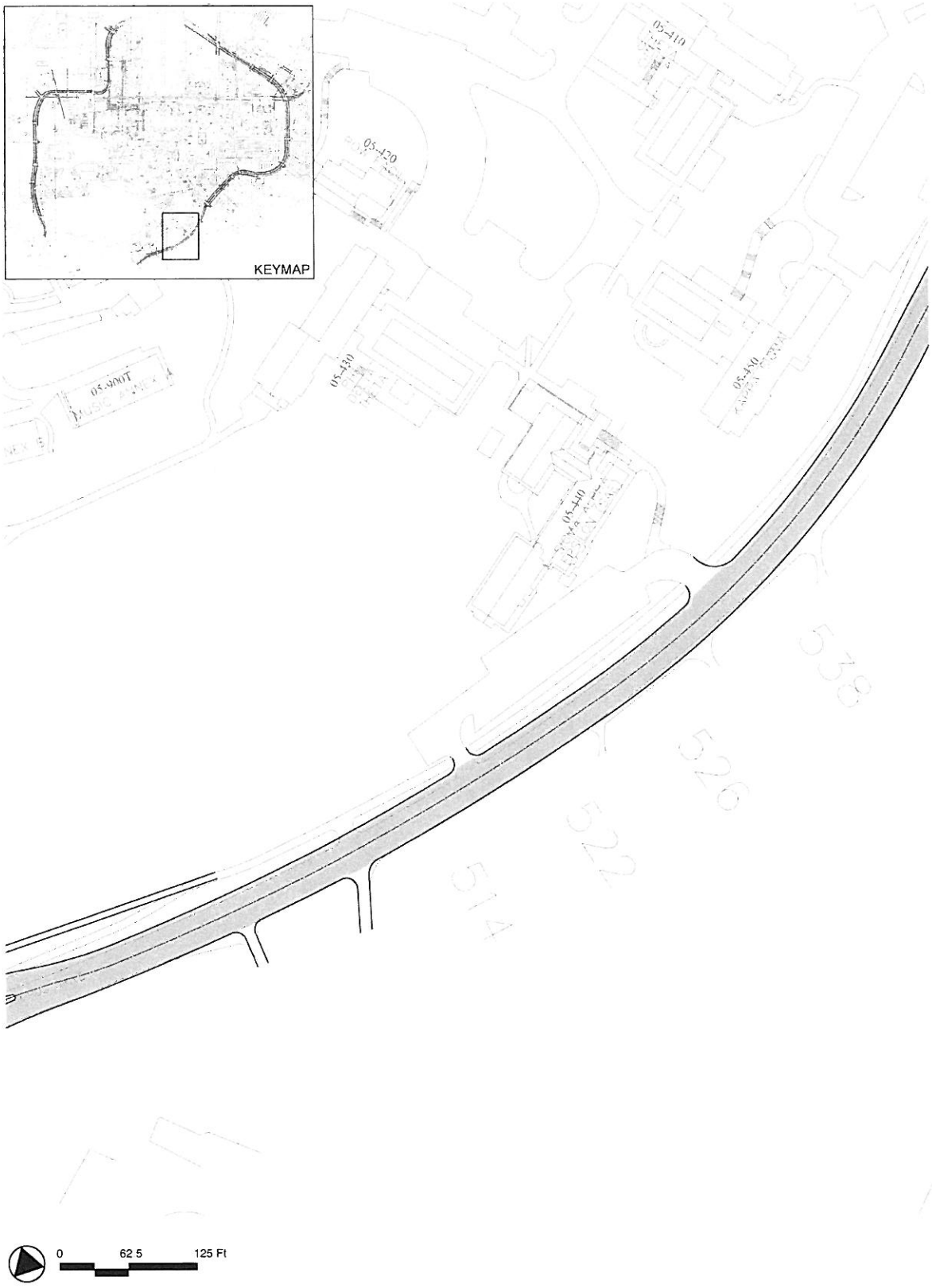
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