

Transit-Oriented Development (TOD) Design Proposals for Fresno

FINAL REPORT

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Abstract

With financial support from the CHSRA, researchers at UC Berkeley's Global Metropolitan Studies have developed design concepts for transit-oriented development (TOD) around high-speed rail stations in cities in the Central Valley. In this report, we present a detailed analysis of the proposed High Speed Rail (HSR) station area in downtown Fresno, and propose illustrative urban design concepts meant to increase density and create a pedestrian and transit friendly environment in the vicinity of the station. The proposed urban design strategies address issues ranging in scale from regional growth and transportation patterns to detailed street and building design concepts, promoting multimodal transportation and sustainable building design.

1. Overview of the Study

The California High-Speed Rail Authority (CHSRA) was established and charged with planning, designing, constructing and operating a state-of-the-art high-speed train system (CHSRA website.) With financial support from the CHSRA, researchers at UC Berkeley's Global Metropolitan Studies have developed design concepts for transit-oriented development (TOD) around high-speed rail stations in cities in the Central Valley. In this study, the UC Berkeley research team has examined the TOD potential of the proposed high speed rail station area in downtown Fresno. This station has the potential to be an important hub for the Central Valley. Well designed, carefully integrated into the urban fabric of the city, and sensitively connected into the transport systems of the city and region, the high speed rail station could play a major role as a multimodal transport hub and could become critical asset in spurring on the revitalization of downtown Fresno.

The design concepts presented in this report are based on field work in Fresno and are intended to be compatible with the plans and programs of the city as of fall 2009-spring 2010. However, they are NOT intended to be blueprints for action. They are instead ideas on how development in downtown Fresno might proceed in light of the significant opportunities presented by high speed rail service. The design concepts illustrate how higher densities, mixed uses, street redesigns, and service reconfigurations can be combined to create a vibrant, active downtown in which the high speed rail station will be an integral part. They are presented to stimulate discussions, and to serve as a useful starting point for future planning efforts in Fresno.

2. Methodology

The design concepts presented in this report have been developed in several stages. We built upon a previous study (Deakin, et. al., 2008) that involved developing a clear understanding of the context in which High Speed Rail (HSR) would be operating in California and the Central Valley in particular. In that study, we used CHSRA reports on system concepts, service levels and demand forecasts for HSR services, and analyzed historic and current growth patterns in the Central Valley, drawing upon Census, State and local data sources, plans and documents. For this study we updated this information but did not otherwise revisit it. Also, while we noted the

severe impacts that the current economic downturn has been having on urban development projects (particularly housing), we assumed that this downturn will not be a permanent barrier to Fresno downtown development efforts. In addition, we took note of new initiatives such as the SB375, which offers important incentives for higher densities and infill, and also noted that federal and state population forecasts expect continued growth in the state and in the Central Valley over the longer term. Finally, we integrated feedback from the environmental work completed through April 2010 for the Fresno to Bakersfield section of the high-speed rail system, especially in reference to how it might impact the City of Fresno.

The first phase consisted of review of databases and reports on Fresno and its surroundings, as well as preliminary field work and analysis of the current context. The study team visited Fresno, documented land uses and transportation systems, and observed activities in the study area. This field work allowed us to better understand current development issues in Fresno. In particular, we noted the patterns of low density growth occurring at the edges of cities and towns on land formerly used for farming, as well as the efforts made by the city of Fresno to improve the downtown area.

In the second phase, the study team conducted a detailed site analysis. During visits to the proposed station site and surrounding area, the study team mapped and photographed key features of downtown Fresno. Through this data gathering and subsequent analyses, the study team was able to identify key structures and design elements in the downtown that could be preserved and enhanced. The analysis of existing conditions also included cataloging vacant and underutilized lots to assess the station area's potential for infill development, and examining street functions to identify redesign options to better accommodate higher densities, pedestrian and bicycle movements, and urban transit.

In the third phase of the project, the study team developed a series of transit-oriented design concepts for downtown Fresno. These design concepts rely heavily on the analysis of existing conditions in downtown Fresno and illustrate how new development could be integrated with existing assets in the downtown, and especially the rich architectural heritage. To that end, design concepts focus on infill development and build from many of the positive design elements and architectural features observed in the existing downtown. Similarly, design

concepts respond to regional issues identified in the first stage of the project by focusing on transit opportunities and pedestrian-oriented development.

In addition to analyzing urban design characteristics of the downtown as it currently is built, we reviewed planning and redevelopment documents obtained from Fresno planning staff or from city websites. We presented and discussed initial ideas with officials in Fresno, who expressed interest in pursuing downtown revitalization and also provided us with insights about opportunities and challenges that the city is facing in pursuing downtown development.

Detailed analyses then were conducted in the proposed station areas through additional site visits, mapping, and analysis of socioeconomic data and growth projections for Fresno. The analyses identified assets that could be built upon in the downtown as well as areas where change would be appropriate. Based on these analyses, a series of transit-oriented urban design concepts were developed. Comments received from CHSRA staff and other stakeholders – in particular, local officials – will be reflected in the final report.

We revised initial drawings to reflect changes in HSR proposed alignment and elevation as of early spring 2010. Note, however, that the drawings presented in this report are intended only to be illustrative of the planning and urban design strategies that could be used around an HSR station in Fresno, and are not intended to be a representation of actual plans for the HSR or for the City.

This final report was then prepared, along with a PowerPoint presentation.

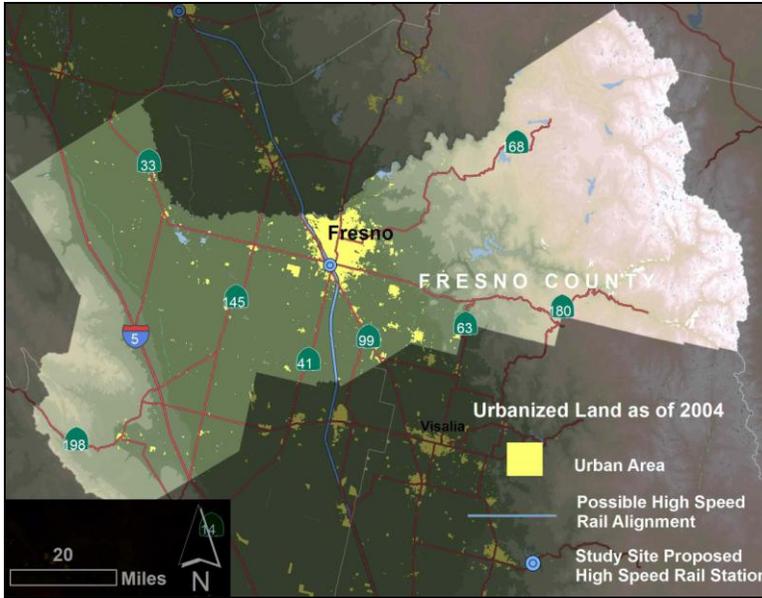


Figure 2: Fresno County and urban area

Downtown Fresno has been considered to be an area of about 1.5 sq. mi. bordered by three freeways: California State Routes 41, 99 and 180 (Figure 3.) However, the City is looking to redefine its downtown as a more limited Central Business District, with a focus on the area around the Fulton Mall. This planned core area of 500 acres comprises the north cultural arts district, the current CBD, China Town and the south Stadium area.

This core downtown area is home to the Fresno City Hall, the Courthouse, and other local government buildings, as well as the Fresno Convention Center. Downtown Fresno also features a large number of historic buildings, such as the Alexander Pantages Theater, the Bank of Italy Building, and the Californian Hotel. Remarkable examples of early twentieth century architecture, many of these buildings are featured in the National Register of Historic Places. In addition, many other buildings of merit are listed on the city's register of historic buildings. This concentration of notable buildings contributes greatly to the character and the strong sense of identity of downtown Fresno.

Worth noting is that this projection is based on economic and socio-demographic national and trends. California's population today is about 35 million people. By 2020, about 10 million more people will make California their home; and by 2050, the population could be 50 to 70 million people, of which 6 to 10 million are projected to be immigrants (California, Dept. of Finance.)

Fresno's population is highly diverse. According to the 2006-2008 American Community Survey (3-year estimates), about 53.3% of residents were white, 11.6% were Asian, and 8% were black, with the remainder of other races or of mixed race. Some 45% of the population was of Latino heritage. According to the Department of Finance, demographic report (Figure 5) legal foreign immigrants constitute about 30 to 40 percent of the population growth in the last decade while local migration had low to negative effect between 2006 and 2009.