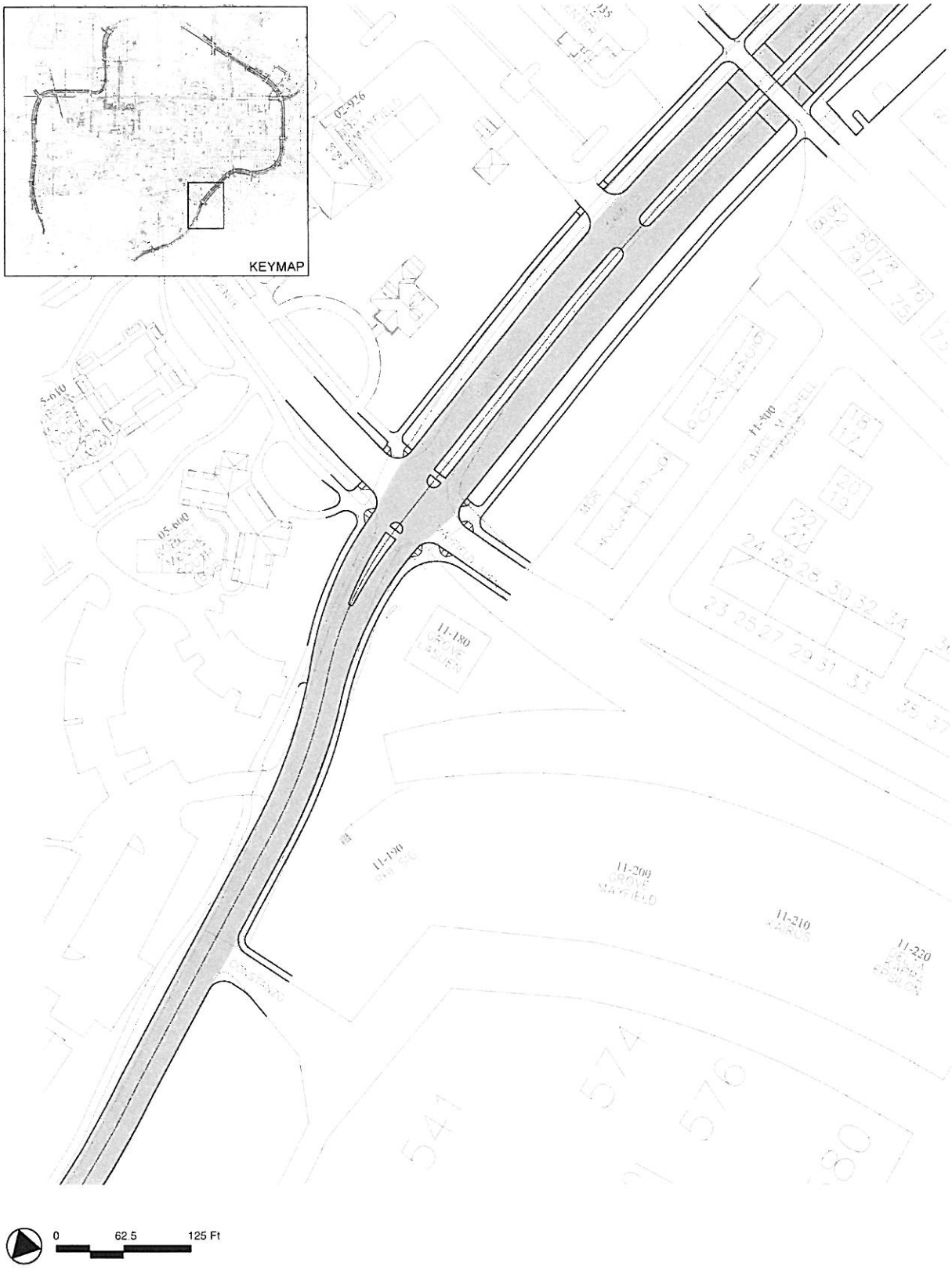
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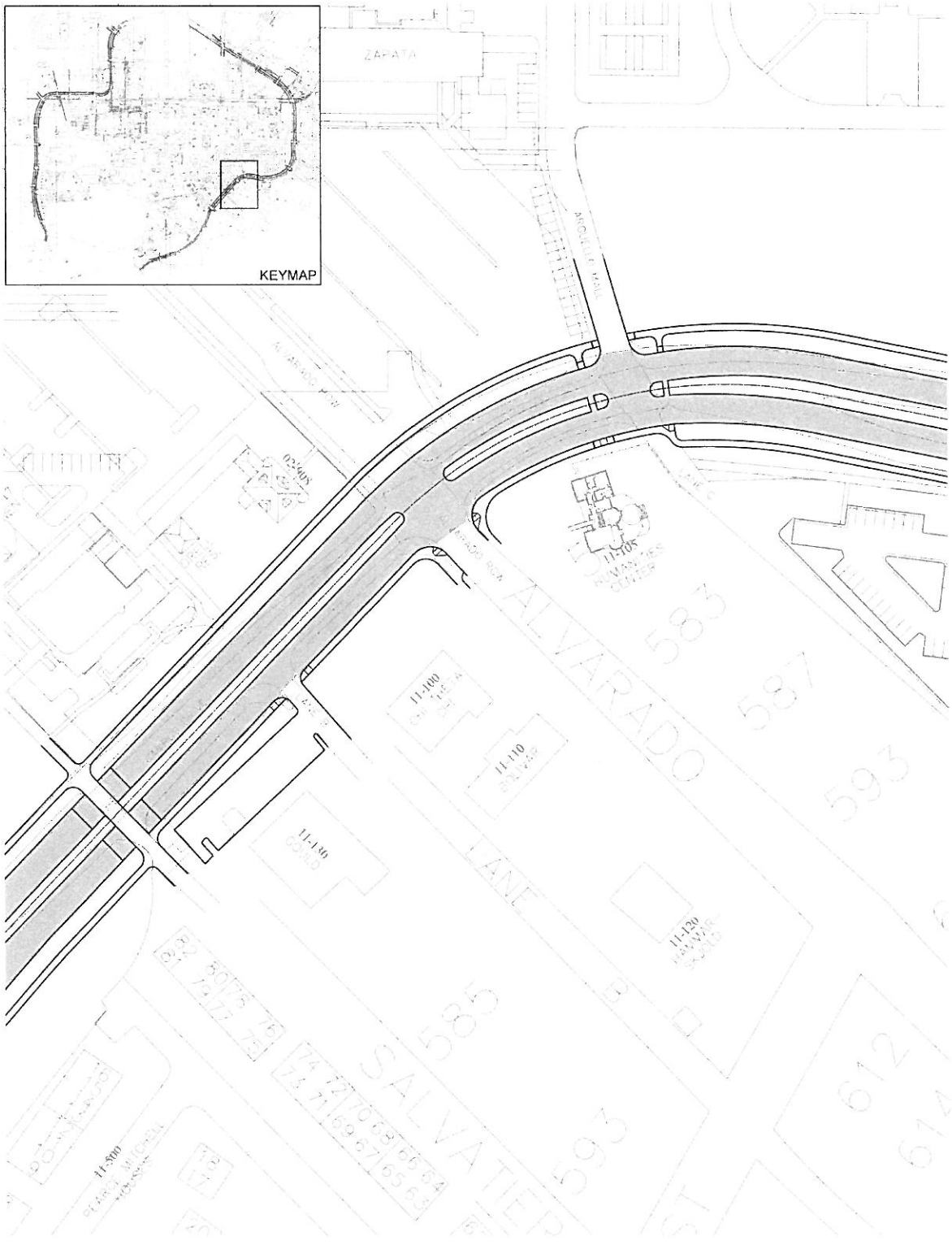