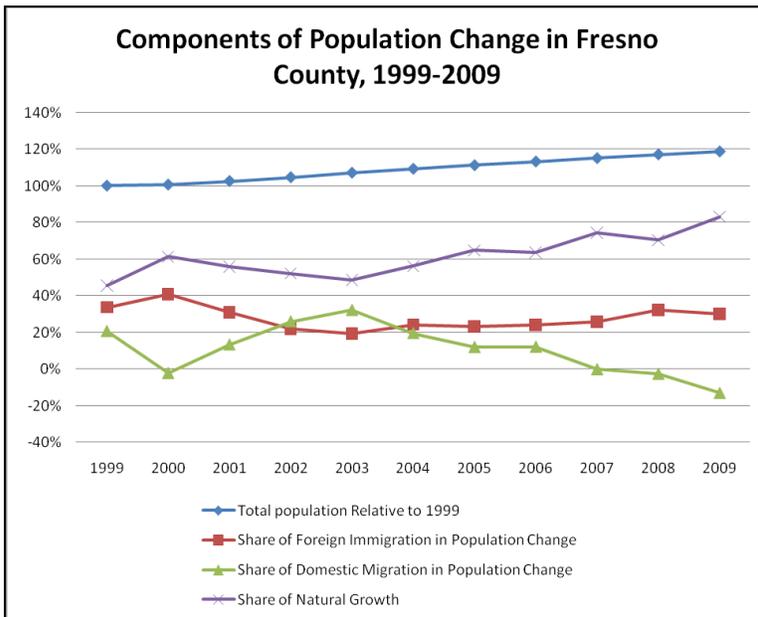


Figure 5: Components of Population Change in Fresno County, 1999-2009

Employment: A variety of employers, from food processors to the Internal Revenue Service regional offices to Cal State Fresno, are located in the metropolitan area. Figure 6 shows the employment by type from the American Community Survey data; total jobs in the City of Fresno in 2007 were 195,525. Downtown Fresno has about 40,000 jobs currently, or about one fifth of the jobs.

If there was enough market demand to fill up the vacant establishments (totaling about 1,500,000 sq. ft.) another 6,000 jobs could be added in the downtown area. Further, if there was additional building activity on underutilized lots, another 10,000 jobs could be added to the downtown, according to the City of Fresno Downtown Revitalization Office.

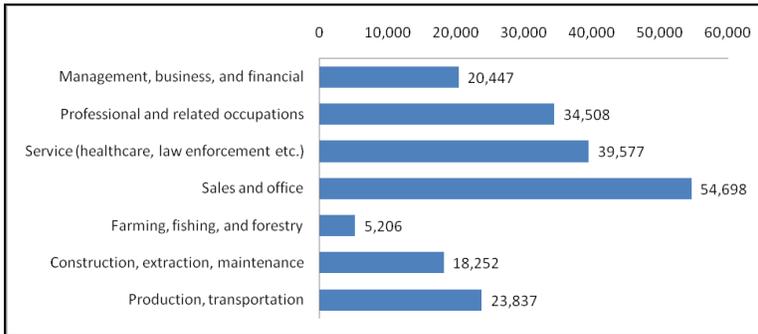


Figure 6: Employment by type in the City of Fresno

Incomes: Incomes in the area are substantially lower than for the state as a whole, with a median household income in 2008 inflation-adjusted dollars of \$42,616, in comparison to the California median household income (2007) of \$59,928. Figure 7 shows the spread of incomes in the Fresno metropolitan area, as reported in the American Community Survey (2007.)

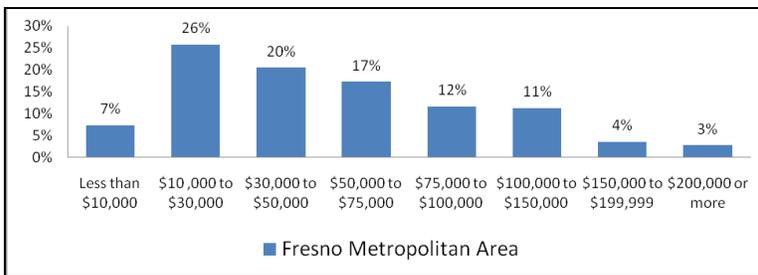


Figure 7: Annual household income distribution (2007)

3.3 Housing and Growth Patterns

The number of housing units in Fresno and the surrounding area has greatly increased as the population has grown. While some downtown projects have been built, much of the increase in housing supply has been accomplished by developing tracts of housing on former farm and ranch lands at the edge of the city and its suburbs. Much of this housing has been of the single

family detached variety and has been at low densities and in single-use developments, with services provided in separate developments some distance away. Average density for the entire city is 4,100 persons/mi², or 2.2 dwelling units per gross acre (US Census, quickfacts.)

One impact of this development pattern has been high levels of car use, since low density single use development patterns are car-dependent and difficult to serve by transit or nonmotorized modes. A second impact is that the development removes productive farm land from agricultural use. Figure 8 shows prime farm lands in Fresno County including those that are not under protection for agricultural uses.

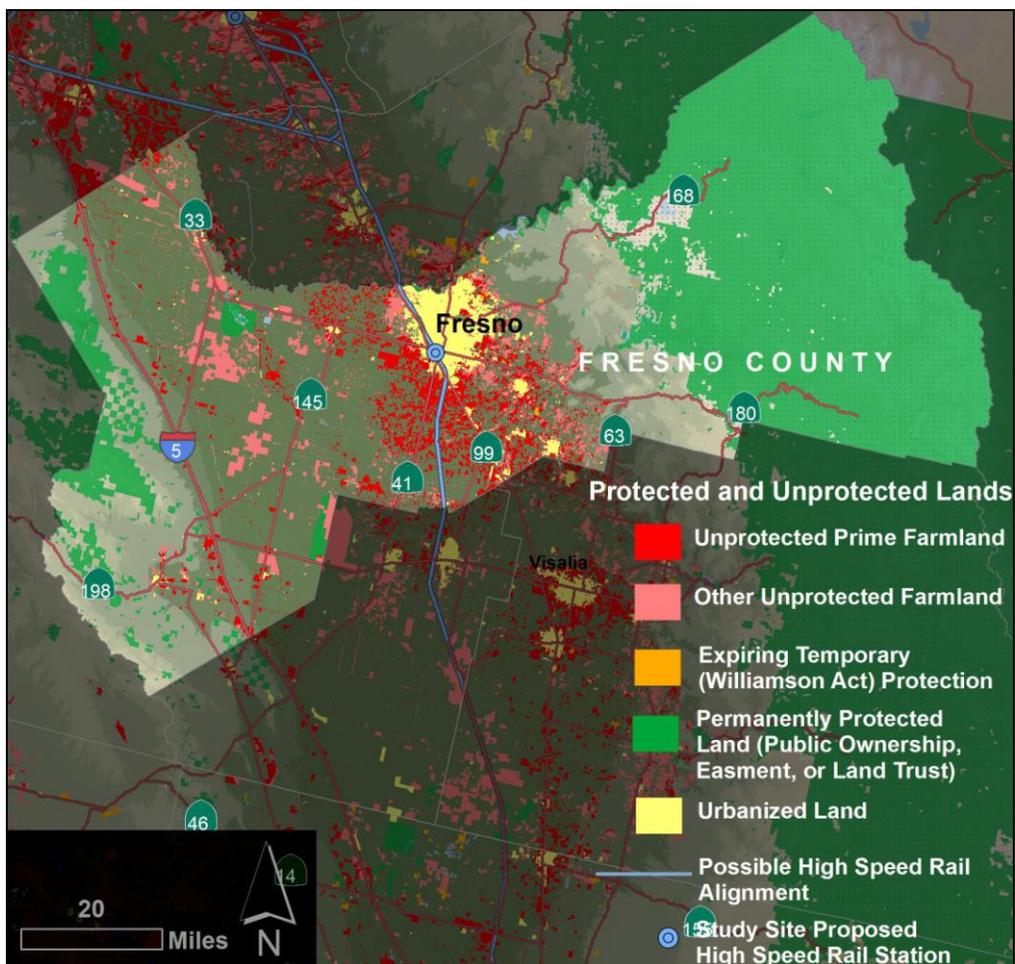


Figure 8: Protected and Unprotected Lands in Fresno

Fresno, as most of the Central Valley, was affected by the severe recession of the past several years and especially by the problems in the housing market. According to local real estate sales data, the median housing price in Fresno more than tripled in a six year period, from \$92

thousand in Jan 2000 to about \$300 thousand in 2006, then steeply declined over the next two years, 2007-2009, hitting a low of about \$125 thousand median price in mid- 2009. Since then a slight recovery occurred and prices seem to have stabilized, but at current median sales price of about half the former high – at about \$150 thousand in spring 2010. (<http://www.trulia.com>, 2010) – the turmoil created by this housing price plunge has led to bankruptcies and foreclosures.

3.4 Transportation Services and Connections

Fresno is served by several major state highways, two freight rail lines, passenger rail service, intercity bus service, and both a commercial and a general aviation airport, as well as by local streets and arterials, transit services, and bikeways. These transportation services not only handle local and metropolitan functions but offer important connections to other destinations in the state and nation.

Although state highways have been upgraded to freeway design within the metropolitan area, elsewhere along the routes some sections are of lower design standards, making road access prone to slowdowns and congestion. There is no direct interstate access to Fresno; the closest Interstate is I-5, some 50 miles across the valley to the west. Current plans for widening SR 99 and other major routes may however increase accessibility by highway in the future.

Fresno is the closest major city to several important recreational areas, including the Sierra National Forest and three national parks, Kings Canyon National Park, Sequoia National Park, and Yosemite National Park, each of which have entrances roughly 60 miles from the downtown. The primary access road to Kings Canyon and the northern entrance to the Sequoia National Park, California State Route 180 (or King's Canyon Road) passes near the northeast edge of downtown Fresno, less than a mile from the proposed HSR station. Fresno is therefore a gateway community for many recreational trips and could potentially play a much larger role as such in the future.