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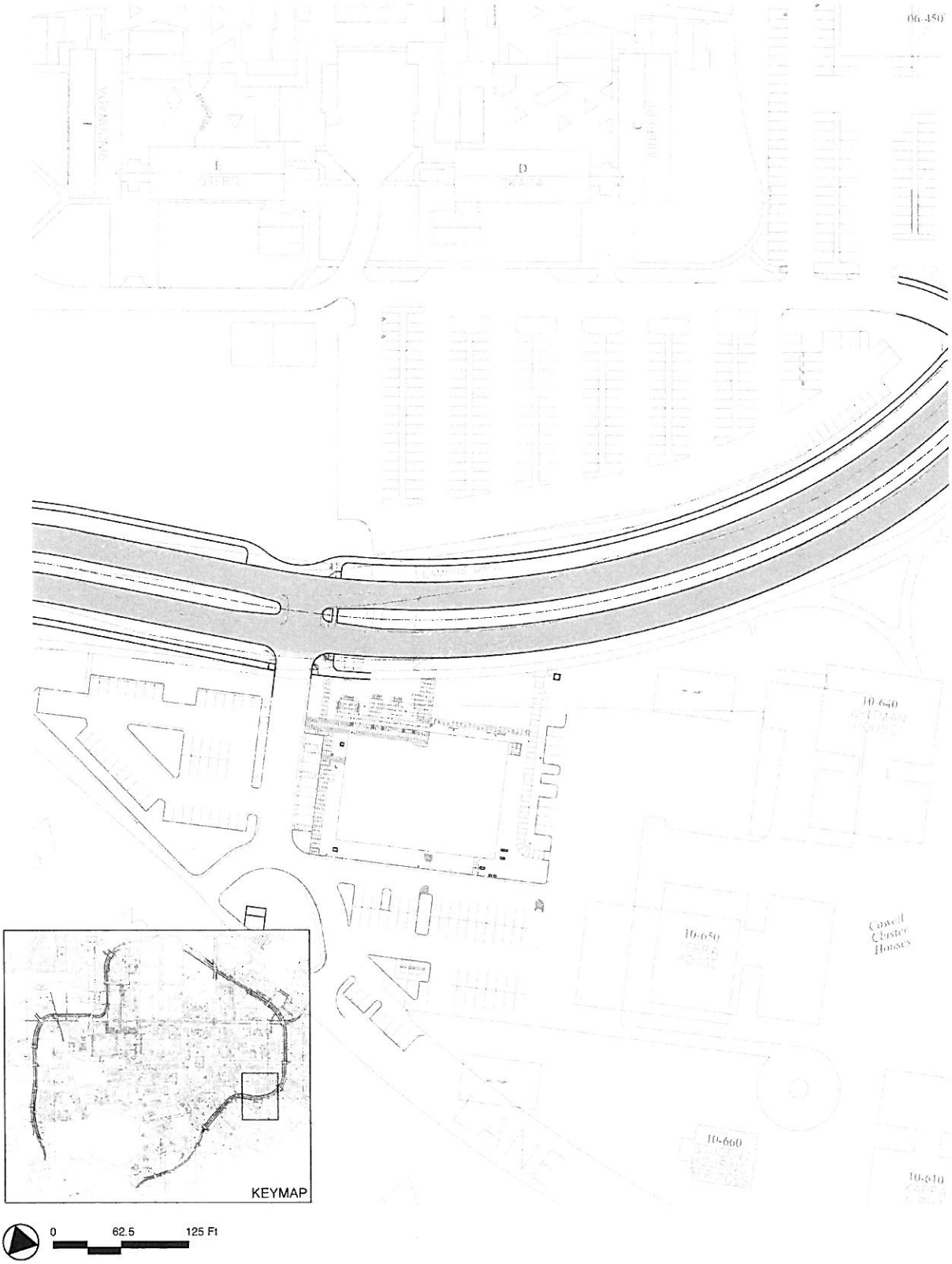
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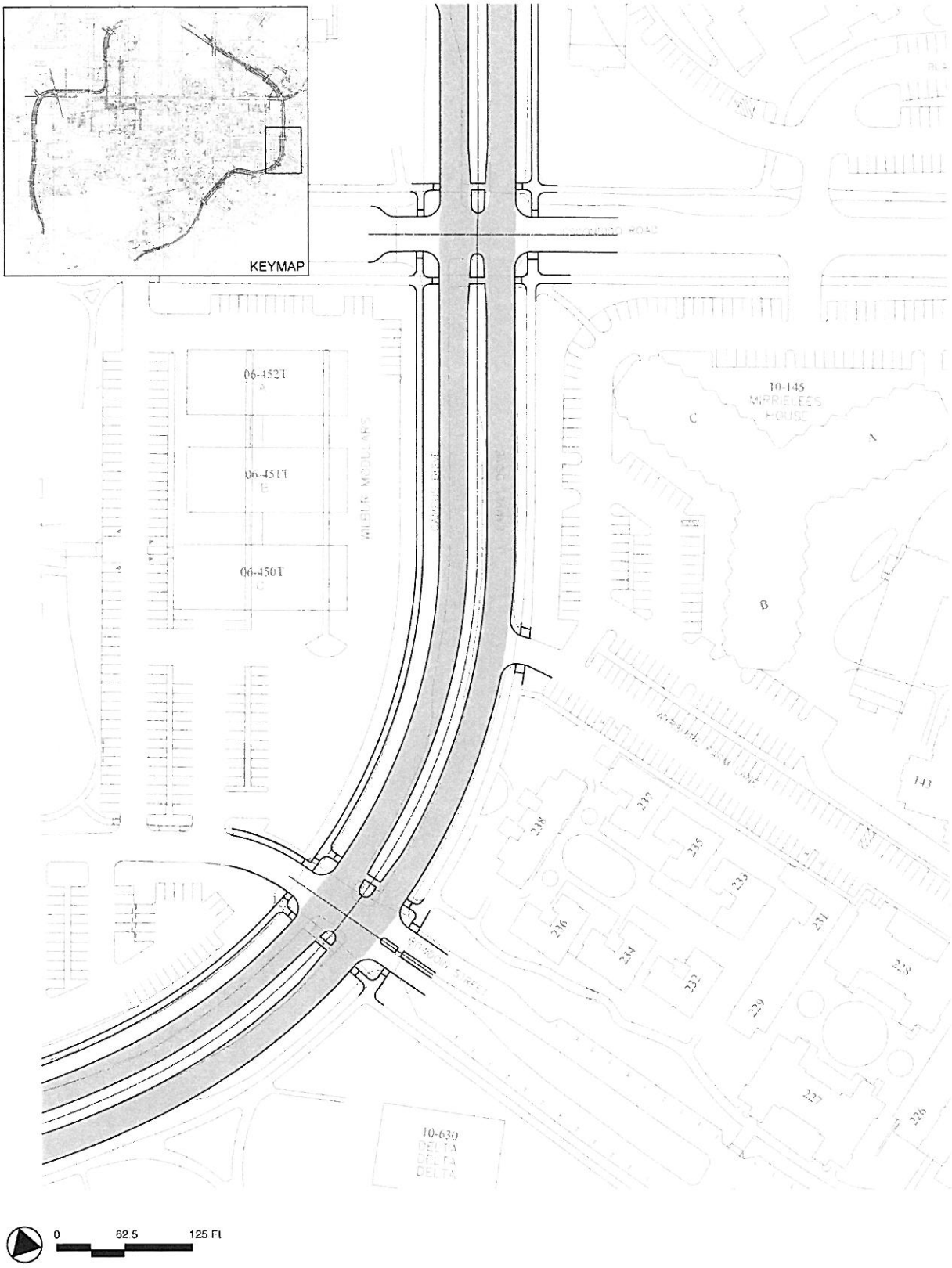