Freight rail lines include Burlington Northern Santa Fe Railway and Union Pacific Railroad, both of which have rail yards in the city; passenger rail service is provided by Amtrak, which uses the Burlington Northern Santa Fe right of way for its services to Oakland, Sacramento and

Bakersfield with bus connections to Los Angeles. The Fresno terminal is in the historic Santa Fe Railroad Depot building, which dates from 1908 and was recently renovated and restored to its original appearance.

Long distance bus service is provided by Greyhound (Greyhound website.) The terminal is located on H St. between Tulare St. and Fresno St.; about a block away from a potential HSR rail station location, and serves major cities within California and in neighboring states.

Air passenger service is primarily provided via Fresno Yosemite International Airport, which handled 1,196,550 passengers in 2009 (communications with Marketing & PR Manager, Fresno Yosemite International Airport.) Flights are offered to Los Angeles CA, Phoenix AZ, Las Vegas NV and Dallas/Fort Worth TX (City of Fresno website.) In addition, general aviation services are provided at the Fresno Chandler Executive Airport.

Locally, most trips are made by car; currently, 90% of all work trips in the city are done by car, with 77% in single occupant vehicles (Figure 9.) Transit, walking and biking combined represent just over 5% of all work trips (US Census, selected economic characteristics, 2006-2008.)

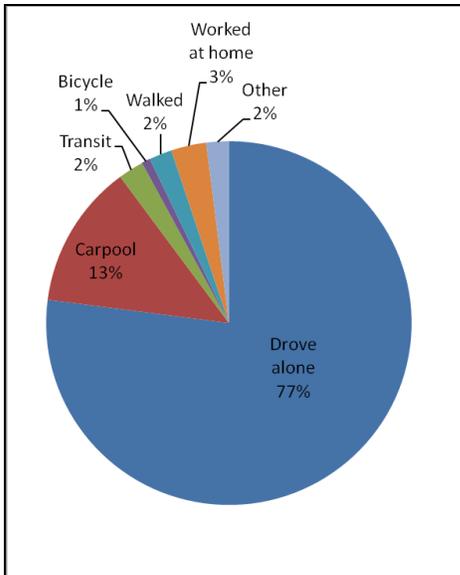


Figure 9: Mode Split for Journey-to-Work, Fresno

Figure 10 shows the average travel time to work for Fresno, with 44% taking 10-19 minutes and 80% taking half an hour or less to get to work. These are relatively low travel times to work and suggest that trips are relatively short and uncongested. Also, unlike some other parts of the

Central Valley, only 4% of Fresno residents commute more than an hour to work, suggesting that long-distance travel is not a major issue at this time.

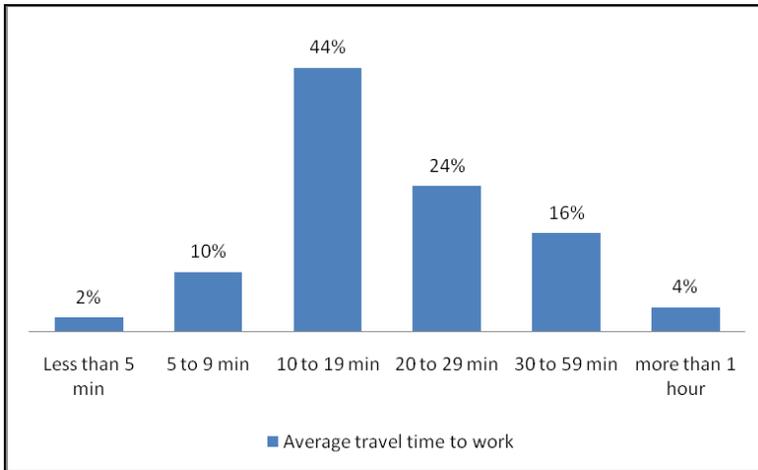


Figure 10: Average Travel Time to Work, Fresno

While the automobile dominates local travel, other modes are available. Public transit is provided by the Fresno Area Express (FAX), a bus company operating 20 bus routes in the Fresno metropolitan area (Fresno Area Express webpage.) FAX operates many of its transit lines on headways of 20 min. or longer even during the peak, but is considering service upgrades including bus rapid transit in some corridors.

The Fresno metropolitan area also has an extensive bike network. Currently, it is designed more for recreational purposes than for commuting, and the downtown is not a major destination on the existing bike network. Given this situation, our urban design concepts have included provisions for bike lanes on most streets in the downtown. We note, however, that the City of Fresno is undergoing a public outreach effort towards updating the Bicycle Master Plan, to be completed in Spring 2010 (City of Fresno Bicycle Master Plan update.) Because the plan was not yet complete when our designs were being developed, the ideas we show in our plans may be unavoidably different from those in the final city plan.

4. Proposed High Speed Rail Service to Fresno

4.1 Overview of Proposals

The California High Speed Rail Authority has worked closely with Fresno in selecting a location for a planned station in the downtown area. At the time our analyses were being conducted, a proposed location at the corner of H and Inyo Streets was the focal point of discussions, and our analyses also focused on this location, assuming the HSR would run in or next to the Union Pacific right of way (ROW.) This corridor would place the station directly across from the Chukchansi Park baseball stadium, in the heart of downtown Fresno. Current environmental analysis for the HSR is also exploring a station location within a few blocks to the northwest of Chukchansi Park. While this report focuses on the H and Inyo street location, the approach, the data, and the design ideas are for the most part fully applicable to the other potential station locations that are within a few blocks.

Whichever location is selected, the presence of the HSR station in the downtown presents a tremendous opportunity for the city to revitalize the downtown through enhanced urban design, a diversity of higher density, mixed use development, and improved transit, bike, and pedestrian connectivity. By using a bustling rail station as a focal point for a walkable, transit-oriented downtown development, the city stands to gain economically, socially and environmentally. For such development to be successfully realized, however, careful consideration and planning must be given to the density of development, parking management, and multimodal transit connections. The approach we present here can be used to study station areas wherever they are located.

4.2 Station Area Analysis – Downtown Fresno

Downtown Fresno has several important assets from a transit-oriented development perspective. The large numbers of historic buildings give character to the area, and can serve as the basis for developing design concepts that are rooted in the local context and adapted to this specific site (Figures 11 and 12.)

Along the Union Pacific corridor, there are a few historical landmarks, but this zone (Figure 13) mostly has surface parking lots and underutilized parcels. Such numerous vacant lots, underutilized parcels, and surface parking lots (Figure 14) can also be viewed as an asset,

because these lots can relatively easily be used for infill development. In particular, downtown Fresno has a significant number of surface parking lots that are ideal locations for infill development, due to their proximity to the future HSR station.

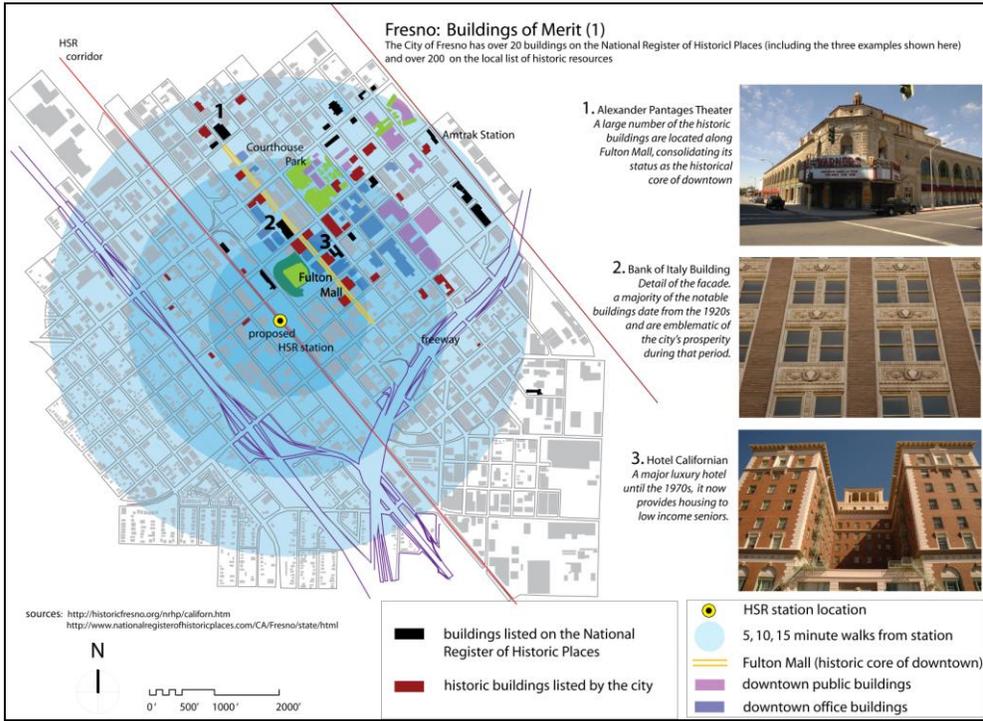


Figure 11: Buildings of Merit in Downtown Fresno (1)