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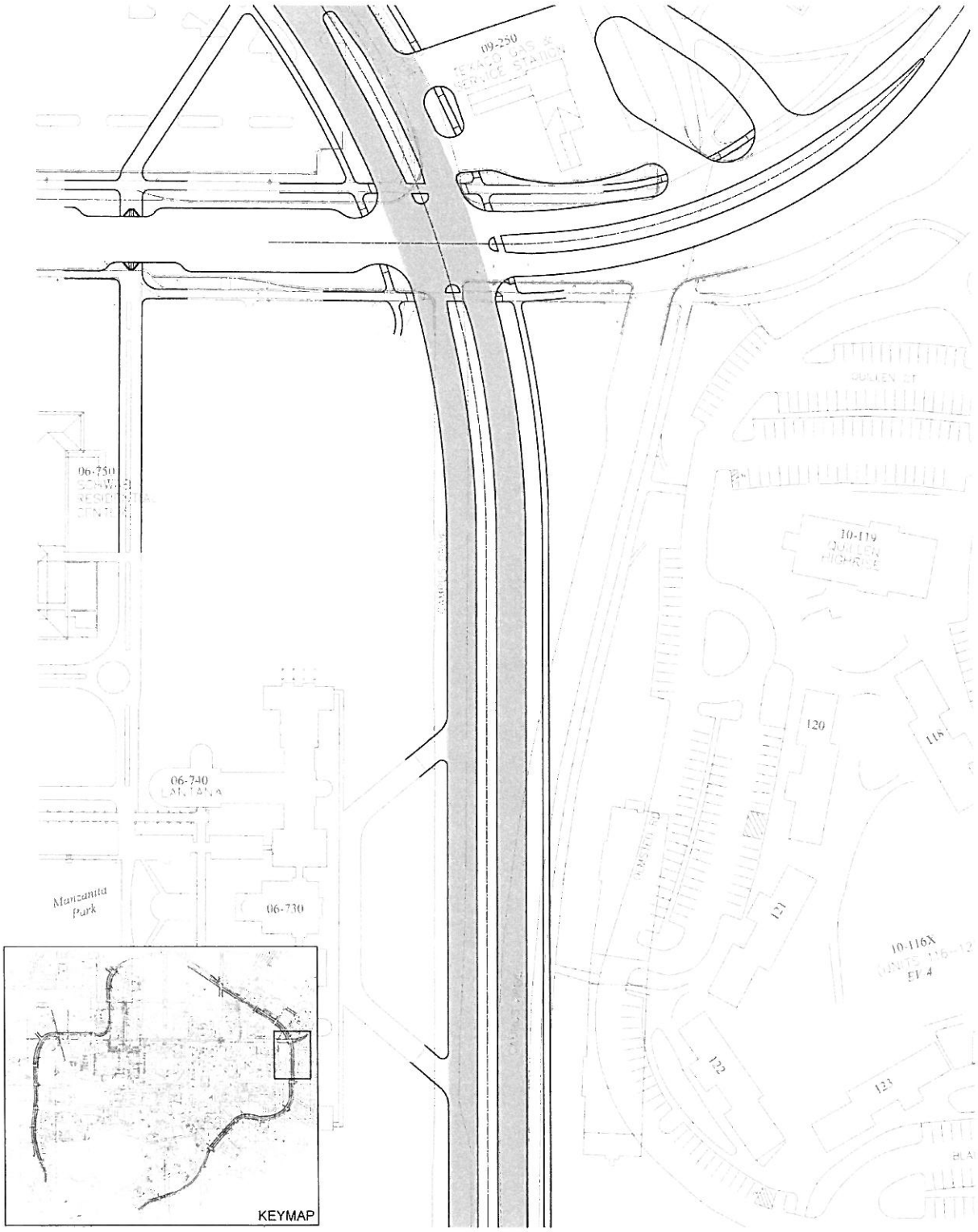