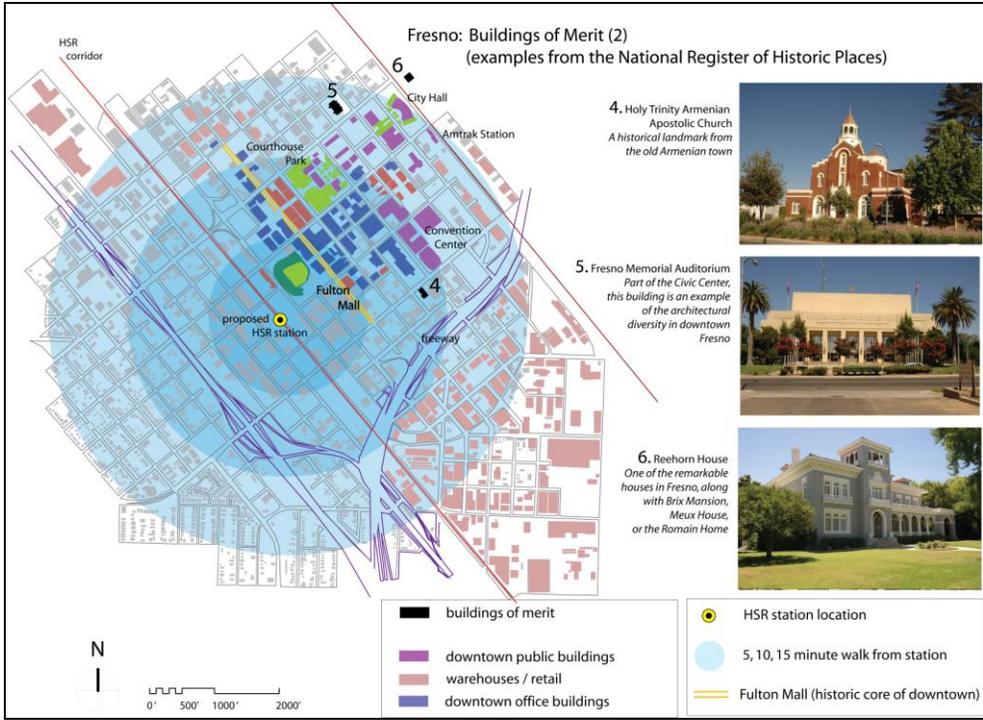


Figure 12: Buildings of merit in downtown Fresno (2)

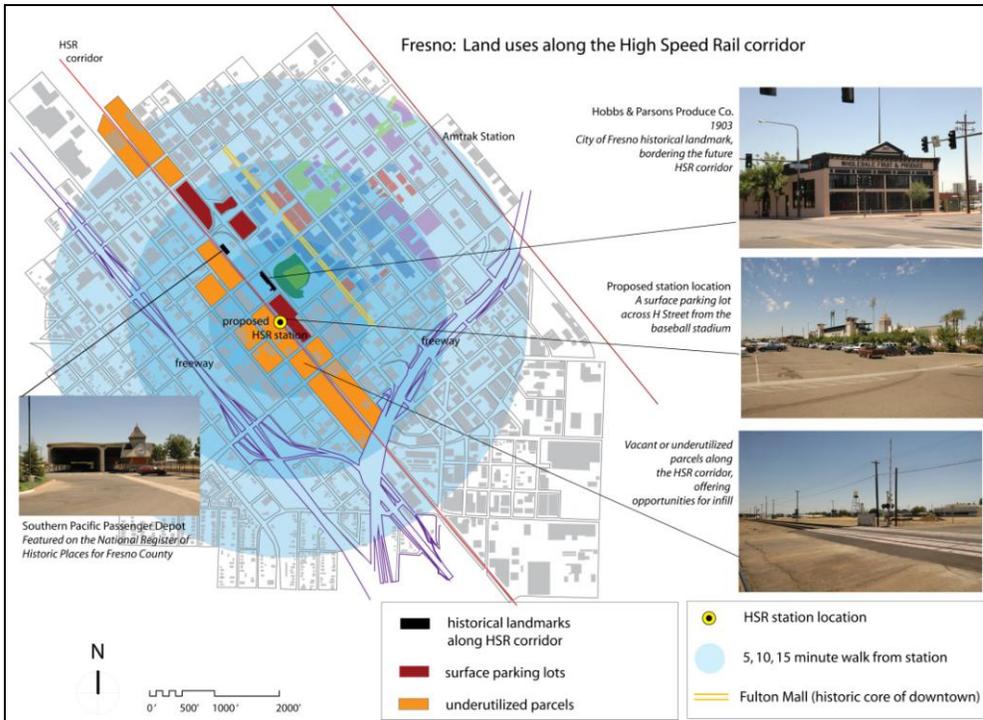


Figure 13: Land Uses along the High Speed Rail Corridor (Union Pacific Corridor Alternative)

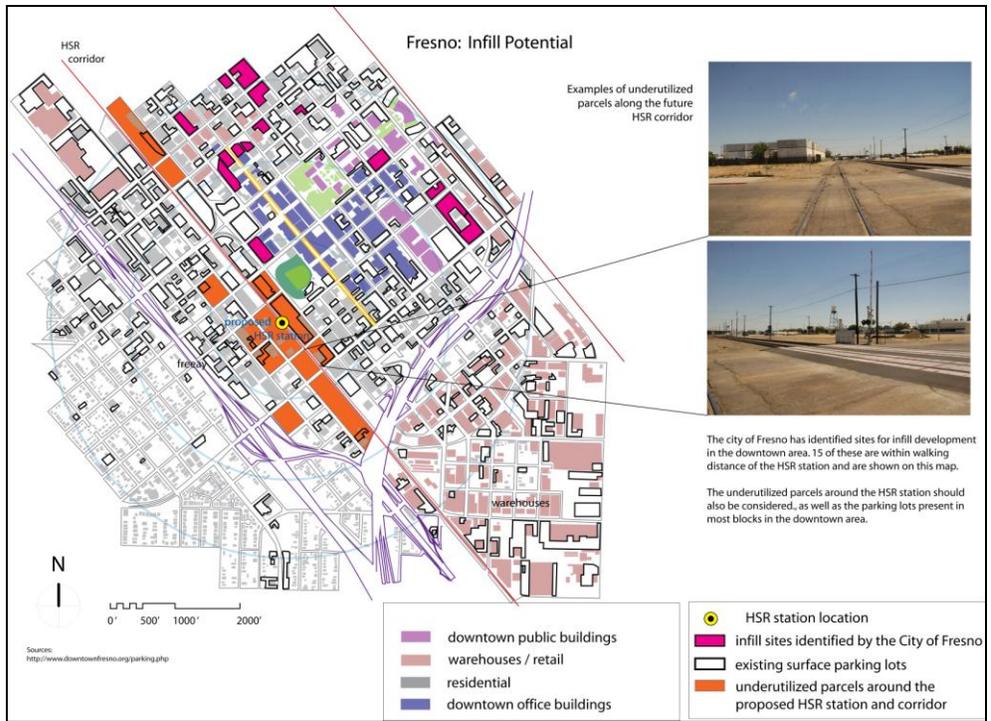


Figure 14: Infill Potential in the Downtown Area

Wide streets take up over a third of the total land area around the station (Figure 15), and many blocks are underutilized. This form of development weakens urban fabric, but can also be viewed as a potential resource for urban development at higher densities. For example, because the street widths are wide, there is room for widened sidewalks, streetscapes, bike and bus lanes, and mixed traffic lanes.

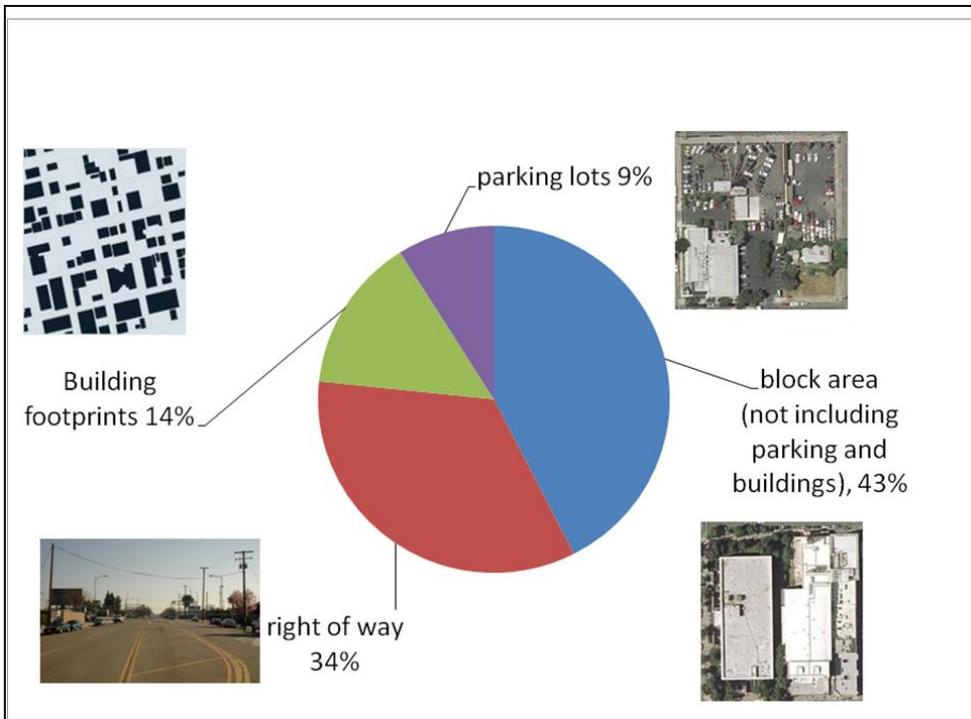


Figure 15: Station Area Analysis – land uses within 1 Sq. Mi. of Station Location (Union Pacific Alternative)

The City of Fresno’s parking policy, in the study team’s view, deserves rethinking. Discussions with local city officials revealed that over the last few years, the downtown has pursued a strategy of providing large amounts of off-street parking, in an attempt to compete with suburban locations for businesses and customers. The city owns over 6,000 off-street parking spaces, in both garages and surface lots (Figure 16 and 17), in addition to the 2,000 existing on-street parking spaces in the downtown (Downtown Association of Fresno website.) These numbers exclude off-street parking spaces directly provided by each office building for their own employees. Field observations suggest that parking occupancy is very low in these publicly owned parking garages and lots, ranging between 10% and 30% during an average weekday.