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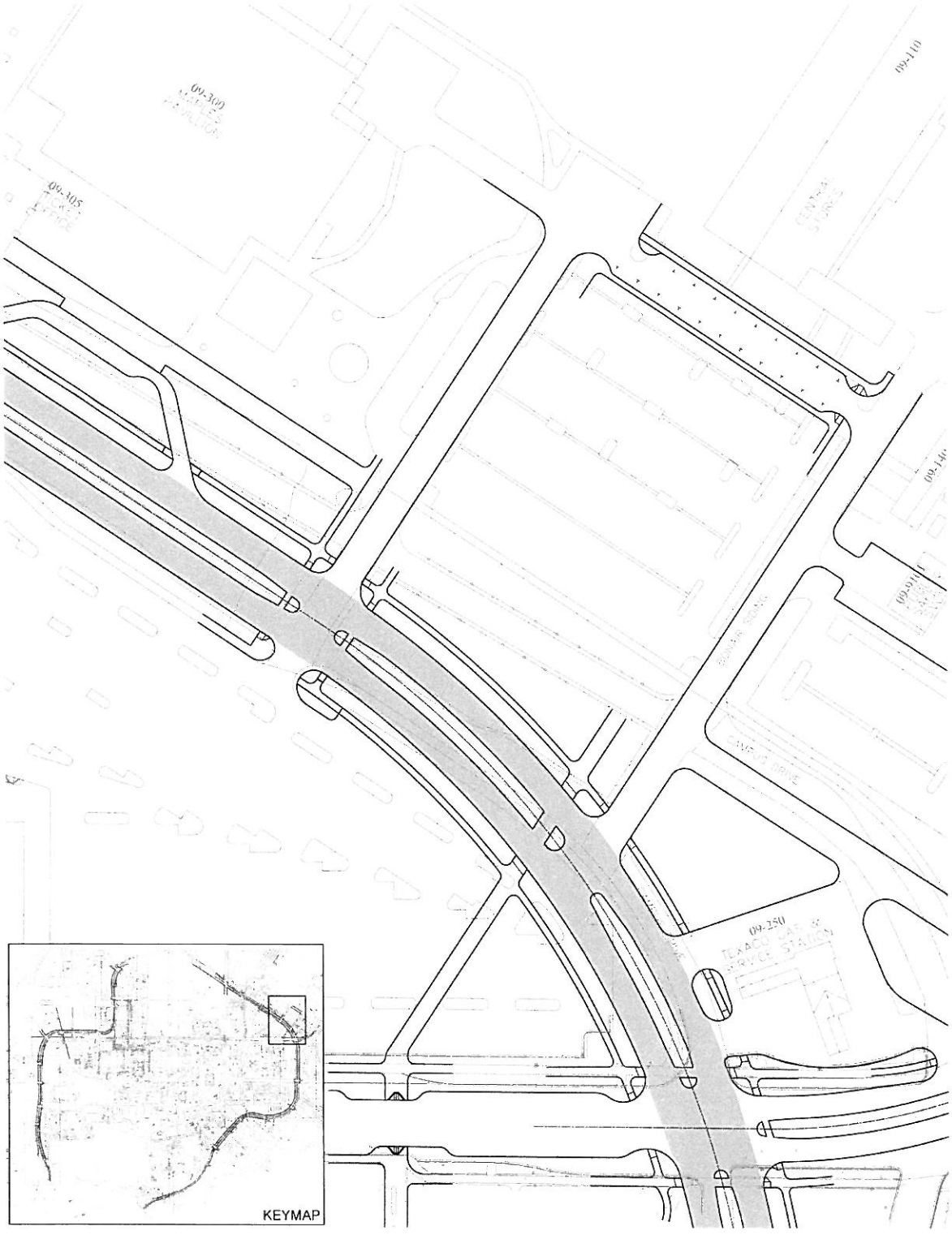
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