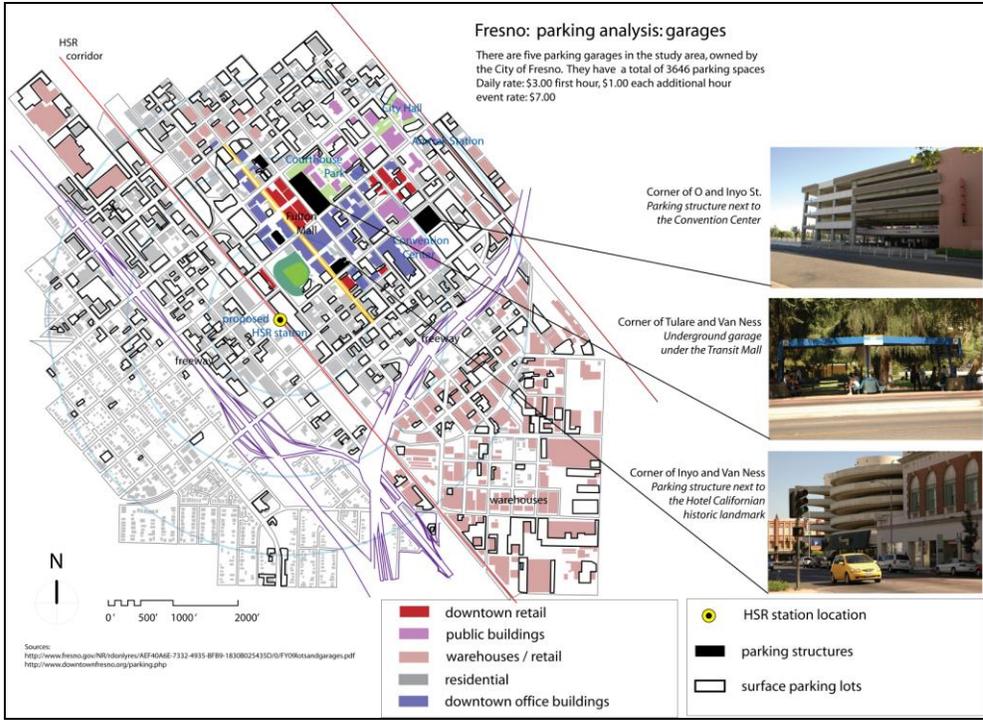


Figure 16: Garages in Downtown Fresno

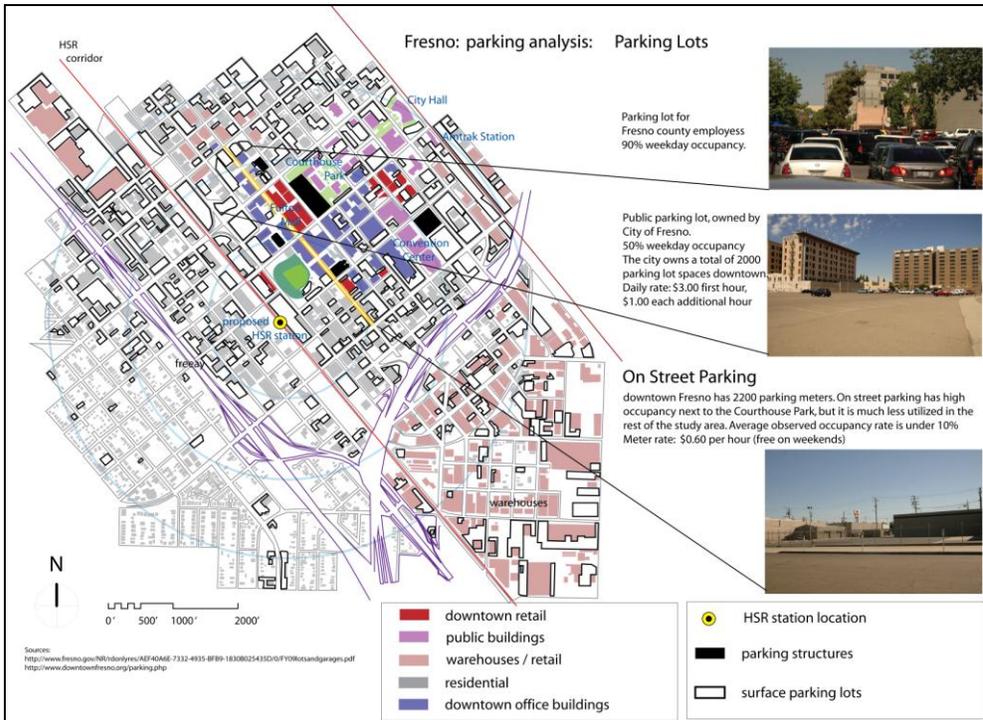


Figure 17: Surface Parking Lots in Downtown Fresno

The high parking vacancy indicates that an excessive number of spaces are currently available and that many of the surface parking lots could be redeveloped for higher uses without any harm to parking availability. Development of surface parking lots would produce several important benefits: higher levels of downtown activity, a better streetscape and pedestrian environment, a higher tax base, and a development pattern that would be friendlier toward transit, pedestrians, and cyclists. Further, it suggests that a review of the city parking requirements might well be in order; current best practices for transit-oriented development worth considering include elimination of formal parking requirements altogether, establishing parking maximums rather than minimums, requiring that all parking be priced at market rates, and unbundling parking from building leases (Cervero, et. al., 2008.)

Higher densities in the downtown would also help make a higher level of transit service possible. Of the 20 bus routes currently operated by FAX, only four currently have headways of under 20 minutes (Figure 18.) These are the bus routes that connect the major regional destinations in the Fresno metropolitan area: the Fresno City College, the California State University Campus, Fresno International Airport, the Community Medical Center, etc.

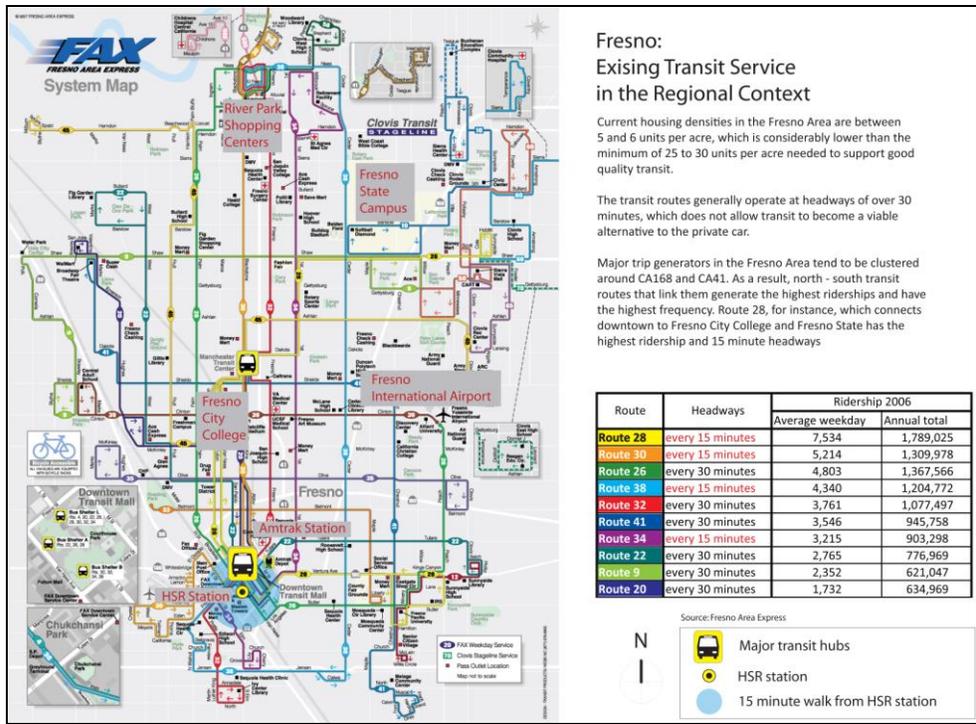


Figure 18: Bus routes in the Fresno metropolitan area

Other bus routes operate on longer headways or on limited hours; they serve the city’s low density residential area (typically 5-6 units per acre) (Figures 19 and 20) and provide basic mobility but are for the most part not competitive with the car from a customer level of service perspective.

The layout of bus routes also deserves comment. Currently the network provides good area wide coverage; but as Fresno downtown develops, it seems likely that new opportunities for higher frequency routes will emerge. In particular, bus rapid transit with high frequencies could be offered between major destinations outside the downtown (e.g., Cal State Fresno) and the downtown; between the Amtrak station and the downtown; and perhaps a few other corridors (Figure 21.) This topic deserves additional attention in future work. In addition, major transfer points will need reconsideration.

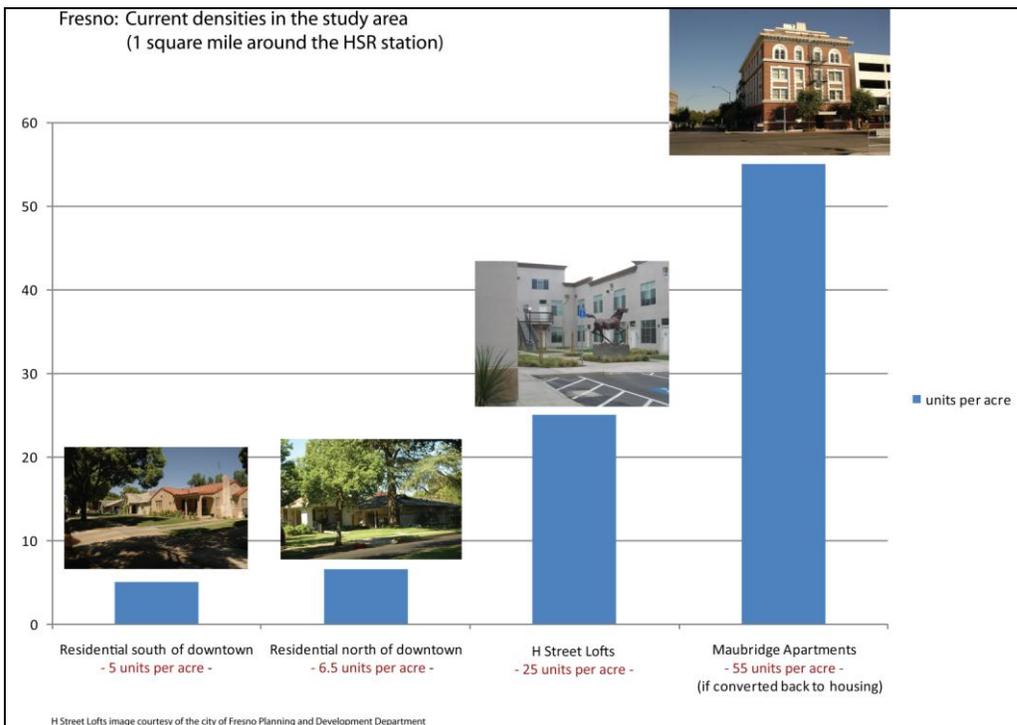


Figure 19: Density in the station area (1)

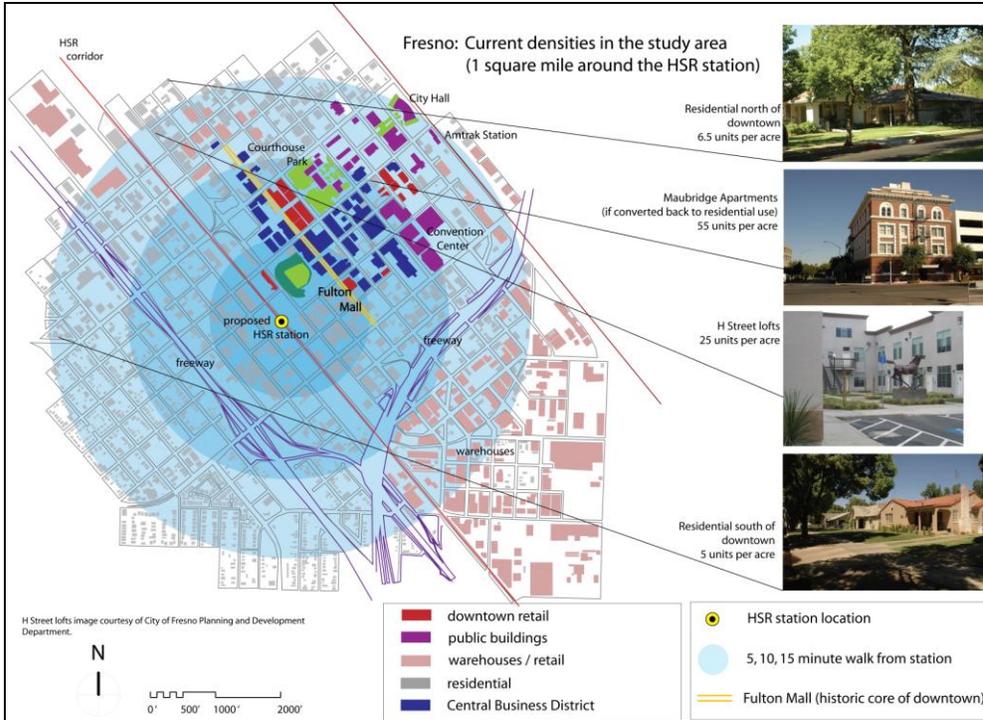


Figure 20: Density in the station area (2)

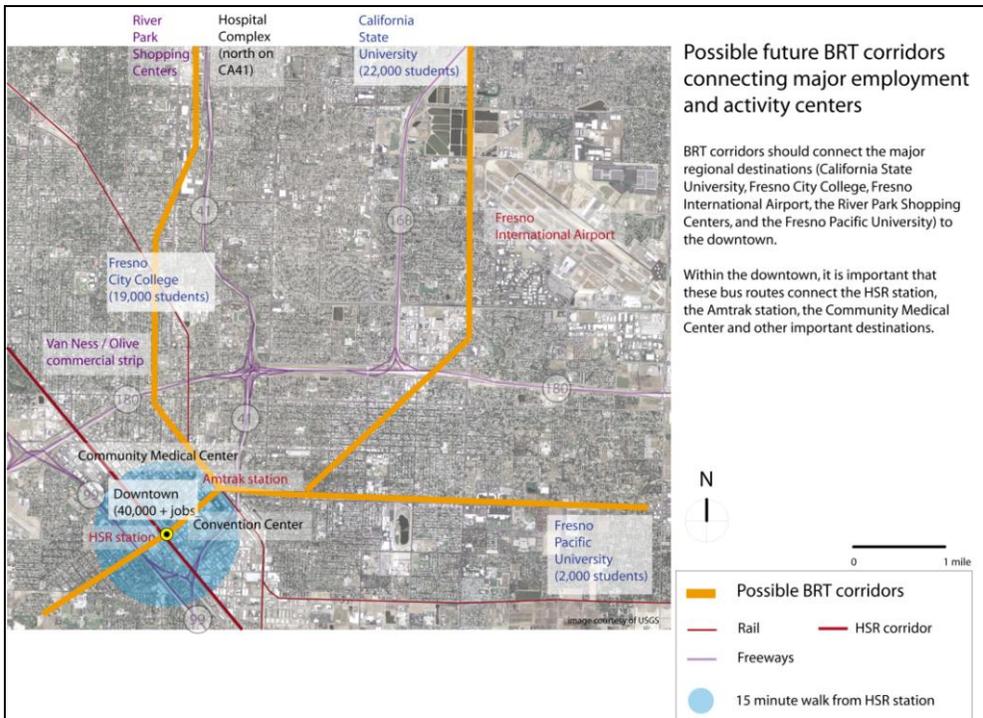


Figure 21: Possible future BRT corridors connecting major employment and activity centers

In the downtown, all bus and trolley routes currently stop at the existing Downtown Transit Mall on Van Ness Avenue, several blocks away from the proposed HSR station location (Figure 22.) This is a good location for a transit hub given the existing conditions in downtown, since it is close to the major government buildings and employment centers. However, with the construction of the HSR system, the HSR station also should serve as a major transit hub in the downtown, ensuring connections between HSR and local and regional transit.

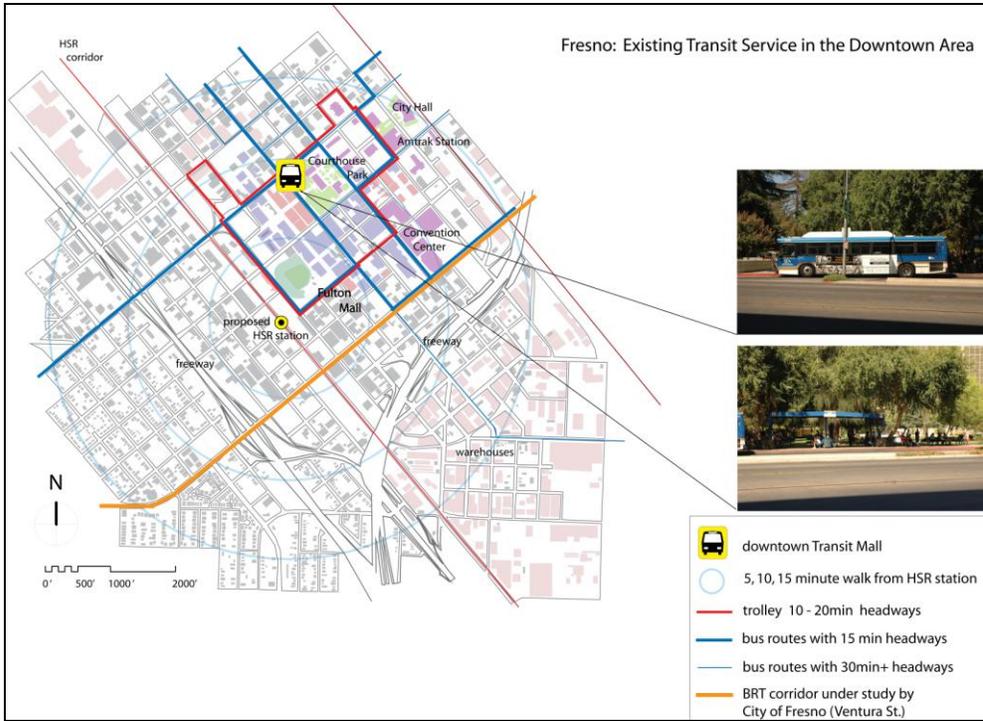


Figure 22: Downtown transit

BRT corridors also could be used to better connect outlying housing districts to the downtown, creating better access to downtown jobs, shopping, and services as well as to the high speed rail station. Along the BRT corridors, in part because of the accessibility added by better bus services, possibilities would arise for higher density development: local shopping and service nodes, higher density housing, small offices, etc.