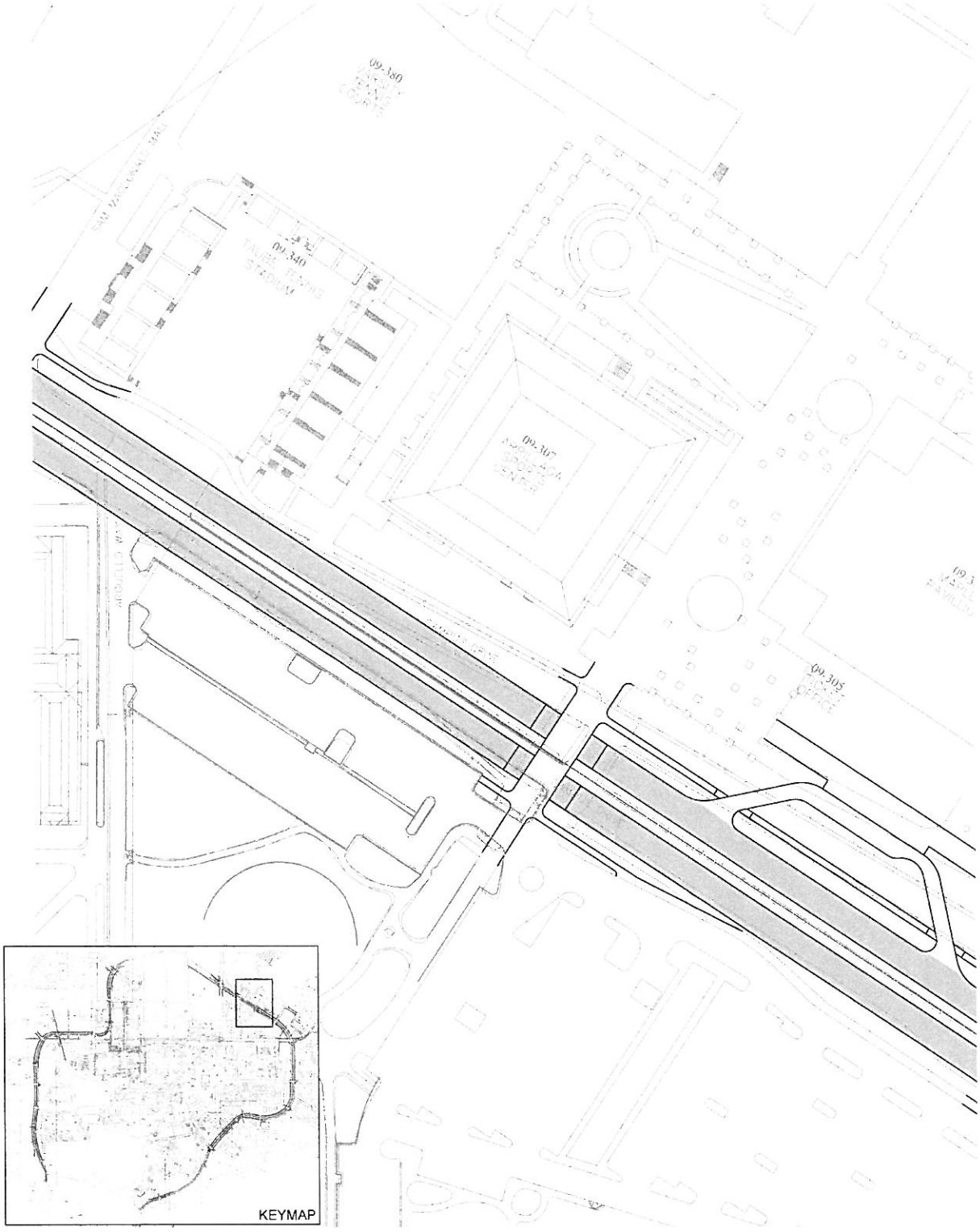
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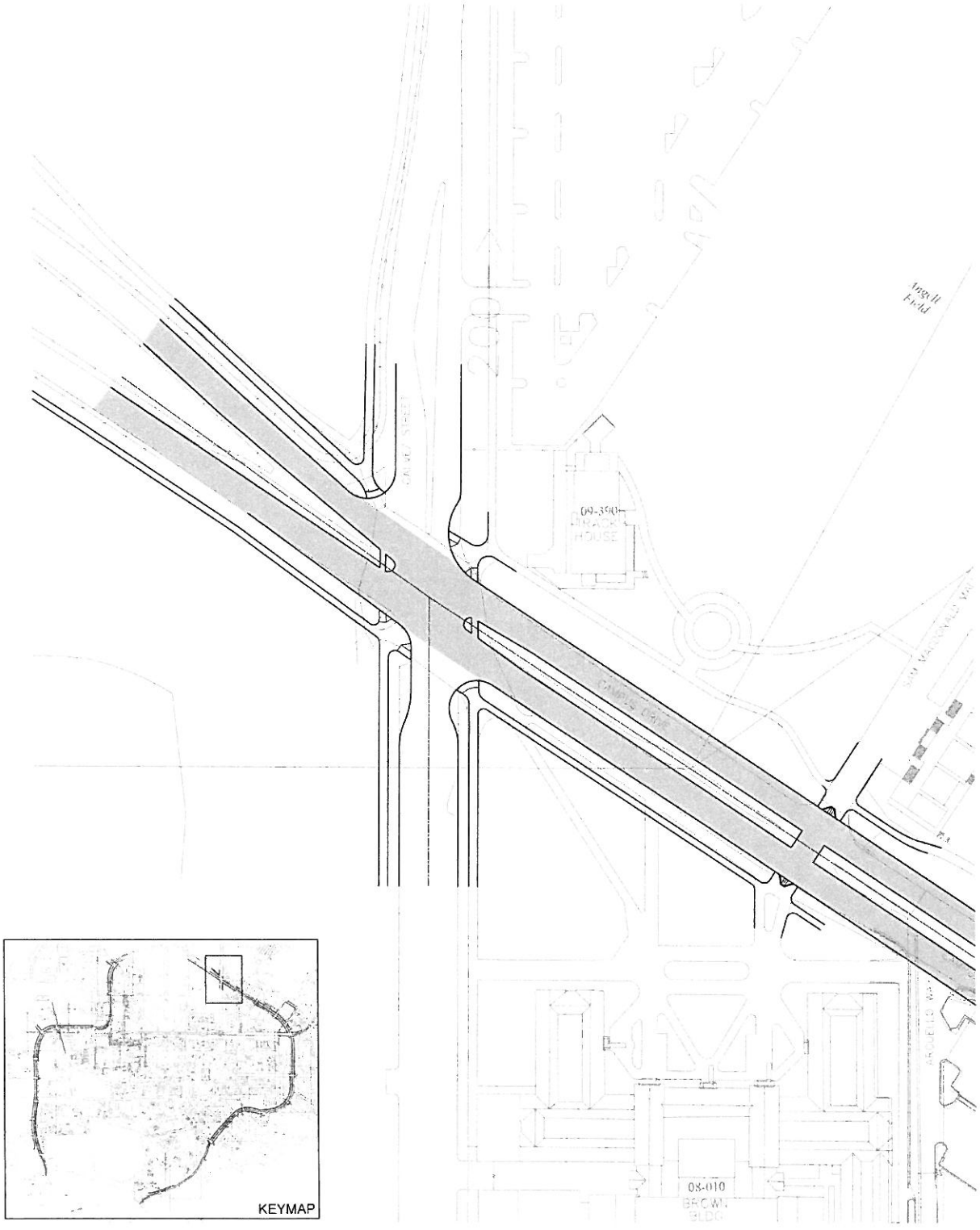
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