Currently, net housing densities in the residential areas bordering downtown Fresno are around 5 to 6 dwelling units per acre. This is well below the minimum density levels needed to support high frequency transit, preferably 25 to 30 units per net acre. Thus higher density development

along BRT corridors would be desirable in order to help justify higher frequency transit service and keep it affordable to provide.

Well planned BRT corridors could be an asset to the neighboring lower density neighborhoods, serving as the location for shopping and services matched to community / neighborhood needs. Specific uses could include multifamily housing, small to mid-sized office buildings, or multi-use development with first floor retail and upper floor office or housing, varying with location. By linking high speed rail to local transit, not only will high speed rail benefit, but so will the downtown and the residents of outlying neighborhoods.

Access to the station and to other parts of the city will be important future design considerations. Currently, both the CA-99 and the CA-41 form sharp boundaries to the study area, with CA-41 offering an overpass access (along with one on Tuolumne St.) At-grade rail crossings exist in some locations. As HSR is introduced and the downtown is developed further, more attention will have to be given to connectivity across freeways and rail corridors (Figure 23.)

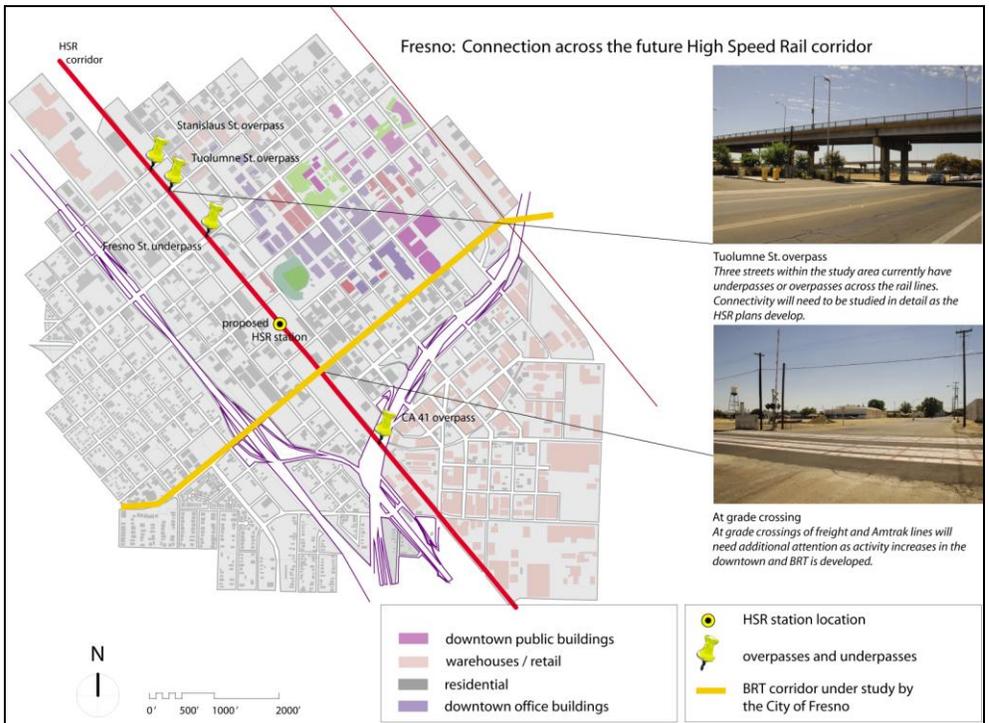


Figure 23: Connectivity across freeways and rail corridors in Fresno

World-wide, safety considerations for HSR have been handled with a combination of fencing, gated crossings, and grade separation in the form of tunnels, cuts, berms, or elevated structures. Current project-level planning for the Fresno to Bakersfield section indicates that this issue may be dealt with in this area by elevating the line as it passes through Fresno. From the San Joaquin River to Clinton Ave, the height could range from zero (at-grade) to 60 feet high. An alternative is still being considered that may permit an at-grade section somewhere between the river and Ashlan Avenue. From Clinton Avenue to the crossing over Highway 41, the height could range from 60 to 75 feet. This includes the station area in Downtown Fresno, between Highways 180 and 41. However, the existing at-grade freight and Amtrak lines also will require careful management as activity in downtown Fresno increases.

With a limited number of crossing points, redevelopment of this area will require careful coordination with the HSR access plan to assure convenient multimodal crossings. On the other hand, coordinated street redesigns occasioned by the HSR could provide much better designs for bicycles, pedestrians and transit, as well as private motor vehicles, resulting in greatly improved connections across the freeways and mitigating their effects.

5. Design Concepts for Downtown Fresno

5.1. Main Urban Design Ideas

The urban design concepts around the proposed HSR station in Fresno focus on making this area a more attractive pedestrian and transit friendly space. This would be achieved by adding a mix of retail, office space, and various types of housing to increase overall density, and by redesigning streets for multimodal transport. The design concepts aim to build on local character, by identifying the most remarkable features of local buildings of merit and using these as a source of inspiration for new design ideas.

The overall urban design strategy for downtown Fresno involves concentrating the highest density of development in the area immediately around the HSR station. There will be thousands of daily boardings to the HST system and local transit systems at the Fresno HST station. Fresno's location in the HSR system, placing it at a short train ride from both the San Francisco Bay Area and Los Angeles, could potentially help downtown Fresno attract office

development around the station. Increased land values and travel trips near the station makes it likely that commercial businesses will also want to locate near the station, potentially creating a 24-hour destination district. This will possibly increase the demand for higher-density residential development in close proximity to the station as well. While it is possible some travelers may commute long distances from Fresno to these employment centers, the Authority's Bay Area to Central Valley Final Program EIR/EIS document found that this is not likely due to the distance of travel and the high fares. The primary focus of the HST system is for long-distance business and leisure travel. Therefore, the Program EIR/EIS found that much of the anticipated residential development around the station will occur because of the increase in retail destinations, nightlife activity, and improved multi-modal connectivity, not because residents are looking to commute by HST (CHSRA, EIR, 2008).

The advantage of our urban design concepts, from this perspective, is their flexibility. Both the building and the street and parking designs we propose can function just as well if infill development around the station has a major residential component or if it is predominantly offices. In both cases, the key is to concentrate higher density mixed use development closer to the station, to increase HSR ridership while also strengthening the status of the HSR station as a major transit hub and destination in the Fresno metropolitan area. Moving away from the station, it is possible to locate quieter medium density developments where a higher share of residential uses would be appropriate. These areas can also incorporate schools and parks, while still being within walking distance of retail, services, transit and employment. At the city scale, high density corridors could link the HSR station with other major destinations. These corridors would be built at sufficient density to support Bus Rapid Transit routes, thus developing a robust transit network at the metropolitan scale.

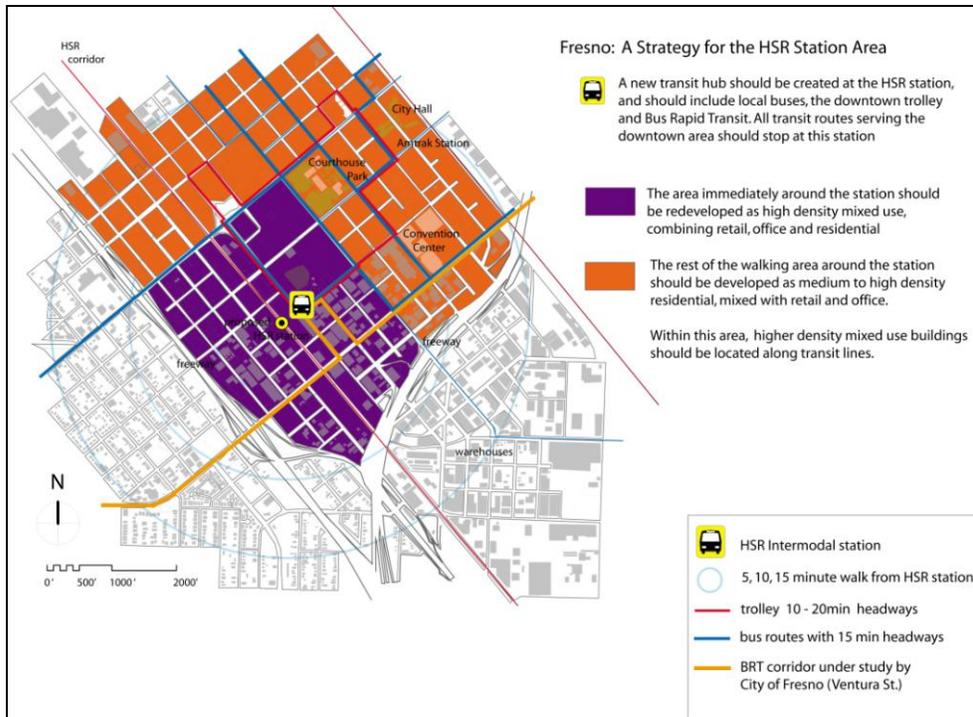


Figure 24: A strategy for the HSR station area in Fresno

Highways CA-99 and CA-41 currently acts a boundary for the downtown (whereas City Hall acts as an anchor); redevelopment offers opportunities to improve connections across the freeway, and reasons to do so. Figure 24 shows (in purple) where the core Station Area Plan needs to focus design efforts and land use policies to create a high quality / high density mixed use environment, and the larger area (in orange) could be developed to be a mid to high density mixed use office, retail and housing area.

One issue is the market in the City of Fresno and the Fresno metropolitan area for medium to high density housing and for more office and mixed use development downtown. Medium to high density housing has been under-produced in much of California and real estate managers from Fresno have told us that they are doing well with rental products of the sort that would support BRT and complement HSR. However, it is beyond the scope of this study to analyze whether higher density housing would find a market in Fresno in the near future. Likewise, the market for further infill offices has not been analyzed here except to note that there currently is a high vacancy rate downtown.

Certainly in the short term, housing market problems and office vacancies would work against the sorts of changes we are suggesting. However, HSR will be delivered over the longer term, and as the economy picks up and growth continues, demand for both housing and office/mixed use could become much higher. Furthermore, policies incentivizing downtown development and reducing the conversion of farmland to urban uses could increase the likelihood of infill.

5.2. Detailed Urban Design Concepts

Street design is an essential component of our urban design proposals. Existing streets in the downtown area have very ample dimensions, varying from 75' to 100' or even 120' for major thoroughfares. They are currently used almost exclusively for car traffic. However, their dimensions would easily allow them to be redesigned as multimodal transport facilities, providing more space for pedestrians, adding bike lanes, and introducing exclusive lanes for buses on certain major arterials. Such a redesign would make the streets a much better environment for alternative transportation modes, making it safer to walk and bike, while also creating the conditions for high quality bus service. For example, Figure 25 shows one such street, and Figures 26 and 27 illustrate how adding a center lane or a curbside BRT might work on such a street. Both these illustrations have a net density of 45 units/acre and about 60,000 sq. ft. of retail space; we illustrate added pedestrian and biking infrastructure.



Figure 25: Possible BRT corridor



Figure 26: Example of an intersection with a center lane BRT system



Figure 27: Example of an intersection with a curb side BRT system

Since one of the main objectives of our street design concepts is to improve the walking and biking environment, it is important to consider the local climate, especially the hot dry summers, with average high temperatures approaching 100F in July and August. From this point of view, one of the most effective design tools is to provide shading, either through a continuous tree canopy, or through architectural elements such as arcades or awnings. Fresno has many opportunities where such improvements can be made. For example, Figure 28 shows Tuolumne street as it exists, whereas Figure 29 is an illustration of how this might be re-designed with infill development added.



Figure 28: Example of possible street redesign: Tuolumne Street existing conditions



Figure 29: Example of possible street redesign: Tuolumne Street

In developing building design concepts for downtown Fresno, we pursued two main objectives. The first was to integrate the new buildings into the existing fabric of the city, complementing Fresno's rich architectural heritage. We used some of the same materials, textures and proportions as in the historical buildings, while trying to adapt the new building design concepts to different potential use, from housing, to retail and office (Figure 30.)



Figure 30: Adapting from the local architectural vocabulary

Our design illustrations engage the local architecture and provide a set of ideas to provide background for discussions on revitalization and infill development. For example, Figures 31, 32 and 33 show how Fulton Street might develop at various levels of infill intensity.



Figure 31: Existing conditions along Fulton Street



Figure 32: An illustration of medium intensity development for Fulton Street

Figure 32 shows development at 114 housing units per block; a net density of 41 units/acre with 57,000 sq. ft. of retail space. Figure 33 shows higher-density development, with 228 housing units per block, a net density of 82 units/acre, with 57,000 sq. ft. of retail space. However, these development densities could be imagined along other streets in Fresno; we would encourage decision makers to use such conceptual scenarios for discussion.



Figure 33: An illustration of high intensity development for Fulton Street

Figure 34 shows a possible overall urban design strategy, consisting of high density corridors along major streets, with a Bus Rapid Transit line operating along the main avenue. Along the main streets, there would be high density buildings, with a mix of retail, office and local services. The blocks immediately behind would have medium to high density residential. These would be

quieter, traffic calmed streets, yet within walking distance of transit, retail and services. It is equally possible to integrate parks within these medium to high density areas, as shown in Figure 34.



Figure 34: Multi-block design concept

In planning for the station area, we envisage a hierarchy of streets, ranging from major thoroughfares to local residential streets. Figure 35 shows an example of a commercial street, lined with arcades along the sidewalk, to improve the quality of the walking environment, an important consideration in the hot dry summer climate of Fresno.



Figure 35: Shopping Street

By placing high density buildings close to transit, it is possible to create 1 or 2 acre neighborhood parks in the surrounding area, while still maintaining an overall density high enough to support high frequency transit. In the specific context of Fresno, these parks (Figure 36) would be beneficial in mitigating the urban heat island effect.



Figure 36: A neighborhood park along a residential street

The proposal to elevate the HSR tracks to 60' would come with its own challenges, just as at-grade crossing might be challenging for addressing street crossings.



Figure 37: Mixed uses along corridor for at-grade HSR adjacent to existing rail ROW

Another important strategy in our building design concepts is to promote sustainable design techniques. By using thicker cross section walls – whether brick or concrete– the thermal mass of the building is increased and this can reduce energy loads (both heating and cooling) and improve thermal comfort. By carefully designing and placing windows, the thickness of the wall can also be used as a window shading device (Figure 41.) As windows are set back from the plane of the façade, they are protected from direct solar radiation, which can significantly reduce cooling loads in the summer. If the proportions of the window and the shading device are adapted to the orientation of the building, the shading device may allow solar radiation to enter the building during the winter months, when the sun is at a lower angle. The resulting passive solar heating reduces heating loads. In choosing the appropriate sustainable design strategies, we have also considered how the building design concepts would integrate with the historic buildings.



Figure 38: Thermal mass and window shading for energy efficient buildings

6. Conclusion and Key Issues

California’s high speed rail system will dramatically increase the accessibility of the Central Valley to the rest of California, but the extent to which Central Valley cities realize additional local benefits from HSR is dependent upon their establishing a supportive framework of planning and development policies. Transit-supportive land use designations and zoning in the station areas, downtown revitalization efforts, proactive parking policies, the construction of transit-oriented developments and the creation of commerce incentive zones are all examples of measures that could be undertaken at the local level to maximize the positive impacts of HSR. Strategies to

encourage compact growth and infill can be complemented with strategies to reduce the conversion of farmland to suburban uses. In order to integrate High Speed Rail into local and regional planning processes, some key issues need to be considered by planning officials.

Station area planning should begin early, to ensure that sites near the station are not dedicated to incompatible and/or inappropriate uses.

Planners should consider how the station area and downtown will be affected by development elsewhere in the city and county. The city should encourage development along transit corridors and plan for bicycle and transit connections from new development to the HSR station. It is important to consider the total market for development in the city and county when planning for both downtown and outlying commercial development, in order to match zoning to markets.

The city could take advantage of the accessibility benefits provided by the HSR station to reduce the costs of development, allowing higher densities with lower parking requirements and lower traffic mitigation fees in anticipation of the higher walk, bike, transit and HSR use that TOD would promote. The city should provide excellent walking and biking facilities in order to encourage fewer trips by automobile. For the downtown area, one could use on-street parking to jump-start infill and also make streets more active. Meters can be used in the short term, while resident and employee parking permits might be a more viable long term solution. For most new developments, parking in structures should be preferred to surface parking and parking requirements should be reduced to reflect downtown accessibility by other modes.

Clustering residential and commercial development around stations will allow some HSR riders to walk to the station. Most passengers will arrive by private automobile, transit and bicycle. HSR stations and their associated development must accommodate access by a variety of modes in a way that minimizes negative impacts to the surrounding areas. The city could use parking management strategies to reduce the impact of station parking requirements on downtowns. Specifically, some of the unused capacity in the existing multilevel parking garages in downtown could be used for the HSR station. It is also possible to provide bus or shuttle connections from the station to garages or lots located further away.

It is important to consider the impact of noise from HSR trains passing at full speed through the downtown. Placing office buildings along the corridor is one example of a possible buffer that

would mitigate the noise impacts of HSR, though the design standards for these buildings would have to be high in terms of soundproofing exterior walls and ensuring resistance to vibration.

The potential of a 60' elevated structure for the HSR would create a different set of issues than at-grade operation alternative, and connectivity, noise and vibration are key issues that will require further detailed analysis that is beyond the scope of this study.

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